



Unit II - Topic 2

FISH HARVESTING, HANDLING AND TRANSPORTATION; CLASSIFICATION

28.1 Introduction

Fish is a source of valuable animal protein and is now considered as a health food. This has resulted in increased consumer demand. Indian fisheries and aquaculture provides nutritional security to the human food and contributes to the agricultural exports and engages very large number of people in different activities. India is the 3rd largest fish producing nations (after China and Indonesia) in the world with the production of 7.3 million MT (FAO 2007). Presently, fisheries and aquaculture contribute 1.10 % to the national GDP, and 5.30 % to agriculture and allied activities, while the average annual value of output during the Tenth Five Year Plan (2002-2007) was Rs31, 682.50 crores.

28.1.1 Classification of fisheries

Fisheries can be broadly categorized into two types - **fin fisheries and non-fin fisheries**. Fin fisheries means fisheries of true fishes, whereas non-fin fisheries is the fisheries of organisms other than true fish like prawn, crab, lobster, mussel, oyster, sea cucumbers, frog, sea weeds, etc.

Fin fisheries can be further categorized into two types **capture fisheries and culture fisheries**.

28.1.1.1 Capture fisheries

It is the exploitation of aquatic organisms without stocking the seed. Recruitment of the species occurs naturally. Capture fisheries is carried out in the sea, rivers, reservoirs, etc. Fish yield decreases gradually in capture fisheries due to indiscriminate catching of fish. Capture fisheries practiced in the sea is referred as **marine fisheries** and **Inland capture fisheries** if it is in the rivers or reservoirs.

28.1.1.2 Culture fisheries

It is the cultivation of selected fishes in confined areas with utmost care to get maximum yield. The seed is stocked, nursed and reared in confined waters and then the crop is harvested. Culture takes place in ponds, which are fertilized and supplementary feeds are provided to fish to get maximum yield.

28.1.2 Fishing techniques

Fishing techniques are methods for catching fish. Use of fishing methods varies, depending on the types of fisheries, and can range from as simple process as gathering of aquatic organisms by hand picking to highly sophisticated fish harvesting systems, viz. aimed mid-water trawling or purse seining



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conducted from large fishing vessels. The targets of capture fisheries can range from small invertebrates to large tunas and whales.

28.1.2.1 Principles of catching fish

The large diversity of targets in capture fisheries and their wide distribution requires a variety of fishing gears and methods for efficient harvest. These technologies have been developed around the world according to local traditions and technological advances in various disciplines like hydrodynamics, acoustics and electronics. Filtering the water, luring and outwitting the prey and hunting, are the basis for most of the fishing gears and methods used even today.

Harvest technologies, as they are practiced today generally fall into 3 main groups:

- } Catching fish singly or in schools by use of nets or spears
- } Trapping fish in stationary gears such as fish traps or set nets
- } Attracting fish to get caught on hooks by use of bait, artificial lures or other means such as light.

28.1.2.2 Fish harvesting methods

Fish harvesting systems includes fishing vessels (craft) and fishing gear. The term fishing vessels is used to denote the mobile floating objects engaged in catching operations. Fishing gear is synonymous for fishing net which is used to catch the fish in the water bodies.

Most significant among the technological developments which support the evolutions of fish harvest technology are

- } Developments in craft technology and mechanization of propulsion, gear and catch handling,
- } Introduction of synthetic gear materials
- } Developments in acoustic fish detection and satellite based remote sensing techniques,
- } Advances in electronic navigation and position fixing equipment,

28.1.2.3 The traditional methods of fish harvesting

Ring seine, Stake net, Chinese dip net, Cast net, Shore seine, Trammel net, Mini trawls, Gill nets, Hook and line, traps and pots

28.1.2.4 Modern methods of fish harvesting

Trawling, Purse seining, Hook and line mechanized Jigging and Trolling lines.

28.1.3 Handling of fishes



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Since fish is highly perishable commodity, it is to be immediately processed into various products to preserve its quality and to increase the shelf life. Fish requires proper handling and preservation to increase its shelf life and retains its nutritional attributes. Fish are particularly prone to rapid pathogenic contamination. The main safety concerns are unhygienic handling during and after fish harvest, insufficient refrigeration, substandard processing and poor packaging. Maintaining the quality of the fish begins with harvest and carries through the harvest to consumption chain.

Handling of fish varies with type of the fish, the processing methods and the intended final product. The earliest practice of fish handling in many part of the world is to keep caught fish alive until cooking and consumption. Till today, this remains to be one of the common fish handling practices.

For harvested fish, the general handling practices after capture are

- } Transferring catch from gear to vessel
- } Washing/Sorting
- } Bleeding/gutting
- } Chilling
- } Chilled storage and unloading

The most important factors to be considered in the initial handling and transport are the temperature, duration of storage/ transport and the hygiene in all respects including that of the handlers.

28.1.3.1 Washing and sorting of fish

The harvested fish should be washed well with potable water to free it from dirt and other extraneous matter. Slime accumulating on the skin surface of dying fish is a protection mechanism against harmful conditions. In some freshwater species slime constitutes 2-3% of body weight. Slime excretion stops before *rigor mortis*; it creates a perfect environment for the growth of micro-organism and should be removed by thorough washing. Water chlorinated at 10ppm level is ideal for initial cleaning.

After washing the catch should be sorted species wise and size wise. Bruised, damaged and decomposed fish shall be separated from the catch during sorting.

28.1.3.2 Dressing

Dressing operations of the catch include **deheading, bleeding and gutting**. This has to be carried out as fast as possible without significant bacterial contamination. Gills and viscera harbour several spoilage bacteria in large number. Therefore, where possible, it is advisable to remove the gills and viscera before the fish is preserved and stored.

28.1.3.3 Deheading



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The head constitutes 10-20% of the total fish weight and it is cut off as an inedible part. Although many mechanized deheading machines had been developed for processing marine fish, freshwater fish are usually deheaded manually.

28.1.3.4 Bleeding

When fish dies, the blood in the fish can clot and turn black or brown in color adversely affecting the color and appearance of the meat. Therefore bleeding is done to preserve the quality of the meat. Slitting the throat followed by hanging the fish by tail or slitting the throat and immersing in cold water are the methods for bleeding.

28.1.3.5 Gutting

The purpose of gutting is to remove those fish body parts most likely to reduce product quality, as well as to remove gonads and sometimes the swim bladder. Gutting consists of cutting down the belly (fish may be deheaded or not), removal of internal organs, and, optionally, cleaning the body cavity of the peritoneum, kidney tissue and blood.

28.1.3.6 Chilling and storage

Decreasing the temperature of the fish to about 0°C slows down the microbiological, chemical and biochemical decomposition processes and extends fish stability. Thus when the raw material is cooled quickly, just after capture, and kept at low temperature during transport, processing and distribution, it meets the basic processing requirements. Its usefulness is extended and at the same time fish quality is maintained.

The most common means of chilling is by the use of ice. Ice is available in several forms such as blocks, plates, tubes, shells, soft and flakes. In modern fish processing plants, especially the small ones, flake ice generators dominate as flake ice ensures major contact surface with fish hence higher cooling capacity, low production cost, relatively dry and will not stick together to form clumps when stored.

Fish spoil more quickly if

- } It has struggled for long in the net or inboard, than a fish, which is killed quickly.
- } Its stomach is full while catching,
- } It is bruised while catching or handling

28.1.4 Transportation of chilled fish

Fish is transported both through air and land. Land transportation of chilled fish is carried out in insulated or mechanically refrigerated vehicles with minimum inside temperature of 7°C. Boxes for land transportation are made of wood, aluminum, high density polyethylene, expanded polystyrene or



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polyurethane. The ideal fish transpiration box should be light weight yet strong enough to withstand the combined weight of fish, ice and stacking and should have good insulating properties. Boxes are usually made of double bottom to collect the melt water.

Air shipment of chilled fish requires a lightweight and protective container. Modern insulated containers are made of high-density polypropylene with polyurethane insulation. Instead of ice, pads of nonwoven fabric encapsulating synthetic absorbent powder are used for chilling of air shipped fish. These pads could be soaked in water and deep frozen for use.

Plywood boxes insulated with 2.5cm thick foamed polystyrene slabs are found to be more useful to transport fish over longer distances involving duration of 60-80hrs.

28.1.5 Marketing practices

The fish marketing is normally done at the collection centers which are mainly situated in the area of fish landing. The fishermen visit the fishing grounds and tend to bring the produce to the nearby market for sale as soon as possible. The fishermen who actually catch fish play only an insignificant role in the disposal of catches. Their role is only to hand over the fish catch to fish merchants at the landing centers for sale. The final distribution and marketing of catch is done by commission agents who step in at this stage.

28.1.5.1 Functions of the fish market

Fish markets are bridges between producers and consumers. The following are the functions of the market.

1. All types of fishes are brought together for selling.
2. Transportation of fishes
3. Storage of fishes
4. Business problems can be solved
5. Fishes can be graded here
6. Money transactions take place in markets
7. Time and distance is saved.

28.1.5.2 Types of markets

Based on the marketing place, production importance and products, the markets can be classified into the following types.

1. **Whole sale market:** More amounts of fish comes to this market, then distributed to other types of markets. Whole sale market can be grouped into two types,



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- a. Primary whole sale market:** More amount of sale of fish takes place in this market. Collection of the fishes from surrounding places and selling the fish to wholesalers takes place. These types of markets are found either in a village or a place covering a group of villages or towns or cities. These are known as shandies.
- b. Secondary whole sale market:** These are also called as gunjs. The fishes are brought from the primary whole sale markets and sold to the wholesalers.
- 2. Terminal markets:** The fishes are sold to the retailers or consumers or to the agents.
- 3. Retail markets:** The fishes are sold to the consumers by the retailers or wholesalers.
- 4. Fairs:** These are found temporarily during festival times or in fairs. The fishes are sold directly to consumers.

References

Hand book of Fisheries and Aquaculture. 2006. Indian Council of Agricultural Research. New Delhi.
Post harvest technology of freshwater fish. 2009. Central institute of fisheries technology. Cochin.