Fish Trapping Devices and Methods of Southern India

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Traps are impounding devices into which an organism is lured and from which escape is made difficult. Trap fisheries have economic and energy related advantages over active search and capture fisheries. A review of 15 types of impounding devices and methods which were prevalent in the immediate past or are still in use in southern India is presented in this paper, broadly following the classification for fishing gear categories as recommended by FAO.

Traps are impounding devices into which an organism is lured and from which escape made difficult. Contrivances for trapping fish may be presumed to antedate the invention of nets (Hornell, 1938). Trap fishing have economic and energy related advantages over active search and capture methods. They are highly fuel-efficient both in terms of returns and biomass per unit of fuel consumed (Willimovsky & Alverson, 1971). Organisms caught in the trap can be retrieved alive in an undamaged condition. Traps can fish continuously during day and night and require only periodical tending for removal of the catch. They can be left in the sea during unfavourable weather and collected when favourable conditions set in (Anon,1980). Capital investment is relatively low and many exhibit a high degree of selectivity. In general, trap is a highly versatile fishing gear whose dexterous operation enables several scattered areas to be worked simultaneously.

A wide variety of impounding gears were in use for trapping fish in southern India, till recently. Many of them stood out as testimony to the ingenuity of traditional fishermen in developing fishing gear appropriate to different fishing conditions and fish behaviour. Majority of them are not seen in operation now-a-days. Several factors such as thinning out of fish population and diminution of natural shallow water sheets leading to poor returns, erosion of skills and attitudinal changes among the practitioners might have contributed to their obsolescence. In this paper, an attempt is made to review the main categories of impounding devices and methods of southern India, which were in popular practice in the immediate past or are still in use, broadly following the classification for fishing gear categories

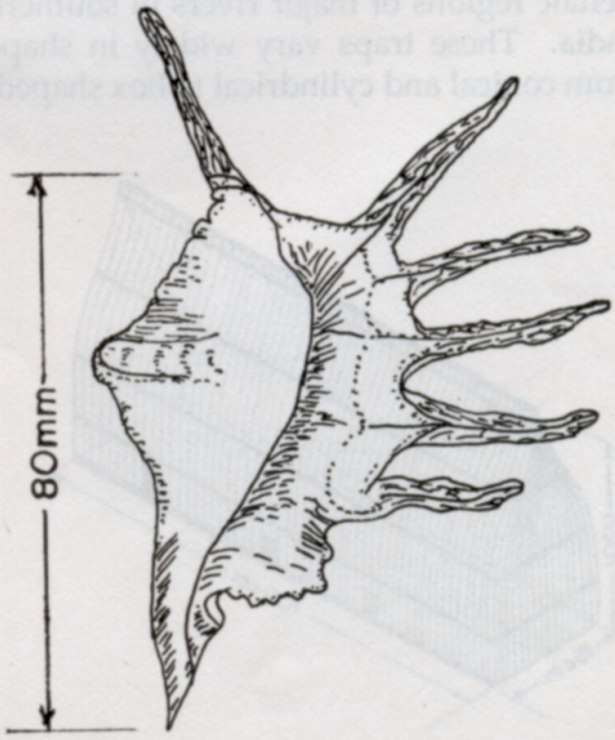

Fig. 1. Shell of *Pterocera* sp. used as octopus trap

adopted and recommended by FAO (Nedlec, 1982).

POTS

Octopus pot:

In Palk Strait between India and Srilanka large number of octopods are caught by using gastropod (*Pterocera* sp.) shells (Fig.1) (Hornell, 1950). Long lines are prepared having several short branches at intervals. At the tip of each branch line, a five fingered shell is attached the apex and fingers having broken off. The number of shell traps on one line may run to a few hundreds. These lines are laid upon the bottom and when lifted next day morning many shells are found occupied by octopods that have sought concealment in them. The lines are set in depths of 5 to 8 m and buoyed up with large wooden floats. This method is practiced even now to catch octopods in these parts.

Basket trap:

The ingenuity of traditional fishermen in making devices for trapping fresh water fishes can be seen at its best in low lying deltaic regions of major rivers in southern India. These traps vary widely in shape from conical and cylindrical to box shaped.

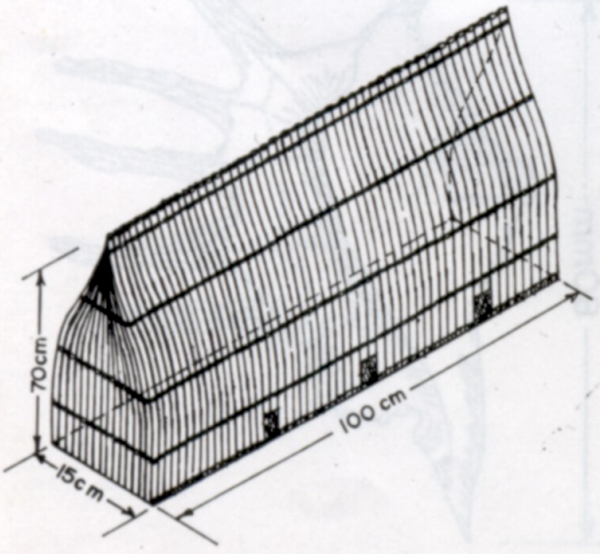

Fig. 2. Basket trap

In swamps of Kolleru lake and Upputeru river, Andhra Pradesh, telescopic two piece conical bamboo basket cages or traps called *Gampa garre* and rectangular basket traps called *Mavulu* are used to capture prawns (Ramamurthy & Muthu, 1969). In small irrigation canals the rectangular basket traps (Fig.2) are used to collect carp fingerlings and other small fishes. They are made of bamboo splinters. Base is rectangular and top is tapered and laced together. A medium sized trap measures 1.0x0.15 m at the base and 0.7 m in height. There are one or two valves made of converging splinters situated at the lower longitudinal side of the trap which give in when pushed by the fish but do not allow their escape.

Traditional lobster traps:

In southwest coast of India, spiny lobsters are conventionally caught by special traps. The technique is to entice the lobsters into traps by employing suitable baits through a narrow tapered entrance through which it is difficult to escape. Traditional local traps used for fishing spiny lobsters in southwest coast of India are called Colachal traps (Miyamoto & Shariff, 1961; Mohan Rajan *et al.*, 1981). They are heart shaped or arrow headed con-

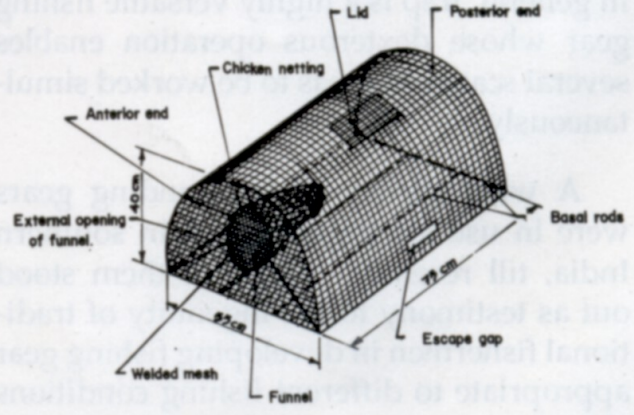

Fig. 3. Modern lobster trap

trivances locally fabricated with palmyrah leaf stalk fibres or date palm leaf stalks of 1.5 to 2 m length, about 3 cm width and 2 to 3 mm thickness. Traps are woven in hexagonal meshes and consists of 'floor', 'side and roof' and 'flapper'. Trap measures 75 cm in length, 60 cm in width and 50 cm in height. Flapper is made of 4 upper meshes and 3 lower meshes.

Modern lobster trap:

CIFT has developed a modern lobster trap (Mohan Rajan *et al.*, 1988). This trap is semi-cylindrical in appearance and measures 75 x 55 x 40 cm with rectangular frame and semicircular ribs made of 10 mm dia M.S. rod (Fig.3). M.S. welded mesh (2.5 cm square) is used as covering material on skeletal frame work. The trap is a single entry type with a trunk shaped funnel of 35 cm in length located at one end. The funnel is designed and attached in such a way that lobsters are guided by gradual inclination to the internal opening through which they fall into the trap. The internal opening is oval in shape and is attached at an inclination of 30° to the horizontal. Hexagonal chicken wire netting is used to cover the funnel. An escape gap of 150 x 30 mm is provided on one side as a conservation measure. There is a lid of 12 x 12 cm on upper middle portion for baiting and removal of catch. After fabrication, plastic coating is given to prevent corrosion (Meenakumari & Mohan Rajan, 1985).

Traps are laid and retrieved by resorting to skin diving. Fishing craft employed is 4 logged boat catamaran with a crew of 2 to 3 men. On reaching the ground, bait (Mussel) is introduced into the trap and baited trap is thrown overboard. As it sinks, a fisherman dives down, collects it under water and sets it in position. Position of the trap is mentally noted by 4 point bearings. Traps are hauled next day in the morning. After locating the position of the trap, a fisherman dives down with a wooden hook tied to the end of a rope. On finding the trap this hook is connected on to it and a signal is given to the fishermen on the catamaran for hauling up. This trap was found to be 2 to 3 times more efficient than the indigenous lobster trap (Kaul & Kandoran, 1987).

Traditional fish traps:

One of the indigenous methods of fishing prevalent in Gulf of Mannar, Palk Bay and some parts of southwest coast is by employing indigenous traps locally known as *Koodu* (Fig.4). These traps are primarily intended for catching perches. In these areas neither seines nor gill nets could be operated, which probably explains the development of perch trapping as an organised fishery in this part of the country (Prabhu, 1954). Rameswaram fishermen have evolved extremely elaborate stellate form of this trap with a roomy side chamber in each of the arm and some times with 5 entrances to the interior (Prabhu, 1954).

The traps are either made out of split withes of Babul (*Acacia* sp.) which is commonly found here or out of thin bamboo reepers or peelings of mid-rib of Palmyrah

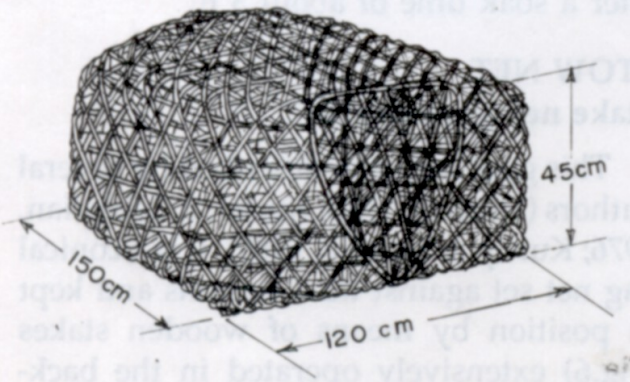

Fig. 4. Traditional fish traps

leaves. The materials are soaked in water before weaving. The traps are made out of 2 sheets of basket work. The lower edges of the sheet of the basket work forming the top and sides are laced to the edges of the bottom and trap is completed by inserting the entrance funnel and tying them in position. The meshes are hexagonal in shape with each side of the mesh having a length of 3 to 4 cm. Number of entrances may be 1 to 5. Length varies from 60 to 150 cm, breadth from 60 to 120 cm and height from 15 to 45 cm.

In rocky bottoms traps are operated singly and in flat sandy bottoms they are operated serially. Usually larger traps with several openings are operated individually. After introducing baits and some stones as ballast, they are taken by two fishermen in a boat or catamaran to the fishing ground. Setting and retrieval of the trap is much in the same way as described under lobster trap fishing by resorting to skin diving. Trap is lifted every day. In serial setting, about 50 traps usually of single entry type with baits and stone ballasts are tied to a long rope at intervals of 20 to 25 m. Marker floats are attached at either end for location of the position. The traps are taken to fishing grounds in canoes or catamarans by fishermen who set them in bottom parallel

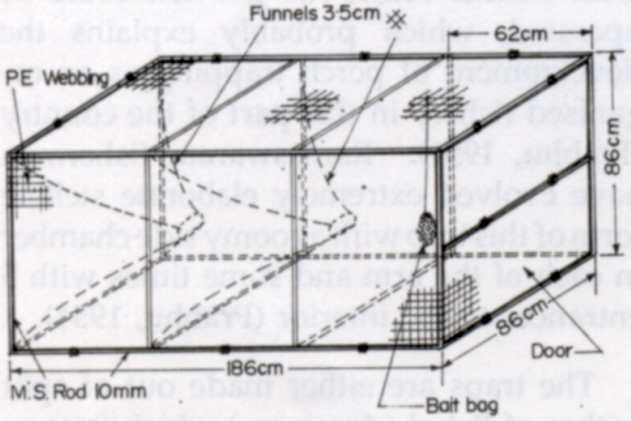

Fig. 5. Kalava trap

to the shore. Baits generally used are dried and decaying holothurians or pieces of crab. Soak time is generally 24 h.

Kalava traps:

There are extensive reefs in depth ranges of 60 to 150 m along the west and east coast of India which have good resident population of perches. Kalava is very important among this, commonly represented by species like *Epinephelus chlorostigma, E. tauvina, E. diacanthus, Pristipomoides* sp etc. Modern traps have been developed for Kalava fishing in recent years (Devidas Menon *et al.*, 1977; Anon, 1985). Kalava trap is a rectangular box having four ribs made of 10 mm dia steel rods (Fig.5). The rods are joined with coil hinges so as to collapse the trap when needed. The frame is covered with polyethelene netting. The trap is open on one side and is provided with two consecutive funnels or valves made of webbing inside the frame. A bait bag is suspended at the end of funnel.

Larger steel vessels of 40 m and above are used in view of the distance of the ground and the endurance required. Traps are set individually. As soon as suitable ground is located based on acoustic survey, the vessel is stopped with bow in the direction of wind. Then a float on a line tied to the trap is released to the sea followed by the trap itself. The trap is hauled up after a soak time of about 3 h.

STOW NET

Stake net (Oonnivala):

This gear has been described by several authors (Hornell, 1938; Kurian & Sebastian, 1976; Kurup & Samuel, 1985). It is a conical bag net set against tidal streams and kept in position by means of wooden stakes (Fig.6) extensively operated in the backwaters of Kerala throughout the year except in heavy monsoon. Net bag is 7-15 m long with a circumference of 16 m or more at

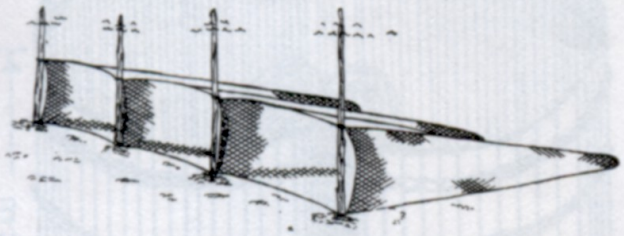

Fig. 6. Stake net

Fig. 7. Aerial trap (Changadam)

the mouth. Mesh size is variable according to the length of the net bag. In small nets it may range from 25 mm at the mouth to 10 mm at the codend. Catches include mullets, white bait, silver whiting, spiny eels, eels and prawns.

AERIAL TRAP

Changadam:

Some fishes when in danger, excited or confronted by obstacles, leap out of water. A horizontal floating net, a raft or even boat or box can be used to collect the fish as they fall back. Mullets and milk fish were being caught by this method in backwaters of Kerala, parts of Andhra Pradesh and Tamil Nadu. Such a raft trapping which was in practice in the backwaters of Kerala is called *Changa payikkal, Changadam or Pachil* (Gopinath, 1953; Job & Pantulu, 1953).

In this method, two long narrow dugout canoes are connected by two poles of 2.5 and 3.5 m in length in such a way that hulls diverge forward from the stern (Fig.7). A net extending out board upon sticks slanting upwards run the whole length of outer side of each canoe. The netting is tied at both the head and foot of the projecting sticks to form a bag like portion between sticks. As a low free board is desirable several spadefuls of sand are put into the canoe. Brush wood and webbings are also put in the craft in which the fish get entangled. Finally, a dragging device made of pieces of chain connected by ropes is stretched between boats with its middle region lying in water touching the ground. As the canoes are poled or paddled slowly, the disturbances caused by rough passage of chain over the bottom frighten the fish which leap into the air and land into the boat or the net. Hornell (1950) feels that this method of fishing came into existence in India only by beginning of 20th century. Now this method of fishing is no more in practice.

STATIONARY UNCOVERED POUND NET

Pound traps:

Extensive pound traps are only rarely seen in southern India. They are large enclosures with a retarding device. Such large sized fishing traps are called weirs if made of nontextile materials and set nets or pound nets if made of netting (Brandt, 1972). One such contraption was described by Hornell (1950) from Sonapur in Ganjam, Orissa and also from backwaters of Kerala. In this place, owing to considerable rise and fall of tide, huge semipermanent pounds are built up of palisades of jungle poles and the intervals filled by bamboo screens or *thatties*. Long leaders of converging screens shepherd the fish and prawns to the opening in the outer pound traps, while others within lead them towards smaller inner chambers where the water is deep. The catch is collected during the low tide. Such large traps are rarely seen now-a-days.

BARRIERS AND WEIRS

Earthen bunds:

Simplest and the most primitive of all trapping devices is the separation of some shallow area of water by erecting a low earthen bund or embankment. By bailing out the water from cut off sections, fishes there in are left stranded in the mud on the bottom and are captured by groping in the mud with bare hand (Hornell, 1938).

Screen Barrier traps:

Screen barriers (Fig.8) are erected in shallow tidal backwaters. They consists of several screens (*thatties*) arranged as vertical walls. The material used for construction consists of narrow strips of split bamboo held together with coir rope. Bamboo strips are 10 mm in width, 120 to 150 cm in length and arranged 5 mm apart. Such screens are arranged as vertical walls of 5 to 25 m overall length either to block the entrance of a blind creek within the tidal influence or along the shore-line to enclose a semi-circular area. Circular, heart shaped or rectangular trap chambers made of same vertical screens are set at intervals. Each chamber is formed by arranging a portion of screen in such a manner that while the middle part of its length forms a circle, an ovoid or rectangle, the ends are curved inwards and brought close together leaving only a narrow passage leading into the chamber in between (Fig.8). As tide recedes, fishes pass into these chambers from where they are caught by scoop nets. The screen walls are supported at intervals by strong posts driven into the bottom. To prevent fishes like grey mullets from leaping the barrier the trap chambers are sometimes roofed with coconut leaves. They are variously known *Thaithal, Adichil, Thattu or Kalambu* (Kurian & Sebastian, 1976). The disadvantage of most of the large barriers is that they are very costly to build and maintain. Hence the barriers are no longer in common use.

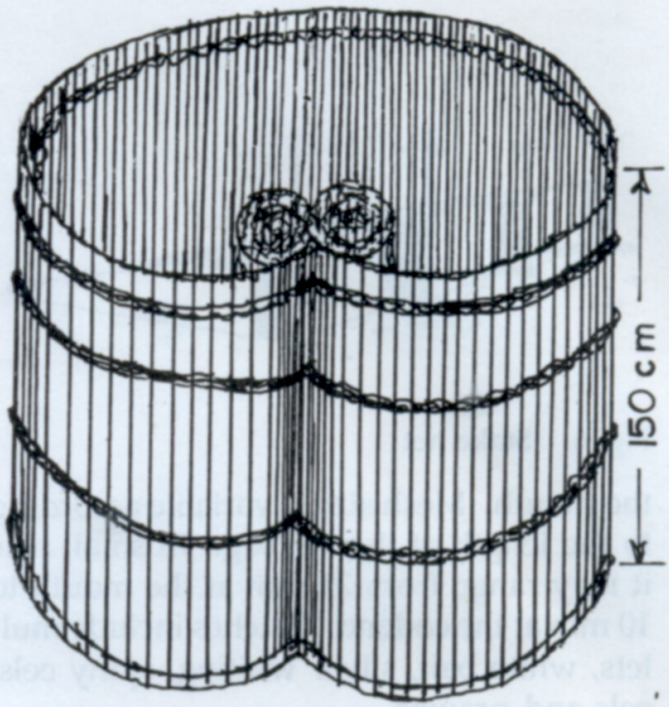

Fig. 8. Screen barrier

MISCELLANEOUS TRAPPING DEVICES

Filter traps:

When contour of the land permits a bunded area to be emptied at will by draining the water through small openings, it facilitates the placing of filter traps in these miniature sluices. Filter traps are of several varieties. Typically, it is a simple cylinder of closely set mid-rib slivers of palm leaflets. One end of the cylinder is open whereas the other has the ends of slivers bunched together and tied (Hornell, 1938). A couple of bamboo hoops usually encircle it on the outside. To stop the slivers from opening under pressure, six or seven encircling

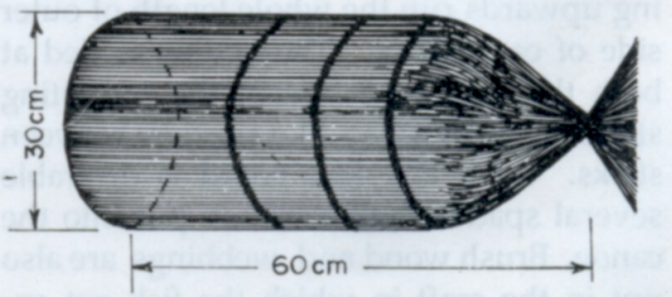

Fig. 9. Filter trap made of palm leaf slivers

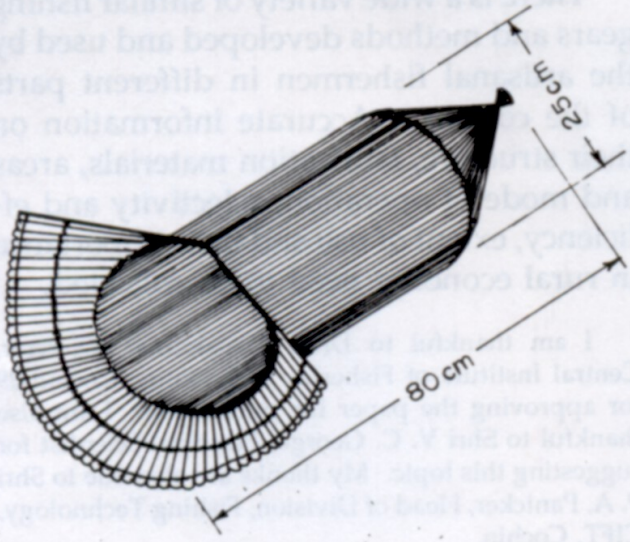

Fig. 10. Aproned filter trap

lacings made of palmyrah fibres are added. It is about 55 to 60 cm in length and about 25 to 30 cm in diameter (K.V. Mohan Rajan, unpublished data). In Malayalam it is called *Kannillakuruthi*, or Eyeless cone traps (Fig.9). Job & Pantulu (1953) has described a filter trap which is an improvement on the one described above and consists of a large sized cylinder with a curved fan shaped apron at the mouth. This is called aproned cone cage (*Nakkulla kuruthi*) (Fig.10). Water flows on to the apron and small fishes or prawns that enter are led by the converging sides of the apron into the cylinder where they are entrapped. Length of the cylinder portion is 80 cm and diameter of the mouth is 25 cm. Both these fishing tackles used to be a common sight throughout southern India but are rarely seen at present.

Tubular traps:

Tubular traps are slender funnels into which fish may penetrate but from which they cannot retreat because the fish jams itself. Murrel noose prevalent in Kolleru lake of Andhra Pradesh is an example (Fig.11). From bell shaped mouth it quickly

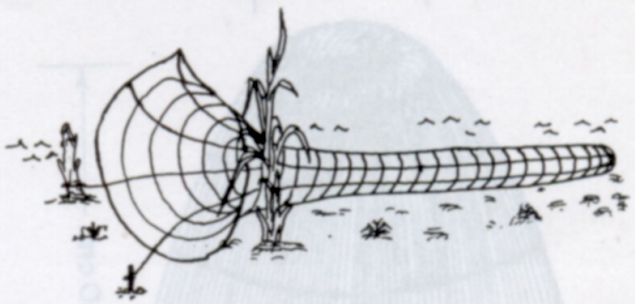

Fig. 11. Murrel trap

narrows down to a hinder region 25 to 30 cm in length and a diameter just equal to that of an adult murrel (*Ophiocephalus* sp.), the fish it is designed specifically to entrap (Hornell, 1950). It is made of dark brown palmyrah fibres extracted from the leaf stalks and worked in double ply into a mesh work of netting. Each trap is anchored between tufts of reed or grass and mouth attached with short cords either to pegs or to adjoining tufts of grass.

Plunge baskets or cover pots:

This is employed to catch fish in knee-deep waters, particularly in inundated paddy fields and channels (Hornell, 1938). It is typically semi-spheroid in shape and is constructed using sub-conical, closely set ribs made either from branches of hard wood tree or splinters of bamboo (Fig.12). These splay outwards and downwards from above. Both the ends are open, the upper being narrower just wide enough to admit the hand. The lower end of the mouth is widely spread and encircled by free termination of the ribs. To keep the ribs in position the trap is hooped at intervals, with split cane or coir cord. The common size varies between 50 to 60 cm in height with a diameter of 50 to 60 cm at lower end. Bamboo splinters used are 10 mm in width. Some plunge baskets have a protective wickered band around the margin of the upper smaller aperture as is typical of African types.

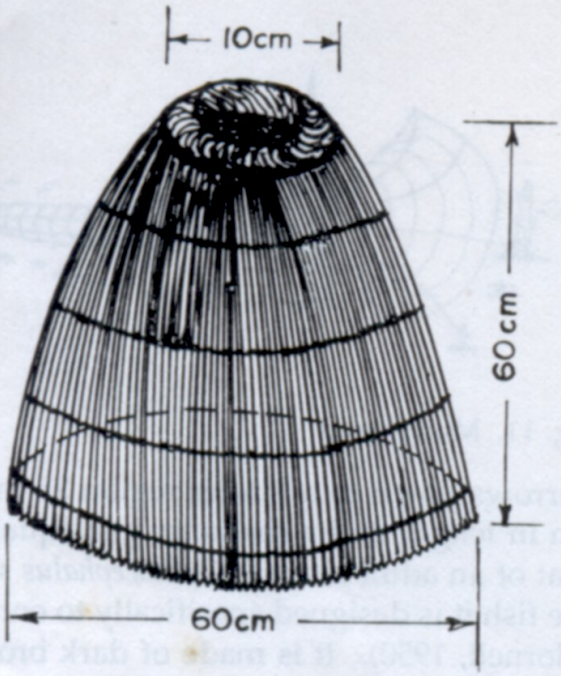

Fig. 12. Plunge basket

Fishermen plunges the implement into water every few steps forcing the spike-armed mouth into the mud with one hand while groping around with the other for any fish that may have been impounded in it. In shallow backwaters, fishing is conducted after sunset with the help of a torch. The glare of the light has the effect of attracting the fishes and when once they come within the striking distance, the plunge basket is skilfully dropped over them.

Fish aggregation and trapping:

Submerged bundles of twigs or branches of trees make attractive hiding places for fishes from where they can be easily caught. In such a method practiced in southern regions, piles of leafy branches is placed in backwater channels with stakes around to keep them from displacement by currents. After a lapse of few days, piles are surrounded by circle of bamboo screens. Fishermen throw out the bushes and catch the fish with dip nets. The obstruction to flow of water caused by bushes lying for lengthy periods on the bottom of a channel leads to silting up and, therfore, this mode of fishing was prohibited in many localities (Hornell, 1938). This method of fishing has become obsolete now-a-days.

There is a wide variety of similar fishing gears and methods developed and used by the artisanal fishermen in different parts of the country. Accurate information on their structure, fabrication materials, areas and mode of operation, selectivity and efficiency, extent of use and their importance in rural economy need to be collected.

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