SCHEME OF WORK FOR JS 2 THIRD TERM

WEEK	TOPIC/CONTENT
1	Revision
2-3	Fishery (definition, classes of fish, and other aquatic organism, uses of fish and fish products)
4-5	Fishery (methods of fishing and risk factors in water and fish farming, risk factors in water and fish farming).
6-7	Forest and forest uses
8-9	Farming and Cropping Systems
10-11	Farm Animal Husbandry
12	Revision and Examination

FISHERY

Fishery is the keeping of fishes in tanks or ponds, feeding them and taking care of them till they become matured for harvesting. It includes the use of good environment (water) to rear, feed, manage and produce fish of all kinds.

Fishery also involves the catching of fishes by fishermen in streams, oceans, lakes and rivers for commercial or private use.

Fish can be referred to as cold blooded animal with backbone, gills and fins, living in water. Hence all the activities about the rearing of fishes are referred to as fishery.

CLASSES OF FISHES

Classification of fishes can be based on

a. Habitat
b. Morphology (structure of the body of fish)

Classification Based on Habitat

Habitat is the home or special environment of animals. Fishes can live in fresh water while others live in salt water. Those that live in fresh water are referred to as fresh water fish example catfish, tilapia, mudfish, Nile perch etc.

Fresh water fishes are found in any water that is salt-free. The environment for fresh water fishes includes streams, ponds, lakes, dams, rivers etc.

Salt- water fishes live in lagoons; seas and oceans examples are mackerel, dogfish, croaker etc.

Classification Based on Morphology

Based on the classification of fishes, some fishes are made up of bones while others have cartilage. Fishes with bones are referred to as bony fishes, while those with cartilages are called cartilaginous fishes. Examples of bony fishes includes tilapia, catfish, croaker, mackerel etc. examples of cartilaginous fishes also include dogfish, rays etc.

Bony fishes can tolerate harsh environments. The bony fishes are hardy and stronger than the cartilaginous fishes.

Other Aquatic Organisms

Apart from fishes, there are many other types of aquatic organisms (water living). These organisms are either eaten as food or used for other purposes. The aquatic organisms can be categorised into vertebrates and invertebrates. Vertebrates are organisms with backbones while invertebrates lack backbones.

Examples of vertebrates include frogs, crocodiles, alligators, turtles, whale, dolphins and hippopotamus. Examples of invertebrate aquatic organisms include crabs, lobsters, shrimps, prawns, crayfish, oyster, periwinkles and octopus.

Classification of other Aquatic Organisms

The other aquatic organisms can be classified as follows:

a. Shell fish – crab, prawn, lobster and crayfish etc
b. Reptiles – turtles, crocodile, alligator etc
c. Mammals – hippopotamus, whale, seal, dolphin etc
d. Molluscs – octopus, oyster, periwinkle.

USES OF FISH AND FISH PRODUCTS

a. Fishes and other aquatic organisms are sources of food. They supply protein in the diet. They also supply minerals and calcium when eaten as food.
b. They are a good component of animal feed. Fish is grounded into fish meal and mixed with other feed ingredients to supply protein in the diet of farm animals including domesticated fishes.
c. Fine leather for making bags and other wears can be obtained from the skin of reptiles e.g. crocodile
d. The shells of some aquatic organisms e.g. oyster, periwinkle and turtle can be used for decoration in homes.
e. People keep aquarium at home where fishes are kept for fun and pleasure
f. The oil from fishes and other aquatic organisms are of medicinal value. The fish oil is utilized for the preparation of drugs and ointments used for the treatment of some diseases in human beings.

g. Fish production is a source of employment to fish farmers, fishermen and those who engage in selling fishes and other aquatic organisms.
h. Fish production is also a source of income to farmers. Money is obtained by people in fisheries to buy other valuables.
i. Fish production provides raw materials for the industries. Some industries producing food utilize fish and other aquatic organisms to provide protein in the produced food.

SYSTEMS OF FISHERY

The systems of fishery in Nigeria can be categorized into three;

1. Small scale fishery
2. Industrial fishery
3. Aquaculture

Small Scale Fishery

This involves the coming together of small scale fish farmers around river banks and villages near streams to fish using boats, baskets and small traps for catching fishes. Activities at this level are low because they catch fish for survival of their families. The equipment used in small scale fishery are crude and cheaper to maintain.

Industrial Fishery

This is a large scale fish farming. It involves the use of trawlers (large boats) to catch fishes in oceans, inland rivers, lakes and seas. This system is expensive and carried out in large body of water. The fishes caught are always frozen and preserved in the ship for sell. The equipment used for this type os system are fishing trawlers, cold stores and heavy refrigerators in the ship for preservation before the fish are distributed for sale.

Aquaculture

This is the domestication of fish. It involves the rearing of fishes in artificial environments such as tanks, ponds and crates. Aquaculture is fast gaining much recognition in Nigeria because the number of fishermen has reduced and also the water bodies are no longer suitable for fishing due to industrial petroleum activities. People are now retiring to construction of artificial water bodies to rear fishes and other aquatic organisms.

Methods of Fishing and Equipment Used

The methods adopted for catching fishes depends on the environment. There are three major environments namely;

1. The brackish water environment
2. The marine environment
3. The aquaculture environment

The environment determines the method and the equipment. In the brackish water environment where the water is shallow e.g. streams and rivers, fishing is done using spears, knives, arrows and fishing nets.

The types of nets available are as follows

i. **Clap Nets:** It is normally operated on land. It does not require the use of boat or canoe and used for catching fishes in streams and rivers.
ii. **Cast Nets:** The cast net is used by farmers in many riverine areas or communities. It requires the use of boat or canoe in streams, rivers, lakes and lagoons. The net is big and forms a circle over a large surface of water and needs the skill of an experienced fisherman. The net traps the fishes within a

distance covered by the net and are later dragged into the boat.

iii. **Gill Net:** This is used commonly in brackish water, positioned against the tide of moving water in a vertical position. It is always held firmly at the bottom and sides so that it does not collapse. The gill is always left overnight or for days and the fisherman visits daily to remove any fish that has been trapped.

iv. **Fishing Gourds:** It is made of calabash and used to trap fishes in brackish water and lakes. These are used in brackish water that are not moving such as the Argungu fishing festival in Kebbi State.

v. **Hooks:** Hooks are sharp metal curves commonly used in riverine areas. It can be used in both brackish water and marine environment. They are attached to lines with attractive baits of earthworm, small insects or small fishes. The lines have floats that rest on the surface of the water. The hook could be single hook line or many hooks on a long line.

vi. **Fishing Cages and Baskets:** Cages are of various designs and are made of bamboo, cane or wire mesh.

Bad Fishing Methods

Bad fishing methods include the use of dynamites, poisonous baits and chemicals, such as gamalin 20, which kills the fishes and leave them floating on the water. This method is risky because the water would not be safe for drinking. Also, the fishes may be infected with the poison which will render them unsafe for consumption.

Preservation of Fishes

1. **Smoking:** This is the process by which the smoke of the fire is allowed to heat the fresh fish. During this process, the hot

smoke dries the fish. While smoking, fire should be avoided to prevent burning of the fishes.

2. **Sun Drying:** This is the placement of fresh fish in the sun to reduce the quantity of water in the fish. Sun drying is faster and easier when the intestine has been removed.
3. **Curing:** Curing is the application salt to fishes after removing the intestine. This method is to prevent immediate spoilage of fishes that is being taken on a long distance
4. **Freezing:** Fishes are kept in a freezer at very low temperature usually below 0^0C to keep them safe from micro-organisms. Freezing causes the fish and water inside it to be frozen.
5. **Canning:** This is done by storing the fishes in air-tight container after it has been subjected to parboiling. Preservatives are added before the fishes are stored where they cannot be attacked by micro-organisms.
6. **Frying:** This is the boiling of fishes in hot oil put on the fire. It reduces the amount of water stored in the fish and makes the oil to enter the fish thereby replacing the water in it.

EXTERNAL FEATURES OF A FISH

The body of ta fish is divided into three major parts, namely; head, trunk and tail. The head extends from the tip of the mouth to the edge of the gill cover or operculum. The trunk extends from behind the head region tp the region of the anal vent, while the remaining part of the body is referred to as the tail.

HEAD

The head bears the two eyes, mouth, nostrils, and operculum. The eyes are used for seeing objects and food inside the water. The nostrils of a fish are not used for breathing but rather for smelling and detecting the presence of food and predators. The mouth is used

for feeding and intake of water from which oxygen is extracted during breathing. The operculum is the gill cover. Gills are used for extracting oxygen from in-coming water during the process of respiration (breathing).

TRUNK

The trunk bears the dorsal, pelvic, and pectoral fins, part of the lateral line and scales, as well as the anus. A fish uses its fins to move in water. The dorsal fin and tail help to stabilize the body of the fish, while the pectoral and pelvic fins helps the fins to change its direction.

Scales protect the body of the fish from external injury. Waste products of the body are expelled through the anus. The streamlined shape of the body of a fish enables it to move through water with less difficulty. Lateral lines on the trunk also enable the fish to detect movements of the water.

TAIL

The tail is composed essentially of the anal fin, caudal peduncle, and the caudal fin. All the three features are involved mainly in locomotion (movement) of the fish, especially in the steering of the water.

FARMING AND CROPPING SYSTEM

FARMING SYSTEM

Farming is the process of growing crops and rearing of animals under agricultural activities. The different methods used in carrying out these activities are known as **systems.** Therefore, farming systems

are the different methods of growing crops and rearing animals on te farm.

Types of Farming Systems

i. **Sole Farming:** This is a practice whereby a farmer grows a particular kind of crop/animal at a time on the farm.

Advantages of Sole Farming

a. It encourages specialization; the farmer becomes an expert in the growing of a crop or rearing of an animal
b. There will be increase in output of the crop or animal.

Disadvantages of Sole Farming

a. Excess production of the crop or animal introduces an element of risk. It may also lead to a drop in price.
b. The farmer stands at a great risk in events of some unexpected casualties such as fire and disease outbreak.

ii. **Mixed Farming:** This is a system whereby crops are grown and animals are reared on the same piece of land at the same period of time.

Advantages of Mixed Farming

a. The waste of animals added to the soil, helps to increase crop yields by adding nutrients to the soil.
b. The animals can be used for ploughing
c. The animals can be used for transportation
d. The animals are fed with some of the crops grown on the farm
e. Animals may be allowed to graze on the farm after harvesting

f. Farmers practicing mixed farming are rich because they receive income from both crops and animals.

g. Farmers stand a lesser risk in case of any unexpected eventuality.

Disadvantages of Mixed Farming

a. It is stressful where labourers are not available because the farmer is fully occupied throughout the year

b. It may be capital intensive where more labourers are required.

iii. **Pastoral Farming:** This is basically the rearing of animals such as cattle and sheep by farmers who specialize in animal husbandry. The animals are grazed either in areas where the natural grassland is abundant or where grasses are cultivated as pastures and even conserved in the form of hay or silage. This farming practice is generally limited to the arid zones where annual rainfall encourages the growth of grasses and grain crops which are the main food of ruminant animals.

Advantages of Pastoral Farming

a. It is a good source of income to the farmers

b. It requires less or no land area to practice since the animals are moved about all the time.

Disadvantages of Pastoral Farming

a. The system does not produce a high level of animal husbandry since it exposes the animals to various natural hazards.

b. The faeces of the animal cannot be utilized to raise crops since the animal are constantly being moved

Types of Cropping System

i. **Mono/Sole Cropping:** This is a system whereby a farmer specializes in the cultivation of a single crop. It is basically used in large scale farming, and is particularly suitable for the production of export crops.

Advantages of Mono/Sole Cropping System

a. The system is highly rewarding if the crop is in demand
b. It encourages large scale farming
c. It is suitable for the production of export crops
d. The farmers rapidly becomes an expert in all operations involved
e. It gives opportunity to mechanization
f. There is reduction in the time taken to complete routine operations

Disadvantages of Mono/Sole Cropping System

a. There may be an element of risk such as drop in price of the crops produced due to excess production
b. If a crop is attacked by any disease or pest, this could easily spread and affect the entire farm
c. If the crop is for export, the economic status of the farmer depends on the world market prices which fluctuate with demand and supply.

ii. **Mixed Cropping:** Mixed cropping is the cultivation of two or more crops together on a single farm.

Advantages of Mixed Cropping

a. This system protects land from soil erosion
b. It helps to maintain soil fertility
c. Insect pests and disease do not spread easily

d. Labour can be economically distributed throughout the year

e. The farmer is not really affected by drop in the market price of any commodity.

Disadvantages of Mixed Cropping

a. The use of mechanization method is not possible
b. Young crops may be trampled underfoot during the harvesting of older crops.

iii. Continuous Cropping: Continuous cropping is practised in areas where the weather and soil conditions are favourable. In this system, the farmer uses a piece of land continuously for raising food crops such as okra, pepper, tomatoes, pumpkin leaves etc. the soils of these areas must be moist with nutrients available.

Advantages of Continuous Cropping

a. Economic use of available land areas

b. Soils are always moist and nutrients always available

Disadvantages of Continuous Cropping

a. It leads to soil exhaustion

b. It also leads to erosion

c. Low productivity is obtained

iv. Crop Rotation: This is a scientific system whereby different crops are grown continuously on the same piece of land in such a way that they follow a definite sequence or order

Principles of Crop Rotation

1. Deep rooted crops should not follow each other. For example, yam and cassava should not follow each other. Both are exhaustive crops because they both feed heavily on soil nutrients.

2. Shallow rooted crops e.g. maize can follow deep rooted crops e.g. cassava. The fibrous root system of maize tends

to hold the soil particles together, thus preventing erosion.

3. Crops likely to be affected by the same diseases must not follow each other so as to prevent the spread of such diseases.
4. Legumes should be introduced at frequent intervals, as this crop adds nitrates (salt or nitric acids) to the soil.

Advantages of Crop Rotation

a. It helps to maintain soil fertility
b. It allows an economic use to be made of land, labour and other resources
c. Work can be more easily distributed throughout the year
d. It provides farmers with different crops and therefore gives some safeguard against crop failure
e. It gives the crops maximum yield opportunity

Disadvantages of Crop Rotation

It requires careful planning to bring about good results e.g. deep rooted crops like yam and cassava cannot be planted successively.

FARM ANIMAL HUSBANDRY

Animal husbandry is the proper care and management of farm animals to improve their production. The aim is to ensure that farm animals produce very well so that the farmer can make his profits.

Animal husbandry involves selecting good animals for production, breeding the animals, rearing and feeding them for profit. The classes of animals concerned under the study of animal husbandry are cattle, pig, goat, rabbit, guinea pig, horses and donkeys. Other are fowl, turkey, geese, duck, peacock etc. grass cutters are fast being accepted in Nigeria as a livestock with many farms engaging in its domestication and commercial production.

SYSTEMS OF ANIMAL HUSBANDRY

A. **INTENSIVE SYSTEM OF ANIMAL HUSBANDRY**
   This is a method of keeping animals permanently in a house. Animals are not allowed to go out of the house. Feed and water are given to them in the house.
B. **SEMI-INTENSIVE SYSTEM OF ANIMAL HUSBANDRY**
C. **EXTENSIVE SYSTEM OF ANIMAL HUSBANDRY**