

Fish trapping devices and methods in Assam - a review

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ABSTRACT

Traps are impounding devices into which an organism is lured either for food or shelter and are unable to escape. There are a wide number of fish trapping devices and methods operated in the rivers, flood plain wetlands (*Beels*), and low lying water areas of Assam. These traps are of various shapes and sizes depending on the area of operation and the behaviour of target fishes and are mostly made up of split bamboo splinters. The traps have been broadly classified as per the FAO classification of fishing gears. The different trapping devices and methods prevalent in Assam are presented and discussed in this paper. Traps are selective fishing gear which can be used for sustainable fishing in the region.

Keywords: Assam, Flood plain wetlands, Rivers, Traps

Introduction

Traps are passive fishing gears and are designed in such a way that the fish can enter voluntarily into the passage but the same passage becomes a non- return device and the fish get trapped. Trap fishing operations are economical and have energy related advantages over active fishing methods. The idea of catching fishes without much effort might have probably resulted in the development of traps. Contrivances for trapping fish may be presumed to antedate the invention of nets (Hornell, 1938). Trap fishing is highly fuel efficient both in terms of returns and biomass per unit of fuel consumed (Wilimovsky and Alverson, 1971). Traps can be operated continuously during day and night with periodical checking and the fish remains alive without any damage.

The state of Assam is blessed with vast water bodies in the form of rivers and channels, flood plain wetlands (*beels*) and provides ample scope to the fishermen to operate various types of fishing traps. Fish traps are predominantly made of split bamboo separated by narrow interspaces and bound together by strands of cane, coir or plastic twines and ropes. Majority of the traps have one or multi openings, with inwardly projecting bamboo splits which readily permits the entry of fish into the trap but offers no means of exit.

Detailed aspects of fishing with traps and pots have been described by Slack-Smith (2001). Many workers have reported on various fishing traps operated in Indian waters Hornell (1938), Job and Pantulu (1953), Prabhu (1954), George (1971), Brandt (1984), Mohanrajan (1993), Nair

(1993). Kurup and Samuel (1985) and Kurup *et al.* (1993) have described the fishing traps used in Vembanad lake, Kerala. Mitra *et al.* (1987) have described the traps used in upper and middle Hooghly estuary. Details of various traps operated from north eastern India have been reported by Sharma *et al.* (1993). Traps from the Khachodhara Beel in Assam were reported by Sharma and Ahamed (1998). Some efforts to document the type of traps used in Assam has been carried out by Bhagawati and Kalita (1987), Nath and Dey (1989), Choudhury (1992), Choudhury *et al.* (1996), Sharma (2001) and Bhattacharjya *et al.* (2004), Gurumayum and Choudhury (2009) and Baruah *et al.* (2010). Detailed designs of traps of Assam and its operation have been reported by Pravin and Meenakumari (2008).

A detailed study of the various fish trapping devices and methods in Assam, covering the Brahmaputra River stretch and *beels* was carried out during 2004-2006. The gear survey was conducted following a prescheduled proforma (Miyamoto, 1962) and the technical specifications and design details of the gear and mode of operations were recorded. Details such as general dimensions, material, construction details and different modes of operation were collected. The surveyed areas in Assam are given in Fig. 1.

Fishing traps are predominantly made of split bamboo strips as bamboos are abundantly available locally. Traps are designed based on the fish species, its behaviour and size. There are many variations in the design and most of the times the same traps are known by different names in different regions of the state. Based on the study, the different trapping devices and methods were grouped as per the classification of fishing gears by FAO.

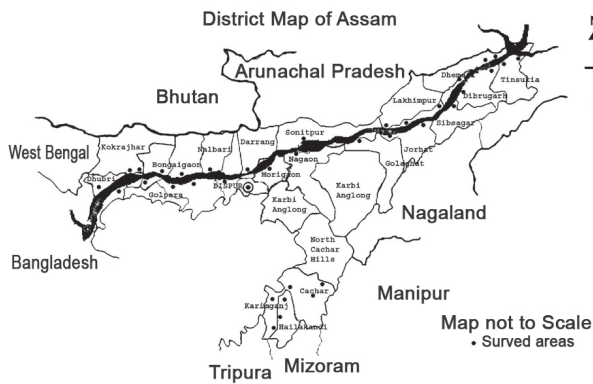


Fig. 1. Map showing surveyed areas

Fish trapping devices

The important details of different trapping devices used in Assam is furnished in Table 1. Fishing traps are predominantly made of split bamboo strips as bamboos are abundantly available locally. There are many variations in the design and most of the times the same traps are known by different names in different regions of the state.

Pots

Pots are designed to catch fish or crustaceans and have different shapes and sizes. They are made with various materials like wood, bamboo, netting, etc. and have one or more opening or entrances. They are usually set on the bottom, with or without bait, singly or in rows. Cylindrical shaped traps are also widely used in the rivers and beels of Assam (Fig. 2-6). These traps have many variants in its design features. *Seppa*, *Faron*, *Kaita* (Prawn trap), *Ubhoti*, *Doo*, *Dingora*, *Ghumai khowa*, *Goni*, *Khoka*, *Hufa*, *Runga*, *Sohra* (eel trap), *Sohra* has another variant known as *Bamidhora sohra*. These traps are periodically taken out of water and checked for any fish trapped in it. Spindle shaped traps (Fig. 7-8) also come in various sizes. They too are known by different names in different areas like *Sohara*, *Tepa*, *Badu Betok* and *Chepa*. The length of the *Seppa* ranges from 80 -250 cm and are tapered at both the ends. Generally it has two mouth openings in the mid region of the trap for the entry of the fish. An opening is provided for removal of catch on one end of the trap which is closed by fastening together during operation. These traps are extensively used in *Beels* and inundated paddy fields and catchment areas to catch miscellaneous fishes. Box traps are widely used and are seen in various sizes (Fig. 9-12). The traps are made of split bamboo and the interspaces vary depending on the type and size of the target fish sought. The traps are provided with ‘V’ shape inlet valves, either small or long covering different sides. These are extensively operated in *Beels*, derelict water bodies, inundated paddy fields and catchment areas, these traps are either baited or

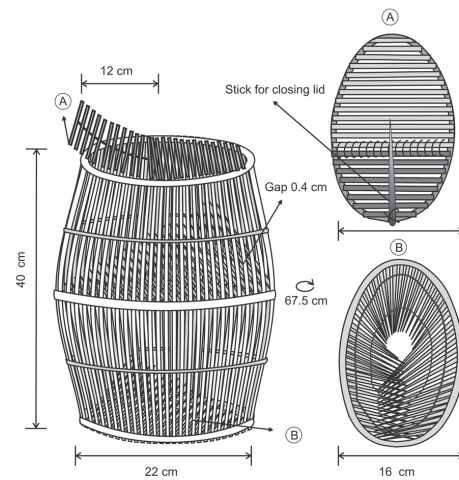


Fig. 2. Cylindrical trap (*Kaita*)

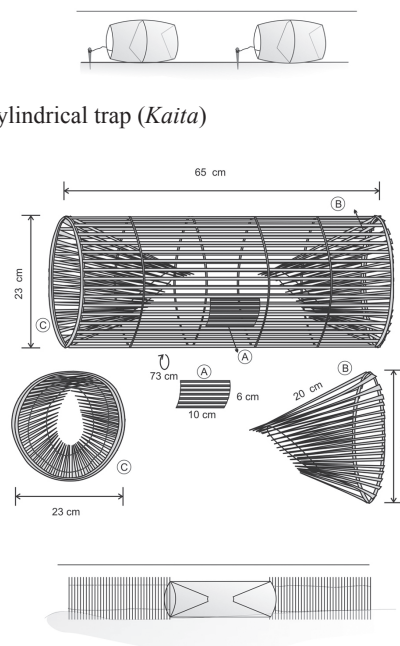


Fig. 3. Cylindrical trap (*Dingora*)

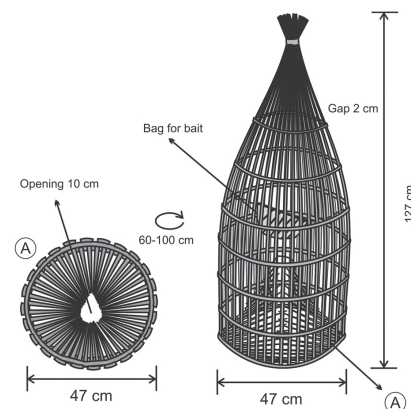


Fig. 4. Cylindrical trap (*Doo*)

Table 1. Different trapping devices in Assam

Trap type	Local name	Major specifications (cm)	Area of operation	Catch composition
Pots				
Cylindrical trap	<i>Sepa/Bhari/Tepa</i>	150 x 37	Paddy fields	<i>Mystus</i> spp, <i>Puntius</i> spp, <i>Botia</i> spp, Small prawns, <i>Channa punctatus</i> , <i>Chanda</i> spp
	<i>Faron</i>	43 x 21	Paddy fields	Miscellaneous fish
	<i>Kaita</i>	32 x 20	Shallow water bodies	Small prawns <i>Masatacembalus</i> spp., <i>Puntius</i> spp., <i>Channa</i> spp., <i>Anabas</i> spp.
	<i>Ubhoti/Queen/Kuni, Tuni</i>	92 x 21	Paddy fields, catchment areas,	<i>Mastacembalus</i> spp., <i>Mystus</i> spp., <i>Channa</i> spp, <i>Clarias</i> spp.
	<i>Doo/Paori/ Juti</i>	210 x 88 / 175 x 85 / 250 x 94	Rivers and Beels	<i>Aorichthys</i> spp., <i>Chitala</i> spp., <i>Tortoise</i> and <i>Channa</i> spp.
	<i>Dingora/ Bundh Dingora</i>	65 x 23	Paddy fields	<i>Mystus</i> spp., <i>Wallago</i> spp., <i>Heteropneustes</i> spp, <i>Clarias</i> spp., <i>Puntius</i> spp., <i>Channa</i> spp., <i>Anabas</i> spp.,
	<i>Ghumai Khowa</i>	160 x 67	Beels and Rivers	Large sized fish, <i>Mystus</i> spp., <i>Puntius</i> spp., <i>Channa</i> spp.
	<i>Khoka</i>	49 x 16	Small streams	<i>Channa</i> spp., <i>Clarias</i> spp., <i>Mystus</i> spp. and <i>Puntius</i> spp.
	<i>Hufa</i>	76 x 10	Low lying fields	Small murels and gouramies
	<i>Runga</i>	92 x 55	Pond outlets and beels	Miscellaneous fish
<i>Sohra/Baha</i>	30 x 50	Ponds and low lying fields	Eels	
Spindle trap	<i>Seppa/ Tepa/ Sohara/ Badu Betok</i>	80 x 8.5 / 86 x 22 / 250 x 30 / 49 x 15	Rivers and Beels	Prawns and small miscellaneous fishes
Box trap	<i>Boldha/ Ghoni/Goni</i>	26 x 26 / 50 x 37	Rivers and Beels	Catfish, <i>Puntius</i> spp
	<i>Dori/ Nagonda</i>	49 x 33 / 29 x 21	Rivers and Beels	Prawns, <i>Puntius</i> spp
	<i>Sepeti/Gui/Tesung</i>	38 x 35 / 78 x 67 / 55 x 34 / 55 x 50	Rivers and Beels	Miscellaneous fish, catfish
	<i>Darki/ Bosna/ Diar/Sepa/ Dingori</i>	79 x 36 / 113 x 65 / 64 x 23 / 88 x 62	Rivers and Beels	Prawn, Eel, catfish,
	Fyke net	<i>Goni rakshaks/ Gukuta dingora</i>	391 x 44 / 314 x 30	Rivers and Beels
Stow nets	Bag jaal	1250 (HR)		Miscellaneous fish
Barriers fences weirs etc.	Banamara	Depending on width of river	Rivers	Miscellaneous fish
	Bhetamara		Rivers	Miscellaneous fish
Aerial trap	Dolonga (Verandah net)	Depending on width of river	Rivers and Beels	<i>Channa</i> spp. and <i>Puntius</i> spp
Miscellaneous				
Plunge basket	<i>Polo/Juluki</i>	70 x 60	Rivers and Beels	Miscellaneous fish
	<i>Chak jal</i>	250 x 200	Rivers and Beels	Miscellaneous fish
Shelter trap	<i>Dolonga</i>	230 x 100	Beels and Rivers	Miscellaneous fish
	<i>Tack</i>	200 x 72	Beels and derelict water bodies	Miscellaneous fish
	<i>Hukuma</i>	225 x 150	Beels and Rivers	<i>Channa</i> spp., <i>Mystus</i> spp. and small prawns
	<i>Chunga / Dhun</i>	100 x 12/80 x 8	Beels	<i>Mystus</i> spp., <i>Puntius</i> spp., <i>Channa</i> spp.

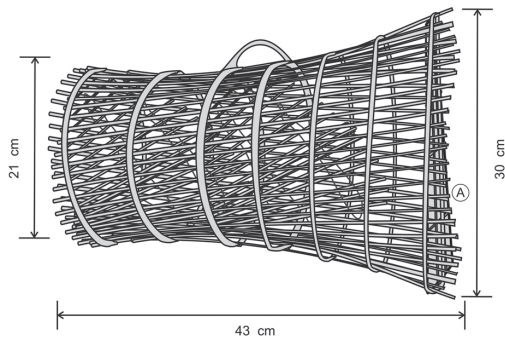


Fig. 5. Cylindrical trap (*Faron*)

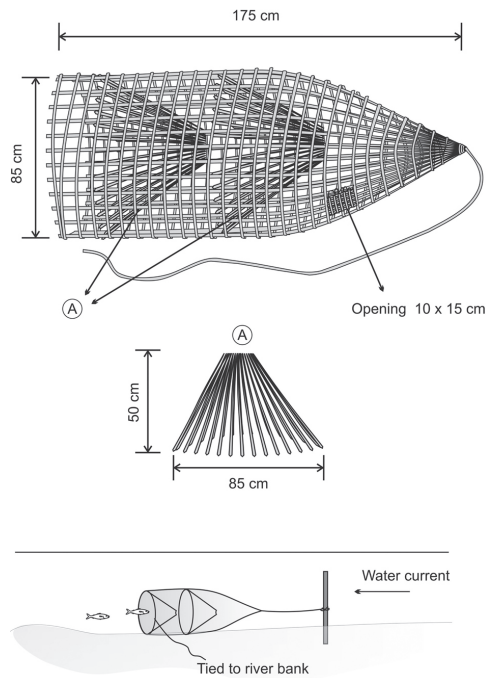


Fig. 6. Cylindrical trap (*Dho mukhi paori*)

unbaited depending on the type of fish targeted. Similar types of box traps operated in Chilka Lake are reported by Jones and Sujansingani (1952). Use of bamboo screens (*Bana*) to guide the fish in to the trap is also prevalent as this increases the catching efficiency of the gears as it restricts the movement of the fish and ultimately leads them to the trap. The most common box traps are *Boldha/Ghani*, *Dori* and *Sepeti*. Other variants of this trap are *Gui*, *Tesung Purang* and *Haokuri*. There are many variations in the box type of traps and they are known by different local names at different regions. *Darki* has multiple inlets and are operated in series across flowing water body and are fixed together by a criss cross bamboo poles.

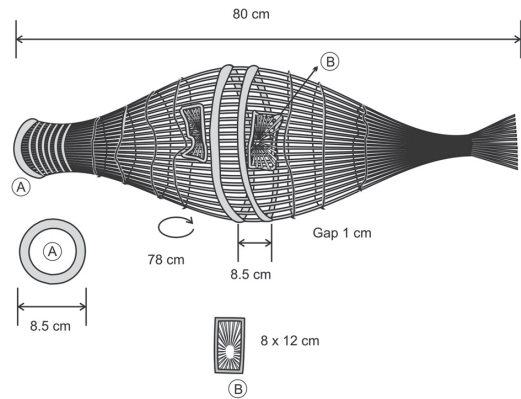


Fig. 7. Spindle trap (*Seppa*)

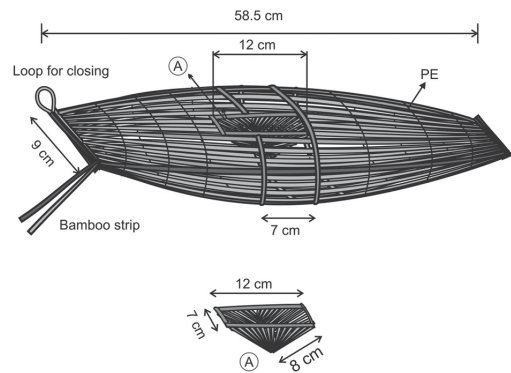


Fig. 8. Spindle trap (*Seppa*) variant

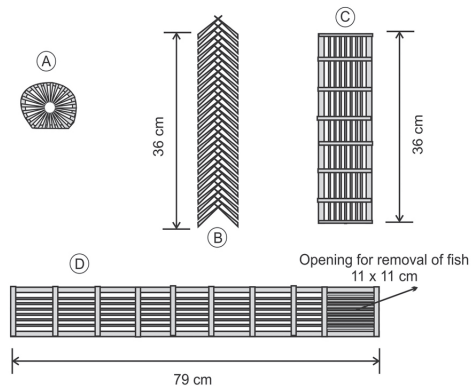
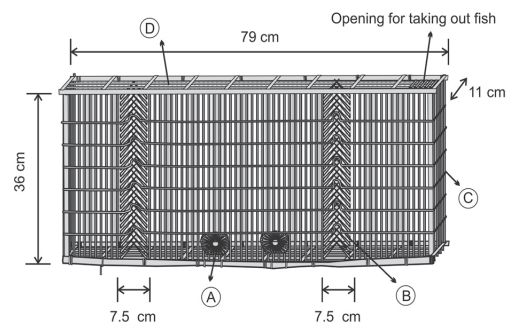


Fig. 9. Box trap (*Darki*)

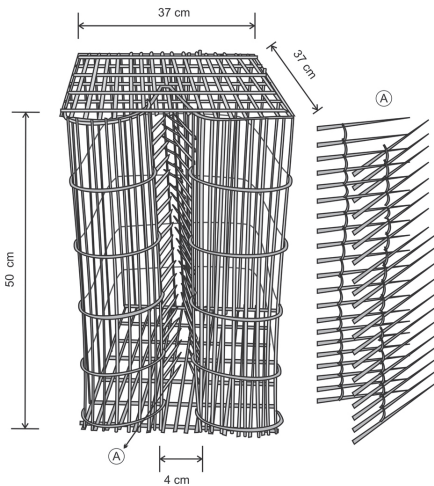


Fig. 10. Box trap (*Ghoni*)

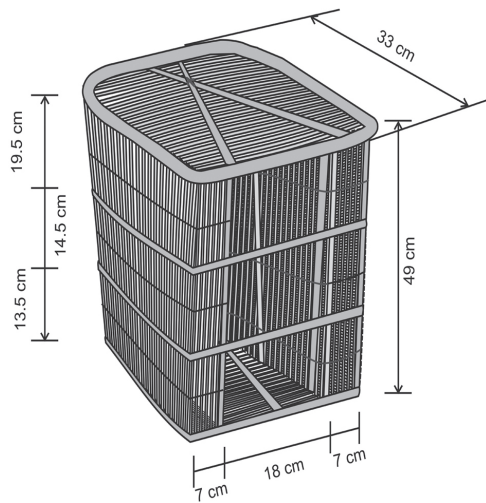


Fig. 11. Box trap (*Dori*)

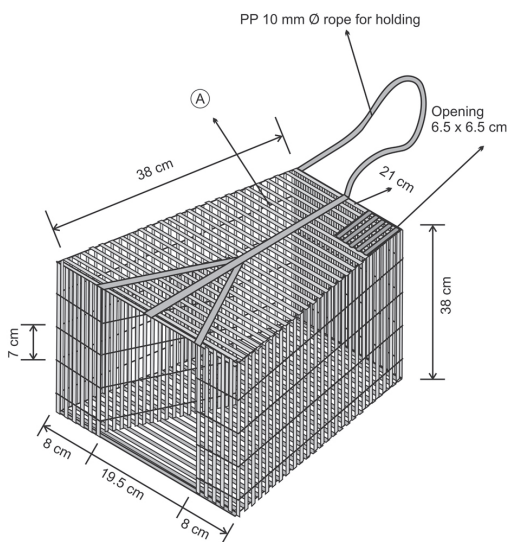


Fig. 12. Box trap (*Sepeti*)

Fyke nets

Fyke net is a trap having cylindrical or cone-shaped netting bags mounted on rings or other rigid structures (Fig. 13). It has wings or leaders which guide the fish towards the entrance of the bags. The fyke nets are fixed on the bottom by anchors, ballast or stakes. The fish enters the net but is prevented to escape due to the non returnable 'valve'. Two varieties have been observed namely *Gonirakshas* and *Gukuta dingora*. Fyke nets are placed against the water current. The fyke nets are fixed on the bottom by anchors, ballast or stakes and are used separately or in groups. The entire net is made of mosquito netting. Total length of the net varies from 3 to 4 m. Rings are made of either iron or bamboo strips and 3 rings of equal diameter are used in the trap. Very small mesh netting are used. The net is operated in shallow region of river during rainy season. It is also operated in the rivulets of river Brahmaputra in the upper stretch. The trap is removed periodically to take out the catch. Catch mainly comprise of prawns, catfish and miscellaneous fishes.

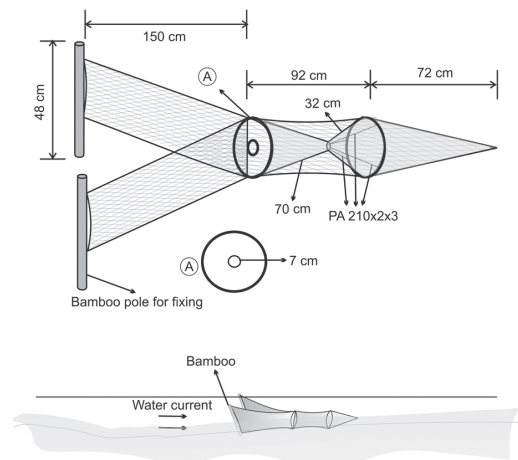


Fig. 13. Fyke net (*Gukura dingora*)

Stow nets

Stow nets are bag shaped gear and is used only in areas with strong currents. These nets are fixed by means of anchors or stakes, placed according to the direction and strength of the current. The mouths are usually held open by a frame, which may or may not be supported by a boat. The design is similar to that of a two seam trawl net (Fig. 14). The net is made of HDPE ranging from 2 to 1.5 mm diameter with mesh size ranging from 100 mm in the mouth region reducing to 20 mm in the codend. The mouth of the net is fastened to the opposite river banks against the current using 20 to 24 mm HDPE ropes. The mouth of the net is kept open with the help of bamboo poles fixed at both ends of the wing and near the bosom region of the net. The fishes are collected in the codend as

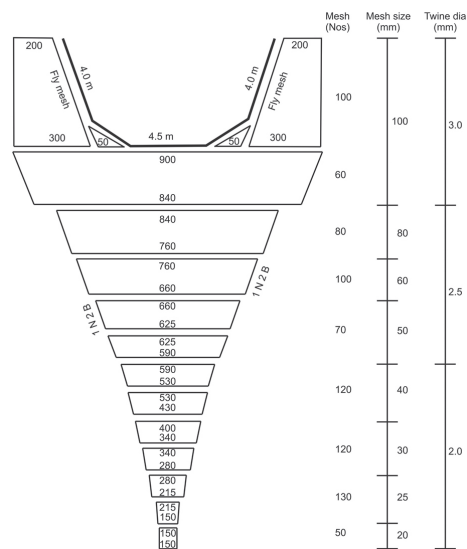


Fig. 14. Design of stow net (*Bagh jaal*)

the current of water takes the fish inside the net. These nets are used only when there is sufficient flow of water. The codend is lifted frequently to check for the catch as well as to remove debris that come along with the water current.

Barriers, fences, weirs, etc

Barriers have been described by Jhingran and Natarajan (1969) and Hickling (1961). *Banas* are set barriers erected bank to bank in the channel connecting the *Beel* to its riverine source (Yadava *et al.*, 1981; Yadava and Choudhury, 1986; Choudhury, 1992). Net barriers are slowly replacing the bamboo barriers as these are cost affective and saves labour and lasts longer than the bamboo screens. The gear consists of leaders, gathering ground, channels and filter platforms. The leaders guide the fish into the trap. The length varies from 10 to 50 m depending on the width of the river stream or canal. Water seep through the platform, leaving the fish. These gears are very effective in capturing nearly all fish moving downstream.

Few traps are placed in water as barriers. Barriers are long leaders of converging screens erected in shallow waters to lead the fishes into the chambers fixed in the end. Gear of this type, made of various materials (stakes, branches, reeds, netting, *etc.*) *Banas* are set barriers erected bank to bank in the channel connecting the *Beel* to its riverine source (Yadava *et al.*, 1981; Choudhury, 1992; Yadava and Choudhury, 1996). Net barriers are slowly replacing the bamboo barriers as these are cost affective and saves labour and lasts longer than the bamboo screens. The gear consists of leaders, gathering ground, channels and filter platforms. The leaders guide the fish into the trap. The length varies from 10 to 50 m depending on the width of the river stream or canal. These gears are very effective in capturing nearly all fish moving downstream. Traps made of split screen

are known as *Banamara* and barriers made using synthetic nets are known as *Betamara*.

Aerial traps

Aerial traps are specialized traps to capture fishes that jump when faced with an obstacle. These fishes can be caught on the surface in boxes, rafts, boats and nets (*Verandah* nets). The fishes are enticed to jump out of water by placing obstacles and are caught in the air by special devices obstructing their jumps. Sometimes the fish are frightened to get them to jump out of the water. The commonly used aerial traps in the northeast are *Leti diya* (Mud trench), and *Dolonga* (*Verandah* net).

A mud trench is constructed in the water channel which blocks the flow of water. The sides of the trench are elevated creating a muddy pit in between. When the fishes encounter the obstruction, they try to jump over the barrier and fall in the muddy pit and the fishes are collected by hand. *Channa* spp. and *Puntius* spp. are commonly caught. This type of fishing is carried out mainly during the post-rainy season when the fishes move from shallow to deeper waters.

Aerial traps are used for shrimps in inland water bodies in Kerala. This is a fishing technique based on the shrimp's reflex action to physical stimulation and is being used for harvesting the shrimps in perennial aquaculture farms in Kerala. They are locally known as *Pachil Changadom* or *Changala Pachil* (Hornell, 1938; Gopinath, 1953 and Job and Pantulu 1953). The shrimps, when disturbed, jump by reflex action and this habit is exploited for this type of fishing.

Miscellaneous trapping devices

Few traps are specifically designed and operated considering the nature of fish to take safe shelter. These traps commonly known as shelter traps or habitat traps (Fig.15 -17) are provided with tree branches, shrubs, and twigs. They come in various size and shapes. The most common ones are *Dolonga* (Quadrangular); *Hukuma* (Conical); *Chunga/Dhun* (Cylindrical) and *Tack* (Circular). The trap is placed in low lying areas and is pulled out of the water after 3 to 5 days and the fishes are taken out after removing the materials provided for shelter. These traps are tied to a fixed bamboo pole with a strong rope to prevent displacement in the water. The catch mainly comprise of *Mastacembalus armatus*, *Mystus* spp., *Puntius* spp., *Clarias batrachus*, *Channa* spp, *Notopterus notopterus*, small prawns and miscellaneous fishes.

Primitive and age old methods like plunge basket traps and other traditional traps are used for trapping fish and shrimps (George *et al.*, 1968). As per the FAO classification, this type of fishing method comes under falling gears. Few authors have placed this method under traps (Mohanrajan,

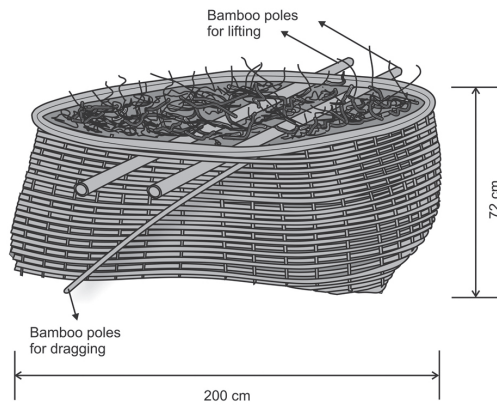


Fig. 15. Shelter trap (*Tack*)

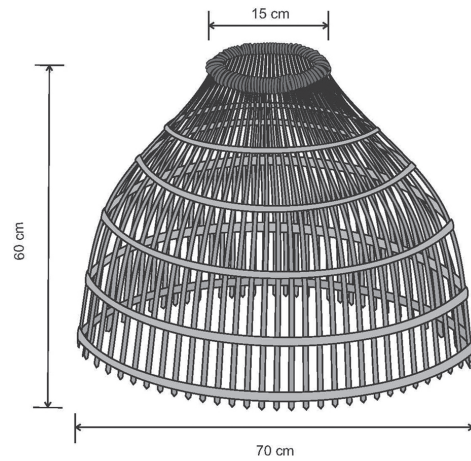


Fig. 18. Plunge basket (*Polo*)

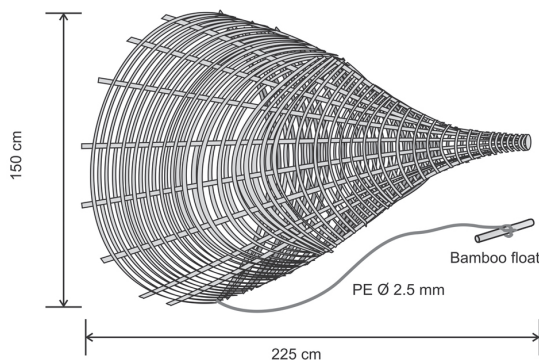


Fig. 16. Shelter trap (*Hukuma*)

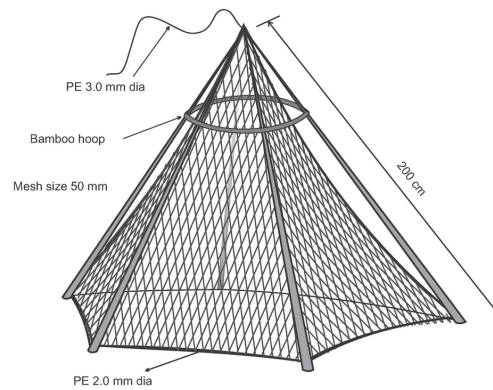


Fig. 19. Plunge basket (*Chak jaal*)

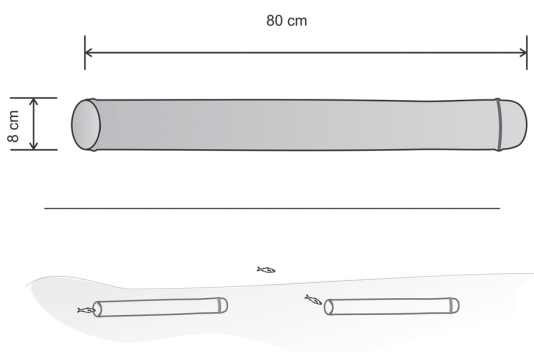


Fig. 17. Shelter trap (*Dhun*)

1993). Cover pots or plunge baskets, popularly known as *Polo* and *Juluki*, is a conical trap open at both ends (Fig. 18-19). These are similar to plunge baskets (*Ottal*) seen in Kerala and are simple trapping devices used in backwaters, paddy fields and estuaries (Hornell, 1938). Cane ropes are used to tie the strips. The free ends of the splinters at the wide mouth are usually sharpened, so that the device could be pushed down and fixed temporarily in mud (Job and Pantulu, 1953). The gear is operated in *Beels*,

shallow water bodies, ponds, paddy fields, etc. Fishermen plunges the basket in shallow waters forcing the spiked ends into the mud with one hand and groping inside with the other hand to take out the fish that may have impounded in it. Another version of the plunge basket is the lantern nets commonly known as *Chak jaal*. It consists of six pieces of bamboo, each about 180 to 200 cm in length. The mesh size of the webbing net is 50 mm. The hauling rope connected to the net is polyethylene of 3 mm thickness. The gear is operated by one or two either from shore or from boat. After plunging the gear, the fisherman dives into the water to collect the fish. The net is operated when the water is clear.

Clap nets mainly used for catching hilsa in riverine waters in the north-eastern regions could also be put under trapping device as the fish enters the device, the mouth is suddenly closed manually. Similarly, the drop door trap (Fig. 20) made of bamboo is fixed with mechanically triggered door as closing mechanism. The trap is about 1.4 m long and the width of the entrance is about 70 cm. The upper edge of the trap has a brick weighing about 3 to

4 kg. In the centre of the trap, three to five 0.16 mm diameter monofilament strings are attached which are connected to a release mechanism that trigger the door to fall down when disturbed and fish which enters, is trapped.

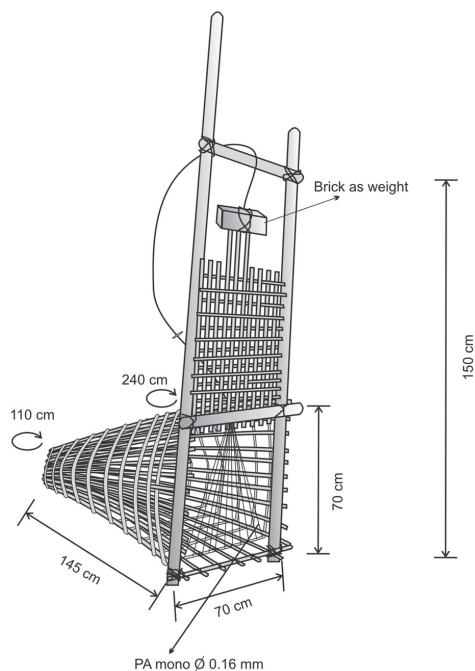


Fig. 20. Drop door trap (*Borma*)

Studies on the fishing gears in the north-east hill region have not received adequate attention. There are a wide number of traditional fishing gears and methods used for harvesting the fishery resources of the state of Assam. Traps are unique in the sense that these are indigenously designed and fabricated by the traditional fishermen themselves, taking into consideration, the area, location and behaviour of the fishes. Most of the traps are made up of bamboo strips and are widely used throughout the state in the rivers, *Beels* and other wetland areas. They come in different shapes and sizes and are easy to fabricate, and is comparatively cheaper and efficient than other traditional fishing gears.

The traditional fishing gears of Assam, especially trap fishing continues to be one of the major fishing methods among the fishermen in spite of the technological developments and introduction of other fishing gears over time. However, factors such as thinning out of fish population and reduction in natural shallow water areas, poor returns, and attitudinal changes of the fishermen can lead to reduction in the use of fishing traps. The construction of the traps itself is an art and remains with the traditional fishers of the region. Synthetic materials for the construction of traps for increasing the durability is an

option, but the present material is abundantly available locally and these are biodegradable and would not have any adverse affect on the environment. Collapsible traps can be operated as this would reduce the space on the boat considerably and the fishermen will be able to take more traps on board his boat. (Remesan *et al.*, 2007). Traps can be made a selective fishing gear, if proper escape devices are provided in the traps to facilitate the escapement of juveniles.

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