

Monsoon flood plain fishery and traditional fishing methods in Thrissur district, Kerala

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The breeding migration of the freshwater fishes is known locally as *Oothayilakkom* or *Ootha*. A study has been conducted during 2010 to study the fishery and fishing gears during *Ootha*. The traditional fishing gears, its fabrication and operation in Thrissur district were studied. *Adichil*, *Chaattom*, *Nathoodu* are gears unique to the study area. The impacts *Ootha* fishery on the sustainability of the fish resources and eco-friendliness of these gears were evaluated.

Keywords: *Oothayilakkom*, *Adichil*, *Koodu*, *Ottal*, *Nathoodu*, *Chaattom*

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The two most spectacular phenomena associated with the fishery of Kerala are mudbank (Chakara in local parlance) in the marine sector and *Ootha* or *Oothayilakkom* in the lowland fresh waters. During the first 5-6 days of the South-west-monsoon, the freshwater fishes perform their journey to uplands from the rivers and inland water bodies (natural or artificial) to pair and deposit the eggs. In the lowlands of Kerala, the fishes use the paddy lands as the breeding ground, which is connected with the rivers through a network of irrigation canals (natural or artificial). The fishes find their way through these canals when the paddy fields are flooded sufficiently to deposit the eggs successfully. Carps (Cyprinidae), cat fishes (Bagridae and Siluridae) perches (Cichlidae) are the fishes which are actively perform this migration. This mass breeding migration is called *Ootha* or *Oothayilakkom* in Malayalam and the catching of these migratory fishes is referred as *Oothapidutham* in local parlance and is hereby translated as Monsoon Floodplain Fishery (MFF). In many places of the state, this *Oothapidutham* is celebrated and the fisher folks including the non conventional fishermen do the active fishing. Diverse fishing gears suitable to harvest these migratory fishes have been designed by the people.

The *Oothapidutham* or MFF has a long tradition and the word *Ootha* must have originated from Tamil word *Ootha*, which is a fishing gear used widely in the coastal districts of Tamil Nadu¹. In Kerala, *Ottal*

is used extensively to fish during the onset of monsoon, the breeding season of fishes. *Ootha* thus meant for an occasion in which *Ottal* or *Ootha* is used and in the course of time *Ootha* gained the meaning of migration and fishing process in toto. Still in some parts of Kerala, it is called *Oothal* instead of *Ootha*, may be an exact articulation of the word *Ottal*.

The fishing methods prevailed in the erstwhile princely state of Travancore during the 1940s encompasses three distinct categories, viz. explosives, poisons and traps². The destructive fishing practices included the excessive use chemicals such as Bureaux, Copper Sulphate, Calcium Cyanide and Gelatine even. The article-'Destructive fishing method in Travancore'- further indicated that the unethical fishing by dynamiting and poisoning affected the total fish production in the country particularly the royal fish species such as mahseer (Tor khudree). However, all the above mentioned methods were restricted to rivers during the summer season and most of the methods were exotic².

The traditional wisdom of the fisher folk of the coastal districts of Maharashtra and the fishing crafts and gears designed by fisher folk of Krishna river basin explicitly shows the traditional wisdom perpetuated through generations^{3,4}. The fishing by the native inhabitants of northeast India, Bastar region of Chattisgarh and War Khasi communities in Meghalaya corroborates the consciousness of the stakeholders on their biological resources^{5,6}. Use of plant ichthyotoxins is also an age old practice in the history of fisheries and the ichthyotoxic plants are still

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being applied by the indigenous communities in different parts of India⁷⁻¹⁰.

Kerala state is endowed with 2,26,275 ha of inland freshwater resources comprising 44 rivers, 49 interconnected backwaters, 53 reservoirs and innumerable irrigation tanks, streams and ponds. The Western Ghats (WG), one of the biodiversity hot spots which is rich in aquatic biodiversity and is the source of the rivers of Kerala and harbour unique fish species^{11,12}. Of the 290 fish species reported from the WG, 210 species are found in Kerala with many endemics. Because of the multitude of reasons, several species became endangered and the IUCN included 39 fishes in the endangered and 8 in critically endangered category^{13,14}. Illegal, non-eco-friendly and indiscriminate fishing are the major reasons for the dwindling of fishery resources of the state.

The literature on the traditional knowledge on the inland fish and fisheries are rather scanty. Except the narrations of the fishing practices in Travancore and in northern Kerala, no substantial records are available^{15,16}. The literatures on this floodplain fishery are meagre the article explains various traditional gears used by the indigenous communities, their fabrication, fishery and their impacts on the sustainability of the fish resources of the state.

Methodology

The study was conducted in 2010 in Thrissur district of Kerala. Lying between 10° 00' and 10°47' N latitudes, and 75° 55' and 76° 54' E. longitudes, Thrissur district is bounded by Malappuram district in the north, Palakkad district to the East, and Ernakulum district to the South. Out of the total geographic area is 3,032 km². 4.38% are wetland (13,285 km²) which includes rivers/streams, reservoirs/barrages, waterlogged and sand/beach. In addition to these, there are 91 ponds and tanks spread in an area of 12,762 km²

The study was carried out in 17 villages (Aloor, Avittathur, Eravathoor, Karikkattuchal, Karimbanakadavu, Karuvannoor, Kundoor, Kuzhuchira, Moopanthodu, Nanthonithodu, Nenmanichira, Parippathodu, Poovathussery, Porakkulam, Vennipadam, Valoor and Marianthuruthu) and visits were made before the onset of monsoon to gather the data on the gear fabrication/preparation and at the onset of monsoon to gather information on the MFF fisheries. Altogether 110 fishermen were interviewed to collect the fishery information. The traditional knowledge

and the associated information were collected from the elder generation with the Prior Informed Consent (PIC). Various types of participatory research tools such as group discussion, semi-structured interviews, key informer surveys and site observations were done to collect information. To collect the specific information on the gears used, quantity of fishes collected, historical data, etc, a questionnaire has been designed. The name, age, time of fishing and gears used were recorded with their consent. The observers were also physically present to witness the mode of operation, harvest, etc. All the fishing gears were photographed and process was video documented. The fishes were identified by referring to standard reference manuals. To study the operations of the gears and to obtain the fishery information, we concentrated in the river-paddy-wetland system in Annamanada and Kuzhur panchayats of the district (Fig. 1).

Results

The present study on the traditional fishing gears in use during the MFF comprises both unique and common types. The common gears which are in use in the study area are Ottal, Koodu, Cast net, gill net and Kuthuvala whereas the unique types are the Nathoodu, Adichil, and Chaattom. In addition to these, hunting and handpicking are the special type of fishing practices restricted to the monsoon which exploit the behaviour attached to the fishes during the season. Since the design of the Koodu and Ottal in the study area is different and they are detailed here.

Nathoodu (Pole basket)

This is a primitive and simple traditional fish trap made of bamboo and unique to central Kerala. A

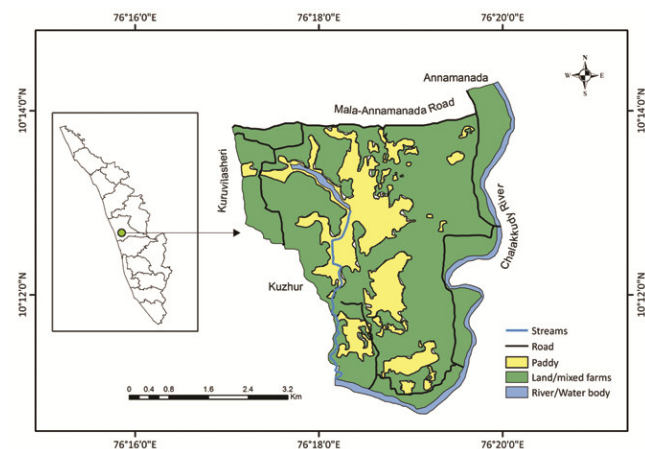


Fig.1—Map of study area-Paddy lands in Annamanada and Kuzhur Panchayat

bamboo pole of 8-10 ft is used for designing the Nathoodu. The pole is cleaved into narrow splits up to $\frac{3}{4}$ of its length (Figs. 2a-b) and the splits are intertwined by four rows giving the shape of a funnel. The Nathoodu is placed in the small cascades or falls. The fishes carried by the water current falls in this and are collected. Though outdated trap, it is still in use (4 Nos) in some areas (Thumboor and Kaduppassery near Irinjalakuda) of Thrissur district.

Adichil

Adichil is a special passive fish trap placed in the water course and it is made of areca nut palm. The areca nut palm is cut and cleaved into small poles of 1-2 cm diameter and 8-10 ft length (length depends on the depth of the water column to be fixed). These, after necessary curing by sun drying, are intertwined by 5-6 rows with high quality coir rope (Fig. 3). This structure of intertwined poles is called as the Adichil (adichil in Malayalam mean to prevent or to hinder).

The Adichil is fixed vertically in the watercourse leaving no gap with the support of horizontal Eucalypts or bamboo poles fixed across the channel. The mid portion of the adichil is looped into a circle of 0.5-1 m diameter (Figs. 4&5). The looping is in such a way that a narrow gap is provided at an angle of 35-45°. The fishes moving against the current, on finding this narrow gap enters into the loop and entrapped. The fishermen enter in to loop through a ladder fixed outside the loop with a scoop net to collect the fishes (Fig. 6).

The Adichil is usually placed in the main canals having connection with the rivers. The site to fix the Adichil in the water course is selected based on the strength of the canal bank, fish movements, level of disturbance, etc. The sluice constructed by the Panchayat turned out to be an ideal site for setting the Adichil. Adichil is operated on the first 5-6 days since the onset of monsoon. An interview with the fishers revealed that the large scale catch will be on the last day which is marked with heavy landing of Wallago attu, Barbodes subnassutus and Horabagrus brachysoma (Table 1).

The cost of Adichil, its construction, fixation and management requires a substantial monetary input. An interaction with the fishermen revealed that in June 2010, they spent nearly Rs. 45,000-50,000. The expenditure for a small Adichil itself is 5,000-10,000/- The Adichil construction and management is mostly a joint venture of 3-10 persons depending up on the size, site, availability of fishes, etc.

Chaattom

Chaattom is a colloquial word meaning 'to jump' and is a fishing trap used exclusively during the monsoon. The main component in Chaattom is the Adichil. However, the adichil is small in size and is placed in the narrow canals within the paddy fields. The adichil is placed not vertically but at an angle of 40-45°. Just behind the adichil, a plastic net of small mesh size (10 mm mesh size) is spread in a loose and slanting manner with the help of two pegs (Figs. 7-8). About 10 chaattoms were recorded in the intensive study area (Kuzhur and Annamanada Panchayats)

During night, fishes moving against water current, hit on the adichil and large sized fishes like Channa and Wallago jump to overcome this hurdle. The jumped fish will fall on the net spread behind. These fishes are collected by the fishermen who guard it with a scoop net or by simple hand picking.

The Chaattom is operated during peak days of fish migration indicated by the continuous rain and it lasts for one or two days. Chaattom become functionless when the fields are flooded and the canal banks are overflowed. The Chaattom is usually operated by one or two persons.

Ottal

It is commonly called as Ootha in Tamil¹. The Ottal is made of 100-105 bamboo (Bambusa arundinaceae) branches or the bamboo sticks. The bamboo branches are cleaned off thorns, immersed in water for 20 days and then sundried to cure by which the branches become strong and resistant to insect attack. At first, sticks/cleaned branches of bamboo are tied on an iron ring of diameter 12-15 cm in such a way that 3 sticks per knot (34 knot x 3 sticks =102 sticks). The iron ring is having 102 sticks hanging down and serves as the mouth of the Ottal. The hanging sticks are joined together by five intertwines with coir rope at an interval of 25 cm. The free down end is made perfectly circular by inserting a ring of Pullani (a woody climber; Calycopteris floribunda) fabricated in appropriate diameter (pullani is cut in required length and kept tied on a coconut tree for 15 days to get a permanent ring shape). The mouth through which the trapped fishes are taken out is made soft by reeling with a coir (or plastic) rope (Fig. 9). The traditional fisher folks of Annamanada and Kuzhur Panchayat have 22 Ottals including the old ones.

The fishermen locate the fishes with powerful light and catch the fish. The ottal is used to entrap highly

sought after fishes like *Channa striata*, *C. marulius* and *Wallago attu* (Table 1).

Koodu

Koodu probably is the commonest passive fish trap throughout Kerala. It is made of bamboo, reed sticks, midrib from the rachis of the coconut palm (eerkil in Malayalam) or Palmyra. It is made in two parts, the main body (Thallakkoodu; Thalla–mother, koodu–trap) and the mouth (Pillakkoodu; Pilla–young, son) both are designed separately. The main body is made of 100 sticks which are interweaved (7-9 stitches) together by coir rope at an interval of 15 cm (Fig. 10). The horizontal free ends are tied together and then made circular by inserting a ring of Pullani with apt diameter. The tail portion of main body is tied/closed when the trap is in operation and the trapped fish is taken out through this. This part of the Thallakkoodu is called as Peele (tail) in vernacular language (= similar to the tail of bird) (Fig. 11).

The mouth of Koodu (pillakkoodu also called thonnikkoodu) is made of 110 sticks/eerkils and these sticks are held together by five stitches of 15 cm gap (Fig. 12). The free ends of the sticks of opposite side are interlaced in such a way that the free parts of the sticks cross each other leaving a circular path below and the anterior part wide giving a conical shape (Fig. 13). A bamboo pole of appropriate length is split into four up to $\frac{3}{4}$ of its length and this fork is inserted into the angles of the interlaced sticks to make it intact. This pillakkoodu is then attached to the main body intact leaving no gaps for the fishes to escape.

During the monsoon fishery, the koodu is fixed in the migratory path with its mouth in the line of water current. The fishes that migrate to the paddy field from the canals against the current are trapped in this. The koodu is advantageous to other devices as all the types of fishes irrespective of size could be trapped. In Annamanada grama Panchayat alone, 46 Koodu of different sizes were recorded.

Kuthuvala

Kuthuvala is a form of lift net of mesh size 10mm mesh size and 5-6 feet length attached well on a round girdle (Fig. 14). Sometimes, two bamboo poles or galvanised Iron (GI) pipes are used instead of the round girdle (Fig. 15). Fishermen whelm the net in the water with moderate flow rate and watch attentively. As the fish trapped in the net, the wriggling of the fishes would be sensed and the net lifted to collect the

fishes. Usually small carps, carplets, bagrids and cichlids are caught by the kuthuvala (Table 1).

Hunting

The hunting is usually done on the first 2-3 days when the water level in the flood plain is very low. The local fisher folks perambulate in the paddy field with the knife and powerful lights. The fishes which migrated to the paddy field to pair and egg lying are located and slashed with knife. The fishermen exploit the unusual behaviour attached with fishes during Ootha that they seldom run away on seeing light or even the predators. This behaviour enables the fishermen to pick them easily either by hand. The fishermen perambulate preferably in small channels through which fishes find their way to uplands (Fig. 16). The snakeheads, minor barbs which shoal to enter the paddy field are collected through this method (Table 1). This migration continues till late night and the fishermen continue to hunt till the morning.

Other mode of fishing

It is observed that there is an obvious transition from the traditional traps to mono-filamentous gillnets and castnets finding the efficiency and good catch (Fig. 17). Mono-filamentous gillnets of varying mesh size are spread in the flood plains or in the migratory pathways. It could also record that gillnets kill wide spectrum of non-fish species like snakes (*Enhydryis dussumieri*) and frogs (*Hylarana malabarica*).

Catch statistics

The total catch of fishes during this ootha from paddy wetland system (489 ha of paddy land) of Kuzhur-Annamanda Panchayats was 1159 kg and that too within in 6 days. Of these, 33.23% of fishes were caught by the gillnet and this is followed by the Koodu (27.25%) (Table 1). Adichil and cast net contributed 13.44% and 12.13% respectively of the total catch. Electrocutation, though in low frequency was also employed for fishing in the study area (Table 1).

Anabas testudineus, *Anguilla bicolor*, *Channa striata*, *Amblypharyngodon melettinus*, *Horabagrus brachysoma*, *Xenentodon cancila*, *Wallago attu*, *Puntius parrah*, *P.mahecola*, *Barbodes subnasutus*, *P.filamentosus*, *Ompok bimaculatus*, *Nandus nandus*, *Macrogathus guentheri* are the fishes caught during the MFF. All these species except the *Anguilla bicolor* were with mature eggs.



Fig. 2-17—(2a)Nathoodu. (2b) Bamboo pole; (3)-Mouth of the Nathoodu; (4) Curing of Arecanut poles for *adichil*; (5) Fabrication of central loop of *Adichil*; (6) *Adichil* in operation; (7) Scooping out the fish from *adichil*; (8) *Chaattom*; (9) *Ottal*; a-mouth; (10) b-interlaces; (11) *Koodu*; (12) Tail (*peelee*) of the *Koodu*; (13) Mouth of the *Koodu*;(14) *Thonnikkoodu*-detached; (15) *Kuthuvala*; (16) Hunting; (17) Gill net fishing

Table 1—Fishes collected through different gears-A case study in the paddy lands in Annamanada and Kuzhur Panchayat of Thrissur district

→ Fish specie														↓ Fishing gears	
	Anabas testudineus	Anguilla bicolor	Channa striata	Amblypharyngodon melettina	Horabagrus brachysoma	Xenentodon cancila	Wallago attu	Puntius parrah	P.mahecola	Barbodes subnasutus	P.filamentosus	Ompok bimaculatus	Nandus nandus	Macragnathus guentheri	Total (% of total catch)
Adichil	4.0	0.0	0.0	0.0	45.0	0.0	73.5	0.0	0.0	33.3	0.0	0.0	0.0	0.0	155.8 (13.44%)
Castnet	0.1	0.0	0.0	19.0	10.5	2.0	73.8	8.8	19.0	0.0	7.0	0.3	0.2	0.0	140.6 (12.13%)
Chaattom	5.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	1.0	1.3	0.0	0.0	3.0	0.0	16.3 (1.40%)
Gill net	52.0	0.0	113.5	5.0	40.5	0.1	103.5	10.0	20.0	23.6	10.0	5.0	2.0	0.0	385.2 (33.23%)
hunting	29.0	21.0	27.5	0.0	5.0	0.0	0.0	0.5	1.0	1.0	0.0	0.0	0.0	0.0	85.0 (7.33%)
Koodu	8.5	8.8	56.0	17.0	30.5	1.0	66.0	36.1	35.0	37.0	4.0	11.0	3.0	2.0	315.9 (27.25%)
Rod and line	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0 (0.08 %)
Kuthuvala	0.0	2.3	0.0	0.5	0.0	0.0	0.0	0.5	2.0	0.0	0.0	0.0	0.0	1.0	6.3 (0.54%)
Ottal	0.0	0.0	6.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0 (0.60)
Rode and line	0.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0 (0.94 %)
Electrocution	0.0	0.0	0.0	0.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.0 (3.01 %)
Total	99.6	32.1	220.0	41.5	167.5	3.1	316.8	55.8	78.0	96.2	21.0	16.3	8.2	3.0	1159.0

Discussion

The fishing practices documented from the study area reflect the traditional wisdom and dexterity of fishing communities. The fabrication and operation of Adichil, Chaattom, Ottal and Koodu requires intelligence and meticulous observations. Ottal has been reported from the Tamil Nadu¹ and the present observation reveals the common pattern in the structure of the Ottal. Koodu the most frequented fishing basket in Kerala differ both in structure and design from the Pari and Katcha fishing baskets reported from Tamil Nadu¹.

The fishing efficiency of gears like Ottal, Koodu, Chaattom and Nathoodu is not high as it depends exclusively on chance and exerts little pressure on the fish resources. The hunting by the fishermen during the Ootha is also depends on the likelihood to see a fish.

The present observation reveals that the mono-filamentous gill nets have replaced the traditional traps in many places studied. The fishers shifted to gill nets and cast nets instead of traditional traps like Koodu, Chaattom, etc. The gill nets of varying mesh sizes (10-50 mm) were used indiscriminately during the monsoon fishing season sweeps apparently almost all macro-aquatic organisms irrespective of size, species, etc. Dead Snakes, swamp eels, frogs and

water birds are frequent sight in the paddy fields where Ootha fishing is intense. A conspicuous reason for the option of gill net is that the fabrication of the even the simplest traditional trap is time consuming and requires considerable monetary input.

The time of operation of a gear/trap is an important factor in determining the eco-friendliness of a trap or gear irrespective of traditional or not. The evaluation of the fishes collected through the traps like Adichil calls for a discussion in this direction. As the fishing by this gear is during the breeding season, most of the fishes landed are berried. The adichil, which is set in the migratory path, practically catches the brooders. In addition to these, there are instances of killing of entrapped fish species which are undesired and uneconomic (Ophisternon benganlense, Carinotetraodon travancoricus).

Most of the studies elsewhere on the traditional fishing methods endorse the role of Traditional Ecological Knowledge on the responsible and wise use of bio-resources. The adichil, though a traditional passive trap could not be considered as eco-friendly particularly when the fishing season is taken into consideration. It also explicitly violates the provisions of the Fisheries legislations of the state. The earlier works on the fish and fisheries of Travancore during 1946 even recommended for a closed season for

fishing during the breeding period². An urgent intervention of the policy makers, Fisheries Department and conservationists is required at this moment for the long term conservation of fishery resources.

Conclusion

The present study illustrates the traditional fishing methods and evaluates the eco-friendliness of these traps. Since the above mentioned traps are used extensively during the breeding season, the eco-friendliness of this TK has to be redefined. The present study calls for the intervention from the fisher folk, researchers and policy makers to ensure the sustainability of resources.

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