



Drive-in-Net Fishing Technique in the Brahmaputra River Valley

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ABSTRACT

Drive-in-nets was a mobile impounding net where the technique of fishing was by driving the fish into the stationary gears by scare lines. These gears were readily operated on the banks of river Brahmaputra and were locally known as *sonajal* in Assam. The gear was comprised of a bamboo framed lift net (*pahjal*) where the capture was affected by the process of confining fish driven by a scare line (*rosi*). The net was made of polyamide multifilament webbing having mesh size of 7-10 mm. The scare line measured 41-135 m in length and was either made of old discarded drag nets of polyamide multifilament material twisted into a line or by a single Polyethylene rope attached alternately with pieces of tortoise or buffalo bones and bricks. A tickling sound by these bones and bricks when dragged over the bottom drove the fishes over the stationary gear. The catch was mainly comprised of small sized fishes viz., *Eutropi ichthys vacha* (32%), *Clupiso magarua* (24%), *Cabdio morar* (13%), *Opsarius* spp. (10%), *Devario* spp. (7%), *Rasbora* spp (6%), *Esomus danrica* (4%) and riverine prawn (4%), with a catch per unit effort of 1.2-3.4 kg/hr/gear. Drive-in-net was an active gear operated during day period of time, preferably in the winter season (November-March) and had a life span of 22-23 yr. The gear was cost effective, environment friendly and can be efficiently operated by 3-4 persons for securing food from the river.

Key Words: Assam, Drive-in-net, Fisheries, Harvesting, River

INTRODUCTION

Numerous numbers of fishing gears were on record for use by the local and migrant fishermen in the natural water resources of the country (Jhingran, 1991). A few of such earlier records of fishing gear and methods used in Indian water with special reference to the Brahmaputra valley are those of Gurumayum and Choudhury (2007) on river fishing in Northeast India; Pravin *et al* (2011), Baruah *et al* (2013) on fishing gear and methods of the river Brahmaputra; Pravin and Meena kumari (2008), Dutta and Bhattacharjya (2009), Baruah (2014) on traditional and indigenous fishing techniques of Assam. Gulbrandson (1988) has emphasized that developing countries has increasing importance on traditional fishing to provide employment and income of fishing community. A few variations of drive-in-nets has been reported from Lakshadweep,

Hoshangabad and Allahabad in India by Singh *et al* (1998). However, there is hardly any information on drive-in-nets and structures operated in river Brahmaputra and its tributaries. Henceforth, considering the importance of its operational economics for sustainable fisheries and livelihood of the local fishers of Assam, a detailed study on the design, construction, operation of this fishing technique in river Brahmaputra is undertaken in this research work.

MATERIALS AND METHODS

A survey was conducted to study the operation of fishing gears and their methods of application in freshwater systems with special reference to those employed in the Brahmaputra valley. The information on the drive-in nets were collected by personal visits at the fishing sites, landing centers,

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Table 1: Surveyed areas on the river Brahmaputra in Sonitpur and Biswanath districts of Assam

Sr. No	District	Surveyed areas		
		River fishing grounds	Landing center	Fishing village
1	Sonitpur	Singrighat, Jahazghat, Dhenukhanaghat, Toubhanga	Tezpur	Sirajuli, Kalibari
2	Biswanath	Jaluaghat, Panpur	Biswanath Chariali, Gomirighat	Biswanathghat, Biswanath, Puranidagaon

fishing villages and interaction with 23 fishermen, 2 village heads, 5 *mohaldars*, 3 lessees and 3 fishery officers (Table 1). *Sonejal* has been categorized as drive-in nets in this present work based on the classification of Brandt (1984); Sreekrishna and Shenoy (2001). The technical specifications and design details of the structure and method of operation were recorded following a prescheduled Performa by Miyamoto (1962) and Nedelec (1975). Fish identification was performed at the site on the basis of morphometric and meristic characters by Jayaram (1999) and Eschmeyer *et al* (2018). Photographs were taken with the aid of digital camera Sony Cyber-shot DSC-77 at the fishing and fabrication sites. Catch and effort data were analysed to calculate catch per unit effort (CPUE) of the gear based on the time of operation of the gear by using the formula, $CPUE = C_t / E_t$, where CPUE is catch per unit effort (kg/hour-gear), C_t is catch in time t (kg), E_t is effort in time t (hour-gear).

RESULTS AND DISCUSSION

The principle of capturing fishes in drive-in-nets was by scaring them to drive into a stationary gear. A drive in net was made of two units; a mobile lift net (*pahjal*) with a scare line (*rosi*) and was operated mostly in the middle stretch of the Brahmaputra valley. This gear (drive-in-net) was locally known as *sonejal* in Assam. The lift net was constructed with a frame and was assisted by a scare line during operation to scare the fishes in process of confining fish. The two units of the gear are described as;

Push net (*Pahjal*)

Push nets were commonly used in water bodies of Assam and were locally known as *pahjal*. The net was hung on a 'V' shaped bamboo frame. The bamboo frame consists of two whole bamboo pieces of which, one was longer than the other. The longer and the shorter poles measured 5.5 ± 0.2 m and 4.5 ± 0.5 m in length respectively. The diameter of the bamboo poles may vary from 2.5-5.3 cm. The shorter one was tied to the long bamboo pole and was movable. The free end of the longer pole formed the handle of the net, which helped in lifting (Fig. 2). The mouth part of the 'V' shaped frame was devoid of bamboo. The net was made of Polyamide multifilament (210x1x3) with a mesh size of 10 mm at the mouthpart followed with 7 mm mesh size at the remaining part of the net.

Scare line (*Rosi*)

Two types of variations were observed in the fabrication of scare lines. In one type, the scare line was made by twisting a few old discarded drag nets of PA multifilament materials. These lines were 3.0-3.5 cm in diameter, heavy in weight and were easily sinkable in water. In other cases, a polyethylene rope of 1.0-1.2 cm in diameter was used. The rope was alternately attached with pieces of animal bones and bricks (Fig. 3). The animal bones were prepared from the left over carcasses of tortoise or buffalo. The bones and the bricks were tied equidistantly at 30-45 cm from each other. The polyethylene rope was light in weight but sinkable due to the attached pieces of bones and bricks. In either of the scare lines, the length ranges from 41-135 m depending on the mass of water to be

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enclosed during operation.

Mode of operation

The scare line (Fig.3) was paved in the form of an arc covering a certain mass of water. The scare line was slowly and gradually dragged over the river bottom towards the stationary lift net (Fig.2), finally confining the fishes within the limit of the triangle. Here driving by scaring into the stationary gears was the mode to capture fishes. This net (*pahjal*), locally known as *sonejal* in Sonitpurand

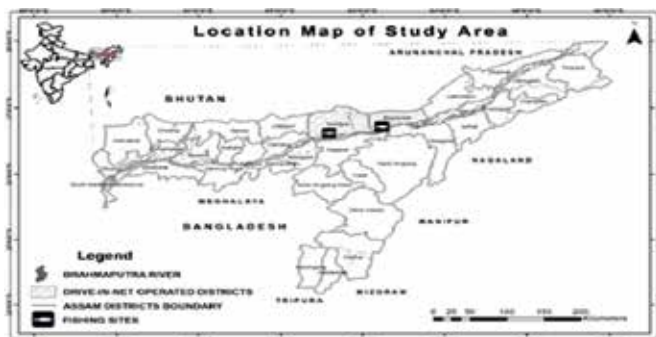


Fig. 1: Map showing the operational area of drive-in-net (*sone jal*) on river Brahmaputra

Biswanath districts was usually operated in shallow sandy sides of river Brahmaputra. Three persons were required to operate the gear. One man held the net (*pahjal*) on the shore while the other two pulled the scare line (*rosi*) from either ends towards the net (Fig. 5). The scare line was pulled from any part of the water body towards the shore where the net was placed. The tortoise shell or pieces of buffalo bones attached to the rope alternately with brick pieces produced a tickling sound when dragged over the bottom. This sound scared the fish to swim towards the net lied over the river bottom. Once the fish gathered over the webbings the net was lifted. The process was continued for few times in the same area. The gear was shifted to another suitable site as soon as the fisherman experienced a lower fish catch at a particular site. The fish harvested were mainly comprised of *Opsarius* sp., *Devario* sp., *Rasbora* sp., *Clupiso magarua*, *Eutropi ichthys vacha*, *Cabdio morar*, *Esomus danrica* and river prawns (*Macrobrachium* sp.). The net had an approximately cost of Rs. 1,500.00 with a life span of 22-23 years



Fig.2: Installation of the push net (*pahjal*) at a suitable river site



Fig. 3: A fabricated scare line (*rosi*) with bricks and bone pieces



Fig.4: The scare line for operation on river Brahmaputra



Fig. 5: Operation of drive-in-net (*sonejal*) by driving the scare line (*rosi*) towards the push net (*pahjal*)



Fig. 6: Percentage contribution of fish catch in drive-in-nets

(bricks and rope was replaced periodically).

Drive-in-nets were mostly seen in the Brahmaputra stretch flowing through Sonitpur district of Assam where the gear was known as *sonejal*. The uniqueness in the gear was the fabrication of the scare line which was alternatively tied with tortoise shell and bricks for producing a tickling sound during dragging. These nets were similar to *kandalivalai* nets consisting of a scare line and three different nets (*fathivalai*, *manakathavalai* and *kandalivalai*) operated in the lagoons of Lakshadweep islands where corals do not formed obstacles. This scare line in Lakshadweep was 300-600 m, made of dried coconut leaves was paved in a semicircular manner over ramose or massive coral substratum from where more fish can be scared into open lagoon water. However, these drive-in-nets operated in coastal areas differed to the one operated in the Brahmaputra valley in their method of fabrication and mode of operation. The operation at Lakshadweep involved dragging the nets and scare lines towards each other whereas the *sonejal* of Assam was stationary and the scare line was dragged at a faster pace. A similar type of operation was observed at Hoshangabad as *chir* fishing, where the scare lines of palmyra leaves threaded with ropes were used to congregate the fish. Three bamboo poles forming the three corners of a triangle were driven in the shallow areas of the river. The scare line was paved in the form of

an arc covering the entire breadth of the river and confined the fishes within the limit of the triangle. The catch was mainly *Mystus* sp. *Gopaljal* of Allahabad were similar to stick held seine net but drive the fish actually into the net by scare lines made of twisting old nets (Singh *et al.*, 1998). The confined fishes, mostly *Mystus* sp., were then caught by lantern nets.

CONCLUSION

The method of operation of drive-in nets in Assam was unique and has no reports in the northeastern part of the country. The information collected herewith was provided by the fishermen communities and the knowledge of fishing by drive-in nets has been inherited from their ancestors, which probably restricts its distribution and operational area in the region. Drive-in-net was an active gear and needs considerable amount of time during operation. The CPUE of the gear was approximately 1.2-3.4 kg/hr/gear as reported by the fishermen. The gear was operated during day time and preferably in the winter season when the water volume and velocity was reduced in the river Brahmaputra. It can be concluded herewith that operation of this gear was cost efficient and an effective technique to gather food for livelihood and nutritional security for the rural fishers of Assam. The method of operation was found environment friendly without deteriorating the fish habitat and fish fauna. The catch composition revealed that the fish species were under the category of least concern in the IUCN Red List and the CPUE of the gear was good enough for the self-sustenance of the livelihood of the fishermen communities.

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