

Traditional fish trapping devices and methods in the Brahmaputra valley of Assam

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An investigation was made on the availability of different types of fish trapping implements in the Brahmaputra valley with an objective to study their respective dimensions, seasonal variation, abundance, catch, cost, variability of gears with species, season and their mode of operation. The identified fish traps can be classified into 28 different types of 5 major categories based on the principle of capture, design, and operational methods. These traps vary widely in shapes from conical, cylindrical, pyramidal to rectangular shaped mostly made of fine screen work made of slender splits of bamboo.

Keywords: Traps, Traditional, Brahmaputra valley, Assam

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Brahmaputra basin, a part of the composite Ganga-Brahmaputra-Meghna basin extending over an area of 5, 80,000 sq km is enclosed by the Himalayas on the North, the Patkai range of hills on the East running along the Indo-Burma border, the Assam hills on the South and the ridge separating it from the Ganga basin on the West. The 2,880 km long Brahmaputra river traverses its first 1,600 km in Tibet, reverses its course west wards through Arunachal Pradesh for about 160 km and enter the valley of Assam for about 640 km and turning South through Bangladesh for its last 480 km¹. The average width of the Brahmaputra valley is about 86 km of which the river itself occupies 15-19 km. Throughout its course the river Brahmaputra is highly braided and bestows the state Assam with vast aquatic resources in the form of adjoining tributaries and channels, flood plain wetlands (*beels*), derelict water bodies providing an ample scope for the fishers to operate various types of traps.

Traps are passive fishing gears in which the fish can enter voluntarily in such manner that the entrance itself became a non- return device. The idea of catching fishes without much effort might have probably resulted in the development of traps. Contrivances for trapping fish maybe presumed to antedate the invention of nets². Traps are devices

designed to encourage the entry of animals, which are prevented from escaping either by particular aspects of their behaviour or by the design of the trap itself regardless of the kind of material used in its construction³. Trap fishing is highly fuel efficient both in terms of returns biomass per unit of fuel consumed⁴. Traps can fish continuously during day and night with periodical checking and the organisms can be retrieved alive without any damage. Brush park fishing, popularly known as *katal/ Jeng* fishing, is also widely practiced in rivers and other open waters in Bangladesh⁵. Traditional fishing is more energy efficient and is in a better position to adapt and adopt renewable sources of energy⁶. Traditional fisheries offer twice the returns per unit of investment and generate almost 7 times direct employment opportunities as compared to mechanized sector⁷. The methods of fishing in the river Brahmaputra are diverse and the crafts and gears used are mostly indigenous⁸.

The design details and operation of the different types of fishing traps in the Brahmaputra valley of Assam are discussed in this paper. The traps have been classified into 5 major groups based on their shape, size and method of fishing.

Methodology

A survey with reference to various fish trapping devices and methods was conducted in forty river fishing grounds, twenty seven wetlands, eight landing

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centres and sixty seven fishing villages in the entire stretch of river Brahmaputra and floodplain wet lands (*beels*) in the state Assam during 2004-2007. The gear survey was conducted following a prescheduled proforma⁹ and the technical specifications and design details of the gear and mode of operation were recorded. Based on the proforma, the details such as general dimensions, material and construction details were collected from more than 120 fishermen, 70 lessees, mohaldars and middleman, etc.

Results

The identified fishing traps were classified into 5 major categories with 28 varieties based on the principle of capture, design, and operational methods (Figs. 1-14).

- (i) **Hiding place:** Artificial implements or devices stuffed with bunch of twigs, bushes, weeds, etc. which affords refuge for lured fish and whence the fish are captured based on its modus operandi. The major fish catch are *Mastacembelus armatus*, *Mystus* spp., *Puntius* spp., *Clarias batrachus*, *Channa gachua* and small prawns.
- (a) **Dolonga/ Derjakori/ Tak:** This is a bowl shaped bamboo woven trap usually filled with weeds, tree branches, twigs to provide shelter to the fish. The anterior open end of the trap is supported with bamboo hoops to provide rigidity. The trap is placed and lifted from water with the help of two whole bamboo poles along the diameter (2.5 m) of the trap. The trap is mostly used to catch fish in *beels* and slow flowing water bodies throughout the year. A bamboo pole or a banana trunk is used to mark the location of the trap in water. The approximate cost of such gear is ` 500.00 and has a life span of 2-3 yrs (Fig. 1).
- (b) **Hukuma:** This is a funnel shaped bamboo made trap stitched intermittently with thick bamboo splits to provide rigidity. Fish enticed from its open end (0.9-1.3 m dia) cannot retreat back. The 2.25 m long trap is mostly operated in *beels* and mild flowing rivers (Fig. 2).
- (c) **Khoka:** This trap resembles *hukuma* in its shape except its mode of construction. This trap is constructed of a single piece of a bamboo of 1 m length where one end is complete and united while the opposite end is split as to cause them to diverge from one another (0.6 m dia). The trap is operated in weed infested water bodies at lesser depths. The trap is lifted periodically to remove the fish. This trap ranges from ` 30.00-100.00 in price in market.
- (d) **Chunga/ Dhun:** This is a simple piece of bamboo or betel nut trunk of 0.5-1.0 m length and closed at one end by a node. The trap is placed at the bottom of a water body at a reachable depth and is marked with a float to locate its position. Fishes enticed inside are caught.
- (ii) **Barricades/ Barriers:** Complete barriers principally made of various non textile materials which prevent the escape of fish from a certain natural area in which they have voluntarily entered after having been intercepted in their natural course of migration or movement in their search of food and breeding grounds.

Barriers, locally known as *banas* are often installed across rivers and channels connecting to *beels* in the configuration of alphabet "V". These are made of closely woven bamboo splits fastened together with coir and plastic ropes permitting as low as inters pace 0.5-1.0 cm between them. The inner wall of the submerged portion of *banas* is further lined with mosquito netting serving as a guide wall to lead the fish into a lever operated dip net installed at the end of the passage. This set is generally installed during the winter season from September to April when water flows at a lesser speed. Priced fishes such as *Chitala chitala*, *Wallago attu*, *Labeo* spp., etc. are its major catch (Figs. 3&4).
- (iii) **Tubular traps:** These are the set traps or enticing devices, exclusive of those made of textile, which prevent the escape of fish by means of trap doors provided with non return valves. The traps vary in shapes. The catch comprises of fishes such as *Mastacembelus aculeatus*, *Mastacembelus armatus*, *Mystus* spp, *Mystus tengra*, *Monopterusuchia*, *Channa punctatus*, *Channa gachua*, *Channa marulius*, *Clarias batrachus*, *Aorichthys aor*, *Chitala chitala*, *Puntius* spp, small prawns, etc.
- (a) **Seppa/ Tepa:** This is a spindle shaped trap, dorso-ventrally flattened having the maximum girth at the mid and tapering at the ends. This bamboo woven trap varies from 0.2-0.9 m in length and is provided with 1-4 numbers of trap doors along the mid alignment of the base. The trapped fish is removed from an opening at the posterior extremity. These traps are operated in inundated paddy fields and shallow water bodies during monsoon season. The trap cost `50.00-100.00 (Fig. 5).

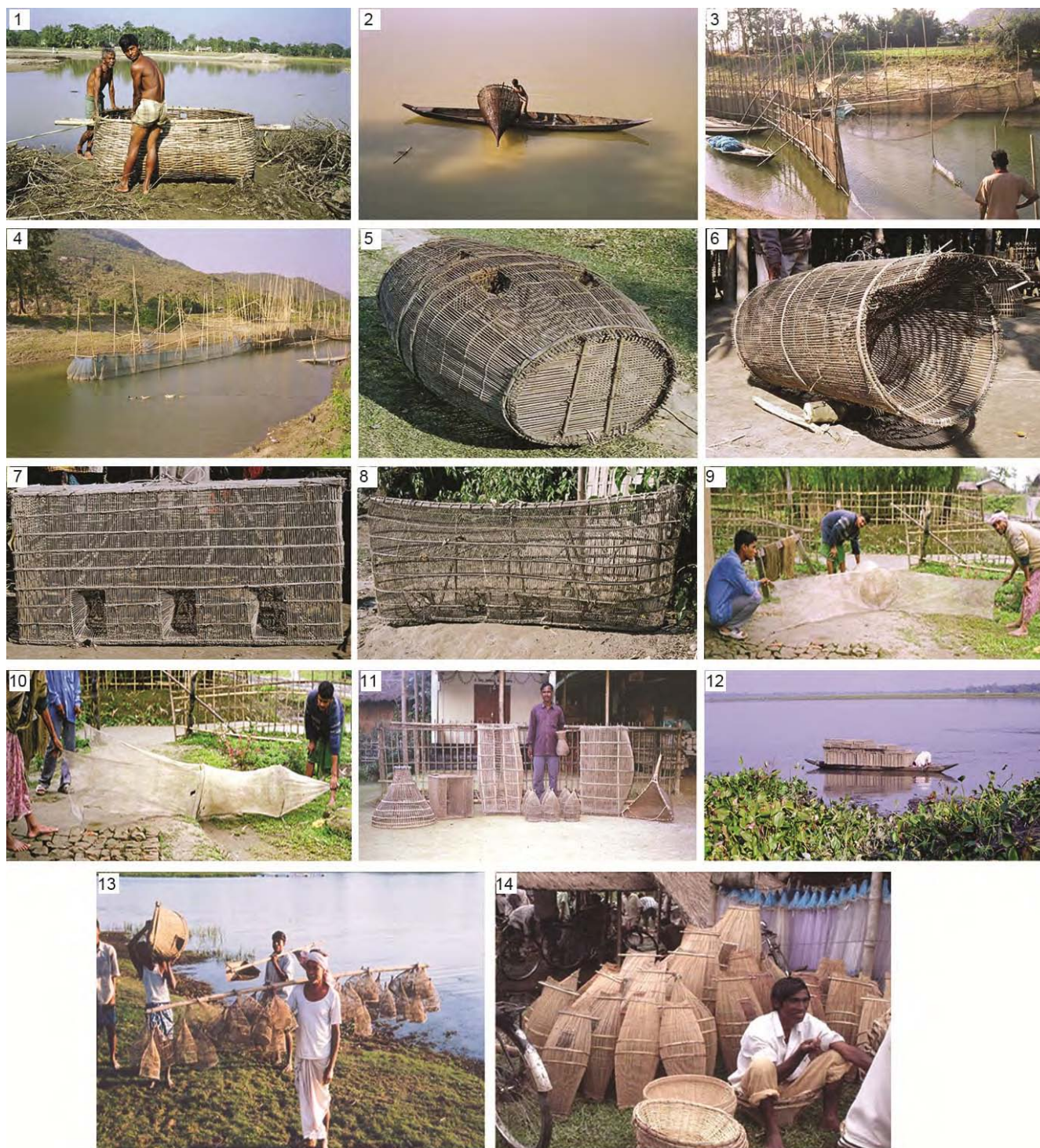


Fig. 1-14—A hiding device (*dolonga*); (2) A hiding device (*hukuma*); (3) A barricade (front view); (4) A barricade (rear view); (5) A tubular shaped trap (*seppa*); (6) A tubular shaped trap (*ghoni*); (7) A box shaped trap (*bosna*); (8) A box shaped trap (*djar*); (9 & 10) A trap net (*ghukuta dingora*); (11) A fisherman with his fishing devices; (12) A fisherman installing his traps in a *beel*; (13) A fishermen with tubular shaped traps; A weekly market for fish traps

- (b) **Bhari/ Seppa:** This is a flower vase shaped trap made of a single piece of thick bamboo. The piece is split up at one end (20 cm dia) while the other end remains complete and united. The trap attains a maximum girth at the mid region and is provided with a trap door located near to the anterior end guarded with non-return valves.
- (c) **Koita/ Kathia/ Seppa:** It is an elliptical shaped trap (32-87 cm length) with maximum girth (0.6-1.5 m) at its mid. This trap has two trap doors, one at the anterior extremity and the other at the mid girth. The trap is operated during rainy season in all types of shallow water bodies. Dry fish, large ants, earthworm are used as baits. The cost of the trap varies from ` 10.00-25.00 and the life span ranges from 1-6 yrs.
- (d) **Ubhoti/ Queen/ Faron/ Kuni/ Tuni:** This tubular trap is higher (0.4-0.9 m) than broad (0.2-0.7 m) and has a uniform circumference from the base to a certain height whence the splits converge into an apex as a bunch, bound round by a cord or rope. The trap is guarded with 2 trap doors with non return valves; one rectangular shaped at the base erected vertically along the height and the other circular shaped fastened horizontally to the inner circumference. Trapped fishes are taken out by untying the bunch at the apex. The trap is operated in flooded paddy fields, catchments of river, derelict water bodies and muddy areas during the occurrence of flood (August-September). Mollusks, earthworm, mussels are used as baits. Cost of the trap varies from ` 15.00-100.00 and may last for 3 months to 3 yrs depending on its usage.
- (e) **Paori/ Doo/ Juti/ Sasha:** This is one of the biggest traps used in Assam. The length varies from 1.2-2.5 m with a diameter of 0.5-0.9 m. Like *ubhoti*, this trap is made of bamboo splits (0.3-0.8 cm thickness) and has a uniform circumference from the base up to a certain height from where the strips converge into a tapering point as a bunch, bound round with a cord. The trap is supported with bamboo hoops along its inner and outer circumferences at regular intervals to provide rigidity. The base is concave shaped with a trap door for the entrance of fish. Based on harvesting method and mouth opening, 3 varieties have been observed. The trap is operated during monsoon months in rivers and *beels*. The cost of the gear ranges from R` 100.00-1500.00 and the life span is 1-3 yrs.
- (f) **Dumukhi paori:** This trap resembles the earlier trap in all details except having a uniform circumference (85 cm dia) all along its height (1.75 m). Both the ends are provided with an oblique trap door tilted inwardly for a depth of 28 cm from the base. Both the trap doors have an inner opening measuring 25 cm in diameter. The trap is operated in *beels* and river with mild flow. The trap is fixed with bamboo poles to hold in position when operated in deeper areas. Approximate cost of the gear is ` 350.00 and the life span is 4 yrs.
- (g) **Dingora/ Bundh dingora/ Runga/ Farom:** This is a drum shaped trap with 1-2 numbers of non-retractable trap doors, one followed by the other. The anterior end is circular in configuration and possesses one of the doors while the posterior end is closed and varies from triangular to trapezoid shape. A small outlet at the posterior end is used for removing the enticed fish. The gear varies from 0.4-0.8 m in length and the 0.2-0.4 m in breadth. This trap varies in design and rigging from one place to another and hence the cost and life span.
- (h) **Ghumai khowa:** The trap is drum shaped with a circular base of 0.7 m diameter attached with a trap door. Usually a bamboo screen is erected at the opening to lure fish into the trap. Fish is harvested from a small window measuring 19 x 14 cm fabricated at the mid region of the trap. This bamboo woven trap measures 1.6 m in length and is operated in *beels*, rivers and lotic water bodies. The cost of the gear is ` 600.00 with a life span of 5-6 yrs.
- (i) **Ghoni:** The trap is a cylindrical in shape with a uniform circumference of 1.3-1.9 m diameter and 0.8-1.5 m in overall length. The anterior end has a non-return trap door while the posterior end is closed. The webbing over the trap door is further extended as a hood for a length half of its circumference. During operation, two traps are installed on opposite directions with a *bana* screen erected bisecting the doors luring fish to enter from both the directions. The trap is operated in *beels* and rivers during monsoon with a peak season from May to August. The trap costs ` 250.00-500.00 and has a life span of 3 yrs (Fig. 6).
- (j) **Khoka:** This is a bottle shaped trap measuring 0.5 m in length. The narrower end (9 cm dia) is plugged with weeds at the time of operation while

the broader end (16 cm dia) is provided with a non retractable trap door. The non-retractable door is inwardly projected (23 cm) with an inner diameter of 14 cm. The trap has a life span of one year and priced at ` 25.00-30.00. The trap is operated in low-lying areas and in pond dykes with mild current.

- (k) **Hufa/ Hufi/ Sohora:** This is a funnel shaped trap made of a cut-off piece of a whole bamboo (0.8 m long). One end of the trap is spliced in a manner letting the splits to diverge from one another. The trap is without a trap door and the anterior end forms the mouth (15 cm dia) for letting the fish in. The mouth part is stitched with thin strips in circular fashion to provide rigidity. The price of the gear is ` 10.00 and has a life span of 4-6 months. The trap is operated during rainy season in paddy fields and low-lying water bodies with swift current.
- (iv) **Box traps:** These are box-shaped traps made of bamboo splits finely knitted with cane and bamboo strings. Big sized box traps are provided with a bamboo screen at the mouth to guide the fish into the trap door. The variations seen among the box traps are stated below. The prized catches are *Wallago attu*, *Clarias gariepinus*, *Clarias batrachus*, big sized murrels, *Labeo gonius*, *Mystus spp.*, *Mastacembelus armatus*, *Colisa fasciatus*, *Puntius spp.*, *Anabas testudineus*, *Heteropneustes fossilis*, *Botia spp.* and prawns.
- (a) **Ghoni/ Gui/ Kholoha/ Sepeti:** These are box shaped traps with minor variations among them. All these traps are higher than broad and are provided with a trap door from the base to the apex along the height. The fish is removed from an opening at the top. The trap ranges from 50-78 cm in height, 37-66 cm in length and 37-67 cm in width. Mouth width varies from 4-23 cm. The traps are operated in slow flowing rivers, *beels*, and paddy fields. These are generally set against the current and are provided with baits, usually earthworm. The cost of the gear is ` 60.00-500.00 with a life span of 1-2 yrs.
- (b) **Dingori/ ghoni:** This trap resembles the above in most details. Here, both the anterior and posterior sides are curved outwardly. The trap is 0.7-0.8 m in height, 0.3-0.5 m in length and 0.3-0.4 m in width. The width of the mouth varies from 7-10 cm. This trap is operated in shallow portions of *beels*, rivers, and stagnant water bodies mainly during flood season. A bamboo screen is erected at times across a water body between two traps to guide the fish through the trap doors.
- (c) **Dori/ Seppa:** This is a box trap with a 'U' shaped cross section. This trap is higher than broad. The trap door extends from the base to the apex at one end. The top of the gear is usually kept open while the bottom remains closed. The trap is operated during rainy season in shallow depth water. The trap measures 0.5-1.1 m in height, 0.3-0.4 m in width. The width of the trap door varies from 18-24 cm. The cost for the gears varies from ` 60.00-1200.00 depending on the sizes. The life span of the gear is 2 yrs.
- (d) **Farom:** This trap is similar to the earlier ones except having two numbers of non retractable trap doors on either side of the shorter axis. The trap doors are constructed of separate webbings to the main body. This trap measures 0.9 m in height, 0.6 m and 0.4 m for its longer and shorter axis respectively. The trap is operated in the river banks, ditches and small impoundments to catch fishes of size less than 1 kg. The cost of the gear is ` 80.00 having a life span of 1 yr.
- (e) **Noganda farom:** The trap is shorter than broad measuring 29 cm in length, 22 cm in width and 18 cm in height. The trap door has a width of 13 cm and height of 18 cm and projects inwards for a depth up to 14 cm. The apex and the base are closed. The apex has an opening for harvesting the trapped fish. The cost of the trap is ` 20.00 with a life span of 2 yrs.
- (f) **Boldha/ Ghoni:** This is a long box trap with its height shorter than its length. This trap is somewhat intermediate in design between the rectangular type boxes and the ones with circular posterior ends. The length of the trap varies from 0.3-0.9 m, width 0.2-0.3 m and height 0.2-0.3 m. These traps are operated in shallow region of rivers, *beels* and paddy fields. Small snails or crushed bigger snails are used as baits. Cost of the gear is ` 40.00-150.00 with a life span of 1-2 yr.
- (g) **Koliha:** This trap is similar to the previous one with the exception that instead of one, two trap doors run from the base to the apex on either sides of the shorter axis. The width of the trap door is 10 cm and projecting inward for 23 cm. The length of the trap is 0.5 m, width 0.4 m and has a height of 0.5 m.

- (h) **Darki/ Seppa:** This is a long box trap provided with 1-2 trap doors placed just above the base along the longer axis. The length of the trap varies from 0.6-1.5 m, width 0.14-0.43 m and height 0.3-0.7 m. The trap door measures 4.5-25 cm in height, 3-18 cm in width and 8.5-17 cm in depth. The trapped fishes are harvested from an opening at any of the rear ends at the apex. The opening measures 8-16cm in length and 4-16cm in breadth. This trap is operated either single or in series, provided with bamboo screens. The trap is priced at ₹ 250.00-550.00 with a life span of 2-3 yrs.
- (i) **Bosna:** It differs from the above one in having three small sized trap doors placed at the periphery along the length of the box on each of the sides. In some varieties, the middle door among the three is replaced by a bigger door running along the height on either of the sides. The door measures 16 cm in width having a depth of 20 cm (Fig. 7).
- (j) **Boldha:** This is similar to the above two traps. This trap has a trap door that runs from the base to the apex along one of the shorter axis. The small sized trap doors are absent. The trap is provided with a bamboo made device for keeping earthworm as bait to lure the fishes to enter. The trap measures 0.28 m in length, 0.09 m in width and 0.3 m in height. The cost for the gear is ₹ 30.00 with a life span of 2 yrs.
- (k) **Diar/ Bosna:** This is a basket shaped trap with bulging sides from base to the apex. The trap has a broader base and narrow apex. The trap is longer than its height and is provided with 2-4 trap doors at the periphery of the base. The fish is harvested from an opening at the apex. The trap is 0.41-0.81 m in height, 0.7-2.1 m in length and 0.10-0.47 m in width. These traps are operated in series fixed to the ground with mud or by anchoring with stout bamboo sticks usually in rivers, paddy fields during the onset of monsoon. The cost of the gear is ₹ 300.00 with a life span of 2 yrs (Fig. 8).
- (v) **Trap nets:** Trap nets are devices made of knitted fabrics, consisting of wings and a series of funnel shaped entrances, which lead into a closed sac, there forming a trap from which exit is difficult.

Trap nets or *fyke* nets are 3-4 m in length grounded during operation with external stout bamboo sticks. These traps are made of small mesh size nets. The rigidity of the trap is provided with 2-3 bamboo or

iron made rings of 0.4-0.5 m dia stitched to the inner circumference of the body with an inter space of 0.7-0.8 m. The fish is harvested from the cod end. The mouth part is provided with two wings of 1.5 m length and 0.5-0.6 m width projected from the either side of the first ring to lure the fish into the trap. The net is operated in shallow regions of rivers during the rainy season mainly during April to September. Cost of the gear is ₹ 300.00 with a life span of 1 year. *Macrobrachium* spp., and small sized fishes are the major catch (Figs. 9&10).

Discussion

A wide number of traditional fishing gears and methods used for harvesting the fishery resources have been developed by the fishers of state Assam (Fig. 11). Traps are unique of their own as these are indigenously designed and fabricated by the traditional fishermen themselves, taking into consideration, the area, location and behaviour of the fishes. Majority of the traps are made up of bamboo strips and are widely used throughout the state in the rivers, *beels* and other wet land areas (Figs. 12&13). They are fabricated in different shapes and sizes and are comparatively cheaper and efficient than other traditional fishing gears. A single type of gear may be known by different names with locality, and sometimes a common name for variety of gears in different districts. 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 (Fig. 14). Traps can be made selective fishing gear, if proper escape devices are provided in the traps to facilitate the escapement of juveniles.

Conclusion

Inland capture fisheries are complex in nature, involving a wide variety of activities undertaken by people from the widest spectrum of socio-economic backgrounds. Trap fishing has economic and energy related advantages over active fishing methods. Moreover, trap fishing is highly fuel efficient both in terms of returns biomass per unit of fuel consumed. The simplicity in its design, construction, operation and low investment cost makes the traps the preferred gear for the small-scale fishermen. Their design usually conforms to the behavior and type of the targeted species including habitat and swimming layers. Traps made of bamboo splinters are subject to putrefaction subjecting to lesser life span for a few

months. Thus, there is scope for modernizing the fishery by using durable traps made of synthetic material in the Brahmaputra valley.

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