Commercial Fishing Methods

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The bulk of the world's seafood supply continues to come from the stocks of ocean fish and other marine creatures. To many the methods and equipments used by fisherman appear to be crude and unsophisticated. Technology, sophistication, complexity and investment in vessels and equipment, together with techniques of finding fish and onboard transportation of fish and post harvest technologies are showing rapid growth. Increasing investment in research and development is continuously improving the efficiency of operations and conditions under which fishermen work.

Many different methods of fishing and types of fishing gear for catching commercially important marine organisms have emerged over the centuries; their continued use and development to meet local conditions in many parts of the world has led to be successful, it must be economically viable. If fisherman does not achieve sufficient financial reward, then he cannot continue fishing.

Many years ago man made the change from hunting to farming animals, so achieving a much greater supply of food than was possible from hunting the natural wild stocks. But this sophistication has not yet been perfected so far in the case of sea life is concerned. Encouraging results are being achieved in the case of both fresh water fish and shell fish.

The last four or five decades have seen new concepts introduced, an increased application of technology and accelerated development of existing methods.

The various species of commercially important sea life have different habits, movements and reaction to stimuli (Behaviour of fish to fishing gear). Shell fish such as shrimp, prawns, crabs, lobster, scallops, clams and oysters are found living

on or in the sea bed. Some species of fish such as cod and haddock (Sciaenids and Perches in Indian waters) are often found near the sea bed, while Flounder and other Flat fish (Soles) will often be lying on or just beneath the bottom; these are demersal species or ground fish, are usually caught by fishing gear worked on the sea bed - demersal or bottom trawls, dredges etc.

Pelagic species, such as herring, sardine, mackerel, tuna and anchovy may be found anywhere between the sea bed and the surface, and these are normally taken by the fishing gear that is not in contact with the bottom like purse seines, ring seines, gill nets, lines etc.

The movement and habits of each species are controlled by such factors as water temperature, salinity, spawning habits, migration, availability of food and thermoclines. Some fish such as herring, sardine, mackerel, tuna and anchovy congregate in dense schools so that they can be taken in bulk by seine nets like purse seines and ring seines.

Economic consideration of fishing methods are of prime importance. A fishing method must be able to catch and bring to market sufficient quantities of fish to provide a viable operation economically. Here the question of individual values of each species of fish has to be taken into account. For example, salmon, lobsters, tunas, seer fish are of high individual value while fishes such as sardine, mackerel and anchovy are of low value. If several techniques appear technically acceptable, the one estimated to provide greatest economic return is the usual choice.

The principal types of fishing gear in use by fishing vessels are given below. In some cases the gear will be towed by the vessel (dragging gear), in some it will be used to encircle a school of fish (Round haul nets like purse seines and ring seines), while in others the gear is static, being left in one place for a while and then retrieved together with its catch (gill nets, bag nets, traps, barrier nets, set nets, long lines, dip nets etc.)

Following are the fishing methods

(a) Towed or Dragged gear:

i) Trawling bottom otter trawling, pair trawling and beam trawling
ii) Multi-rig bottom trawling - Double - rig and Twin - rig
iii) Mid-water trawling, single and pair
iv) Dredging

(b) Encircling gear:

(i) Purse seining
(ii) Seine netting (Danish/Scottish seine)

(c) Static Gear

(i) Gill nets and Set nets
(ii) Traps and Pots
(iii) Long lines

(d) Other mobile gear

(i) Trolling
(ii) Harpooning
(iii) Pole and line

The most important commercially used fishing methods in the world are Trawling and purse seining with its many variations like ring seines, ring nets, lampara etc. Purse seining is used primarily to supply raw material for reduction purposes such as fish meal, as in the case of peruvian and chilean anchovita. But in case of India purse seining is employed to catch sardine and mackerel, both are food fish of the country. Purse seining for tuna is employed to a lesser extent by sophisticated

super seiners to catch and process high grade tunas like "Sashimi", "Sushi" and Canned tunas.

Trawling provides the major part of the world supply of fish for use as human good like cod, haddock, shrimp and lobster. Trawling is used to catch bulk quantities of herring and other fishes by mid water trawls for reduction purposes, but not in the case of India and other countries.

Although purse seining and trawling provide most of the world's fish catch, each of the other method is of considerable importance in particular areas of the world (King crab fishery of Alaska, Tuna fishery by Japan, Pole and line fishery for tuna in Lakshadweep Islands).

Many fishing vessels have the capability of changing quickly from the use of one fishing method to another - "Combination fishing vessels" are of particular importance in fisheries where different species are harvested, requiring different techniques, at various seasons during the year. Typical are the combination vessels of the North Pacific coast of Canada and USA which convert rapidly between purse seining, trawling o long lining. Other examples are found in the Icelandic and Norwegian purse seines which convert to long lining, or the typical British Isles inshore vessels which trawl and use the seine net, or perhaps the ring net.

The efficiency of a fishing gear depends upon the reaction of the fish themselves towards fishing gear. This is an aspect of fish behaviour.

Fish finding is a prerequisite of all rational fishing efforts and one of the determinants of economic efficiency. About 50 percent of time are spent on searching for fish in the case of trawling while it is 80 per cent in the case of purse seining. With the growing impact of fish sonar and the subsequent development of larger nets, purse seining has taken a further step towards improving its already high efficiency eg. tuna fishery. The "sonar guided" purse seining techniques have improved tuna landings considerably by the USA, Japan, France and Spain.

Aimed trawling is an instrument controlled, rationally directed catching operations with midwater/pelagic trawls and eliminates blind groping by trial and error. This concept involves all measures for the efficient "Armed" juncture of trawl and fish, originated from the development of one boat midwater trawling, which has been firmly established in commercial trawling. *It is now being extended also to bottom* and semi-pelagic trawling.

On the mechanical side semi-automatic shooting and hauling machinery is available on board modern fishing vessels for handling all types of fishing gear. Powered blocks, automatic winches, safety release, line haulers, loading devices and various other assemblies are examples.

One recent issue is overfishing due to the ever increasing demand for the fish and fishery products by rising population. With the heavy fishing pressure and overfishing there arises the threat or eliminating some species and that threat suggest the clarion call for conservation and management of fish stocks from over exploitation. One solution to prevent over fishing is short term and quickly rewarding periodic closure of known - breeding grounds. Other methods are the introduction of seasonal ban as "Trawl ban" of Kerala and quota systems and multilateral agreed landing rates in the North Atlantic and North sea nations.