

Artisanal fishing methods along the Vizhinjam Coast, Kerala

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Vizhinjam Landing Centre (8° 22' 30" N, 76° 59' 15" E), is one of the important fish landing centres in Kerala capable where fish landings occur all over the year by employing crafts and gears according to the seasonal requirements and availability of fishes. Primarily carried out by traditional crafts and gears, fitted with outboard engines, vessels fitted with inboard engines and other modern gears are not able to operate along the coast due to patchy rocks and steep sloping continental shelf of this region. During the last decade, there was a complete transition from the wooden crafts to fibre boats which made crafts lighter and in turn enabled increase in the speeds of the fishing vessels. Even some of the catamarans which the government had given free to fishers after the 2004 Tsunami, remain at shore. Most of

the traditional crafts along the coast ranged from 25 to 40 feet overall length (OAL). Two outboard engines with 9.9 HP each are used for propulsion. Fishers disclosed that after the Ockhi Cyclone in December 2017, fishing grounds have changed and there is a conspicuous reduction in fish availability. Drift gillnet forms the major gear in fishing operation along the coast followed by mechanised hooks and line and boat seines.. The details of some of the artisanal gears and its mode of operation are given below.

Hook and line fishing: Hand line (*Aachil*) is characterized by the main line of nylon monofilament twines of length ranging from 15 to 20 m with many branch lines tied at intervals of 1.5 m on the mainline and having hooks at



Fig.1. Hand line hooks (with artificial bait) and branch lines

their distal end (Fig.1). At the end of the main line, 0.5 kg iron sinker is attached. The 15 m longline is used during night the 7 m longline during daytime. The monofilament twines are categorized as numbers 40, 60, 80 etc. based on their thickness, with smaller the number the thicker the twine. For day fishing, number 80 main lines with number 60 branch line is used, while for night fishing number 30 is used for both main and branch lines. Similarly, different types of hooks categorized into numbers are used. Hooks used for day fishing range from number 8 to 13 while hook number 15 is used for night fishing. The hand lines are operated from 28-foot fiberglass coated plywood boats (FPB) fitted with 9.9 HP outboard (usually two) engines. Three to four fishermen go for fishing and each of them operates a hand line. Fuel consumption is estimated at about 7 litres per hour with consumption of about 10 litres of kerosene. Apart from FRP boats, catamarans are also employed for the hand line operations. Catamarans made by 4 pieces of 6 m long logs and powered by traditional sail (cotton) with a bamboo pole mast and small outboard engines are in vogue. One to three fishermen go for handline fishing in catamarans with operations carried out throughout the year.

Hand lines with jigs for squid and cuttlefish are made up of monofilament twines number 80 (mainline) having 28 fathoms length with 1 m of number 60 branch attached to it. Six to ten branch lines with jigs (Fig.2) are tied at an interval of 1 to 1.5 m along the main line. Motorized FRP boats fitted with outboard engines with manpower of 6 to 7 are employed in jigging operations. A jig like device made of a long thin steel rod attached with four hooks is used for capturing cuttlefishes and the crab is tied at the middle of the rod as bait. Spindle-shaped lead weight covered using glittery ribbon with attached hooks were also used (Fig.3). Once the cuttlefish get entangled



Fig.2. Squid jigs



Fig. 3. Fishing hook used for jigging cuttlefish



Fig.4. Coconut spadix FAD unit used for cuttlefish fishing operations

in hook, the lines are lifted to collect the catch. Hand jigging is employed both day and night.

Occasionally a few catamarans are also employed for squid fishing which is again carried out during day and night. The peak season for the operation of handlines is during October -November period. Fish Aggregating Devices (FADs) made by tying 8-10 coconut spadixes

tied together using nylon rope (Fig.4) and each such unit attached to sand-filled synthetic bag or stones for anchorage are extensively used for catching cuttlefish (*Sepia pharaonis*). Several units of FADS are placed within 15 to 30 m depths by the local fishermen which are located using GPS at regular intervals. The fishing is conducted in areas ranging from 5 to 15 km from the shore mainly concentrated along Poovar to Varkala coastline. Fishing for cuttlefish using FADs is carried out only during daytime.

Long line fishing: Traditional long line (*Choora Mattu/ Ayiram choonda*) mainly used for catching tunas. November to March is peak longline fishing season along this coast which is operated for tunas, cobia, groupers and snappers. Mainline of number 80 monofilament nylon twine 5 nautical miles in length with 3 m branch line of twine numbers 60 to 70 attached with hooks are employed (Fig.5).

The distance between each hook is 10 m and at the end of every 50th hook, a float (5-litre empty oil) is tied using 1.5 mm thick rope of 75 m length and a sinker (300 g) tied with 15 cm rope. 20 floats are used for every 1000



Fig.5. Long line with hooks to catch tunas

hooks. The hook number 9 is used for tuna, number 8 for cobia and numbers 6 and 7 for groupers. The area of operation is from 15 to 25 nautical mile (nmi) from shore having depths of 48 to 72 fathoms. These crafts usually venture into the sea by 2 am to reach the fishing ground by 5 am and shooting of the lines takes one hour. The hauling of the gear starts after 6.00 am. Sardines stored in ice boxes are used as baits.

Reef long line (*Paruamatu*): This long line is used mainly for catching *Pristipomoides* spp., rock cod, carangids, skates, cobia etc. The main line is made up of number 120 monofilament twine of 4 nmi length with 1.5 m branch lines made up of. number 80 monofilaments attached with hook number 9. The distance/length between each hook is 5 m and for every 100 hooks, a floating line is tied using 1.5 mm thickness rope of 125 m length and two 5 litre empty oil cans are tied to the float line for floatation besides a sinker (300 g) tied with 15 cm rope. The total number of floats used is about 20 for a long line with 300 hooks (Fig.6). The depth of operation is 55, 65, 75 and 110 fathoms at distance of 30-110 nmi from shore.

Shark long line (*Shravu mattu*): In this long line billfishes, sailfish, sharks, yellowfin tuna and rays are caught using either varieties of live coastal tunas or mackerel as bait. The main line is made up of Number 140 monofilament nylon twine with 25 to 90 m branch lines made up of number 110 monofilaments attached with 1 feet long thin silver wire-rope made of 20 strands connected using a swivel, to which hook Number 2 or 3 is attached at their distal end. The distance/length between each hook is measured 50 m with a total of 100 hooks (Fig.7). A float line of 7.5m length of 1.5 mm thick rope was also



Fig.6. Reef long line



Fig. 7. Long line commonly used for sharks and large pelagic fishes



Fig.8. Artificial baits with double hook to catch seer fish

attached at every third hook with a 5 litre empty oil can for floatation. Flag floats tied at both the ends with a black or red flag attached to a pole to identify the ends of the gear. The imported double hooks with artificial bait are now used to catch seer fish (Fig.8). Number 8 hook employed for the capture of fishes weighing about 100 kg cost about ₹200 each. *Thangal vallam* as well as single day fishing boats use hooks for capturing seer fishes and other large pelagics. A bamboo stick with Number 1 hook is used to remove these big fishes from the net.

Monofilament gill net (*Roll vala, Kangoose vala*)

The size of the gear is 100 to 120 m in length with 15 m breadth having 62 mm mesh size. Head rope is of 3 mm thickness with small floats attached at every 3.5 m length and for every float a stone sinker of 150 g is attached. In addition to the small floats at every tenth float 5 litre empty oil can or large spherical shaped float is also attached. (Fig.9). A total of 30 spherical floats are used in each gill net. During May to September when the sea become turbid fishermen adjust the float line to



Fig.9. Monofilament gill net

3 m and during October to April and during full moon phase, 15 m float lines are used and again during the new moon phase the float lines are reduced to 7 to 8 m length. This gear is mainly employed for catching tunas and mackerel. The float line is attached with 150 numbers of 3 inch floats arranged at intervals of 2 m and small stone sinkers corresponding to each float tied to the foot rope of the gear. The end of the net has a float line of 45 m on which 2 five litre empty cans function as floats and the foot rope bears a four kg stone sinker. The gear is preferred due to its light weight and low visibility during day time.

Drift gill net (*Valiya vala, Ozhukku vala*)

These gears operated throughout the year have 9 m breadth with 100 mm mesh size. On the 4 mm thickness float line 120 mm sized floats are attached at an interval of 2.5 m. After every 15 small floats one five litre empty oil can is used as floats and one kg stone sinkers tied at both ends of the gear. Thirty two foot boats for single day fishing operation within 5 to 25 nautical miles and 40 footer fishing boat with fish hold for multiday fishing of 5 to 7 days are seen. These boats usually operate beyond 50 to 60 nmi with a man power of four fishermen. For multi-day fishing 15 to 30 blocks of ice are usually required for preserving the catches. During November to March fishing is conducted up to 50 to 60 nmi and during June to September fishing confined to 5 to 25 nmi. The area of fishing operation is from Kanyakumari to Varkala with operations that starts at 2 pm and the boats reaches the fishing ground by 5 to 6 pm. After shooting the gear it is hauled in after 5 hours and large tunas, seer fish, sharks etc. are caught.

Bottom set gill net (*Thathuvala*)

This gear has 3 m breadth and is made up of 62 mm mesh size monofilaments. Float line is made of 3 mm thickness rope and every three meter a small float is attached. Two foot ropes of 1.5 mm thickness are used for attaching small lead sinkers (20 g) at 40 cm interval and the second rope is used for attaching the net. This gear is operated up to 3 nautical miles from the shore and usually operates within 1 to 1.5 nautical miles from the shore. Three to eight fishermen will be involved in fishing from a boat. In this gear, the disentangling of the fishes caught is highly time consuming and also labour intensive. Catches include flatfishes, crabs, prawns, croakers, skates, rays and chanks. This gear is operated from 5 to 9 am.

Trammel Net (*Disco Vala/Konchu vala*)

This gear is made up of three layered netting with approximately 300 m length. The mesh size of the inner net is 48 to 50 mm and the outer two layers netting is of 100 to 120 mm. Head and foot ropes are of 2 mm thickness. The breadth of the gear is 2 fathoms. The float line measures 30 fathoms. At both end of the gear, three numbers of 5 litre empty oil cans were tied as floats. Besides, sinkers weighing 3 kg was also attached at the end of foot rope. At every 40 cm of the foot rope a lead sinker of 50 g size, and also every three meter of a head rope a small float was also attached. The gear is characterized with two head ropes and two foot ropes, that is head ropes for attaching the three layers of netting also and also for attaching 100 floats and the foot rope for attaching sinkers respectively. A single trammel net unit requires 3.6 kg (3 pieces of 1.2 kg) netting. Trammel nets were operated from 6 am to 7 pm. Usually 4 to 7 fishermen go for this fishing in a single boat and gear is hauled at every 30 minutes.

Boat seine (*Thattu madi*)

This gear is made up of four net pieces, known as *ara vala*, *kuralu madi*, *thelinga madi*, and *ka vala* made of

nylon and has three parts, (i) a short wide mouthed conical bag called the *madi* or net proper made of nylon, (ii) a platform known as *thattu* attached to the lower part of the gear (iii) two long wings attached to the margin of the *thattu* on either side known as *era vala*. Each wing or *era vala* measures 150 m in length with 40 meshes breadth each measuring 1.5 m from one knot to the nearest knot. The distal extremity of the wings on either side is also attached with two nylon ropes known as *Kamba*.

Two catamarans or fibreglass coated plywood boats are employed for operating this gear. The gear is loaded in one catamaran/boat and venture into the sea along with the other catamaran/boats. When a fish shoal is sighted the net is shot and one of the warps is handed over to the crew in the other catamaran/ boat. The two boats move apart and encircle the shoal in the direction opposite to the movement of the shoal. Later on, two boats come close, hauls the net simultaneously and unload the fishes from the bag portion of the net into one boat. The fishermen continue fishing operation if catches are satisfactory. The fishing season is June to October. The fishes caught in this gear are carangids, ribbonfishes, catfishes, clupeids, sciaenids, pomfrets, *Sphyræna* spp., *Sillago sihama*, balistids, *Priacanthus* spp.etc.

Along Vizhinjam coast the main gear used for squid during monsoon season (July-November) is boat seine. The motorized FRP boats fitted with outboard engines of fishermen from Anjuthengu to Kollamkodu concentrate on fishing at Vizhinjam. Boat seines operated along 3 to 10 km from the shore within 20 to 35 m depth. Boat seines are also operated from two catamarans of 5 m size comprising 6 fishermen who row the same with oars. This type of fishing carried out from Vizhinjam to Poonthura or Vizhinjam to Pulluvila, up to 18 fathoms and about 3 km from shore. Squids, anchovies, sardines, prawns, carangids, tuna, sciaenids, *Nemipterus* spp., *Lactarius lactarius*, pomfrets and mullets are caught in this gear.