

## **FISHERY**

Fishery may be defined as the natural science that takes care of living organism (fishes) in water. It includes all the activities involved in keeping, feeding, management, harvesting, processing and marketing of fish and other aquatic organisms from natural and artificial water bodies. Examples of fishes includes; tilapia, carp, perch, croaker, mackerel, cat fish, shark, salmon etc.

## **CLASSES OF FISHES**

Generally, fishes can be classify based on their

1. habitat and
2. morphology (structure of the body of the fishes)

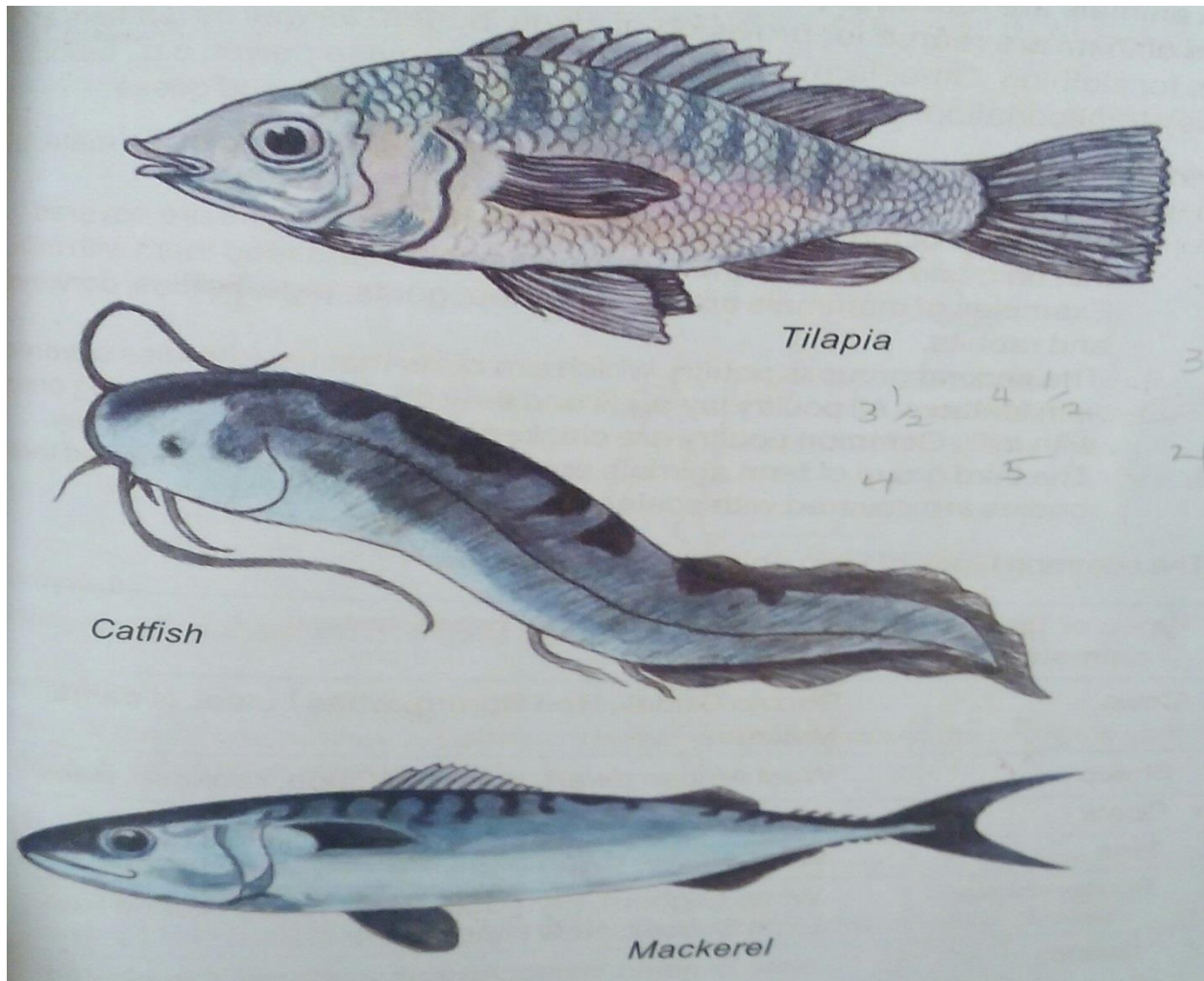
## **CLASSIFICATION OF FISHES BASED ON HABITAT**

Habitat is the home or the living environment of an animal. It has to do with the type of water fishes live and grow in. there are two main types of habitat in which fishes can be found and these include fresh water and salt water. Fishes are therefore classified as fresh water fish and salt water fish.

**FRESH WATER FISHES:** Fresh water is any water that has no salt taste. Examples of fresh water bodies are streams, springs, rivers, ponds, lakes etc. All fish types living in streams, ponds, rivers, lakes, springs are called fresh water fishes. Fresh water fishes cannot survive in sea or salt water environment. Examples of fresh water fishes are trout, pike, carp, perch, tilapia and mudfish.



**SALT WATER FISHES:** Salt water is any water body that has salt taste. Examples of salt water bodies are seas and oceans. All fish types that live in salt waters of seas and oceans are referred to as salt water or marine fish. They cannot survive in a fresh water environment. Examples of salt water or marine fish are bonga fish, croaker, ray, sharks, mackerel, silver fish, sea cat fish etc. Salt water fishes are of two types. Those that live at or near the surface of the water are called pelagic marine fish. The second type called demersal marine fish live at or near the bottom of the sea.



### **Classification of fishes based on morphology**

Fishes can also be classified based on morphology or structure of their body into bony fish and cartilaginous fish.

**Bony Fishes:** These are fishes that possess bony skeletons, gill covers and swim bladders. They can be found among the fresh water fishes and also among the salt water fishes. However, majority of bony trim fishes are found in fresh water. Their fertilization occurs externally. Examples of bony fishes are tilapia, catfish, croaker, mackerel etc.

**Cartilaginous Fishes:** These fishes possess soft bone or bone composed of cartilage. Majority of the cartilaginous fishes are found in the sea (salt water). The cartilaginous fishes are not as hardy as the bony type. Examples of cartilaginous fishes are sharks, salmons, dolphins, skates, rays, dogfish etc

Some of the most important factors which enable fish to live in water are:

- i. **The shape of their bodies:** fishes have a long, streamlined shape which enables them to move easily through the water. Instead of legs, they have fins and a tail which are shaped like paddles and are used for pushing through the water backwards when swimming.
- ii. **The swim bladder:** in order to help them in water, fishes have a sac filled with air inside their bodies; this air-sac is called the swim bladder
- iii. **Gills:** Gills are delicate organs containing plenty of blood near their surface. The gills of fish are present in their mouths and are used for obtaining oxygen from the water. To obtain oxygen from the water, a fish passes water into the mouth and over the gills so that the oxygen in the water passes easily into the blood in the gills. In

this way, fish obtain all their oxygen supply from the water in which



they live.



## TOPIC: FISHERY; OTHER TYPES OF AQUATIC ORGANISMS (SHELL FISH).

It is not only fishes that live in water. There are a number of other aquatic animals that are living in water. These are classified into group as follows:

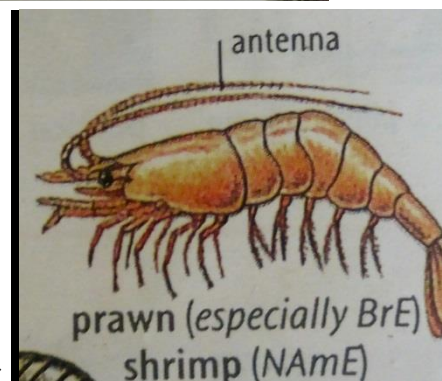
- (1) Crustaceans or Shell Fishes
- (2) Amphibians
- (3) Reptiles
- (4) Mammals

### Crustaceans or Shell Fishes

The crustaceans are not fishes but many a times are harvested with fishes while fishing in the ponds, lakes, rivers and oceans. Most of the crustaceans are edible and they are sold in the markets. Some crustaceans inhabit the sea while others live in fresh water. Examples of crustaceans are prawns, shrimps,



crayfish, lobster,



periwinkles, oysters, crabs, etc.

### **Amphibians**

Amphibians are animals with moist hairless skin through which water can pass in and out.

Nearly all amphibians live the first part of their life in water and the second part on land (a double life reflected in the name amphibians which comes from the Greek word amphi meaning “both” and bios, meaning “life”).

Amphibians were the first animals with backbones to adapt to life on land.

Examples of amphibians are toads, frogs,



etc.

### **Reptiles**

These are animals with tough, dry skin covered with horny scales. Some of the most widespread living reptiles are turtles, lizards, snakes, crocodiles and alligators.

### **Mammals**

These are animals that have adapted to life in the oceans. Mammals in water include hippopotamus, whales, dolphins, seals, etc.

## **TOPIC: USES OF FISH AND FISH PRODUCTS**

The importance of fish and other aquatic organisms include:

1. Food
2. Leather
3. Polishing material
4. Ornaments
5. Soap and medicine

6. Animal feed
7. Building
8. Glue and fertilizer
9. Employment
10. Income
11. Raw materials

#### FOOD

Fish and other aquatic organisms are used mainly as human food. Fish flesh is regarded highly for containing first class animal proteins, vitamins and many minerals salts and other chemical substances that are needed to keep the human healthy and strong. The flesh of fish, crabs, prawns, and squid is very soft and good to eat. Fish and turtle eggs are also commonly eaten. Fish eggs which are salted and prepared for eating are called caviar.

#### LEATHER

The skin of cartilaginous fish such as sharks is tough and covered with small, sharp spines. It is sometimes dried and specially treated to produce very special leather called shagreen. Crocodile and turtle skins also make very good leather for hand bags, wallets, belts, and shoes.

#### POLISHING MATERIAL

Dried fish skin or shagreen is sometimes used like glass-paper for polishing surfaces.

#### ORNAMENTS

The scales of fish are sometimes used to make artificial pearls which can be worn as beads. Oysters contain pearls which are polished and worn as jewelry.

#### SOAP AND MEDICINE

The oil obtained from fish, whales and turtle are used as food and also for the manufacture of medicines and soap. Cod-liver oil is a very popular item consumed by many people as food supplement. Cod liver and other fish oils contain a lot of vitamins.

#### ANIMAL FEED

Many fish and parts of fish which are not eaten by humans are processed into fish and used in the manufacture of livestock feed. For example, fish meal is an important ingredient of popular feed used for raising chickens, turkeys, and ducks. Another important ingredient of animal feed is calcium and this is obtained from the shells of aquatic animals such as oysters and squid.

## **BUILDING**

Shells of oysters and periwinkles are sometimes mixed with cement and for building houses. The periwinkles make the walls strong and highly attractive.

## **GLUE AND FERTILIZER**

Fish bones are also used for the manufacture of glues and fertilizers. Certain fishes which are not edible or having gone bad during processing could be made into valuable fertilizer which is rich in phosphorus and lime.

## **EMPLOYMENT**

Fish production is a source of employment to farmers and all those involved in fish processing and selling business.

## **INCOME**

Fish production is a source of income to farmers and all those involved in fish and selling business.

## **RAW MATERIALS**

Fish provides raw materials for some food processing industries where fish and other aquatic animals are used as source of protein in the produced food.

## **TOPIC: METHODS OF FISHING**

Fishing is the process of harvesting fish and other aquatic animals from a body of water. It is also described as any method used in catching fishes in water.

There are number of methods and tools available to the farmer for harvesting and catching fish.

## **FACTORS THAT DETERMINED METHOD OF FISHING**

1. Area.



2. Type of fish.
3. Size or volume of water.

## GENERAL METHODS AND EQUIPMENT FOR HARVESTING FISH

1. Use of hooks and line.
2. Draining of ponds.
3. Fishing Basket.
4. Use of fishing nets examples are scooping net, gill net, cast net, clap net, seine net.
5. Use of fishing gourds.
6. Use of spears, knives and arrows.
7. Use of fish poisons.
8. Use of explosives.

## METHODS OF PRESERVING FISH

1. FREEZING: This is a method of preservation where fishes are frozen in fish cells immediately after being caught, and stored for very long time, for commercial purposes.
2. CURING: This is a method of preserving fish by means of salting, drying, smoking and pickling.
  - a. Salting: it is the preservative agent used to lengthen the shelf life of fish and fishery products during salting. Fish is salted and dried.
  - b. Pickling: the preservative used is either vinegar sauce or salty water. This method of preservation is considered semi-preservation because the fish shelf life is short. It is mostly used for home consumption, e.g. in making appetizer.
  - c. Smoking: it is carried out over wood smoke under carefully controlled conditions.
  - d. Drying: this is a method of fish preservation in which the moisture content of the fish is removed by exposure to natural air current.
3. CANNING: Many varieties of fish are canned in sauce or oil to preserve them.
4. DEHYDRATION: Dehydration is the process of removing moisture with the use of mechanical device that provides artificial heat for drying.
5. FERMENTATION: During fermentation of fish, protein is broken down in the presence of a high salt concentration. The fish protein is mainly broken down by enzymes which come from fish itself.

6. **SOLAR DRYING OF FISH:** Solar dryers work by retaining the heat of the sun's rays, leading to a higher drying temperature and thus greater drying speed to remove the moisture content of the fish.

## **RISK FACTORS IN WATER AND FISH FARMING**

These are those factors that are capable of causing water pollution and danger to fish and other aquatic organisms. Waste products from human activities can be a source of contamination to water bodies and risk to fish.

- a. Use of chemicals.
- b. Discharge of petroleum oil into water bodies.
- c. Industrial effluents and sewage discharge.

**USE OF CHEMICALS:** Farming activities by man involves the use of fertilizer, herbicides and insecticides for optimum growth and protection of crops. When residues of these chemicals are washed by rain water into a nearby river, stream, pond etc. That body of water will be contaminated and the lives of the fish in such water body will be at risk.

The use of fish poisonous chemicals like Gamalin 20 and Snipper DDVP to harvest fish by some fishermen can destroy non target fish and other aquatic organisms in the water. The accumulation of these chemicals in the tissues of the fish can accelerate the deterioration of the fish flesh and could be harmful to man when consumed.

**DISCHARGE OF PETROLEUM OIL INTO THE WATER BODIES:** Accidental or deliberate discharge of petroleum oil water bodies can be a major risk factor in marine ecosystem. Petroleum oil contain water soluble toxic materials that can pollute water bodies and have adverse effect on fish and other aquatic organisms.

**INDUSTRIAL EFFLUENTS AND SEWAGE DISCHARGE:** Industrial effluents discharged from food processing plants, mills, breweries, tanneries, etc. into small and large water bodies can pollute the fish water bodies can pollute the fish environment and have negative impact on the aquatic ecosystem.

Waste resulting from domestic sewage (human feces and urine, small washing, food processing or preparation and` cleaning of utensils) that are

in most cases channeled into water bodies can cause depletion of oxygen. This can cause death and migration of fish and other aquatic organisms.

## TOPIC: FORESTS

Forest is a collection or group of trees growing together within a particular area of land. It also consists of a number of other organisms which live under the trees e.g. herbs, shrubs and microorganisms.

Forestry is the study and care of all living organisms, which live in the forests. It is also the science or skill of planting and growing trees or management of trees for profitable uses.

Types of forests

- (1) Mangrove
- (2) Rain forest
- (3) Derived forest

**MANGROVE:** The mangrove swamp is found in the coastal areas of South south and Western States of Nigeria. They are in Akwa Ibom, Cross River, Delta, Rivers, Bayelsa, Ondo, Ogun and Lagos States. Mangrove swamps carry mangrove species of trees ( *Rhizophora racemosa*) which are tall and could reach a height of 45 meters. These trees are valuable for fuel and other uses, and its bark contains 20 to 40 per cent of tannin, a valuable product for the tanning industry. Mangrove swamps also provide local people with which is a major source of protein for them.

**RAIN FOREST:** It lies to the north of the mangrove swamp and water swamp. The rain forest carries a dense collection of big, tall trees. The area is great importance for forestry and agricultural products. Trees of economics importance and which are native to Nigeria found in the rain include iroko (*Chlorophora excels*), Obeche (*Triplochiton scleroxylon*), Afara (*Terminalia superba*), the Oil Palm (*Elaeis guineesis*), the Mahoganies(*Khaya ivorensis*) and African walnut (*Lovoa klainneana*).

**DERIVED FOREST:** This zone lies to the north of the rain forest. Centuries of clearing and burning for farming operations as well as logging have produced a savanna landscape of grass and scattered trees from what was formerly a rain forests, are however, still found in riverine and low-lying moist areas. Grasses commonly found in this zone include:

- |                         |                               |
|-------------------------|-------------------------------|
| a. Guinea grass         | <i>Panicum maximum</i>        |
| b. Giant star grass     | <i>Cynodon plectostachyus</i> |
| c. Rhodes grass         | <i>Chloris gayana</i>         |
| d. Northern Gamba grass | <i>Andropogon gayanus</i>     |
| e. Elephant grass       | <i>Pennisetum purpureum</i>   |

f. Kyasuwa grass

*Pennisetum pedicellatum*

## TOPIC: FOREST RESOURCES

There are a number of useful materials which are derived from the forest. The usefulness of each is determined by the following;

- i. Culture ii. Taste iii. Environment IV. Level of social development  
v. level of industrial development

## THE FOLLOWING ARE SOME EXAMPLE OF RESOURCES FOUND IN THE FOREST

1. Trees
2. Wildlife
3. Fruits and vegetables products
4. Various herbs
5. Shelter
6. Industrial resource.

## TOPIC: USES OF FOREST RESOURCES

1. Forest checks erosion of soil.
2. It provides man with source of food, shelter and protection.
3. Forest materials provide good sources of foreign exchange earnings e.g. Timber and furniture exportation.
4. Forest resource as raw materials for industries.
5. Forest resources provide man with gardens and amusement parks (recreational facilities) which beautify towns and urban centers.
6. It provides employment opportunities for people as guards and rangers.
7. Forest provides shelter for wildlife and serves as a tourist center.
8. Forest provides medicinal herbs.  
It is an important source of fuel for people.

## EFFECTS OF FOREST ON THE ENVIRONMENT

1. Soil Protection.
2. Adequate Water Supply.
3. Forest Effect on climate.
4. Wildlife preservation.
5. Human activities: human activities that affect the forest

- a. Clearing \Deforestation
- b. Hunting
- c. Bush burning
- d. Farming and Depletion of wildlife.