

Traditional Riverine Fish Catching Devices of Assam

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Traditional riverine fish catching devices operated in the Barak, Dhaleswari, Jatinga, Brahmaputra, Dhansiri and Dorika rivers, in Assam have been studied with regard to their structure, operation and productivity. The study revealed the occurrence of 18 types of fish catching devices, which have been categorized into seven groups, viz., (i) hook and line gear (*lar barshi* and *kupa barshi*), (ii) traps (*dori*, *polo*, *dhu*, *hogra* and *chairon jal*), (iii) towed gear (*leua jal* and *pelain jal*), (iv) dip nets (*dheki jal* and *dorar jal*), (v) entangling gillnets (*patan jal*), (vi) seines (*maha jal*, *pan jal* and *basta jal*) and (vii) falling gears (*jhaki jal*, *rekh jal* and *utar jal*). The trap *polo* of river Dorika obtained the highest catch per man-hour (22.52 kg) followed by *jhaki jal* in river Brahmaputra (1.11 kg) and *polo* in river Barak (1.00 kg). *Maha jal*, though a massive gear, has given poor catch per man-hour (< 0.005 kg).

Key words : Fishing gears, Barak river, Dhaleswari river, Jatinga river, Brahmaputra river, Dhansiri river and Dorika river, Assam

A large number of different types of implements are used by different tribes, for harvesting fish from river systems in Assam. The fishing devices in the lentic and lotic water bodies show variations with regard to their fabrication and operation. Fish catching devices of the world have been discussed by Brandt (1980). Fishing implements in the Indian inland water bodies have been studied by different workers (Hornell, 1923; 1937; Anon, 1949; Job & Pantulu, 1953; Krishnamurthy & Rao, 1970; Jones, 1959a; b; George, 1971; 2002; Dutta, 1973; Banerjee & Chakravarthy, 1972; Khan *et al.*, 1991; Ramesan & Ramachandran, 2005). Kar & Dey (1991, 1993, 1996); Kar *et al.* (1999) have studied the different fish catching devices being used in Sone Beel, the biggest wetland in Assam. Kar (2003, 2007) gave a brief overview of the fishing gears of Barak drainage in Assam and in the rivers in Mizoram and Tripura. In the present communication, an attempt has been made to study the diverse fish catching devices, operated in the Barak, Dhaleswari, Jatinga, Brahmaputra, Dhansiri and Dorika rivers, in Assam.

Materials and Methods

The present study was conducted during the period from January 2002 to December 2005 in River Barak in Cachar and Karimganj districts, River Dhaleswari in Hailakandi district, River Jatinga in N.C. Hills district, River Brahmaputra at Dhing in Nagaon district, River Dhansiri at Bokajan in Karbi Anglong district and River Dorika in Sibsagar district. The fish catching devices have been studied with regard to their structure, operation and catching efficiency. Gear efficiency was determined on the basis of catch per haul and catch per man-hour (Dey, 1981). The information was collected by field visits and interviews with the fishermen and fish traders. The economics of the fishing gears was worked based on field data, using standard procedure (FAO, 1974).

Results and Discussion

The different types of fish catching devices observed in the study area have been

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grouped under seven categories. The fishing gears along with their vernacular names, mesh size, average catch per unit effort and target species are given in Table 1.

(a) Hook and Line gear

Lar barshi

In this, metallic hooks of various sizes are tied to coir rope of 400-600 m in length, using nylon twine at an interval of about a meter. The baited hooks are operated near the river bottom and retrieved after a soak time of 4-8 h. The gear is operated by a single fisherman from a canoe. It is generally operated throughout the year in the depth range of 1-5 m.

Kupa barshi

It consists of a hook connected by a nylon line of 30-50 cm in length to a bamboo stick of 1.0-1.5 m in length. Earthworms or small forage fish are used as baits. A single fisherman operates 80-100 units of the gear at a time. During operation, the rod remains afloat in water and the baited hook is hung from it. Soaking time extends to a few hours. It is operated in large number in the shallow areas of the river generally during the dry season.

(b) Traps

Dori

The *dori* is fabricated by knitting 1mm thick bamboo slivers together using cane string. The bamboo mat is strengthened with intermittent thick bamboo slivers. On the inner side of the trap, a V-shaped door with a narrow slit (1.5-2.0 mm wide) is given for the fish to enter. The trap is placed in the shallow regions of the river in the depth range of 0.5-0.8 m. The catch is collected after 8-10 hours of soak time. These are operated throughout the year.

Polo

It has a circular base of 60 cm and a narrow pitcher-like mouth of 10 cm. It is fabricated by bamboo slivers of 3 mm thickness interwoven by cane strings maintaining a gap about 4 cm. It is generally used in community fishing at knee-deep water during the dry season.

Dhu

It is a bamboo cage having a circular base of 45 cm and a conical apex entrance. It is fabricated by bamboo slivers of 40 cm, interwoven using cane strings, maintaining a gap of 2 mm, in between. The fishes caught, are collected through the trap mouth periodically. It is operated mainly during the dry season at a depth range of 0.6-1.2 m

Hogra

It has a circular base of about 60 cm and its fabrication is similar to that of *Dhu*. The interwoven bamboo sticks are, however, 70 cm long with a space of about 3 mm in between. The trap is placed against fast flowing waters in a narrow passage or sluice gate. The fishes flowing along with the current are trapped in the cage. It is operated mainly during September to November at a depth range of 0.5-1.0 m

Chairon jal (Clap net)

It is a kind of trap net used specifically for catching hilsa shad. It is about 15-18 m long and 2.0-2.5 m wide and is fabricated by tying a net along two bamboo sticks, each of 15-18 m in length. The lower stick has a 5 m long nylon string with a 7 kg weight tied to it to help fast sinking. 8 cm long floats are attached to the upper stick at interval of about 12 cm to keep it afloat. A fisherman in a boat rows the gear along the river current to a distance ranging from 0.5 to 1.0 km. When the hilsa shad, moving upstream enters the net, the fisherman closes the mouth of the gear by pulling the string

Table 1. Distribution, mesh size, mean catch per man-hour and major target species of traditional fish catching devices of Assam

Gear Category	Local name of the gear	Mesh size (mm)	Mean catch per man-hour (kg)	Major Target species
River Barak in Cachar District				
Hook and Line	<i>Lar barshi</i>	-	0.002	<i>Channa</i> spp., <i>Mastocembelus</i> sp.
Towed gear	<i>Pelain jal</i>	5	0.133	<i>Puntius</i> spp., <i>Mystus</i> spp.
	<i>Leua jal</i>	10	0.001	<i>Puntius</i> spp. <i>Mystus</i> spp. <i>Amblypharyngodon mola</i>
Dip nets	<i>Dheki jal</i>	20	0.002	Indian major carps, <i>Puntius</i> spp. <i>Salmostoma bacaila</i> .
	<i>Dorar jal</i>	10	0.19	<i>Amblypharyngodon mola</i> , <i>Chanda</i> spp.
Entangling gillnets	<i>Patan jal</i>	10	0.002	<i>Puntius</i> spp., <i>Mystus</i> spp., hilsa shad., <i>Wallago attu</i> .
Seines	<i>Maha jal</i>	10	0.0001	Indian major carps, hilsa shad, <i>Aorichthys aor</i> , <i>Wallago attu</i> , <i>Puntius</i> spp. <i>Mystus</i> spp., <i>Chanda</i> spp., <i>Eutropiichthys vacha</i> , <i>Clupisoma garua</i>
	<i>Pan jal</i>	10	0.002	<i>Salmostoma bacaila</i> , <i>Gudusia chapra</i>
	<i>Basta jal</i>	20	0.35	Indian major carps. <i>Eutropiichthys vacha</i> , <i>Clupisoma garua</i>
Falling gears	<i>Jhaki jal</i>	10	0.01	<i>Puntius</i> spp., <i>Mystus</i> spp., <i>Amblypharyngodon mola</i>
	<i>Rekhjal</i>	50	0.003	<i>Wallago attu</i> , <i>Aorichthys aor</i> ,
	<i>Utar jal</i>	10	0.003	Indian major carps, <i>Wallago attu</i> , <i>Chitala chitala</i> , <i>Aorichthys aor</i> , <i>Bagarius bagarius</i>
Traps	<i>Chairon jal</i>	40	0.0001	<i>Tenualosa ilisha</i>
	<i>Tinon jal</i>	30	0.002	<i>Tenualosa ilisha</i>
	<i>Araion jal</i>	25	0.003	<i>Tenualosa ilisha</i>
	<i>Duion jal</i>	20	0.0005	<i>Tenualosa ilisha</i>
	<i>Buribain jal</i>	15	0.007	<i>Tenualosa ilisha</i>
River Barak in Karimganj District				
Hook and line	<i>Lar barshi</i>	-	0.003	<i>Channa</i> spp. <i>Mastacembelus armatus</i>
Towed gear	<i>Pelain jal</i>	5	0.04	<i>Puntius</i> spp., <i>Mystus</i> spp.
Dip net	<i>Dheki jal</i>	20	0.002	Indian major carps, <i>Puntius</i> spp., <i>Mystus</i> spp.
Traps	<i>Polo</i>	3	1.000	<i>Wallago attu</i> , <i>Channa</i> spp.
River Dhaleswari in Hailakandi District				
Hook and Line	<i>Lar barshi</i>	-	0.002	<i>Channa</i> spp., <i>Mastocembelus armatus</i>
	<i>Kupa barshi</i>	-	0.001	<i>Channa</i> spp, <i>Walloago attu</i>
Traps	<i>Dhu</i>	-	0.71	<i>Glossogobius giuris</i> , <i>Colisa fasciatus</i>
	<i>Hogra</i>	-	0.08	<i>Puntius</i> spp., <i>Mystus</i> spp.
	<i>Chairon jal</i>	40.0	0.0007	<i>Tenualosa ilisha</i>

Gear Category	Local name of the gear	Mesh size (mm)	Mean catch per man-hour (kg)	Major Target species
Towed gear	<i>Pelain jal</i>	5.0	0.11	<i>Puntius</i> spp., <i>Mystus</i> spp.
	<i>Leua jal</i>	10.0	0.006	<i>Puntius</i> spp., <i>Mystus</i> spp., <i>Colisa</i> spp.
Dip netr	<i>Dorar jal</i>	10.0	0.034	<i>Puntius</i> spp., <i>Mystus</i> spp.
	<i>Dheki jal</i>	15.0	0.005	<i>Puntius</i> spp, <i>Chanda</i> spp.
Entangling gillnets	<i>Patan jal</i>	10.0	0.0005	<i>Puntius</i> spp., <i>Mystus</i> spp.
Falling gear	<i>Jhaki jal</i>	5.0	0.033	<i>Puntius</i> spp., <i>Mystus</i> spp., <i>Amblypharyngodon mola</i>
	<i>Utar jal</i>	10.0	0.007	<i>Wallago attu</i> , <i>Aorichthys aor</i>
River Jatinga in N.C. Hills District				
Hook and line	<i>Kupa barshi</i>	-	0.007	<i>Wallago attu</i> , <i>Channa</i> spp.
	<i>Lar barshi</i>	-	0.006	<i>Channa</i> spp. <i>Mastocembelus armatus</i>
Traps	<i>Dori</i>	-	0.027	<i>Glossogobius giuris</i> , <i>Puntius</i> spp., <i>Amblypharyngodon mola</i> , <i>Mystus</i> spp.
Entangling gillnets	<i>Patan jal</i>	10.0	0.0008	<i>Puntius</i> spp., Indian major carps, <i>Tenualosa ilisha</i>
Towed gear	<i>Pelain jal</i>	5.0	0.073	<i>Puntius</i> spp., <i>Mystus</i> spp.
Dip nets	<i>Dheki jal</i>	15.0	0.004	<i>Puntius</i> spp. <i>Mystus</i> spp.
Falling gear	<i>Jhaki jal</i>	5.0	0.012	<i>Channa</i> spp, <i>Mastocembelus armatus</i>
River Brahmaputra at Dhing, Nagaon District				
Hook and line	<i>Lar barshi</i>	-	0.005	<i>Wallago attu</i>
	<i>Kupa barshi</i>	-	0.008	<i>Wallago attu</i> , <i>Channa</i> spp, <i>Puntius</i> spp. etc.
Dip net	<i>Dheki jal</i>	20.0	0.58	Indian major carps, <i>Tenualosa ilisha</i> <i>Puntius</i> spp.
Entangling gillnets	<i>Patan jal</i>	15.0	0.0007	Indian major carps, <i>Tenualosa ilisha</i> <i>Wallago attu</i> , <i>Eutropiichthys vacha</i> , <i>Clupisoma garua</i>
Seines	<i>Maha jal</i>	20.0	0.005	<i>Ailia coila</i> , Indian Major Carps, <i>Wallago attu</i> , etc
Falling gear	<i>Jhaki jal</i>	10.0	1.11	<i>Puntius</i> spp., <i>Mystus</i> spp.
River Dhansiri at Bokajan, Karbi Anglong District				
Towed gear	<i>Pelain jal</i>	5.0	0.45	<i>Puntius</i> spp., <i>Mystus</i> spp.
Falling gear	<i>Jhaki jal</i> (small)	5.0	0.045	<i>Puntius</i> spp., <i>Mystus</i> spp.
	<i>Jhaki jal</i> (big)	20.0	0.032	Indian major carps
River Dorika in Sibsagar District				
Dip nets	<i>Jati</i>	10.0	0.23	<i>Chanda</i> spp., <i>Puntius</i> spp.
Traps	<i>Polo</i>	-	22.52	<i>Wallago attu</i>

attached to the lower stick and the fish is collected. It is operated generally during April to October. On the basis of mesh size, the *chairon jal* are differentiated into various types such as *tinon jal*, *araion jal*, *duion jal*, *buribain jal*.

(c) Towed gears

Among the towed gears operated in the rivers, operation of *leua jal* has been found to be more common in Barak drainage compared to the Brahmaputra drainage. *Pelain jal* on the other hand, is used by most of the fishing communities in both Barak and Brahmaputra drainages. An account of the two types of towed gears are given below:

Leua jal

It is fabricated by tying two bamboo poles of about 1 m long at their bases using nylon twine to form of a 'V' frame to which net bag is attached. The netting is attached to the frame at a hanging coefficient of 0.23. One of the poles is slightly longer (1.2 m) and acts as a handle, during operations. The gear is operated by two fishermen from a canoe in 3.5 – 5.0 m depth from May to October. Field studies revealed that about 7.5% of the landings by *leua jal* generally are trash fishes such as *Amblypharyngodon mola*. This gear is ineffective in catching large fishes. The fabrication cost of the gear is Rs. 2000/-, and the mean catch and returns per haul is 0.3 kg and Rs.16/-, respectively. Catch per man-hour is 0.0012 kg, which is lower than *pelain jal*.

Pelain jal

The triangular frame of this gear is made by tying two bamboo poles of 0.75 m in length and a slightly longer pole of 1.25 m which act as a handle. The netting is attached to the frame at hanging coefficient of 0.80. A single man tows the gear from the shore to knee-deep water (0.5 to 1.0 m). The fish caught are kept in the collecting basket,

which is tied to the waist of the fisherman. The gear is operated throughout the year, unlike *leua jal*, which has pronounced seasonality in operations. The fabrication cost of the gear is Rs. 700/-, and the mean catch and returns per haul is 0.1 kg and Rs.10/-, respectively. Catch per man-hour is 0.113 kg, which is higher than that of *leua jal*.

(d) Dip nets

In the rivers in Assam, particularly in the Barak drainage, the operation of dip nets was initiated by the *Patni* and *Maimal* communities of fishermen since ancient times (Kar, 1990; Kar and Dey, 1993)). An account of the two principal types of dip nets in the rivers is given below:

Dheki jal

It is a stationary type of triangular dip net made from cotton or nylon netting. It consists of two 5 m long bamboo poles tied together to form an acute angle. The net is fastened on the two poles of the bamboo while at the free end, it is supported by a rope. The net operated using a framework of bamboos, is kept immersed in water for some time and lifted for harvesting the fish in overlaying waters. The net, in general, is lifted at an interval of 15-20 min, depending on the availability of fish. *Dheki jal* is usually operated from the last part of August to mid-January. Sometimes, a bamboo barricade is also constructed from the bank to the net for preventing the escape of the fishes, with the water flow. The gear is used to harvest both big and small fishes such as Indian major carps, *Salmostoma bacaila*, and *Puntius* spp. Kar and Dey (1996) reported that the *dheki jal* accounted for 2.4 % of the Indian major carps and 15.3 % of the trash fish catches. Fabrication cost of the gear is Rs. 10000/-. Mean catch and returns per haul is 0.4 kg and Rs.12/- and catch per man-hour is 0.002 kg.

Dorar jal

It is a traditional boat operated dip net. The netting is hung to the frame at a hanging coefficient of 0.5. It is operated using a 3 m long bamboo pole fixed to a flat bottomed craft. Four persons and three crafts are employed to operate the gear. Two of them operate the gear while the other two engage themselves in chasing the fish towards the gear. It is generally seen in operation from September to November. Kar and Dey, (1996) reported that the *dorar jal* landed 18.2% of the trash fishes in the rivers. The gear is used to catch small fishes such as *Amblypharygodon mola* and *Chanda* spp. The gear was found to be ineffective for harvesting Indian major carps. This gear is generally operated during monsoon. Fabrication cost of the gear is Rs. 5000/-. Mean catch and returns per haul is 0.25 kg and Rs.8/- and catch per man-hour is 0.118 kg.

(e) Entangling gillnets

The entangling gillnets are locally known as *patan jal*. In Assam, particularly in the Barak drainage, entangling gillnets were introduced by the *Kaibarta* community of fishermen during the 1950s (Dey and Kar, 1989), which has subsequently become popular among fishermen communities operating in wetlands and rivers (Kar and Dey, 1991). It has been observed that the gillnets operated in these rivers are mostly made of polyamide monofilament. There has been a gradual shift from polyamide multifilament to PA monofilament as gill net material (George, 2002; Ramesan and Ramachandran,

2005). Variations in the construction and operation of gill nets have been found from place to place, due to differences in topography of the fishing area, current and depth of water, target species and mode of operation.

Patan jal

It is deployed to harvest *Tenuulosa ilisha*, *Wallago attu*, *Mystus* spp., *Labeo* spp. and *Puntius* spp. The mesh size of the gear varies in accordance with the size of the fish sought. The gillnet with larger mesh (46 mm) are usually operated to capture *Wallago attu*, *Tenuulosa ilisha* and *Labeo* spp while the gill nets with smaller mesh size are used for *Puntius* spp. (15 -19 mm mesh). Polyamide monofilament netting of 0.3 to 0.6 mm dia twine are used for fabrication of these gillnets. Stone sinkers (80 g each) and plastic floats are used for operations. The gear is generally set at dusk and hauled at dawn. They are operated at depth range of 2 to 4 m round the year. Dey and Kar (1990) reported that landings by *patan jal*, on an average, consists of *Labeo* spp. 0.01%, *Wallago attu* 0.083%, *Tenuulosa ilisha* 0.012%, *Channa striata* 0.23% and of *Puntius* spp 16.9%. Typical sizes of gillnets, mesh size, productivity and returns are given Table 2.

(f) Seines

The seine nets in the rivers and wetlands of Assam, particularly in the Barak drainage, was introduced by the *Kaibarta* community of fishermen during the early 1950s (Kar, 1990).

Table 2. Details of entangling gillnets operated in River Barak

Length (m)	Mesh size (mm)	Fabrication cost (Rs.)	Mean catch per haul (kg)	Mean catch per man-hour	Returns (Rs./haul)
300	46	2000	0.6	0.008	30.00
300	19	2250	0.9	0.002	41.00
300	15	2500	0.7	0.002	28.00

Maha jal

It is the largest beach seine observed in rivers and wetlands of Assam. Its hung height ranges from 7.3-9.6 m in the middle and 1.5-3.5 m at the outer edges. The length of the seine operated in rivers ranges from 300 to 400 m while those operated in wetlands ranges from 300-900 m. The seine is fabricated of cotton or nylon netting of 4 mm with an upper selvedge of 7 mm mesh and hung to 8 mm dia head rope. Indigenous bamboo floats (length: 30 cm), metal sinkers (200 g each) are used for rigging the gear. 100-150 m of fibre ropes are attached to the net for hauling. During operation, the underwater portion of the net is kept vertically erect using floats and sinkers while the epi-surface part of the net is lifted above the water surface with the help of poles in order to prevent fishes from escaping during operation. *Maha jal* is generally operated in rivers from November to February at a depth range of 1.0-3.0 m. 15-20 men, carrying equal portions of the net on two boats proceed towards the centre of the river, and drop the net in a semi-circular fashion as the boat returns towards the shore. After encircling, the net is dragged ashore by pulling both head rope and foot rope and the catch concentrated in the middle of the net is collected. Dey and Kar (1990) reported that the *maha jal* accounts for 17.63% of the Indian major carps and 63.10% of the trash fish catches from the wetlands of Assam. The present study revealed that *maha jal* catches in rivers consist of about 60% of the large fishes and 30% of small fishes. Fabrication cost of a 400 m long gear is Rs. 62000/-. Mean catch and returns per haul is 70 kg and Rs. 750/-, respectively, and earnings per head is Rs. 188/-. Mean catch per man-hour for this type of gear has been estimated as 0.00007 kg.

Pan jal

It is a boat-operated seine and is fabricated by joining 10-15 pieces of nylon

nets together, each 8-10 m in length and 5.0-5.5 m in height. Its total length generally ranges from 100 to 180 m while the mesh size varies from 4 to 8 mm. The foot rope is 6 mm dia and head rope is 4 mm dia. Spindle-shaped 120 mm long wooden buoys are tied to the head rope, at an interval of 10-12 cm for floatation. Towing ropes (2-3 m long) are attached to the head rope and the foot rope at either end to facilitate operation. The gear is operated by groups of six persons. Fishermen carry equal portions of the net in two round bottomed boats and shoot the net to encircle the fishing area at a depth of 1.0-2.5 m. Among the 6 operators, 4 persons lift the net while the other two persons agitate the waters in order to drive the fish towards the net. In Barak drainage, the *pan jal* is operated from October to April for harvesting species like *Gudusia chapra* and *Salmostoma bacaila*. Fabrication cost of a 180 m long gear is Rs. 10000/-. Mean catch and returns per haul is 3.5 kg and Rs. 300/-, respectively, and earnings per head is Rs. 75/-. Mean catch per man-hour for this type of gear has been estimated as 0.002 kg.

Basta jal

The *basta jal* is a type of encircling gear which is kept in fishing position by means of 8 cm long wooden floats and metallic sinkers (200 g each). The *basta jal* has a length of 4.95-6.8 m and depth of 4.5-6.0 m and a mesh size 14-16 mm. The gear is operated by three persons in one boat. During operation, a small portion of the river is encircled with the net. The first person operates the boat, the second lowers the net and the third arranges to encircle the area to capture fish. In Barak drainage, *basta jal* is generally seen to be operated during the period September-February at a depth range of 0.50-2.0 m. Fabrication cost of a typical gear is Rs. 2000/-. Mean catch and returns per haul is 0.5 kg and Rs.15/- and earnings

per head per haul is Rs. 3.75/-. Its mean catch per man-hour has been estimated as 0.34 kg.

(g) Falling gears

Different type of cast nets are commonly used in the river systems of Brahmaputra and Barak. These include *jhaki jal*, *rekh jal* and *utar jal* which differs in size and mesh size of netting used for construction.

Jhaki jal (Ural jal)

This type of cast net is ubiquitously used in Assam. The bell-shaped net, made of either cotton or nylon netting, has a circumference of 11-14 m. About 4-6 kg of iron balls are attached to the perimeter; and total weight of the gear is 7-8 kg. The circumference of the gear is curved inward to form pouches around its inner edge to prevent fish from swimming out, when the gear is lifted out of water after operation. In operation, the fisherman folds and casts it over an area of water. The net is retrieved by a string attached near the centre. In Assam, this type of gear is operated throughout the year at a depth range of 0.5-3.0 m. *Jhaki jal* has been found to be effective in harvesting the Indian major carps and the big catfishes, which formed, respectively, 10 and 20% of the landings. Fabrication cost of a typical gear is Rs. 800/-. Mean catch and returns per haul is 0.1 kg and Rs.1.5/- and earnings per head per haul is less than a rupee. Mean catch per man-hour for this type of gear has been estimated as 0.013 kg.

Rekh jal

It is fabricated in the same manner as *jhaki jal* except that the meshes are much bigger in size. Its circumference ranges from 11.5-15.0 m, and mesh size varies from 35 to 38 mm. Its operation is also almost similar to that of *jhaki jal*. During operation, a portion of the river is pre-selected and four

such nets, carried on four canoes, are cast at a time from four corners of the site for maximizing catch. In Barak drainage, *rekh jal* is operated, generally from November to March, for harvesting fishes such as *Wallago attu* and *Cirrhinus mrigala* and *Aorichthys seenghala*. About 7% of the landings of *rekh jal* was constituted by big catfishes. Fabrication a typical gear is Rs. 700/-. Mean catch and returns per haul is 0.1 kg and Rs. 3/- and earnings per head per haul is Rs. 1.5/-. Mean catch per man-hour for this type of gear has been estimated as 0.0034 kg.

Utar jal

Its operation is almost similar to *jhaki jal* and *rekh jal*, with a larger circumference of 15-18 m and mesh size of 42-45 mm. It is operated mainly during October to January. Fabrication cost of a typical gear is Rs. 4000/-. Mean catch and returns per haul is 8 kg and Rs. 400/- and earnings per head per haul is Rs. 100/-.

18 types of fish catching devices, categorized into seven groups, have been recorded at different locations in Barak and Brahmaputra river systems and their tributaries (Table 2). In terms of catch per man-hour, *polo* of river Dorika obtained highest score (22.52 kg) followed by *jhaki jal* in river Brahmaputra (1.11 kg) and *polo* in river Barak (1.00 kg). *Maha jal* in all the rivers, though a massive gear, have shown poor score in terms of catch per man-hour (0.00007 kg in river Barak and 0.005 kg in river Brahmaputra).

Many of the fishing gears have been operated seasonally. The fishing gears such as clap net, the *leua jal* and the *utar jal* are used during monsoon season, while the *maha jal*, *basta jal*, *bara jal*, the gill nets and the hooks and lines are mainly deployed in rivers during winter season. The *jhaki jal* and the *pelain jal* are operated in all seasons.

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