**AGRICULTURAL SCIENCE SS 3**

**SECOND TERM**

**SCHEME OF WORK**

**WEEK TOPICS/CONTENT**

# ANIMAL NUTRITION

2. Causes and symptoms of malnutrition and their correction In farm animals.

silage should be mentioned. Types of diet for the various classes of animals and their characteristics should be studied

# AGRICULTURAL EXTENSION

Methods of disseminating new ideas and techniques to farmers

Agricultural extension programmes in Nigeria e.g. ADP, NDE et.

Problem faced by agricultural extension in Nigeria e.g. illiteracy among farmers etc.

**FISH FARMING:**

Meaning and importance of fish farming

Conditions necessary for siting a fish pond establishment maintenance of fishpond Fishery regulations – meaning and regulations like close season, catch quota regular stocking etc.

Fishing methods and tools

5-6 **ANIMAL IMPROVEMENT:**

Meaning, aims and methods of animal improvements

Introduction

Selection

Breeding-types

ARTIFICIAL INSEMINATIO:

Meaning of artificial insemination

Methods of collection of semen

Advantages and disadvantages of artificial insemination

# 8-9 AGRICULTURAL FINANCING

Meaning, importance and sources of finance

Sources of finance-personal savings, commercial banks, cooperative societies etc.

Classes of credit:

Problems faced by farmers in producing Agric credit

Problems faced by institutions in granting loans to farmers

10. Revision

12-13 Examination

**WEEK 1 & 2**

# ANIMAL NUTRITION – ENOTE ON AGRICULTURAL SCIENCE

Livestock feeding and nutrition are vital aspects of animal production. Understanding the impact of feed shortage, different types of feed, and the nutritional requirements for farm animals is essential for successful animal husbandry.

Feed Shortage Effects:

Feed shortages can have detrimental effects on animal production:

1. Low Birth Weight or Weight Loss: Insufficient feed leads to underweight animals.

2. Poor Reproduction and Maturity: Animals may experience delays in reaching maturity or breeding.

3. Reduced Milk, Meat, and Egg Production: Inadequate nutrition results in lower production.

4. Increased Death Rate: Starvation and malnutrition can lead to higher mortality.

5. Susceptibility to Diseases: Weakened animals are more prone to illnesses.

6. Slow Growth: Animals fed poorly grow at a slower rate.

7. Weakened Draft Animals: Work animals lose strength and efficiency.

**Classification of Livestock Feed:**

Livestock feed can be categorized into four main classes:

1. Basal/Energy Feed (Carbohydrate Concentrate): Rich in energy and low in protein, e.g., maize and cassava.

2. Protein Concentrate: High in protein and low in carbohydrates and fats.

3. Mineral/Vitamin Supplements: Required in small quantities for growth, digestion, and disease resistance.

4. Roughages: High in fiber but low in protein and digestible carbohydrates. Includes pasture plants like grasses and legumes.

**Characteristics of Feed Classes:**

1. Basal/Energy Feeds:

- Low crude fiber (less than 18%)

- High in carbohydrates or fats

- Low protein and fiber

- Highly digestible

- Low in minerals

2. Protein Concentrates:

- Low crude fiber (less than 18%)

- High in protein

- Low in carbohydrates and fats

- Low fiber

- Highly digestible

- Low in minerals

3. Mineral/Vitamin Supplements:

- Required in small quantities

- Low energy and protein

- Low fiber

- High in vitamins and minerals

- Essential for growth, digestion, and disease resistance

4. Roughages:

- High crude fiber (more than 18%)

- High fiber, low digestible carbohydrates, and protein

- Low digestibility

- Includes grasses, legumes, and other forms like hay and silage.

**Preparation of Feed Ingredients:**

Various feed ingredients can be processed for livestock:

- Blood Meal: Collected blood is clotted, dried, and crushed into powder.

- Fish Meal: Prepared through dry or wet processes involving drying, smoking, or heat treatment.

- Groundnut/Palm Kernel Cake: Seeds are crushed and pressed to remove oil, followed by drying.

- Cotton-Seed Meal: Cotton seeds are ground and the remaining residue is dried.

- Bone Meal: Prepared through dry or wet processes by burning, crushing, and drying bones.

- Maize/Guinea Corn: Grains are separated from cobs, dried, and ground into the desired texture.

**Food Nutrients for Livestock:**

Six classes of food nutrients are essential for animal growth and development:

1. Carbohydrates: Provide energy for growth and reproduction, found in maize, cassava, and other sources.

2. Proteins: Used for growth, tissue repair, gamete formation, and production of meat, eggs, and milk.

3. Fats and Oil: Provide energy, essential fatty acids, and improve diet palatability.

4. Minerals: Essential macro-elements (calcium, phosphorus) and trace elements (iron, zinc) are required for various bodily functions.

5. Vitamins: Aid digestion, support growth, and enhance disease resistance.

6. Water: Vital for overall sustenance.

This revised content provides a clearer and more comprehensive overview of livestock feeding, nutrition, and the essential food nutrients for farm animals.

**Sources**: These are bone meal, oyster shell, limestone, salt licks

|  |  |  |  |
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| **MINERAL** | **SOURCES** | **FUNCTIONS** | **DEFICIENCY SYMPTOMS** |
| Calcium | Bone meal, oyster shell limestone. Milk rock calcium phosphate | Bone and teeth formation egg shell formation. Blood clotting | Ricket, osteomalacia, soft egg shell.  Retarded growth |
| Phosphorus | Bone meal, Dicalcium phosphate, fish meal | Bone and teeth formation; acid-base balance; egg shell formation | Ricket, lack of appetite osteomalcia |
| Magnesium | Salt licks, wheat gems, forage, grasses | Aid functioning of the nervous system activation of enzymes | Hyper-irritability, nervous disorder called tetany |
| Sulphur | Salt licks, fish meal | Constituents of protein and  amino acids like cysteine, methione | Poor growth |
| Iron | Yeast, iron injection, salt licks | Constituent of haemoglobin in red blood cell. Constituent of protein called myoglobuline | Anaemia e.g. baby pig anaemia of piglets. |
| Lodine | Lodized salt, fish meal | Constituent of hormone called thyroxine | Goiter |
| Cobalt | Salt licks | Constituents of vitamins B12. Activate some enzymes | General malnutrition |
| Copper | Salt licks | Aids formation of heamoglobin& iron absorption | Anaemia |
| Fluorine  **Vitamins** | Salt licks, fluorinated water | Prevents tooth decay. | Tooth decay. |

Vitamins are organic substances also required by animals for proper growth and development of the body. Vitamins are grouped into two major classes:

**Fats soluble vitamins:** These are vitamins that are soluble in fats e.g. vitamins

A,B,E and K

**Water soluble vitamins:** These are vitamins that are soluble in water e.g. Vitamins C and cabalamine, pantothenic acid, folic acid etc.

|  |  |  |  |
| --- | --- | --- | --- |
| **VITAMINS** | **SOURCES** | **FUNCTIONS** | **DEFICIENCY/SYMPTOMS** |
| Vitamin A  (retinol) | Fish meal, grasses yellow maize | Proper eye sight (or vision) Epithelical cell  formation aid reproduction | Neghtblindess |
| Vitamin C (Ascorbic) | Grasses, vegetables and fruits | Formation of connective tissues, bone and dentine | Scurvy |
| Vitamin D (Calciferol) | Bone meal, fish meal and sunlight | Aids bone and teeth formation, egg shell formation | Ricket, Osteomalacia, soft shell egg |
| Vitamin E (Egosterol) | Vegetables, grasses synthetic vitamin E | Aids reproduction. As an antioxidant | Reproductive failure like starility and premature abortions |
| Vitamin K  (phylloquinone) | Fish meal, vegatables | Aids blood clotting prothrombin formation | Haemorrhages i.e. inability of the blood to clot in time |
| Vitamin B1 (thiamine) | Yeast, cereals, green plants | Co-enzyme in energy metabolism | Poor appetite, Beri-beri |
| Vitamin B2 (Riboflavin) | Green herbage and milk products | Co-enzyme in protein and fat metabolism | Slow growth dermatitis |
| Vitamin B12 (Cobalamine) | Fish meal, milk products | As co-enzyme in several biochemical reactions. Red blood cell formation | Pernicious anaemia |

Niacin Yeast, Carbohydrate oxidation Pellagra (reddish tongue)

(Nicotinic acid) cereals, grasses

**Water:** water is very important in livestock management, be it to the animals or to their immediate environment.

**Livestock Nutrition and Ration Formulation**

Proper nutrition is paramount in the care and management of farm animals. This comprehensive guide discusses the sources of water, the functions of water in animal husbandry, and the principles of diet and ration formulation for different classes of animals.

Water Sources and Functions:

- Drinking Water: Essential for hydration.

- Tap Water: Convenient for providing water to animals.

- Metabolic Water: Obtained from food breakdown.

- Rainwater: Natural water source.

- Rivers and Ponds: Natural water bodies for animals.

- Grasses and Fresh Fodder: Can contain moisture for hydration.

Water serves multiple functions, including:

- Drinking for animals

- Metabolism and food digestion

- Dipping/drenching against parasites

- Washing and cleaning animals

- Sanitation purposes

- Milk and meat processing

- Maintaining body temperature

- Irrigation of pastures

- Constituent of milk, eggs, and meat

Types of Ration/Diet and Their Uses:

- Diet: The feed given for specific metabolic or physiological functions.

- Ration: The total feed supplied to an animal within a day.

- Balanced Ration: Contains all essential nutrients in the right proportions for normal growth, reproduction, and body functions.

Factors influencing ration selection include the animal's purpose, class, age, health, management system, and physiological state.

Types of Rations:

1. Maintenance Ration: Maintains normal body functions, does not promote weight gain. Suitable for non-lactating breeding animals.

2. Production Ration: Promotes high production of milk, meat, eggs, or growth. Given to lactating, weaning, pregnant, fattening animals, broilers, layers, and animals before mating.

Ration Formulation:

When formulating rations for farm animals, consider these principles:

1. Animal's physiological state

2. Feed availability

3. Nutrient composition

4. Animal's age

5. Feed familiarity

6. Palatability

7. Cost of feed ingredients

Balanced diets or rations can be prepared by carefully combining protein sources (e.g., fishmeal, groundnut cake), fat sources (e.g., palm kernel cake, oils), vitamins, mineral sources (e.g., bone meal, oyster shell), and carbohydrate sources (e.g., maize, guinea corn).

Conclusion:

Understanding the various types of rations, their uses, and the principles of ration formulation is crucial in optimizing the health, growth, and production of farm animals. Proper nutrition is the cornerstone of successful animal husbandry.

To prepare a ration for layers, the following ingredients, for example, are required:

1. Maize meal (carbohydrate) = 65%
2. Groundnut cake (protein) = 20%
3. Fish meal (protein) = 5%
4. Palm oil (oil) = 4%
5. Bone meal (mineral) = 5%
6. Mineral salt (mineral) = 0.5%
7. Vitamins supplement (vitamins) = 0.5%

**100%**

## Malnutrition in farm animals

**Definition:** Malnutrition is a condition in which an animal shows evidence of nutritional deficiency. It occurs when a ration does not supply all the essential nutrients in the right proportion and quantities. In other words. It results when an animal takes in insufficient food or it eats diet which is deficient in one or more nutrients like protein, vitamins, carbohydrate, mineral and vitamins. This eventually result in nutritional disease.

Malnutrition diseases, causes, symptoms and corrections are shown below:

|  |  |  |  |
| --- | --- | --- | --- |
| **MALNUTRITION DISEASES** | **CAUSES** | **SYMPTOMS** | **CORRECTION** |
| Ricket&Osteomalacia | Lack of calcium phosphorus and vitamin D | Flexible and curve  bones soft-shell  eggs | Add fish meal, bone or oyster shell to feed |
| Perosis (slipped tendon) | Lack of chlorine, folic acid, calcium, phosphorus in diet | Chicken lie down on their kneels | Add vitamin Bcomplex and bone meal |
| Pregnancy toxemia ketosis | Lack of sufficient energy intake by farm animals | Loss of appetite | Feed carbohydrate to animals |
| Milk fever | Low blood sugar | Loss of appetite, constipation and nervousness | Feed oyster shell or bone meal and carbohydrate |
| Grass tetany | Low iron in blood | Loss of appetite and nervousness | Inject iron dextran into the body |
| Night blindness | Lack of vitamins A | Inability to see clearly in dim light | Feed yellow maize |
| Scurvy | Lack of vitamin C | Lesion around the connective tissues | Feed vegetable and fruits to animals |

Beri-beri Lack of vitamin B1 Lack of appetite, Feed yeast, (thiamine) fatigue and loss of cereals and weight vegetables.

Questions:

1. What is Animal nutrition
2. State three classes of Animal feed.
3. What is malnutrition
4. What is balanced diet
5. State five malnutritional disease

**WEEK 3**

## Meaning of agricultural extension

Agricultural extension can be defined in any of the following ways:

Agricultural extension is process whereby modern farming techniques and

research findings are taken to the farmers through extension workers and, problems of the farmers are taken to research institutions for solution

Agricultural extension is an informal, out-of school voluntary agricultural

education involving the spread or dissemination of information on recent improved development in agriculture from researchers to the farmers through extension against

Agricultural extension is the process system or service which assists farmers of farm people through education procedures in improving farming methods and techniques.

## Roles or functions or objectives of agricultural extension

Agricultural extension is very important for the development of agriculture in West Africa.

Government should encourage agricultural extension services for the following reasons:

**Increase in agricultural production:** It encourages farmers to increase their production of food crops, cash crops and livestock

**Teaches improved farming practices:** It teaches farmers improved practices in the cultivation, rearing and processing of crops and livestock

**Collection and collation of basic information:** It helps to collect and collate basic information relating to rural programmes

**An intermediary between farmers and research institutes:** It acts as an intermediary between farmers and research institutes

**Supervision of agricultural loans:** it helps to supervise the beneficiaries of agricultural loans.

**Changes people’s attitude towards their problems:** it helps to change people’s attitude towards their problems.

**Raises standard of living:** it helps to raise the standard of living of the farmers.

## Identification of proper marketing channels: it helps to identify proper

marketing channels: it helps to identify proper marketing channels for the farmers to sell their products.

**Acquisition of skills:** it helps to acquire skills and specialization in the production of crops and livestock.

**Teaches land management techniques:** it introduced and teaches farmers, land management techniques which increase land fertility and productivity.

**Teaches improved practices in product processing:** it enables farmers to be taught improved practices in processing of livestock and crops.

**Implementation of auxiliary programmes:** it helps in planning, organizing and implementing auxiliary programmes, e.g. young farmers clubs.

**Assistance to foreign experts:** it enables extension officers to give necessary assistance to foreign experts visiting states on the invitation of government in order to carry out various feasibility studies in various fields of agriculture.

**Supervision of agricultural development programmes:** it assists in supervising and evaluating agricultural development programmes

## Problems facing agricultural extension in West Africa

Problems facing or militating against agricultural extension in West Africa include:

**Inadequate farm input:** Farm or agricultural input are inadequate and often get to the users (farmers)very late

## Non-involvement of extension officers: The subject matter specialists

(agricultural extension officers) are often not properly involved

**Inadequate transport facilities:** inadequate transport facilities for extension staff

**Inadequate motivation of extension agents:** Extension agents are not sufficiently motivated

**Poor supervision of farmers:** The supervision of the farmers by the extension agents is weak or poor

**Delay in information:** Information to farmers is usually delayed and distorted due to poor training of the extension agents

## Inadequate of the tradition and customs of local communities: Many agents

are ignorant of the traditions and customs of their system. Making it difficult for them to receive audience

**Inadequate extension workers:** Very few extension workers are available to

work with too many farmers i.e. there is low extension-farmer ratio

**Poor communication facilities:** Poor facilities for extension communication which limit the scope and efficiency of coverage

**Illiteracy of the farmers:** target farmers are largely illiterate and find it difficult to follow instructions

## Inadequate monitoring of extension agent performance: Poor or inadequate

monitoring of the activities poor performances of the extension agents because of difficulties, therefore, mediocrity is often perpetrated

**Inadequate extension tools:** Extension tools and facilities are grossly inadequate for the extension work to succeed

**Conservatism of farmers:** The conservatism of farmers makes changes difficult

**Undefined roles for agents:** There is no properly defined roles for the extension workers. Hence, they are not effective in their work

## Target group of the extension agent

Commercial farmers. Subsistence farmers

Farmers’ cooperative societies

Nomads; youth organization e.g. young farmers club

Non-governmental organizations

Fishermen/fish farmers

Community development associations Bee keepers

## Methods of disseminating new ideas and techniques to farmers

Methods used in disseminating new ideas and techniques to farmers are grouped into three classes: (i) Individual method (ii) Group method and (iii) Mass media method.

## Individual method

The individual method includes farm and home visits, aimed at direct contact between farmers and the extension agents. The purpose is to give advice or assistance on a wide range of farm and home problems. In order to succeed, it may require the assistance of volunteer leaders or administrators to arrange meetings so as to develop public relation with organizations and important individuals. Examples of individual methods of disseminating ideas and innovations include (i) home of the farmer (ii) office or farm (iii) telephone call, (iv) correspondence (v) result demonstration.

## Advantages of individual method

It gives and obtains information that will be useful to farmers and / or researchers

It can only work for a small group of farmers

More attention is given to the individual farmers than any other method

It may involve the use of telephone which makes information dissemination faster

## Disadvantages of individual method

It is a time consuming method

It is also a very tedious method

Extension agent cannot reach many farmers

It may be very expensive e.g. telephone calls

## Group Method

The group method involves the working together will groups of farmers under the supervision of the extension worker(s). Examples of group methods include: (i) symposia (ii) lectures (iii) debates (iv) Group discussion (v) excursions (vi) field trips (vii) group demonstration plots (viii) agricultural show.

## Agricultural show

Agricultural show is usually organized by federal, state or local government and companies to demonstrate or exhibit farm produce from improved agricultural practices.

Agricultural show provides forum for interaction between and within farmers and manufacturers. It is also effective in stimulating farmers’ interest to adopt new farm or agricultural techniques or improved practices. It also provides avenues for of agricultural produce.

## Advantages of group method

It enables extension workers to reach out to many farmers at a time

It saves time and money

It is not as tedious as in the case of individual method

Farmers tend to show more interest in what may be introduced

## Disadvantages of group method

Some member of the group may easily discourage others

Extension agent may not always find all members of the group to be present all the time

Extension officers may not be enough to carry out their jobs in many groups

## Mass media

Mass media involve the dissemination of information through special media of communication to the farmers. The method is used to create awareness and interest in the new ideas and techniques among the majority of the farmers. In other words, this method enables many people to know about the new innovation. Mass media include the use of radio, television, newspapers, film shows, pamphlets, banners, handbills and hand-outs.

## Types of mass media

There are two major types or group of mass media. These are electronic media and print media.

**Electronic media:** This involves the use of electronics like, radio, television, film show, etc. to disseminate information to farmers. Through the electronic media, many people can easily be reached if only they have the means. It is an expensive method by which farmers can easily be contacted.

**Print media:** This involves the use of media like newspapers, banners, handbills newsletters, hand-outs, pamphlets, etc. to disseminate information to people. Just like the electronic media, information can get to many people but illiteracy, combined with poverty would prevent many people from getting the desired information.

Mass media, (electronics and print) have the same advantages and disadvantages.

## Advantages of mass media

They can reach out to a large audience provided it is within means

They may not require the presence of extension agents

The new techniques and innovation can easily reach the farmer at a fixed date and time e.g. either on radio or television

Time wasting and stress involved in going round the farmers are eliminated

Farmers can put the new ideas to use by themselves

The information, especially print media last long

The printed information can be posted or received by mail

Pictures (in electronic) can easily be served as teaching aids

It is useful in information dissemination to deaf but literate famers.

## Disadvantages of mass media

They are very expensive to operate e.g. talks on radio or television

They are only useful to the educated farmers; illiterate farmers can never benefit

They are only available to farmers who are wealthy enough to own television and radio sets

Farmers may find it difficult to ask questions on matters which they do not understand

## Agricultural extension programmes in West Africa

Agricultural extension programmes are the media or channels through which new ideas and techniques are disseminated to rural farmers. In other words, they are bodies or agencies which have extension workers on the job to improve their daily services that they will be able to transfer these innovations to the rural famers.

## Importance of agricultural extension programmes

To change peoples’ outlook towards their living conditions

To teach rural people to recognize and take interest in their problems so as to overcome them

To teach farmers improved practices using various methods, demonstrations, lectures, film shows, sympodial, radio etc.

To act as a link between farmers and research institutions/Government

To teach farmers efficient management on the farms

To assist in obtaining loans and credits

To assist in locating markets for their farm produce To monitor the use of Agric loans

To assist farmers to locate sources of farm input

To evaluate the success or otherwise of the extension programme

To educate rural woman on home management

To plan and execute farming educational programmes

## Adoption of innovation

Agricultural research organization normally brings new innovations to the farmers through extension agents. The adoption of innovations or new ideas and techniques in agricultural is not always automatic. Depending on several factors, the rate of adopting of a particular innovation varies with individuals

## Faction affecting the rate of adoption of innovation

**Level of education:** The more educated a farmers is, the higher the rate of adoption of innovation. It will take a longer time for an illiterate farmers to accept new ideas in farming

**Attitude of the farmer:** Most farmers that develop positive attitude toward new innovations are more likely to succeed than those that do not respond at all  **Financial status of a farmer:** Experience has shown that wealthy farmers are ever willing to accept and experiment on new farming techniques that than very poor or peasant farmers

**Size of the farm:** The bigger the farm, the higher the rate at which a farmer will be willing to accept new ideas. Also the smaller the farm the slower the rate of adoption of innovation

**Presence of extension worker:** the presence of extension worker within the farming community may help the individual farmer to accept the new ideas or techniques in farming

**Result of demonstration plots:** The result from demonstration plots, particularly, if it is a good one will promote the acceptance and adoption of the innovation but when the result is not good, farmers will abandon the whole idea concerning the innovation.

## Categories of farmers based on adoption of innovation

Agricultural research organization or extension officers usually categories farmers according to the rate of adoption of new innovation. These categories include:

Innovators

Early adopters

Late adopters

Never adopters

## Innovations

Innovations are farmers who introduce changes or new ideas of farming into a new area. Such ideas may reach the innovators through the extension agents, mass media, or they might have seen it done in another place. The proportion of such people are usually very small. They may suffer some losses due to inexperience or error during the cause of doing their work. As a result of these reasons, they will require encouragement.

## How to encourage the innovation

**Expert advice:** There is need for the extension officer to constantly be with innovators to render expert advice to them concerning what they are doing

**Granting credit facilities:** The extension agent can assist these farmers to source

for loans to enable them important or critical for the success of the new innovation must be easily available to the farmers

**Provision of farm inputs:** Essential farm inputs such as chemicals. Fertilizer,

seed, etc. which are important or critical for the success of the new innovation must be easily available to the farmers

**Granting insurance cover:** There should be insurance cover, particularly on the

new ideas and innovations the farmers are trying to establish. Whether they succeed or fail would not have much impact for the farmers since there is an insurance on the programme

**Providing market for produce:** This innovators have to be assured that their

produce will be purchased at an encouraging price. This will boost the moral in the practice of the new idea or innovations

**Organizing agricultural shows:** This should be done to enable the innovators exhibit or display their products for the purpose of attracting others

**Prizes/Awards:** Prizes and awards should be given to the innovators

**Subsidy:** The activities of the innovators should be subsidized to encourage hem

**Market information:** The extension agencies should provide vital market information to the innovators.

## Early adopters

Early adopters is the second group that comes in immediately after the innovators. Depending on a number of factors as discussed above, the percentage of early adopters may be high or low.

If the percentage is low (say 10% or below), it shows that:

The new idea was not uniformly accepted

The new idea has to be practiced by some for others to see the result

The new idea must have run into a hitch

The new idea must have run into been too complex to understand if the percentage is high (say 30% or above) it shows:

The new idea was uniformly accepted

The new idea was practiced by all farmers

The new idea was smoothly executed without problems The new idea was a simple and an easy one.

## Late adopters

Late adopters are the third group of farmers that can accept new ideas and techniques. In most cases, the number or percentage of late adopters is usually very high.

## Reasons for high number of late adopters

They may be illiterate farmers

They may be poor or peasant farmers

They may have conservative attitude

The idea may be too complex for them

Some of the farmers must have waited to see the result of that of a person practicing them now

Some of the farmers must have run into problems in the course of implementing the new innovation

The farmers may be disenchanted with inconsistent government policies and programmes

Poor communication system also account for high number of late adopters

It may also be as a result of a weak extension system

Cultural and tradition belief system do slow down the adoption of new ideas When the result of the new technique is not significantly better than the existing method, the people drag their feet

## Never adopters

Never adopters is the last group of farmers that will never accept nor adopt the new innovations. This group of farmers no matter how best the extension agents will try to convince them, will never change their mind. High level of illiteracy, poverty and conservatism are the major reasons for these farmers’ unwillingness to adopt new innovations.

## Factors responsible for their unwillingness to accept or adopt innovations

**Illiteracy:** These farmers who are never willing to adopt innovation are mainly illiterates who can never appreciate any good work

**Conservative attitude:** This group of farmers are never willing to accept new

ideas. They will prove to the extension agent that cannot teach them farming as they have been doing it ever before they were born

**Poverty:** As a result of the high level of poverty, these farmers are never willing to spend a mite of money to acquire new idea. They might need everything free of charge

**Lack of exposure:** Most of these farmers lack exposure. Hence, they can never appreciate good work or idea that may come to them

**Fear of tax payment:** These farmer see extension officers as tax collectors. They

believe the officers are sent by government to use the introduction of innovation as a means of collecting taxes from them.

**Qualities, functions/roles and problems of agricultural extension officer or agent or worker**

## Agricultural extension officer/worker

**Meaning:** An agriculture extension officer or worker is a person who is involved in the dissemination of new ideas and techniques from the research institutes to the farmers. He acts as an intermediary between researches and the farmers.

## Qualities of a good extension worker

**Originality:** For an extension officer or worker to succeed as an agent of change,

he must be original. He must have the native intelligence to be original in his thoughts, words and action

**Leadership**: He must be a leader among leaders. He must be able to know the

way i.e. his goal and lead the rural farmers to grasp and embrace that goal. He must be patient and able to inspire the rural farmers to achieve the goal

**Initiative**: A good extension worker must have initiative to tackle problems

himself before referring them to supervisors. He must be able to take steps without being directed

**Organizational ability**: The success of any extension activity will depend on how it is planned, organized and executed. He should be able to organize training of leaders

**Problem solving ability**: A good extension worker must be able to recognize

problems, define them in simple terms and solve them if they fall within his training and experience

**Clear judgment**: He must possess great foresight, he must be able to appreciate the problems of the farmers on the ground and know what to do to solve them

**Reliability/honesty**: An extension worker must be reliable, a man of his words. If

the agency sends him down to the rural area, he should go down to deliver the piece of information and bring back feedback. If the rural farmers discover that he is reliable, they can then assimilate the new innovation and research findings

**Communication skill**: An excellent extension worker must possess good

communication skills e.g. good command of local language, boldness and oratorical abilities

**Freedom from local politics**: A good extension worker must not be involved in the local polities so as to win the confidence of all members of the target group

**Respect for culture and traditions**: He must be a good mixer for him to succeed.

He must be able to come down to their level. He should dress like them, eat whatever they present, possibly drink their water, while not losing his goal for doing all these. By these wise behavior he will win the hearts of the rural farmers. He should not feel superior to the farmers so as to achieve his goal. He must be approachable

**Technical knowledge**: With sound training, an extension worker must be able to

impact knowledge. He should be able to motivate these adult learners to acquire knowledge

**Punctuality and availability**: He should be able to attend all pre-arranged meeting, seminars, workshops, etc. promptly and always make himself available

## Roles of an extension worker

**He provides agricultural consultancy services:** He consult and reflects on rural or agricultural development project for the farmers

**He plans and executes programmes:** He plans and executes farming educational programmes

**He organizes and supervises farmers’ groups:** He organizes and supervises farmers’ groups i.e. meeting, co-operatives and their workers; meetings **He conducts and organizes training for farmers:** He conducts or organizes training for farmers

**He liaise with other agencies:** He liaises with other agencies that may have influence on the rural environment and the farmers

**He assist in improving farmers’ outlook:** He helps to improve the outlook of farmers towards their problems or difficulties

**He acts as intermediary between researchers and farmers:** He acts as a connecting lick (intermediary) between the researchers and the farming communities

**He teaches farming practices:** He teaches improved farming practices to farmers **He evaluates extension programmes:** He evaluates agricultural extension programmes and projects

**He supervises agricultural loans usage:** He supervises the utilization of agricultural loans

**He locates marketing channels:** Extension agents do assist farmers to locate marketing channels for farm produce

**He sources for farm input:** Extension agents also assist farmers to source for farm input like fertilizers, seeds, chemicals etc.

**He sources for farm loans:** Extension workers also assist the farmers to source for loans to enable them buy various input and produce crops and livestock.

## Problems facing an agricultural extension officer

Problems facing an agricultural extension worker or officer in the discharge of his duties include:

**High level of farmers’ illiteracy:** High level of illiteracy among farmers may affect the rate of adoption of new farming techniques

**Absence of credit facilities:** Absence of credit facilities to farmers make them uninterested and prevent the implementation of accepted innovations

## Insufficient motivation of extension agent: Insufficient motivation of the

extension workers by way of better remunerations for their effort tends to retard their performance

**Inadequate resources:** Extension workers do not have adequate resources, such as money, to travel or enough materials to supply their target farmers

**Unfavorable attitude of farmers:** Unfavorable attitudes of rural farmers towards government programmes, tend to make extension work a bit difficult

**Inadequate trained extension agents:** Inadequacy of well-trained extension staff makes the extension worker have a wider area and more farmers than he can cope with

**Unco-ordinated efforts by government agencies:**Unco-ordinated efforts by government agencies may lead to confusion and rejection by farmers

**Poor transportation network:** Poor transportation network by way of lack of vehicles and motor able roads, militates against the extension worker

**Inadequate evaluation machinery:** Inadequate evaluation machinery makes it difficult for he agent to assess their own achievement or success

## Non-involvement of farmers in planning programmes: Rural farmers, the

ultimate consumers of extension programmes are not involved in planning programmes are not involved in planning programmes which results in non-commitment to such programmes when it is introduced

**Language barriers:** Language barriers do lead to improper dissemination of new innovations by the extension worker

**Inadequate publicity:** inadequate publicity by way of mass media are not fully utilized in publicizing extension programmes.

Questions:

1. What is agricultural Extension?
2. State five objective of Agricultural Extension
3. List three method of disseminating information to farmers

**WEEK 4 & 5**

**FISH FARMING**

## Definition of fish farming

Fish farming (culture) is the act of rearing selected species of fish under scientifically controlled conditions in enclosed bodies of water such as pond, streams, rivers etc. where they feed, grow, breed and are harvested for consumption or for sale.

## Terms associated with fish farming

Fingerlings – The newly hatched fish(es)

Fisheries – This is the study of fish and fishes

Fish – This refers to a particular species, regardless of the

Number or quantity

Fishes – This refers to the different species of fish

Pond – This is artificial body of water where fish (es) can be reared

Gears – These are equipment used in harvesting fist

Fry – This refers to young fish (es) or baby fish(es)

School – This is a group of fish (es)

Hatchery – This refers to a unit where fish eggs are incubated and Hatched artificially into fish

Aquarium – This is an artificially fish pond kept for aesthetic or

Entertainment purposes at home

Aquaculture – This refers to the study and production of fish, shrimps

And other aquatic food organisms.

## Importance of fish farming

Fish farming important for the following reasons:

T provides fish which serves as a source of food e.g. protein to man and livestock

It provides a means of increasing the availability of protein to people at reduced cost

It provide a means of recycling wastes e.g. animal dungs from farms, factories and sewage disposal system

Fish can be processed into fish by products such as fish meal, fish oil, manure and skin

It provides employment and income to many people

A better use of land and water in our environment is also ensured through fish farming

It can generate foreign exchange to a nation, especially when fish are exported to others countries

Fish farming is also useful in the area of research work and other educational purposes

## Conditions of factors necessary for siting a fish pond

The factors or conditions necessary for siting a fish pond include:

Adequate water supply

Soil in the area

Vegetation of the area

Topography of the area

Availability of fast growing fishes

Availability of supplementary feedstuff.

**Adequate water supply:** There must be constant supply of water of good quality and quantity. The water can be from streams, lakes, rivers, irrigation canals, springs etc. Good quality water is necessary because it will provide oxygen and food to fish, create a medium for waste discharge and reproduction. The water should not have a bad smell, taste or colour and should not be too muddy and must be free from pollution

**Soil in the area:** Soil in the area must be fertile so as to supply nutrients to the fish. It should be clay because of its ability to hold water which is very important in fish pond construction. Soil with too much sand or gravel is to good and would not retain water

**Vegetation of the area:** Low vegetation especially grasslands are preferred. Woody sites are not suitable because clearing and stumping will greatly increase the cost of setting up the fish pond

**Topography:** The shape of the land should allow for easy draining and filling of pond with water. The water must flow from a place that is higher than the pond so that the water can flow into the pond directly if not, the need for water pumps would arise and this will increase the cost of the project. However, fish pond can be constructed on a flat or level ground but lots of soil have to be removed to create the slope

**Availability of fast growing fish:** fingerlings or baby fish for stocking a fish pond should be the type that can grow fast and mature within a very short time. The use of improved varieties (breeds) in stocking fish pond makes fish farming more profitable

**Availability of supplementary feedstuff:** Supplementary feeding is done to ensure rapid growth of fish and allow high stocking density. Artificial or compounded feeds in from of pellets are used to supplement the natural feed (planktons) the addition of fertilizers also promotes the rapid growth of planktons (natural fish food) in the pond.

## Classification of fished

Fishes can be classified into two main groups:

**Classification based on fish habitat:** under this classification, two groups exist: **Fresh water fishes:** These fishes live in fresh water i.e. the water does not contain salts. Examples of such fresh water include pond, streams, rivers and lakes. Examples of fishes in this group include tilapia, carp, perch, trout, mudfish etc.  **Salt water fish:** These fishes live in water containing salt such as lagoons, seas and oceans. Examples of salt water fishes include salmons, mackerel, shark, tilapia, rays, eels, etc.

**Classification based on body structure** under this classification, two groups also exist:

**Bony fishes:** These fishes possess bony skeletons. Examples include tilapias, mudfish, carps, trout, catfish, salmon, perch, and herring. Majority of these fishes are found in fresh water.

**Classification fishes:** These fishes possess soft bones composed of cartilages. Majority of these fishes are found in salt water and examples include shark, dolphin, dogfish, and rays.

**Features of a standard fish pond**

The essential features of a standard fish pond (fig. 31.1) include: (i) Dam (ii) Core trench

## Fig. 31.1: Top or Aerial view of a fish pond

Distribution channel

Spill way

Monk

Boards

Screen

Dam slope (inner and outer).

**Dam:** This is the large area of the pond that holds water. It ensures the availability of water in the pond

**Core trench:** This is the excavated portion of the fish pond. It consolidates the walls with stones and cement

**Distribution channel:** This is the area which helps to introduce water nto the

pond. Water is distributed to all the sections of the pond until it gets to a particular volume. Fertilizers can equally be mixed up with water and distributed together

**Spill way:** This is a passage for water to flow over or around a dam. It is positioned at one end of the dam. It uses wood or wiremeshed screen

**Monk:** This monk regulates water level automatically in the pond. It helps in the

discharge of water from both the surface and bottom. It has vertical low and horizontal culverts or pipes. They are constructed with concrete

**Boards:** These are structures which regulate the flow of water. They are made

up of desirable wood and also hold water inside the pond. They are fitted at the Centre or middle of slabs at the gates

**Screens:** These structures helps to prevent the entry of undesirable species of fish into the pond. They also prevent fish movement out of the pond

**Dam slope (inner and outer):** This helps to regulate water movement into and

out of the pond. It also ensures the availability of water in the pond. It is usually constructed at the beginning and end of the pond.

## Establishment/construction of a fish pond

The following operations are normally carried out when establishing a fish pond:

**Site selection:** Site selection involves the choice of best site based on necessary

conditions like, a piece of land through which a perennial stream flows. The site should be on a fertile and clay soil to prevent seepage of water. It should have a valley with narrow neck and at a fairly open area

**Reconnaissance or general survey:** Detailed survey of the chosen site should be

carried out, especially by extension workers. Such workers help to determine the height of pond, volume of earth to be used for duke, total water surface area, volume of water in the pond or embankment

**Clearing and stumping of site:** This involves the removal of thrash, cutting of trees and removal of stumps

**Construction of dam:** Dam is usually constructed across the stream. Material

used in the construction should be of good quality. Clay soil should be used for dam construction because of its ability to hold water

**Construction of core trench:** This involves the removal of the soil or excavation.

It is positioned at right angle to the dam. Such dam should be made with consolidated stones or cement walls

**Construction of spill way:** Spill way is positioned at one end of the dam. Wood and wire-meshed screen should be sued to construct the spill way

**Impoundment of pond:** This involves the filling of the pond with water by

opening the monk board of the reservoir. This leads to the release of water and flow to fill the pond

**Liming:** This involves the addition of limestone or calcium carbonate powder to

the sides and bottom of the pond to seal pores and prevent water loss. Liming also reduces acidity of the pond water and encourages the growth of planktons (fish food). However, liming is done before filling the pond with water. The lime materials should be left for four weeks in its dry state

**Pond fertilization:** fertilizer encourages the growth of planktons (fish food).

Pond fertilization is done by pouring organic fertilizers such as poultry droppings, cow dung or the use of inorganic ones like N.P.K. or super phosphate. Pond fertilization should be carried out 15 days before stocking pond with water

**Pond inoculation:** This is the introduction of proper plankton’s species into the

pond. This is done by obtaining some water from a plankton rich pond and pour into a newly fertilized pond. When the pond water begins to turn green, this green water indicates the abundance of planktons (natural food of fish). To keep the water green, fertilizer is added into the pond every week

**Stocking of pond:** this is the introduction of the proper baby fish called

**fingerlings** or **fries** into the pond. The pond is stocked at the rate of two fingerling per square meter. The fingerlings should not be poured into the pond, rather, the container should be placed gently into the water and the fingerlings allowed to swim into the water pond themselves.

## Maintenance of a fish pond

To ensure the continuous availability of fish in a fish pond or maintain high fish yield, it is necessary to ensure:

**Regular feeding:** The fish must be fed twice daily from selected point (s).

supplementary feed in the form of compound feed should be given in sufficient quantity to ensure rapid growth and early maturity of the fish

**Deweeding:** This is the removal of weeds from the pond. It allows the

dissolution of oxygen in water, the penetration of sunlight to the bottom of the pond which will promote the growth of fish food (planktons). It also prevents the build-up of pests and disease

**Desilting:** This is the removal of silt or prevention of silt from entering into the

pond. Desilting makes the water to be clean, promotes easy movement of fish within the water and also prevents pollution of the water

**Aeration:** Aeration enables oxygen to dissolve in water which is required by fish

to dissolve in water which is required by fish for respiration. Fishes usually come to the surface of water due to lack of oxygen in the water. Weeds, excessive organic manure, overstocking etc. prevent proper aeration of the pond

**Constant supply of water:** The pond should always be filled with water and any leakage repaired

**Control of predators:** Predators like birds and snake should be prevented from

entry into the pond because they could eat up the fish in the pond. This can be done by keeping the pond surrounding clean (e.g. by constant weeding).

**Prevention of diseases:** Diseases should be prevented as this could kill all the

fish in the pond. Adequate feeding, stocking, temperature, manuring, weeding, etc. help to prevent diseases

**Regular harvesting:** Regular harvesting of fish is necessary to prevent over

population, outbreak of diseases and cannibalism. Periodic or total harvesting could be done six months after stocking, using net or by draining of the pond

**Regular application of fertilizer:** This should be done once in a month to promote the growth of fish food (planktons) in the pond.

## Processing and preservation of fish

Harvested fish is either consumed, sold or preserved for future use. Fish processing involves the removal of scales, fins, gut and gills. The remaining part is than cooked or fried for eating. By-products of fish processing include (i) fish meal (ii) fish scales (iii) cod liver oil (iv) fish skin.

Fish can be preserved for future use by any of the following ways:

**Salting:** This is the application of salt on the fish. It prevents the growth of spoilage organisms

**Smoking:** This is the drying of fish over naked fire. It reduces he moisture content and increase the taste and flavor of the fish

**Sun-drying:** This involves the drying of fish using heat from the sun. in this process, fish can only be stored for a short time

**Freezing:** This involves the use of cold storage like refrigerators and deep freezers to store fish over a very long time

**Canning:** This involves the storage of processed and consumable fish in cans under special conditions for future consumption e.g. sardine.

## Fishing tools or gears

Examples of fishing tools or gears commonly used to harvest fish (es) include (i) cast net (ii) drag net draw net or sein net (iii) clap net (iv) set net (v) trawler with sein net or fishing trawler (vi) fish traps, gill net, fishing basket, harpoon or spear.

## Fishing nets

**Functions/Uses:** Fishing nets are generally used for the harvesting of fish (es) from either ponds, streams, rivers, lakes, oceans or sea

**Description:** There are various kinds of nets commonly used. Examples include:

**Scoop net:** This is a small net which may be rectangular or cylindrical in shape

with the required or regulated mesh size. It has a wide mouth and a small / long wooden handle. After the pond has been drained, harvesting can be done with a scoop net (fig.

31.2)

**Gill nets:** Gill nets are used to harvest or catch bigger fish (es) in a pond, thus,

leaving the smaller fish (es) until they attain bigger sizes. Gill nets are usually made of 23cm mesh size. They are called gill nets because the fish pokes its head through the net mesh and is caught around the gills as it tries to wriggle through the net. The gill nets have lead sinkers (weights) at the bottom rope and floats at the top ropes

**Seine net:** A seine net (fig. 31.3) is capable of collecting all the fishes in the pond

at once because it has smaller mesh size than the gill nets. It is made of heavy fibre to hold the fish. The nets usually have lead sinkers (weights) attached to the bottom ropes. These weights hold the nets at the bottom of the pond so that the fish cannot escape underneath the floats attached to the top ropes to help the net form an enclosure. Seine net is used with trawlers called fishing trawlers

**Fishing trawlers:** This is a large fishing boat in which large nets called seine nets

can be attached. It is used for harvesting large fish (es) in the deep sea or oceans. The net can or is capable of harvesting or catching large quantities of fish (es) at a time for commercial purposes

**Fishing basket:** This is a fishing tool designed like a basket (fig. 31.4). It has a

cylindrical shape with a wide mouth. It has a trigger close to the mouth while at the taper end, holds the food (bait). The bait attracts the fish and when it enters the basket, the trigger is pulled down as the body of the fish touches it and this closes the mouth of the basket. By so doing, the fish cannot come out of the basket as it is being trapped

**Hook and line:** The hook and line is also a fish harvesting tool. It has a long

wooden handle (fig. 31.5), a long line, rope or twine, a float and a hook. The principle used in hook and line fishing is to offer the fish a bait (usually a small piece of fish or earthworm) fixed to a hook at the end of the line or rope. The fish while trying to bite the bait, swallows the hook and thus gets caught.

**Other method of harvesting fish include:**

**Trapping:** This involves the setting of traps to catch fish. It involves the use of

gears made from ropes or raffia woven into various models of enclosures for capturing fishes. They are set along water courses and any fish that enters the trap would not be able to get out but remains there until it is caught by the fisherman

**Netting:** This involves the use of various types of nets to catch fish. Nets like gill

net, clap net trawl net etc. which have been woven into various sizes and thickness are thrown into water to catch fish

**Electro-fishing:** This involves the use of electricity to catch fish by creating

electric fields in an enclosed area such that current is sent across, killing fishes between poles. It can only be used for total harvesting of fish

**Draining of ponds:** This involve draining of pond water for easy use of net to catch large fishes

**Use of ultrasonic:** This is an instrument which can make sound in water and

attract fishes so that they can easily be trapped or harvested using other means of harvesting

**Impaling:** This involves the use of spears or harpoons to attack and catch big fishes.

## Basic laws and regulations of fishing

**Meaning:** Fishery regulation is a set of rules and laws governing the exploitation and other practices of fishery resources, especially in open access water. In other words, fishery regulations are laws made by the government in order to control and protect fish harvesting so that they do not go into extinction and for them (fishes) to be in regular supply from time to time.

Fishery regulations or decree in Nigeria was promulgated in 1971 during General Yakubu Gowon’s regime. The regulations are:

**Close season:** This is a regulation in which no fishing is permitted to take place for a given period of time. This allows the smaller fishes to grow and mature

**Catch quota:** This is a form of control in which a fisherman is allowed to catch a

specific quantity of fish or regulating the number of fisherman by issuing them fishing permits or licenses at a specific amount

**Mesh size regulation:** This involves the use of a particular mesh or net size such that only the matured fishes are caught, thus protecting the young ones

**Regular stocking:** This involves the addition of compactible species of fish to increase the population of fishes in water

**Population control:** This involves the use of other fish types like clarias (catfish) to eat up tilapia or early harvesting to prevent over population

**Prevention of vessels:** No vessels (except canoes) shall fish within the first two nautical miles of the water of the Nigerian continental shelf

**Ban on the use of poisonous materials:** The use of noxious or poisonous matter is prohibited because it often results in the death of both the mature and the young fishes

**Ban on the use of poisonous materials:** The use of noxious or poisonous matter is prohibited because it also result in the death of both matured and the young ones

**Landing tax:** Landing tax should be introduced such that total catch and sizes of fish should be taxed at the site of landing

**Allocation of fish areas:** Fishing areas are allocated to individual fisherman so as to curb indiscriminate interference within large fishing areas

**Restriction on breeding section:** The breeding section of water should be identified so as to restrict fishing in the section

**Ban on discharge of pollutants or toxic substance:**Pollution or toxic materials should not be discharge into the Nigerian waters

## Ways of making fishery regulations effective in Nigeria

There are several ways in which fishery regulation can be made effective in Nigeria these are:

**Use of local or native languages:** The fishery regulations should be written and

made available in local or native languages

**Simple presentation to fisherman:** The regulations should be presented to the fishing community or fisherman in very simple ways

**Wide publicity to create awareness:** The regulations should be given wide

publicity, using radio, television, posters, leaflets/handbills in order to bring such to the awareness of the people

**Use of law enforcement agents:** Appropriate law enforcement agents should be used to enforce the regulations

**Revocation of licences:** There should be revocation or withdrawal of licences of defaulting fisherman

**Prosecution of defaulters:** There should be prosecution of defaulting fishermen.

Questions:

1. What is fish farming?
2. State five importance of fish
3. State five method of preserving fish
4. What is fish processing

**WEEK 6 & 7**

## PROCESSESS OF ANIMAL IMPROVEMENT

There are three processes or methods of animal improvement. These are introduction, selection and breeding.

## INTRODUCTION

Introduction is the bringing into the farm or a country, high quality breeds of livestock with a high productive capacity and other good desirable characteristics from another farm or country. Before the introduction of such animal from another (exotic breeds), one must be sure that such breeds possess higher quality characteristics than the local breeds. Different breeds of farm animals exist and these include the local breeds, imported breeds and the cross breed.

The local breeds are usually small animals, slow-maturing, poor producers, but adapted to local environment and resistant to many diseases. The exotic (imported) breeds are big animals, early-maturing, good producers but may not adapt to local environment and not resistant to many diseases. To obtain a balance, the exotic breeds are used to mate the local breeds to obtain cross breeds which will now combine all the good qualities of exotic and local breeds.

Advantages of Introduction

1. Breeds which are not originally present in the home country are introduced
2. It enhances greater productivity
3. It leads to the absence of pests and diseases
4. Breeds may perform better in terms of quality and quantity, if it is able to adapt to local environment .

Disadvantages of Introduction

1. It may introduce new diseases (s) to the area.
2. It may introduce new pest(s) to the area.
3. It may have the problem of adaptation to the new area.
4. It may not perform maximally.

SELECTION

Selection is the process of picking or selecting from a mixed population, those animals with breeding value as parents. Selection is undertaken to maximize genetic gain. It helps to select animals that are capable of transmitting their genetic attributes to their offspring. Animals with desirable characteristics like good meat production, egg laying etc, are selected. Selection is grouped into two main classes.

1. Natural Selection: This is the ability of individual animal to weather through unfavourable environmental forces to survive and reproduce. Those that are unable to survive die off.
2. Artificial selection: This selection is done by man using his intelligence and influence to select and mate animals in order to increase the number of animals. There are four types of artificial selection.
3. Mass selection: Animas are selected or rejected on the basis of their own performance (merit). Animals with the desired characteristics are chosen in preference to those not possessing them from a large group of animals.
4. Progeny selection: Animals are selected on the performance of their progeny or offspring. Mothers of the best performed offspring are retained while the mothers of offspring that do not perform well are discarded.
5. Family selection: Animals are selected or rejected on the basis of the performance of the relatives or family. It is usual when family size is large.
6. Pedigree Selection: Animals are selected or rejected on the basis of the performance of their ancestors. This is based on the belief that ancestors have passed on their traits to the animals being considered and so the animals are likely to perform equally or even better than the ancestors.

Advantages of Selection

1 It ensures that only the best naturally available animal is selected. 2 Animals with desirable characteristics are selected.

1. Animals from best breeds are bred for distribution
2. Animals with undesirable characteristics are detected and rejected
3. Selection reduces the spread of diseases.
4. It also reduces the spread of parasites associated with breeding stocks.

Disadvantages of Selection

1. Selection is tedious and time consuming.
2. It is very costly in terms of time and money
3. It requires expertise which may not be readily available.
4. It brings about elimination or exclusion of some desirable traits of some parent stock.
5. No new desirable characteristics are introduced.

Breeding

Breeding involves the breeding or development of animals by transferring inherited qualities from parents to offspring. This is achieved through mating.

Types of Breeding

1. In-Breeding:
2. This involves mating of more closely related animals than the average of the population from which they come, e.g., the mating of father to daughter, son to mother or brother to sister.
3. It produces offspring with undesirable characteristics because of recessive genes showing up.
4. It also enables the farmer to get desired character or quality well developed in an animal
5. In-breeding helps to produce inbred lines that can be used for cross breeding to produce hybrid vigour.
6. It also leads to in-breeding depression.
7. Line-breeding:
8. It is closely related or similar to in-breeding.
9. It involves the mating of not too closely related animals, e.g., mating between cousins.
10. It has the same disadvantages as in-breeding, but it takes a longe period for undesirable trait of the parents to appear (i.e in-breeding depression)
11. It is used to consolidate traits for a sire or dam. Most of the high quality commercial characters developed recently have been as a result of line-breeding.
12. Cross Breeding:
13. This is the mating of proven quality animals from different breeds
14. It may lead to an increase in hybrid vigour, e.g., the cross between muturu breed of cattle which is resistant to trypanosomiasis and Whit Fulani which is susceptible to the disease to produce a hybrid which combines he good qualities of the two breeds.
15. It results in breeds of animals with higher production capacity than any of the parents
16. It brings about greater rate of growth in an offspring.
17. It produces individuals that can withstand climatic variation in the environment
18. It increases diseases resistance in offspring.
19. It also promotes higher yields of eggs, meat and milk in offspring.
20. Out Breeding: This is the mating of unrelated individuals animals within the same breed. Out-breeding is the opposite of in-breeding. It produces offspring with greater vigour and productivity.

Advantages of Breeding

1. The crossing or mating of superior animals from two different breeds produces an offspring that is superior to the average of either parent. This is called hybrid vigour or heterosis (cross breeding).
2. Offspring grows more rapidly and is more economical to rear (cross breeding).
3. It results in the production of pure breeds or pure lines (in-breeding).
4. It helps to concentrate and preserve specific qualities in an animal (In-breeding)
5. Off springs produced can withstand variations within the environment (crossbreeding).

Disadvantages of Breeding

1. It may result in in-breeding depression, i.e., a reduction in vigour and performance (in-breeding).
2. It can also result in drop in production such as, milk, egg, mat, slow growth rate, loss of fertility (in-breeding).
3. It may also result in poor resistance to diseases (in-breeding).

ARTIFICAL INSEMINATION

This is the introduction of semen into the reproductive tract of the female by a method other than natural mating. The semen containing spermatozoa are carefully handled, diluted and stored in freezer at a temperature of 196oc in liquid nitrogen until it is required for use.

For artificial insemination to succeed, the semen which has been stored is introduced into the female reproductive tract during breeding cycle (the heat period) so that fertilization will occur. Artificial insemination is only possible in animals whose heat period is easily observable because spermatozoa are only viable for few hours after introduction in to the female reproductive tract.

Methods of collecting semen from a proven male for use in artificial insemination are:

1. Artificial vagina
2. Massage method
3. Electro-ejaculation
4. Recovery of semen from the vagina after service.

Advantages of Artificial Insemination

1. It is easier and less expensive than natural mating since the farmer is saved the expense of maintaining a herd of male animals.
2. It is easier and cheaper to import he semen of exotic breeds rather than the male animals themselves.
3. It makes it possible to use the best male animal to a large extent.
4. It is possible to service many females of different sizes leading to the production of many offspring.
5. It brings about reduction in the transmission of venereal and infectious diseases.
6. It allows for the testing of offspring of a particular individual within relatively short period of time.
7. The semen of a good bull can still be used long after the death of the bull.

Disadvantages of Artificial Insemination

1. It requires expertise which may not be readily available
2. Difficulties in detecting heat in female animals may limit the success of artificial insemination
3. In-breeding effects may show up if only a few bulls are used in a particular environment.
4. If the handling procedure is inadequate (i.e improper timing of breeding in the oestrus cycle), the pregnancy rate may be very low.

Questions:

1. What is animal improvement?
2. State three method of Animal improvement
3. State five objective of Animal improvement

**WEEK 8 & 9**

## AGRICULTURAL FINANCING

MEANING OF AGRICULTURAL FINANCE AND CREDIT

Agricultural finance is defined as the act of acquisition and use of capital in agriculture. In other words, it deals with the supply of and demand for funds in the agricultural sector of the economy. On the other hand, agricultural credits are loans obtained by the farmer to start or to expand his farming business. It is repayable over a period of time with some interest as determined by the source of the credit.

Types of Farm credits

There are three types or classes of credit. These are:

1. Short term Credit: This is a productive credit which the borrower is expected torefund in a year or less. It may be used to purchase livestock feed, fertilizers, seeds, fuel, or to pay for hired labour.
2. Medium term credit: This credit is to be repaid within a period of two to five years. It may be used to purchase machinery, breeding livestock or housing for livestock.
3. Long term credit: This credit is repayable within a period of three to 20years. It can be used to purchase costly fixed assests such as land, construction of farm buildings, dams and irrigation projects.

Agricultural Subsidy: Agricultural Subsidy refers to a non-refundable aid granted to a farmer. Examples include reduction in the prices of inputs such as fertilizers, improved seeds, chemicals, etc, free information such as weather forecast, new technology, market sources, etc.

Interest

Meaning: Interest is the amount paid on borrowed capital or an amount earned above the cost of goods. Interest is usually paid on borrowed capital which usually comes along with loans. For example, if a farmer borrows N500,000.00 from a bank and the interest on the loan is 10%, it means the amount he will pay as interest is N50, 000.00 per annum, i.e., x = N50,000.00

When the farmer is paying back the loan with the interest, the total amount he will pay the bank is N550, 000.00

Differences between Subsidy and Credit

S/N CREDIT SUBSIDY

|  |  |
| --- | --- |
| i. Credit is a repayable loan. | It is a non-repayable loan. |
| ii. Credit is always in cash | It may be in cash or in land. |
| iii. It includes bank loans, credit schemes and cooperative | It includes reduction in prices of input like chemicals, seeds, fertilizers, etc. |
| iv. It has a time period for its return | It is given and never to be re-turned |

v. Government does not bear part Government bears part of the burden of a of the burden of a loan subsidy

IMPORTANCE OF AGRICULTURAL FINANCE

i. It enables farmers to meet seasonal and annual fluctuations in income and expenditure ii. It enables farmers to adjust to changing economic conditions.

1. It also increases the efficiency of the farmers
2. It enables the farmer to increase the size of his farm. v It helps to protect against adverse conditions on the farm. vi It enables farmers to acquire more farm inputs for increased production.

## SOURCES OF FARM FINANCE

Farmers can get credit or loan to finance their farming business through any of the following sources:

1. Agricultural bank: Agricultural bank such as the Nigeria Agricultural and Cooperative Bank (N.A.C.B) was established in 1973 to grant loans to all potential farmers. Only farmers can borrow money from the bank, hence it is called the Farmers’ Bank”.
2. Commercial Bank; Commercial banks are major sources of lending to agriculture. Banks like First Bank, U.B.A, Union Bank have agricultural departments where the farmers can get loan to carry out their farming activities.
3. Supervised agricultural credit Scheme: This scheme was set up with the purpose of granting loans to farmers. The scheme is supervised by the Central Bank of Nigeria (C.B.N)
4. Thrift and saving societies: Members contribute money either daily, weekly or monthly. At the end of an agreed period, the money is paid back to the members which they can use for their farming activities.
5. Money lenders: These are people who lend out their money to farmers to enable them to produce. However, the money lender will charge high interest rate and demand security for such loan.
6. Cooperative societies: These are the people who come together to pull their resources (money) together to produce. Members can easily get loan from the societies. Apart from this, commercial banks prefer to give loans to cooperative societies than individual farmers.
7. Government agencies: Farmers can easily get loans from certain government agencies like the National Directorate for Employment (N.D.E) and Agricultural Development projects (A.D.P) for their farming activities.
8. Self Finance: This refers to the money saved by an individual which can be used to finance his farming activities.
9. Individuals: Farmers can also borrow money from individuals like friends and relatives to finance a project.

Problems Farmers may Encounter from Some Credit Sources.

1. Commercial Banks
2. They are usually biased in favour of large sacle farmers only.
3. They demand collateral which farmers cannot provide.
4. There is the problem of relatively high interest rate.
5. Community Banks
6. The amount of credit is usually small and inadequate to meet the needs of farmers.

7 They insist on a would-be lender coming to open account with them before loans are given.

1. Money Lenders
2. They are usually biased towards enterprises that bring in quick returns to repay the loan.
3. Their interest rates are too high to allow for an appreciable input from the farm business.
4. Family Sources
5. The use of loan is usually small and inadequate
6. They usually insist on short-term credit.

## IMPLICATIONS OF FARM CREDITS

The procurement of loans or credits for farming activities is associated with some implications. In other words, farmers find it difficult to get loans from banks because of the following reasons:

1. Interest rates: Interest rate is the rate at which farmers can borrow money from bank, i.e, the amount of interest a farmer will have to pay on the money borrowed. High interest rate discourages borrowing while low interest rate encourages borrowing. Therefore, farmers cannot borrow when the interest rate is too high.
2. Collateral Security: This is what the banks and other financial institutions will want a borrower to present before a loan can be given. Such securities include landed property, buildings, etc. most farmers do not have these securities and therefore, cannot borrow money.
3. Long gestation period of some crops: Some crops like rubber, cocoa and oil palm take a very long time to mature. Banks, therefore, find it very difficult to grant loan to farmers engaged in the cultivation of such crops.
4. Unpredictable climate which can lead to crop failure: Agricultural activities in Nigeria depend naturally on rainfall. A good rainfall encourages productivity but lack of rainfall is a doom to farming activities. Banks, therefore, are always afraid to lend money to farmers because unfavourable climate can lead to crop failure.
5. Lack of farm records: Farmers lack good farm records of all their activities which can be used to assess their credit worthiness.
6. High level of loan defaulters: Farmers may not be able to repay the principal, let alone the interest charged, in case of natural disaster.
7. Lack of insurance Policy: Farmers do not take insurance on their farms.
8. Lack of moratorium: Banks do not give moratorium or deferment of payment of loans to farmers.
9. Land tenure System: The prevalent land tenure system works against procurement of agricultural loans.
10. Small farm holdings: Farm holdings are too small and uneconomical to operate for mechanization and profit.
11. Lack of awareness: As a result of high level of illiteracy among farmers, they are hardly aware of the existence of loan facilities in banks.

12 Bureaucracy: Bureaucracy (red tapism) which is normally involved in the procurement of loan does lead to non-disbursement of loans to farmers.

Questions:

1. What is Agricultural financing
2. State five source of financing
3. Sate five differences between loan and subsidy