LOW ENERGY FISHING TECHNIQUES

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Introduction

The continuing rise in the cost of fuel oils has highlighted the need to place more emphasis on improving the fuel economy of fishing vessels. Factors which influence fuel consumption of fishing vessels are (a) hull design (b) the resistance of appendages, such as keel, cooling and other protuberances on the outside of the hull, (c) fouling of the hull (d) machinery (e) the propeller design and (f) the fishing gear and methods of fishing.

Fishing is hard hit by the rise in fuel prices. This is especially true of trawlers. Because of high fuel consumption of trawlers, there has been considerable development in the use of large diameter propellers and nozzles and large reduction gears to improve efficiency. In a fishing vessel eg: trawler, between 80% and 90% of the total energy input is in the form of fuel for the propulsion machinery.

According to an estimate furnished by the Indian Oil Corporation, fishing vessels have utilised 6 lakh tonnes of fuel and oils against 12 lakh tonnes used by shipping transport during 1989-90.

Consequent on the introduction of mechanised boats and modern fishing methods in the late fifties, fishing attained the status of an industry. The widespread use of outboard motors in the eighties brought in marked changes in the traditional sector. The deployment of outboard motors enabled the country crafts to go deeper and farther for fishing. It is estimated that 1,72,000 country crafts, 25,000 motorised crafts and 35,000 mechanised boats are operating in Indian waters.

Traditional fishing is practised in the inshore waters using country crafts depending on manual labour. Mechanised boats utilise engine power for voyages and fishing operations. Motorised craft use engine power for cruising and the fishing

operations are conducted manually. This type of fishing is referred to as low energy fishing.

Low energy fishing techniques have many advantages. Since engines are used only for voyages the expenditure on fuel is reduced. The efficiency of the fishing hands increase as they get rest during the cruise time which also is reduced. The reduced cruise time gives more fishing time. Motorisation enables them to go far and wide in search of fish. The catch can be brought to the landing centre earlier in good condition which increases the market price.

Different low energy fishing techniques are described below.

Gill netting

Gill nets are the most popular and widely used gear. Gill net is a rectangular piece of webbing. The upper and lower edge meshes are attached to the head and foot ropes. The area of the mesh changes according to the ratio of mounting the webbing to the rope. The net is kept in position in the water by using required number of floats along the head rope and sinkers along the foot rope. In earlier days, pieces of light wood were used as floats. This has been replaced by plastic floats which are readily available in different sizes and shapes. The sinkers used are made of lead, iron, cement or stone. There is no hard and fast rule regarding the length and depth of gill nets. It is decided by the ease of operation, fish to be caught, depth of ground and area to be covered. The number of units operated depends on the size of the vessel and number of crew.

The mesh is the basic unit in a gill net. The size of mesh varies according to the size and shape of the fish. The fish is caught by gilling in the gill region or anywhere between the gills and the dorsal fin, entangling or by both. The twine size used depends on the size of the fish to be caught.

The gill net is arranged on board as the vessel starts from base. On reaching the ground the net is shot from one end after measuring the depth and observing the current and wind. When shooting is complete the rear end is attached to the boat with a long rope. The position of the net is indicated by flags at the distant end and middle and during

night, lights fixed along with flags are kept on. This helps other boats and ships to notice the presence of nets under operation. The net is kept in the desired depth by adjusting the floats and sinkers. Larger floats are attached at regular intervals using long ropes. The net is set at surface, bottom or midwater depending on the availability and movement of fish. The net is operated as set or drift. Hauling is done after keeping the net in water for about six hours. The net is hauled from one end pulling the head and foot ropes simulataneously and the fish is taken out.

Long lining

Fishing with long line is another important low energy fishing technique. Hard twisted rope of three to six mm diameter is used as the main line. Branch lines are attached to the main line at definite intervals. The branch lines bear the hooks. Swivels are sometimes attached to the branch lines. The branch lines of surface long lines are long and that of bottom are short. In the former, the portion near the hook is made of twisted steel wire. The distance between branch lines is more than the total length of two branch lines. This method is adopted for catching fast swimming and predatory fish such as shark, tuna, seer and catfish. The selection of the hook is made according to the size of fish and shape and gape of the mouth. Hooks in various sizes and shapes are available.

Hard twisted and tanned cotton ropes were used for lines in earlier days. Now this has been replaced with nylon and polyethylene ropes. Monofilament ropes of 1-2.5 mm diameter are also used. Branch lines of twisted steel wire are used in some places. In some cases twisted steel wire is used in part for the main line adjacent to the sides of the branch lines. There are local variations in the construction of long lines. The number of hooks operated depends on the size of the vessel and number of crew. The main line with a few branch lines make a unit. The gear is extensively used in Tamil Nadu, Orissa and Andhra coasts.

The long line is set in different positions according to the type of fish to be caught. The line is set in the surface waters for tuna, in mid water for seer and at the bottom for sharks. The gear is operated either as set or drift.

Hand lining

Hand lines are very simple and inexpensive. A weight of two to three kg is secured at one end of a 1.5 to 2.0 mm diameter monoline and at a little distance above the weight, branch lines bearing hooks are attached at regular intervals. The weight at the end keeps the line in a vertical position. The hooks are baited and the line lowered into the water. When the fish hooks on the line it is pulled up swiftly. After taking out the fish, the hook is baited again and the operation continued. The use of hand driven line haulers makes the operation easier and faster. This method is used mainly for fishing *kalava* and other reef fish, in and around fish aggregating devices and in places where other fishing methods are impossible.

Trap fishing

Fish traps are mainly used at the sea bottom with uneven ground due to the occurrence of rocks and corals. The traps are made of iron frame covered with webbing. At one end an entrance funnel is provided and at the other on opening is given for taking out the trapped fish. After suspending a bait the trap is lowered into the water with a long rope and a float is tied at the free end. The traps are set individually or by connecting them with rope. The trap is retrieved by picking up the float and then pulling the rope. Traps of varying sizes and shapes are in use. During trap operation, hand lines can also be used very effectively. In the coastal waters, traps and pots are widely used for lobster fishing and crab fishing.

Ring seining

Ring seine operation is popular along the Kerala coast. Ring seine is a modified *Thanguvala* operated from traditional crafts. The introduction of mini purse seine from motorised craft by CIFT acted as a catalyst for the development of ring seine fishing.

The ring seine is rectangular in shape. Seines up to 800 m length with 18-20 mm mesh are used for mackerel and sardine. The gear for white bait has a mesh size 10-12 mm and length up to 400 m. The net is made out of nylon webbings. In the central portion, the rectangular pieces of webbings are

arranged horizontally and on either side vertically. There is a gradual reduction in the number of meshes in depth towards the outer edges. The main webbing is joined with a small strip of polyethylene webbing of similar mesh size along the upper and lower edges and this is fixed to another strip of polyethylene webbing with 75-80 mm mesh size along the upper and nylon webbing at the lower extremes. The sides are joined with triangular pieces of webbings. The net is then mounted to three to four mm diameter rope. Floats are passed through 8-10 mm diameter rope and rigged to the mounted rope on the upper side. In the lower side, sinkers are attached. The purse rings are attached to the foot rope with short bridles. A rope is passed through these rings for closing the bottom. On the sides 'V' shaped bridles are fixed to which the long ropes are tied. Since rings are used to close the net it is called ring seine.

The gear is operated for catching shoaling fish. The net is shot after scouting and locating the shoal. The nature and colour of surface water, the presence of birds etc. are indicators of shoals. The gear is shot very fast encircling the shoal, taking into consideration the wind direction, current, movement of fish and its speed. The purse line is pulled swiftly closing the bottom of the net thereby impounding the shoal. The success of fishing depends on the speed with which the shoal is encircled and pursed. The net is hauled up from either ends and fish bailed out. Overpowering of crafts for ring seining involves consumption of more fuel.

Bag nets

Bag nets are long and conical shaped with rectangular mouth. These nets are known as 'dol nets' along the north west coast. The front portion has larger meshes and meshes towards the tail end are smaller. The net is set in position using heavy stones or stakes and large floats on the head rope. The gear is operated in areas where there is heavy current.. All types of fish are caught in this net. But in the Gujarat coast, bag nets are used mainly for Bombay duck. The gear is also popular along the north east coast. Stake nets are extensively used for prawn fishing in the backwaters of Kerala.

Even though the fishing sector has been divided into traditional, low energy and mechanised, there is no definite demarcation among them. Most of the methods are employed

in all the sectors. The use of gill nets and lines, which are environment friendly, energy saving and selective, needs encouragement and popularisation.

Some fuel saving measures

- Reduce speed
- Use long hull
- Use improved propeller
- Change reduction gear
- Use inboard diesel engine
- Use sail
- Keep hull clean and engine well maintained
- Resort to gill netting, long lining and purse seining
- Avoid overpowering of craft