

## Trap fishing in India

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### Introduction

Nature and mode of operation of fishing gears have a significant role in making fishing responsible and sustainable. Fishing in a responsible and sustainable way is one of the important challenges faced by the fishing industry. Fishing is an energy-intensive process that results in higher operation expenses especially in capture fisheries. Under Section 8.6 under Article 8: of Code of Conduct for Responsible Fisheries envisages the importance of optimum use of energy for responsible and sustainable fisheries. Among passive fishing methods, Trap fishing is one of the energy-efficient age-old fishing methods and it has been widely practiced throughout the world in both tropical and temperate seas (Hawkins, et al., 2007). Pots and traps are gears which make the entry of the aquatic species easy and make the escapement difficult due to special designs. The parts of traps which prevent the escapement may be chambers, flaps, narrow paths, funnels etc. Enormous designs of pots and traps exist throughout the world. Based on the abiotic and biotic factors, pots and traps differ regionally in size, design, operation etc.

### Pots and traps

According to FAO, traps are large structures fixed to the shore. Pots are smaller, movable traps, enclosed baskets or boxes which are deployed from any craft. In India, the usage “Pot” is not much common and the fish trapping devices are generally termed as “Traps”. Traps are generally operated in the area where other types of fishing gears cannot be operated due to uneven bottom or submerged obstacles. The advantages of trap fishing are

- Trap fishing is economic and low energy is required when compared to the active fishing method. They are highly fuel efficient both in terms of f returns and biomass per unit of fuel consumed (Wilimovsky and Alverson, 1971, Mohan Rajan, 1993).
- Organisms caught in the trap can be retrieved alive in an undamaged condition
- Traps can fish continuously day and night and require only periodical tending (Pravin et al., 2011)
- They can be left in the sea during unfavorable weather conditions and can be collected when favorable conditions set-in.
- Capital investment is relatively low and many traps show a high degree of selectivity.

### Mechanism & Type of fish trapping

In India, based on the area of operation, pots and traps are classified mainly into pots and traps of marine and inland sector. The inland traps and pots are very common and popular throughout the country. Even though various marine fish traps are operated for livelihood subsistence, organized marine trap fishing exists only in the Southern coast of the country, especially in Tamil Nadu. Rectangular-shaped trap for fin fishes and semi cylindrical-shaped

design for lobsters are the most widely used trap designs in India. Depending on the level of modernization, traps are also classified into traditional traps and modern traps. Plunge baskets, box traps, filter traps, aproned filter traps screen barrier, bamboo screen barrier, net barrier, *Chemballi koodu*, *chevu*, Kalava traps, lobster traps, crab traps etc are some of the examples for the traditional trapping systems (Remesan, 2006, Remesan and Ramachandran, 2008). Details of some of the important traditional traps (Marine sector) are described below.

### **Marine Fish traps**

The traditional fish traps operated along Gulf of Mannar, Palk Bay and south coast are known as *koodu*. These traps are mainly used for catching perches and perch like fishes. Fishers from Rameswaram evolved extremely elaborate stellate form of this traps with a roomy side chamber in each of the arm and even with 5 entrances of the interior. These traps are made of splinters of babul tree or with thin bamboo reepers or palmyrah leaf stalk fibers (Meenakumari, 2009). The meshes are hexagonal in shape with each side of the mesh having a length of 3-4cm. The length of the trap varies from 60-150cm, breadth from 60 to 120cm and height from 15 to 45 cm.

### **Kalava traps**

Kalava traps are operated for kalava and perches. They are used in rocky sea bottom and submerged reefs in depth ranging 60-150m along the west and east coast of India. Traditional Kalava traps are known as Rameswaram type traps. Modified modern kalava traps are also operational in various part of the country. These rectangular traps made of 10mm dia MS rods with strengthening ribs. These rods are joined together with coil hinges so as to facilitate the collapse of the trap when not in use.

### **Lobster traps**

Spiny lobsters are traditionally caught from the south coast of India with traditional lobster traps. These traditional traps are called as Colachal traps. They are heart-shaped/arrow-headed trap locally fabricated with biodegradable materials. By understanding the shortcomings and operational difficulties of the traditional traps, ICAR-CIFT has developed and popularized modern lobster trap for this region (Meenakumari et al., 2009). These traps were accepted by fishermen (Fig.1) due to their special design and durability.

Gargoor fish traps, Caribbean traps (arrowhead, "Z", "S", etc.); round traps, rectangular traps; "D"-shaped traps, collapsible traps, pelagic fish traps, North Atlantic cod pots, plastic multipurpose traps are some of the common designs used throughout the world. In trap fishing, fishes are caught by attracting (using bait or any other attractant) or forcefully directing to specially designed traps or trapping area by utilising the behaviour of the targeted species. The diversity of fish traps designs ranges from natural structures like rocks and corals to specially designed species-specific traps (Slack-Smit, 2001). Based on the nature of catching mechanism, tarps are classified in to various categories viz. Barrier type, Habitat traps, Tubular traps, Mechanically operated traps, Basket traps , Large open traps, Aerial traps etc.

### **Targeted species**

Most of the fishes, crustaceans and cephalopods can be caught with traps and pots. The catch rate of the trap fishing depends on the distribution and assemblage of the targeted species in the fishing ground also the behaviour of the fishes. In India, shallow-water reef and estuarine fish and shellfish are commonly caught with traps and pots, Most pots and traps used in the tropics have been designed for fishing in reefs, rocky areas and on the rough bottom. The fish,

cephalopods and crustaceans taken include snappers, emperors, groupers, parrot fish, surgeon fish, squirrelfish, angelfish, tropical rock lobsters and others. Pot fishery is widespread in mangrove creeks and estuarine areas for various crabs (mud crabs, swimmer crabs, spanner crabs, etc.), adult prawns (giant freshwater prawn) and a number of offshore shrimps. Various types of squid and octopus are also trapped in most tropical waters

#### **Factors considered during the fabrication of fish traps.**

The cost for material and the charge for fabrication of fishing traps should be made minimal, by using locally and easily available materials. The material used for the construction should be durable and should be able to withstand the physical stress of the fishing environment. If the traps are for marine use, the material used should be sturdy in sea water or it should be coated or treated with suitable anti corrosion agent. By using biodegradable materials, ghost fishing can be prevented in the event of losing the trap during operation. The design should be simple and easy to set and haul. The gear should be easy to carry in the vessel and should not have any complex structures, projections or attachments. The catch quantity can be improved by using a greater number of traps. For this stackability of the gear plays an important role. If the traps are of light weight and collapsible, a greater number of gears can be accommodated in boat or vessel. The design should be selected based on the biological characteristics of the targeted species like morphology, feeding and swimming behavior, niche etc.

#### **Parts of a typical fishing trap**

A typical fish trap consists of the following parts.

**Main frame skeleton (rib):** frames are the main skeleton or ribs of trap. Usually, strong materials prevent the traps and pots from losing their shape during fishing. Wood, bamboo or metal are the commonly used materials for the fabrication of main ribs,

**The outer covering:** This part may be with bamboo slits; synthetic meshes or metallic webbings. In traditional pots, coconut or palms leaves are used. The selection of material is mainly based on the traditional usage, cost and availability.

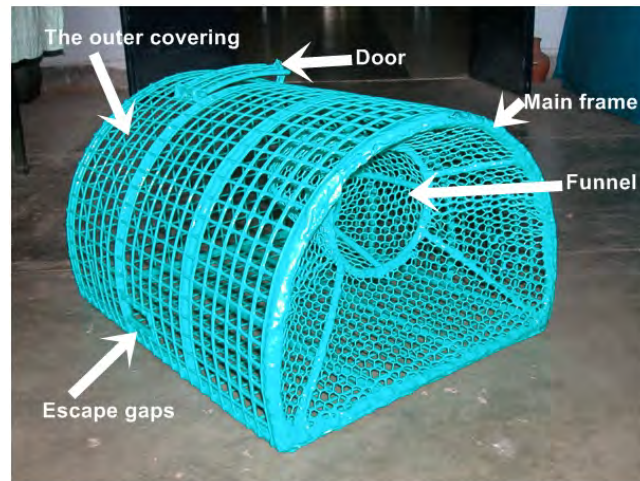
**Funnel (entrance):** funnel or entrance is the major part of a trap. These are the entrance to the trap. The number of funnels varies depending on the design of the trap. The entrance may be single or multiple. Studies show that a greater number of funnels increases the catching efficacy of the gear.

**Door:** Doors are referred to the catch collecting area. Some designs may be provided with, an area where the meshes can be opened and closed for collecting the catch

**Escape gaps:** An Escape vent ensures responsible fishing. These are the gates for the escapement of juveniles entering inside the gear (Fig 1). Escape gaps are common in lobster traps in many parts of the world, but not in India.

**Bait area:** normally bait will be provided in the trap to attract the fishes. Bait will be fixed in the main chamber of the trap with suitable bait bags or chambers. Small pelagic fishes, slaughter house waste and small animals are commonly used as bait for attracting the fishes. Even artificially formulated bait can be used in traps.

**Ballast:** In the area with higher tidal flow or current, suitable weights need to be provided in the traps to prevent losing of traps. Ballast is normally used in the traps constructed with light weight material. Ballast also helps to maintain the original posture of the traps during operation.



**Fig 1. Modern lobster trap (ICAR-CIFT Design)**

### **Operation of traps**

Before operating traps, we should have some basic idea on the type of targeted fish, bait, post-harvest handling, storage of catch and market for the harvest. (Slack-Smit, 2001). Simple trapping and potting can be carried out from small boats or canoes or from large vessels. The efficiency of fishing with pots or traps can be improved by the use of equipment like power winches, haulers etc. Once the fishing grounds are fixed, traps can be setup at any time of a day.

Buoys or floats are normally attached to mark the location of the traps. There will be a buoy line attached to the traps/pots for the operation. Proper rigging is essential for the successful operation of the gear. The type and size of the buoy and the length of the buoy line varies based on the area of operation. Normally the length of float line is kept as one and half to twice the water depth of the fishing ground. The length of the line can be increased if the water current is higher at the fishing site. Bright coloured flags, radar, reflectors and even radio beacons are used in advanced trap designs for easy identification. Traps can be operated as single or in series (Slack-Smit, 2001).

Traps and pots can be operated with or without bait. In the case of habitat traps, there will not be provision for the bait attaching area. Funnel shape and positioning of the bait play important role in catch rate. Normally, centre of the traps is the ideal location for attaching the bait. The position of the bait can be optimised by fishers by continuous trial and error method. Depending upon the targeted species, waste from poultry slaughter house, fish and shrimp waste, molluscan meat, wheat flour mix etc can be used as bait. Quality of a good bait include effectiveness to attract targeted species, easy to attach in the gear, long lasting, local availability, low cost etc.

Soaking time also depends on the targeted species and its behaviour. It also depends on the species abundance at the fishing ground. Soaking time varies from few minutes to two to three days while 12- 24 hours is ideal soaking time. After suitable soaking time, traps can be hauled onboard. This can be done either by hand or by mechanical hauler. After collecting the catch, re-baiting can be done and traps can be deployed again in the same or different location.

### **Ghost fishing in trap sector**

Due to bad weather condition, gear conflicts, physical condition of the fishing ground, entangling of large marine animals etc. there will be a chance to get lost or abandon the fishing

gear during operation. These lost or discarded fishing gear which are no longer under a fisherman's control known as derelict fishing gear (DFG), can continue to trap and kill fish, crustaceans, marine mammals, sea turtles, and seabirds. The most common types of DFG to ghost fish are gillnets and pots/traps. Ghost fishing can impose a variety of harmful impacts, including: the ability to kill target and non-target organisms, including endangered and protected species; causing damage to underwater habitats such as coral reefs and benthic fauna; and contributing to marine pollution (NOAA, 2015). To prevent the ghost fishing in traps fisheries, the following steps can be adopted.

- Using proper ballast and anchoring mechanism
- Always operate traps in good weather condition
- During unfavourable conditions, remove traps from fishing ground
- Select suitable site for the installation of traps
- Always provide escape vent or escaping mechanism in the design.
- Use of biodegradable meshes in specific locations

### **Conclusion**

In India, marine trap fishing is an age-old artisanal fishing technique that is confined to the southern states, especially in Tamil Nadu. Traps are highly energy efficient low-cost fishing gears with high size selectivity. Trapping allows some control over the species and sizes of the catch. The trap entrance, or funnel, can be regulated to control the size of fish that enter. Fresh and live catch ensure premium price to the fishers. Once the traps are set, the fishers can operate other gear or engage in other works to increase their income. There is enormous scope for modernizing the traditional fish traps with the most efficient designs and durable gear materials. In the context of energy conservation and responsible fishing techniques, trap fishing in the artisanal sector needs to be promoted.

### **Reference**

- Cochrane ,Kevern L) 2002(, A Fishery Manager's Guidebook - Management Measures and Their Application FAO ,fisheries technical paper424 .
- Hawkins, Ulie p, callum m. Roberts, fiona r. Gell and calvin dytham (2007) Effects of trap fishing on reef fish communities, Aquatic Conser Mar. Freshw. Ecosyst. 17: 111–132
- Meenakumari, B., Boopendranath, M.R., Pravin, P., Thomas,S.N and Edwin, L. (2009) Eds) Handbook of fishing technology, Central Institute of Fisheries Technology, Cochin:vii+372p.
- Mohanrajan, M. 1993. Fish trapping devices and methods of southern India, Fish.Technol. 36: 85-92.
- NOAA, (2015): NOAA Marine Debris Program. 2015 Report on the impacts of “ghost fishing” via derelict fishing gear. Silver Spring, MD. 25 pp
- Pravin P.,Meenakumari, B.,Baiju, M.,Barman, J., Baruah, D., and Kakati, B (2011) Fish trapping devices and methods in Assam - A review, Indian J Fish., 58(2): 127-135.
- Remesan M.P (2006). Studies on inland fishing gears of north Kerala. PhD Thesis , Cochin University of Science and Technology.
- Remesan M.P and Prajith K.K., 2018. CIFT Meen koodukal (CIFT Fish traps) in malayalam, ICAR-CIFT training manual.

- Remesan M.P and Ramachandran A, (2008) Fish traps in the inland waters of North Kerala. *Fishery technology*, Vol.45(2) pp: 137-146.
- Slack- Smith, R.J (2001) Fishing with traps and pots, FAO Training series 26
- Von Brandt, A. (1959). Classification of fishing gear, p. 274-296. *In* Kristjonsson, H. ed. *Modern fishing gear of the world*. London, Fishing News Books Ltd.
- Wilimovsky, N .J. and Alverson, D. L. (1971) *In*: Kristjonsson, H. (Ed.) *Modern Fishing Gear of the World* Vol. 3, Fishing News (Books) Ltd. London. 509 pp