AGRICULTURAL SCIENCE

FOR

Senior Secondary School

3

AKADALEARN

SS3
FIRST TERM NOTES ON AGRICULTURAL SCIENCE

TABLE OF CONTENT

FIRST TERM

WEEK 1

Agricultural Science SS3 First term
Topic: Animal Nutrition (III)

Malnutrition in Farm Animals

This 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. It results when an animal takes in insufficient food or it eats diet which is deficient of one or more nutrients like protein, vitamins, minerals e.t.c Malnutrition or malnourishment is a condition that results from eating a diet in which nutrients are either not enough or are too much such that the diet causes health problems. It may involve calories, protein, carbohydrates, vitamins or minerals.

MALNUTRITIONAL DISEASES	CAUSES	SYMPTOMS	CORRECTION
Rickets and Osteomalacia Perosis	Lack of calcium, phosphorus, Vitamin D, Lack of chlorine, folic acid, calcium in diet	Flexible and curve bones, soft shell eggs, Chickens lie on their kneels	Add fish meal, bone or oyster shell to feed Add vitamins and B-complex
Pregnancy toxemia	Lack of sufficient energy, ketosis	Loss of appetite	Feed carbohydrate
Milk fever	Low blood sugar and constipation	Loss of appetite, nervousness	Feed oyster shell or bone meal
Baby pig anaemia	Low iron in blood	Nervousness, galloping and convulsion	Inject animal Iron dextran
Night blindness	Lack of Vitamin A	Inability to see clearly at night	Feed with yellow maize
Scurvy	Lack of vitamin C	Lesion around connective tissues	Feed animals vegetables and fruits
Beri-Beri	Lack of vitamin B1	Lack of appetite, fatigue and weight loss	Feed animals with yeast, cereals and vegetables

MINERAL	SOURCES	FUNCTIONS	DEFICIENCY SYMPTOMS

Calcium	Bone meal, oyster shell, limestone, milk	– Bone and teeth formation – Egg shell formation – Blood clotting	– Rickets – Osteomalacia – Soft egg shell – Retarded growth
Phosphorus	Bone meal, dicalcium phosphate, fish meal	– Bone and teeth formation – Acid – base balance – Egg shell formation	– Rickets – Osteomalacia – Lack of appetite
Magnesium	Salk licks, wheat gems, forage, grasses	– Aids functioning of the nervous system – Activation of enzymes	– Hyper – irritability – Nervous disorder
Sodium and chlorine	Common salt, salt lick and fish meal	– Regulates acid base balance – Maintenance of osmotic pressure – Improves pleasant taste of feed	– Reduced growth and weight – Decline in appetite
Sulphur	Salt licks, fish meal	Constituents of protein and amino acids like methione	Poor growth
Iron	Yeast, iron injection and salt lick	Constituent of haemoglobin in red blood cell and of protein called myoglobuline	Anaemia
Iodine	Iodized salts, fish meal	Constituent of hormone called thyroxine	Goiter
Copper	Salt licks	Aids formation of haemoglobin and iron absorption	Anaemia
Fluorine	Salt licks, fluorinated water	Prevents tooth decay	Tooth decay

Assessment

1. Explain Malnutrition
2. What are the deficiencies of the following
   - Calcium
   - Copper

- Iodine
- Iron
- Sulphur

3. What are the sources of the minerals mentioned in question 2?

WEEK 2

Agricultural Science. S.S.S3 First Term
TOPIC : Agricultural Extension

Agricultural Extension

- This is a 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.
- It 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 agents
- Agricultural extension is the process, system or service which assists farmers or farm people through educational procedures in improving farming methods and techniques.

Objectives of Agricultural Extension

1. To help people living in rural areas to recognize and take interest in their problems
2. To link farmers with research institute
3. To help farmers access agricultural loans from cooperatives and banks.
4. To help accelerate rural development
5. To convince people to make themselves available to be taught how to raise their standards of living by their own efforts.
6. To educate farmers on how to use scientific and improved technology for agricultural purposes
7. To help improve the health of rural dwellers through nutrition using their own farm produce

Roles or Functions of Agricultural Extension

1. Increase in Agricultural Production – It encourages farmers to increase their production of food crops, cash crops and livestock.
2. Raises standard of living of farmers
3. Teaches improved farming practices and product processing which leads to greater productivity through the use of innovative technology.
4. Acquisition of Skills – It helps farmers to acquire skills and specialization in the production of livestock
5. Identification of proper marketing channels for farmers to sell their product
6. Supervision of agricultural development programmes
7. Helps the farmer to understand land management and techniques which can help increase land fertility and productivity
8. Assistance to foreign experts – It enables extension workers to give necessary assistance to foreign experts visiting the state.
9. Supervisions of agricultural loans
10. Acts as an intermediary between farmers and research

Problems Facing Agricultural Extension

1. Inadequate farm input – These farm inputs often get to the farmers late as a result of inadequacy
2. Inadequate motivation of extension workers
3. Inadequate transport facilities for extension staff
4. Poor supervision of farmers by extension workers
5. Poor communication facilities between extension workers and farmers
6. Inadequate Extension tools to facilitate extension work
7. Language barrier – Low level of education of most farmers can be a barrier
8. Illiteracy of farmers
9. Ignorance of tradition and customs of local government
10. Corruption of Extension Personnel – Some funds meant for farmers can sometimes be diverted by extension workers for their personal gain

Methods of Disseminating New Ideas

There are three main extension teaching methods

Individual Method – This includes farm and home visits aimed at direct contact between farmers and the extension agents. The purpose is to give advise or assistance on a wide range of farm problems. Examples of ways of disseminating ideas and innovations through individual methods are

- farm visits
- home visits
- telephone calls
- e-mails
- personal letters
- text messages

Advantages

1. It gives and obtains information that will be useful to farmers and researchers
2. It involves the use of mobile phones which makes communication dissemination easier
3. More attention is given to an individual farmer
4. It can only work for a small group of farmers

Disadvantages

1. It is time consuming
2. It is tedious
3. Extension agents can not reach many farmers
4. It is expensive.

Group Method – This involves working together with groups of farmers under the supervision of the extension workers. Examples of this method are –

- meetings

- seminars
- demonstrations
- group discussion
- symposia
- debates
- lectures
- workshops
- excursions
- field trips
- conferences

Advantages of using demonstration as a group method

1. Participants are able to participate in the debate issues about lessons being taught
2. It encourages teaching of a large group of farmers
3. Communication is made easier
4. It is more economical in terms of time and energy
5. It helps to improve farmers awareness
6. It is a practical problem solving technique

Advantages of using field trip

1. It is used to observe real life situations to farmers and they are able to learn practical application of what they have learnt
2. Farmers are able to discuss what they have learnt during field trips with other farmers

Advantages of Group Method

1. It saves time and money
2. It is not as tedious as individual method
3. Farmers tend to show more interest in what they are introduced
4. It enables extension workers to reach out to many farmers at a time

Disadvantages

1. Some members maybe easily discouraged
2. Members of the group may not always be present at the same time
3. Extension workers may not be enough

Mass Method – This involves the dissemination of information through special media of communication to farmers. This method is used to create awareness and interest of new ideas and techniques among farmers. Examples of ways are

- posters
- bill boards
- newspapers
- news bulletin
- fliers, handbills
- radio
- television
- websites
- exhibition
- journals

Types of Mass Media

- Electronic Media – The use of electronics e.g. television, radio, film show.
- Print Media – The use of printed information like banners, posters, leaflets, handbills e.t.c

Advantages of Newspapers

- Long-lasting effect because farmers can refer to it any time
- Less expensive
- Can be widely circulated
- Used in areas without electricity

Advantages of Television

- Messages last longer in the minds of people
- It can reach communities not accessible by roads

Advantages of Mass Media

1. It can reach a large audience at the same time
2. It doesn't require the presence of extension workers
3. Farmers can use new ideas without the help of extension workers
4. Less stressful and less time consuming
5. The information lasts long in the minds of the people

Disadvantages

1. Electronic media is expensive to operate
2. They are only useful for the literate farmers
3. They are only available to wealthy farmers who can afford them
4. Farmers will find it difficult to as questions

Importance of Agricultural Extension

1. To teach farmers improved farm practices
2. To educate rural women on home management
3. To teach farmers efficient management of farms
4. To help farmers obtain loans
5. To act as link between farmers and government/research institute
6. To monitor the use of agric loans

Qualities of Good Extension Worker

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

1. Originality – He must have native intelligence to be original in his words, thoughts and actions
2. Leadership – He must possess leadership qualities
3. Initiative – He must have initiative to tackle problems of farmers
4. He must have problem solving ability
5. He must have respect for culture and traditions
6. He must possess excellent communication skills
7. Availability and punctuality is key
8. He must be honest and reliable
9. He must be a good listener
10. He must have extensive knowledge of the subject matter
11. He must be friendly
12. He must learn other languages
13. He must learn to be patient

Roles of Agricultural Extension Worker

1. He plans and executes programmes for farmers
2. He sources for loans to be used by the farmers
3. He helps farmers to locate marketing channels
4. He teaches farmers good farming practices and home management
5. He conducts and organises trainings for farmers
6. He supervises the farmers
7. He acts as intermediary between farmers and research institute
8. He evaluates extension programmes

Problems facing Agricultural Extension Workers

1. Absence of credit facilities
2. Non-involvement of farmers in planning programmes
3. Inadequate evaluation machinery
4. Illiteracy of farmers
5. Language barrier
6. Inadequate resources

7. Unfavourable attitudes of farmers and inability to embrace change
8. Poor transportation network
9. Inadequate publicity

Assessment

1. What are the objectives of Agricultural extension
2. Agricultural extension workers face certain problems in the course of carrying out their duties. Mention the 4 most prominent
3. List the 3 ways in which new ideas can be disseminated to farmers and mention the disadvantages of Group Method

WEEK 3 & 4

Agricultural Science. S.S.S 3, First Term
TOPIC: Fish Farming

Fish farming or pisciculture is the principal form of aquaculture, while other methods may fall under mariculture. Fish farming involves raising fish commercially in tanks or enclosures, usually for food. A facility that releases juvenile fish into the wild for recreational fishing or to supplement a species' natural numbers is generally referred to as a fish hatchery. Worldwide, the most important fish species used in fish farming are carp, salmon, tilapia and catfish. Fish farming can also be defined as the act of rearing selected species of fish under scientifically controlled conditions in enclosed bodies of water such as ponds, streams, and rivers where they feed, grow, breed and are harvested for consumption or sale.

Aquaculture
This is the act of rearing selected species of fish, shrimps, crabs, under scientifically controlled conditions in enclosed bodies of water such as ponds, streams, and rivers where they feed, grow, breed and are harvested for consumption or sale.
Terms associated with Fish Farming

- Fingerlings – Newly hatched fish(es)
- Fisheries – Study of fish and fishes
- Fish – A particular species of fish regardless of their number
- Fishes – Different species of fish
- Pond – Artificial body of water where fishes can be reared
- Gears – equipment used for harvesting fish
- Fry – refers to young fish(es) or baby fish(es)
- School – Group of fish(es)
- Hatchery – A unit where fish eggs are incubated and hatched artificially into fish
- Aquarium – Artificial pond kept for aesthetic or entertainment purposes

- Aquaculture – Study and production of fish, shrimp and other aquatic organisms
- Pisciculture – aquaculture practice involving finned fish.
- Extensive aquaculture – managed aquaculture dependent on the local natural setting, such as a pond or coastal sea area.
- Intensive aquaculture – managed aquaculture controlled through human engineered means, such as managing water quality and sources of food.
- Fish Hatchery – one form of a fish farm, managed with the intent of resupplying native wild populations in natural environments.
- Ornamental fish – are small fish, such as koi, which are typically grown to be kept in aquariums or small landscape ponds.
- Game fish – Fish, such as trout, raised to become replenishment stock for natural sport fisheries.
- Wild fishing harvest – the commercial and personal fishing consumption in a specific area and over a specific time frame.

Fish farming

- Water Quality – the characteristics of water, such as water temperature and contamination, which define its ability to sustain life and its purity from chemicals.
- Culture tanks – Artificial holding areas used to rear fish farm stocks.
- Fish husbandry – the breeding and rearing of fish for a variety of reasons.
- Anadromous fish – migratory fish that live in salt water but breed in fresh water.
- Catadromous fish – migratory fish that live in fresh water but breed in salt water.
- Amphidromous fish – migratory fish that live in both fresh and salt water, independent of breeding.
- Potamodromous fish – migratory fish that move within fresh water only.
- Oceanodromous fish – migratory fish that move within salt water only.

- Genotyping – determining the genetic makeup of a fish or stock or the purpose of managing the efficiency of aquaculture production.
- In vitro fertilization – artificially fertilizing fish eggs in a laboratory setting.
- Fish meal – commercially processed food source used in fish farming as a source of protein for the fish stock.
- Yearling – Development stage of fish following the fingerling stage and lasting until approximately one year of age.
- Brood stock – fish of any particular species which are raised for reproduction purposes.
- Fish kill – a description of the number of fish stock to die in a specific amount of time.
- Pond acreage – area committed to extensive aquaculture holdings at a fish farm or company.

Environmental

- Overfishing – detrimental practice of removing more of a natural aquatic species than what natural reproduction can support.
- Contaminants – Both natural and artificial materials not typically found or found in unusually high concentrations which can be detrimental to the health of wild or farmed aquatic species

Importance of fish farming

1. Provides fish which serves as source of food
2. Useful in the area of research and educational purposes
3. Better use of land and water in our environment is ensured through fish farming
4. Provides means of increasing the availability of protein to people at reduced cost
5. Generation of foreign exchange if it is imported to other countries
6. Means of recycling waste
7. They can be processed into other fish products e.g. fish meal, can fish (sardine, geisha and tuna), fish oil and manure

8. Provides employment and income to people

Conditions necessary for siting a Fish Pond

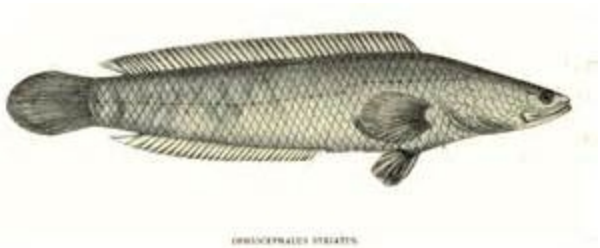
1. Adequate water supply – There must be constant water supply of good quantity and quality for fish farm to survive. Source of water – lake, streams, rivers, bore holes, springs, canals, irrigation.
2. Availability of supplementary feedstuff – Supplementary feedstuff is done to ensure growth of fish and allow high stocking density
3. Soil – The soil in the area must be fertile so as to supply nutrients to fish. It should be clay because of its ability to hold water
4. Vegetation of the area – low vegetation especially grass lands are preferred.
5. Topography – The shape of the land should allow for east draining and filling of pond with water.
6. Availability of fast growing fish – fingerlings or baby fish for stocking should be a type that can grow and mature within a very short period.

Classification of Fishes

Classification based on habitat – two groups

Fresh water fishes – They live in fresh water (water without salt). Examples of fresh water are ponds, streams, lakes, rivers. Examples of fish are tilapia, carp, trout, mudfish.

Salt water fishes – They live in salt water (water that contains salt). Examples of salt water are lagoons, seas, oceans. Examples of fishes are mackerel, tilapia, shark, rays, eels.

Classification based on body structure – two groups

Bony fishes – They possess bony structure. Examples are tilapia, mudfish, salmon, catfish, perch, herring, and trout. Most of them are found in fresh water

Cartilaginous fishes – They possess soft bones composed of cartilage. Examples are shark, dolphin, rays and dogfish. Most of them are found in salt water.

Features of standard fish pond

1. Dam – Large area of the pond that holds water.
2. Core trench – Excavated portion of pond. It consolidates walls with stones
3. Distribution channel – Area which helps to introduce water into the pond.
4. Spill way – Passage for water to flow over or around a dam. Made of wood and wire mesh
5. Monk – They regulate water level automatically in the pond. It helps in discharge of water from surface to bottom
6. Boards – Structures that regulates flow of water. Made of desirable wood.

7. Screens – Structures help to prevent entry of undesirable species of fish
8. Dam slope – This helps to regulate the movement of water in and out of the pond.

Establishment of a Fish Pond

1. Site selection – Choosing of the best site based on favourable conditions like a piece of land with a perennial stream flow. Site should be on a fertile and clay soil
2. General survey – Survey of land should be carried out.
3. Clearing and stumping of land – Removal of thrash, cutting of tree and removal of stuffs.
4. Construction of dam – Dam is usually constructed across the stream. Materials for construction should have good quality
5. Construction of core trench – Removal of soil or excavation. Positioned at right angle of dam
6. Construction of spill way – Positioned at one end of the dam
7. Impoundment of pond – Filling of pond with water
8. Liming – Addition of limestone or calcium carbonate to powder sides and bottom of pond to prevent water loss
9. Pond fertilization – This encourages the growth of planktons (fish food)
10. Pond inoculation – This is the introduction of proper plankton species into the pond.
11. Stocking of pond – Introduction of the proper baby fish called fingerlings into the pond.

Maintenance of Fish Pond

1. Regular feeding – Twice daily
2. De-weeding – Removal of weeds from pond
3. Desilting – Removal of silt or prevention of silt from entering pond
4. Aeration – This enables oxygen to dissolve in water for fish respiration
5. Constant water supply – Pond must always be filled with water

6. Control of predators – Keeping of fish surrounding clean.
7. Regular harvesting – This is necessary to avoid over-population
8. Regular application of fertilizer – This should be done once a month

Processing and Preservation of Fish

By products of fish processing are

- Fish meal
- Fish scale
- Cod liver oil
- Fish skin

Methods of Preservation are

- Salting – Application of salt on fish prevents spoilage
- Smoking – Drying of fish over naked wire to reduce moisture content and increase flavor and taste of fish
- Sun- drying – Drying of fish using heat from sun
- Freezing – Use of cold storage to store fish
- Canning – Storage of processed and consumable fish in can
- Roasting – Mechanical burning of fish over naked fire

Methods of Harvesting Fish

Fishing tools are – cast nets. Drag net, clap net, set net, trawler, fish traps.

- Fishing nets – used for harvesting of fish from pond, stream, river
- Trapping – setting traps for fish. It involves the use of gears made from ropes
- Netting – use of various types of nets to catch fish
- Electro-fishing – use of electricity to catch fish by creating electric field in an enclosed area.

Assessment

1. Mention 4 ways in which fish can be preserved
2. Mention 4 importance of fish farming

3. Fill in the blank spaces with the correct answer – **culture tanks, catadromous**
4. **fish, Overfishing, Brood stock, Yearling, fishes, fry, ornamental fish, fingerlings, game fish, aquaculture, hatchery, school, fish, aquarium, anadromous fish, potadromous fish**

   a. ..... is a unit where fish eggs are incubated and hatched artificially into fish

   b. ..... refers to young fish(es) or baby fish(es)

   c. ..... means a group of fish

   d. ..... signifies newly hatched fish

   e. An artificial pond kept for aesthetic or entertainment purposes is called.....

   f. Artificial holding areas used to rear fish farm stocks is called .....

   g. ..... are small fish, such as koi, which are typically grown to be kept in aquariums or small landscape ponds.

   h. ..... migratory fish that live in fresh water but breed in salt water

   i. Development stage of fish following the fingerling stage and lasting until approximately one year of age is called .....

   j. ..... is the detrimental practice of removing more of a natural aquatic species than what natural reproduction can support.

Answers

Question 3

1. Hatchery
2. Fry
3. School
4. Fingerlings
5. Aquarium
6. Culture tanks
7. Ornamental Fish
8. Catadromous fish
9. Yearling
10. Overfishing

WEEK 5 & 6

Agricultural Science SS3 First term
Topic: Animal Improvement

Animal Improvement
Animal Improvement refers to the ways of developing and breeding only those animals that show the greatest merit under consideration such as good feed conversion, growth rate, disease resistance and egg size. It also involves the upgrading of existing (local) breeds as a result of some desirable characteristics which they possess.

Aims of Animal Improvement

1. To produce animals that can give high yield or products in form of meat, egg and milk.
2. To produce animals that can provide high quality of products such as low back-fat thickness, yolk size and shell hardness.
3. To produce animals that are resistant to parasites and diseases
4. To produce animals which can adapt to climatic conditions
5. To produce animals with early maturity
6. To produce animals with high feed conversion efficiency
7. To produce animals with high growth rate

Processes of Animal Improvement
Introduction – This involves bringing into the farm or a country high quality breed of livestock with a high productivity and capacity with other desirable qualities from another farm or country. Before introduction of such animal, one must be sure such breed possesses higher quality characteristics than the local breeds.

Advantages of Introduction

1. It introduces breeds which are not originally present in that country or farm

2. Absence of pest and diseases
3. Breeds may perform better in terms of quality and quantity if they are able to adapt to the local environment
4. It enhances greater productivity

Disadvantages of Introduction

1. It may not perform maximally
2. It may introduce new pest and diseases into the area
3. Problem of adaptation

Selection – This is the process of selecting or picking from a mixed population those animals with breeding values 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. Two classes of selection

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

Artificial selection – This selection is done by man using intelligence and influence to select and mate animals in order to increase the number of animals. There are four types of selection under this category

- Mass selection – Animals are selected based on their own performance. Animals with desired characteristics are chosen in preference to those not possessing such traits from a large population
- Progeny selection – Animals are selected or rejected based on the performance of their progeny or offspring
- Family selection – Animals are selected or rejected based on the performance of their relatives and family. Useful when the family size is large

- Pedigree selection – animals are selected or rejected based on the performance of their ancestors i.e. it is believed that the ancestors must have passed their traits to the offsprings

Advantages of selection

1. It ensures that only the naturally best animals are selected
2. It reduces the spread of parasite and diseases
3. Animals with undesirable characteristics are detected and rejected
4. Animals from the best breeds are bred for distribution
5. Animals with desirable traits are selected

Disadvantages of selection

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

Breeding – This involves development of animals by transferring inherited qualities from parents to offspring via mating

Types of Breeding
In – breeding

- This involves mating of closely related animals than the average of the population from which they come e.g mating of father and daughter, son and mother.
- It produces offspring with undesirable traits because of recessive genes showing up.
- It enables farmers to get desirable characters well developed in an animal
- It helps to produce inbred lines that can be used for cross breeding

Line – breeding

- Involves mating of not too closely related animals example -mating between cousins
- It takes longer period for the undesirable traits of parents to appear
- It is used to consolidate traits for a sire or dam

Cross breeding

- Mating of proven animals from different breeds
- It may lead to increase in hybrid vigour
- It results in breed of animals with higher productivity
- It brings about greater growth rate in an offspring
- It produces individuals that can withstand adverse weather conditions
- It also promotes high yield of meat, eggs and milk production

Out – breeding : Mating of unrelated individuals within the same breed. It is the opposite of in-breeding. It produces off springs with greater vigour and productivity.

Advantages

1. Off springs grow more rapidly and is economical to rear
2. It results in production of pure breed or pure lines
3. Mating of superior animals of two different breed produces an offspring that is superior to the average of either parent
4. Off springs produced can withstand adverse weather conditions.
5. It helps to concentrate and reserve specific qualities in an animal.

Disadvantages

1. It may result in in-breeding depression i.e. reduction in performance
2. It can result in drop in production level of milk, meat and eggs
3. It may also result in poor resistance to diseases

Artificial Insemination

This is the production of semen into the reproductive tract of female by a method other than the natural mating. The semen are carefully handled, diluted and stored in a freezer at -196C. Artificial insemination is only possible in females during heat period.

Methods of collecting semen from a proven male

- Artificial vagina
- Massage method
- Electro-ejaculation
- Recovery of semen from 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
2. Semen of a good bull can still be used long after its death
3. Allows for testing of off springs of a particular individual within a short period of time
4. It makes it possible to use the best male animal
5. It is easier and cheaper to import semen of exotic breeds

Disadvantages

1. It requires expertise which may not be available
2. Difficulty in detecting heat period in females
3. If the handling procedure is inadequate, pregnancy rate may be low

Assessment

1. Mention and explain the processes of animal improvement
2. What do you understand by artificial insemination?
3. Mention the methods of collecting semen from a proven male

WEEK 7 & 8

Agricultural Science SS3 First Term

TOPIC: Agricultural Financing

Agricultural Financing

Agricultural finance is the act of acquisition and use of capital in agriculture. It deals with the supply and demand for funds in the agricultural sector of the economy.

Importance of Agricultural Finance

1. Enables farmers to acquire more farm inputs for increased production
2. Enables farmers to meet with seasonal and annual fluctuations in income and expenditure
3. Enables farmers to increase farm size
4. Enables farmers to adjust to changing economic conditions
5. Increases the efficiency of farmers

Agricultural credit – these are loans obtained by the farmers to start or expand farming business. It is repayable over a period of time with some interest

Agricultural subsidy – this refers to a non-refundable aid granted to a farmer. Examples are reduction in prices of input, such as fertilizers, improved seeds, chemicals, free information such as weather forecast and new technology

Interest – this is the amount paid on borrowed capital or an amount earned above the cost of goods.

Differences between subsidy and credit

Credit	Subsidy
It is a repayable loan	Non-repayable loan
Always in cash	Maybe in cash or land
It includes bank loans, schemes and cooperatives	Includes reduction in prices of input, seeds and fertilizers
It has a time period for payment	It is given and never returned

Government does not bear part of the burden	Government bears part of the burden

Sources of finance

1. Agricultural bank – Example is Nigeria Agricultural and Cooperative bank. Only farmers can borrow from the bank
2. Commercial bank – examples UBA, Union bank, First bank have agricultural department where farmers can get loan
3. Thrift and saving societies- Members contribute money on weekly and monthly basis and then paid back to members
4. Money lenders – These are people who lend out their money to farmers to produce
5. Government agencies – Farmers can get loans from certain government agencies like National Directorate for Employment, Agricultural Development Projects
6. Self-finance – Money saved by individual to finance farming activities
7. Micro-finance banks – Banks that provide finance to the poor who are traditionally not served by the financial institutions
8. International development agencies – Food and Agricultural organization, World Bank, United Nation development Agricultural Development.

Problems farmers may encounter from credit sources

Commercial banks

- They are biased in favor of large scale farmers only
- They demand for collateral the farmer cant provide
- High interest rate

Community banks

- Credit amount is usually small and inadequate to meet farmers needs

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

Money lenders

- High interest rate
- They are usually biased and want quick returns on loan given

Problems militating against farmers in securing loans

1. Collateral security – Such securities are landed property and buildings usually required by commercial banks and farmers don't have such
2. Lack of Awareness – As a result of high level of illiteracy amongst farmers, majority of them are not aware that credit facilities are available in banks
3. Lack of farm records – Farmers lack good farm records which could have been used to access credit
4. Long gestation of some crops – Banks do not want to borrow farmers who are engaged in this kind of farming
5. Small farm holdings – Farm holdings are too small and uneconomical to operate mechanized farming processes
6. Interest rate – High rate of interest has hindered so many farmers from securing loans
7. Bureaucracy – Bureaucracy which is normally involved in the procurement of loans does lead to non-disbursement of loans to farmers
8. Lack of insurance policy
9. High level of loan defaulters – Most farmers do not pay back hence this discourages creditors from giving them loans
10. Unpredictable climate which can lead to crop failure

Problems militating against banks in granting loans to farmers

1. Inadequate farm records and account of farmers
2. Unpredictable weather which may hinder outcome of harvest.
3. Low level of education by farmers

4. Diversion of loan for other purposes – Farmers are not faithful and sometimes divert loans to other personal needs
5. Uncertainties in farming business
6. Problems of pest and disease which may affect farm produce

Classification of credit

1. Classification based on length of period of the loan –
   – Short term credit : This is to be returned in a year or less. It can be used to purchase livestock feed, seeds, fuel, fertilizers.
   – Medium term credit: This credit is to be repaid within a period of 2 – 5years. It can be used to purchase machinery, livestock or breeding houses
   – Long term credit: This credit is repayable within 3 – 20years. It can be used to purchase fixed assets like land, construction of dams, irrigation projects
2. Classification based on credit sources
   – Institutional credit – Credit granted from institutions like commercial banks, insurance companies, cooperative societies and government agencies
   – Non – institutional – Credit granted from non-institutional places like personal savings, individuals, thrift and savings societies, friends and money lenders
3. Classification based on liquidity
   – Loan in cash – Credit given to farmers in form of physical cash
   – Loan in Kind – Credit given to farmers in kind or material form such as seeds, fertilizers, tools and chemicals etc

Capital Market

This is a market for raising medium term and long term loans for agric business. They are institutions, structures and mechanism where by medium and long term loans are made available too investors.

Institutions involved in capital market

- Commercial bank
- Mortgage bank
- Stock exchange
- Insurance companies
- National Economic Reconstruction Fund
- National Social Insurance Trust Fund
- Merchant bank

Assessment

1. Mention 5 sources of finance
2. Mention 4 problems farmers face when sourcing for credit facilities
3. What are the differences between subsidy and credit

WEEK 9

Agricultural Science S.S.S 3 First Term
TOPIC: Agricultural Insurance

Introduction

Farmers are faced with series of risk that can affect production processes. Examples are unfavourable weather condition, pests and diseases, natural disasters, excess rainfall e.t c

Agricultural insurance is the insurance policy which provides compensation to farmers for losses suffered. For example, the loss of their crops due to natural disasters such as hail, drought and floods and loss of revenue due to decline in prices of agricultural products. Insurance is one of the tools farmers and stakeholders can use to manage risks that are too large for them to handle. Party of the risk is transferred to another party who takes it in return for a fee.

Importance of Agricultural Insurance

1. It plays an important role in stimulating investment in agriculture and in stabilizing the farmer's income
2. Insurance can assist the farmers in accessing new opportunities by improving their ability to borrow either in cask or kind as credit facilities
3. Insurance is relevant in improving agricultural technology. New technology usually require borrowing additional fund and investment and the farmer maybe afraid of entering into additional commitments when he is not sure of the production results

Agricultural Risks

1. Human or personal risk – Health issues of Farm operator
2. Financial risk – This involves possible increase in interest of mortgage, insufficient liquidity or loss of equity.
3. Asset risk – Theft, fire and other kinds of damages to assets

4. Production or yield risk – Weather is majorly responsible for this, it also includes pest and disease invasion on livestock and plants
5. Price risk – Fall or rise in prices after production modification has been done.
6. Institutional risk – Policy changes which interfere with agricultural issues

Types of Insurance policy

1. **Crop insurance** – This is purchased by agricultural operators including farmers, ranchers to protect themselves against loss of their crops either due to natural disaster or loss of revenue due to price instability.
   Scope of Crop Insurance
   – Fire
   – Hail
   – Frost
   – Windstorm
   – Rainstorm
   – Malicious damage
   – Convulsions of nature (earth quake, land slide, volcano, pest and diseases)
   Crop insurance policy can be in two ways
   Single or named peril
   b. Multi – peril or comprehensive
2. **Livestock Insurance** – This insurance has been defined as animals kept or raised for use or pleasure. Livestock products are egg, meat and milk which are important source of nutrition. The significance of livestock insurance is accentuated by the fact that in most developing countries, efforts are being made to improve the genetic quality of animals. Insurance of imported animals will facilitate the transition to improve breeds and thus attain higher productivity
3. **Farm Vehicle Insurance** – This includes tractors, trailers, power tillers, harvesters, threshers, pumps, pedal cycles, wind mills, solar systems etc

These and other mechanical devices are gradually entering the agricultural sector.

4. **Life Assurance** – This deals with insurance of human life either in death, retirement and disability. It has to do with situation that will definitely happen but when and how it will happen is not known. This involves farmers, farm workers and their households. There are 4 groups – term assurance, endowment assurance, whole life assurance and personal accident assurance.

Problems of Agricultural Insurance

1. Re-insurance of agricultural risk is not easily available
2. Skilled personnel at both managerial and operational level are scarce
3. Insurance is not a panacea for the problems of the rural sector. Insurance cannot increase productivity or be a source of financing
4. Lack of adequate information to farmers
5. Uncertainty of weather conditions
6. There are understandable limitations that prevent rapid growth of insurance business.

Assessment

1. Mention 4 Agricultural risks
2. Mention and explain 3 types of insurance policy

WEEK 9

Agricultural Science S.S.S 3 First term

TOPIC: Importance of Aquaculture

Introduction

As the human population continues to grow, finding means to feed those people is one of the most important challenges faced around the globe. Even in troubled economic times, men, women and children need to eat.

And a healthy diet, high in protein is necessary to ensure that growing population does not succumb to sickness and disease. Fish and other aquatic organisms fit the model for healthy sources of protein.

Harvests of wild sources of fish, crustaceans and other aquatic species cannot keep up with the demand presented by the growing human population. Trying to match demand through commercial fishing interests would eventually result in overfishing and the loss of those species entirely. Therefore, while aquaculture is required to meet the human demand, it also relieves the strain on wild species to allow them to continue to be a significant source.

The role of aquaculture in ensuring a consistent supply of aquatic species for human consumption cannot be overstated. Medical research into the health benefits of frequently eating fish is plentiful. One popular buzz word within the healthy eating movement is Omega-3 fatty acids, which are typically found in most fish. Multiple research studies indicate these fatty acids help reduce many forms of cancer and promote healthy brain tissue. Eating fish regularly has also been shown to reduce the risk of heart disease through reducing the probability of clot formation, lowering blood pressure and increasing the good cholesterol levels in the blood stream.

Some studies also suggest inclusion of fish into a healthy diet can have a positive impact on the development of Alzheimer's disease in elderly persons or blood sugar levels in diabetics.

Fish and aquatic species in general are a much healthier source of protein compared to livestock commonly consumed. Beef, pork and chicken all have their positive attributes, but none stand up to the positive attributes of fish.

Professionals in all aspects of agriculture struggle with improving their efficiencies and outputs to meet the food demands of the constantly

increasing human population. Aquaculture is no different, and in fact, plays a critical role in this arena. Fish farming is typically much more efficient than cattle or pork production and other forms of agriculture. Land dedicated to fish ponds will produce ten times or more consumable product than the same land used to raise cattle or pork, while requiring significantly less input.

But aquaculture does not exist without drawbacks. Depending on their location, whether it is a landlocked fish pond, or a floating cage in a saltwater estuary, high concentrations of aquatic species can alter or destroy existing wild habitat, increase local pollution levels or negatively impact local species genetic makeup.

Assessment

Highlight the importance of Aquaculture

SS3
SECOND NOTES ON
AGRICULTURAL SCIENCE

TABLE OF CONTENT

SECOND TERM:

WEEK 1: **ANIMAL HEALTH MANAGEMENT (I)**

WEEK 2: **ANIMAL HEALTH MANAGEMENT (II)**

WEEK 3: **SYMPTOMS AND EFFECT OF DISEASES**

WEEK 4: **SYMPTOMS AND EFFECT OF DISEASES(II)**

WEEK 5: **PARASITES**

WEEK 1 & 2

Agricultural Science SS3 Second Term
Topic : Agricultural Marketing

Agricultural Marketing

Agricultural Marketing are activities involved in the flow of goods and services from the producers to the consumers. These involves all activities required to move farm produce from the producers (farmers) to the final consumers. It also involves selling of farm input to farmers or purchasing of farm input e.g seeds, fertilizers and disposal of agricultural produce to the final users.

Importance of Agricultural Marketing

1. Marketing helps to make products available throughout of the year.
2. Creates employment opportunities for people
3. Locates where there are surpluses and bring them to where there are shortages.
4. Helps in price determination
5. Provides infrastructure such as roads, electricity and pipe-borne water.
6. Enables producers to know the taste of consumers

Meaning Of Marketing Agents Or Channels

Marketing Channel is the sequence of intermediaries and markets through which produce move from the producers to the consumers. These marketing channels are:

1. The Local Market: Market is a place where sellers and buyers are in close contact. Products brought to the market by the sellers (producers) are sold to the buyers (consumer).
2. Middlemen: Middlemen like the wholesalers and retailers form a link which buys goods from the producers.

3. Marketing Boards: They are channels through which produce are purchased in large quantities either for industrial purposes or for export.
4. Producers: These are farmers themselves who are also involved in the marketing of their produce.
5. Exporters: They buy produce from commissioned agents or big time farmers and export the produce to overseas buyers or consumers
6. Commissioned Agents: They buy goods or produce from peasant farmers and sell to marketing boards or exporters.
7. Consumers: They are at times involved in the marketing of farm produce.
8. Processors: They are agents who buy produce directly from producers (farmers) in raw state and process them into usable or consumable products

Stages of Agricultural Marketing

1. Farm Level processing: It involve the local processing of farm produce immediately after harvesting in readiness for sale.
2. Grading or Sorting: It involve the grouping of produce into various weights and sizes for easy handling
3. Packaging: This refers to the loading of produce into various packs in readiness for storage.
4. Storage or Warehousing: This involve the storage of produce before sales or export.
5. Transportation: Is the movement of produce from warehouse to market or Ports for exports.
6. Advertising: This involves making produce known by radio, newspaper and television.
7. Merchandizing: This involves the export of farm produce through the ports to other countries
8. Assemblage: This is the gathering of various produce brought from different sources. It may involve the repackaging of produce in readiness for final consumption.

How Agricultural Marketing Can Be Encouraged

1. Good roads
2. Good government policies
3. Market research
4. Capital or finance
5. Standard units of measurement
6. Adequate market infrastructure
7. Storage facilities

Agents Of agricultural Marketing

This include all the people or bodies directly or indirectly involved in the marketing of farm produce. These agents are:

1. Marketing/commodity boards
2. Producer/farmers
3. Co-operative societies
4. Wholesalers/distributor
5. Individual/private middlemen
6. Retailers

Marketing/commodity Boards: These are public corporations set up by government to handle the sales of agricultural produce.

Advantages of Marketing/commodity Boards

1. It helps to stabilize prices of farm produce.
2. The board sometimes provides capital to farmers
3. It helps to transport the produce of the farmers
4. It advices and encourages farmers to adopt modern farming techniques

Disadvantages

1. It is capital intensive
2. Government interferes with the running of the boards

3. It deals mainly on major export crops

Co-operative Societies- These are trading organisations where various entrepreneurs or members of the co-operative pool their resources together with a view to making profits through marketing of agricultural produce.

Characteristics of Cooperative Societies

1. There is equality among the members since each person has one vote
2. Membership is voluntary
3. The welfare of the members is paramount to the society, e.g. settling of dispute and other social problems
4. Dividends are shared according to the level of individual financial contribution
5. Each member is equally qualified for participation in the management of the society

Advantages of cooperative society

1. The stimulate competition in produce marketing by buying produce in bulk
2. They grant loans to members
3. They provide transportation services
4. They provide storage facilities
5. They have close contact with producers

Disadvantages of cooperative society

1. It doesn't always encourage individual enterprise
2. It is prone to financial misappropriation

Individual/Private Middlemen

Some individuals usually go directly to the farm for farm produce

Advantages of Individual/Private Middlemen

1. The link producers to consumers
2. They assist in even distribution of produce
3. They provide storage facilities
4. They may give loans to producers
5. They evacuate farm produce from the farm to the market

Disadvantages of Individual/Private Middlemen

1. They inflate prices of commodities
2. They create artificial scarcity of goods

Producers/Farmers
These are the farmers themselves

Advantages of farmers

1. The farmers get the full benefit of his effort
2. Consumers get goods at reduced prices
3. Produce gets to consumers fresh

Disadvantages of farmers

1. It diverts the farmers attention from production activities
2. He lacks storage and transport facilities
3. Farmers may suffer increased loss of goods

Wholesalers
These are agents who buy produce in large quantities and sell to retailers in small quantities

Advantages of Wholesalers

1. The purchase produce in bulk

2. They have good storage and transport facilities
3. They pass information from retailers to producers

Disadvantages of Retailers

1. They exploit producers and retailers
2. They create artificial scarcity of goods
3. They inflate prices

Retailers

They buy good from wholesalers and sell in small quantities to the final consumer

Advantages of Retailers

1. They make produce readily available to the final consumers
2. The provide jobs for many people
3. They pass information to the final consumers
4. They give credits to some consumers

Disadvantages of Retailers

1. They may create artificial scarcity for consumers
2. They can suffer losses due to pilfering and decay perishable goods
3. They may inflate prices of commodities

Problems of Agricultural Marketing

1. Inadequate transportation system
2. Inadequate storage facilities
3. Problems of middlemen
4. Poor prices of produce
5. Perishability of produce
6. Inadequate market infrastructure
7. Small scale production of peasant farmers give very little outcome

8. Poor financing of buyers
9. Inadequate research in marketing and storage
10. Inadequate information about production and marketing
11. Inadequate processing facilities
12. Difficulty in assembling products

Marketing Functions

The functions of marketing are

1. Researching – generate adequate information about your target market in order to identify size, culture, behaviour, gender, belief, target audience, their needs and want e.t.c
2. Buying – this is performed in order to acquire quality materials for production
3. Product development and management – Identify what the markets needs and design an effective product based on the identified needs and want of the market
4. Production – production of produce and processing into finished goods
5. Promotion – Effective communication strategies designed to make your products known and available to the market
6. Standardization and grading – To establish specified characteristics of your product
7. Distribution – How your produce can be effectively moved from the point of production to the market
8. Risk bearing – Product damaging in the course of movement. Risk involved during distribution
9. Financing – Provision of income for the business
10. After sales service – Building long lasting relationships with customers.

Marketing of Export Crops

Export crops are crops which are cultivated in Nigeria and at maturity are harvested, processed and packaged for sale to another country.

Major crops are

1. Cocoa
2. Cotton
3. Palm oil
4. Rubber
5. Cassava
6. Cashew nuts
7. Sesame seeds
8. Palm kernel
9. Gum Arabic
10. Sorghum

Importance of Export to Agricultural development

1. Foreign exchange earning
2. Creation of wealth to farmers
3. Generation of employment
4. Provision of raw materials for industries
5. Provision of market for industrial goods
6. Diversification of the economy
7. Provision of finished products

Assessment

1. How can agricultural marketing be encouraged?
2. Mention 5 export crops you know
3. Mention 5 functions of Marketing
4. What are the problems faced in Agricultural Marketing?

WEEK 3

Agricultural Science SS3 Second Term
Topic: Animal Health Management (I)

Animal Health Management

Health is defined as a state of alertness, freedom from ill-health, accomplished by unhindered growth and productivity of an animal. If the animal's physiological processes are functioning normally, the farm animal is described as being healthy.

Signs of Good health in Farm Animals

1. Contentment
2. Alertness
3. Eating with relish and cudding by ruminants
4. Sleek coat
5. Pliable and elastic skin
6. Bright eyes
7. Pink membranes
8. Normal pulse rate
9. Normal breathing rate
10. Normal body temperature

Diseases

Diseases can be defined as the absence of normal health due to infection, nutritional deficiency and imbalance, hereditary and functional disorders as well as injuries. Diseases can also be described as any disturbance in the normal life or body function of an organism which may affect a particular organ or the whole body and sometimes leads to reduced growth, production or premature death.

Types of Diseases

1. Peracute disease – one that lasts only for a short time with no noticeable symptoms
2. Acute disease – This shows noticeable symptoms and manifests maximum causality
3. Sub – acute disease – This lasts more than acute with one or more symptoms of the disease
4. Chronic disease – This is the type that keeps on longer causing loss of growth and production but no resulting death of the animal

Causes of Disease

- Virus
- Bacteria
- Fungi
- Protozoa
- Malnutrition or metabolic disorder

Signs of disease in farm animals

1. Unthriftiness
2. Lack of appetite
3. Dullness
4. Rough coat
5. Ruffled feather in poultry
6. Wasting
7. Diarrhea or water stool
8. Premature abortion
9. Increased mortality rate
10. Discharge from mouth and eyes
11. Decrease in activities
12. Loss of weight

13. Blood stains in faeces
14. Reduced production

Terms Used in Animal Health

1. Pest – These are organisms which through their feeding habits cause physical damage and discomfort to other organisms called hosts. Examples are ticks, lice, housefly tes-tse fly, sand flies, mosquitoes etc
2. Pathogens – These are micro-organisms that cause diseases in farm animals . Examples are bacteria, virus, fungi etc
3. Vectors – They are also pests which besides causing physical damage to the hosts, transmit disease causing organisms to farm animals Examples are ticks, mites, tes-tse fly ad fleas.
4. Parasites – They are a class of Organisms that live on or in their hosts permanently. They establish a physiological relationship with the hosts and rely on them totally for food and protection. Examples are ticks, lice, fleas, mites, liver flukes and tape worms.

Assessment

1. Mention 5 signs of good health in farm animals
2. Explain the types Of diseases
3. Mention 5 signs of diseases in farm animals

WEEK 4

Agricultural Science SS3 Second Term
Topic: Animal Health Management

Economic Importance of Animal Disease

1. Poor growth of animals
2. Diseases lead to poor feed utilization due to loss of appetite
3. Low yield of products
4. Low income to farmers due to reduced quantity and quality of products
5. Money is spent on curing the animal

Factors that can predispose animals to disease

1. Health status of the animal
2. Poor nutritional diet – Animals who are poorly fed are prone to diseases
3. Poor sanitation – When the environment is dirty, Animals can contract diseases
4. Poor management of the animals – Non administration of vaccines and drugs at appropriate doses and time
5. Poor housing of the animals
6. Unfavorable climatic conditions – Extreme temperature, winds and rainfalls can affect animals
7. Poor breeds of animals

Conditions that may Inactivate Pathogens

1. Low temperature – The lower the temperature, the less chances the pathogen survives
2. Sunlight and X-rays – High level of sunlight can cause death of certain pathogens
3. High Temperature – This renders a pathogen inactive
4. Low level or High level of pH in a medium inactivates pathogens

Assessment

1. Mention 4 factors that predispose animals to disease
2. Mention 4 conditions that can inactivate pathogens

WEEK 5

Agricultural Science SS3 Second Term
Topic: Symptoms and Effects of Diseases

Symptoms and Effect of Diseases
Viral Diseases

1. **Foot and Mouth Disease**
   Animals affected are – cattle, sheep and goat
   Causal Organism – Virus
   Symptoms
   – Formation of blisters on the mucous membrane of the mouth and skin, hoofs
   – Salivation
   – Loss of weight
   – Lameness
   – Inflammation of teats and udder
   Method of Transmission – Via infected materials like urine, faeces and milk. Mechanical means by farmers
   Control
   Isolation of infected animals. Burning and burying of contaminated materials. Regular vaccination .
2. **Newcastle Disease**
   Animals Affected – Fowl, turkey. Ducks, goose and guinea fowl
   Causal Organism – Virus
   Symptoms
   – Respiratory symptoms include sneezing, coughing nasal discharge
   – Nervous symptoms include paralysis, muscle tremor, somersaulting and cycling movements
   – Digestive symptoms include lack of appetite and diarrhea

3. **Rinder Pest Disease or Cattle Plague**
   Animals affected are cattle, sheep and goat
   Causal Organism – virus
   Symptoms
   – high fever
   – weakness and fatigue
   – high mortality
   – loss of appetite and weight
   – blood stained diarrhea

Bacterial Diseases

1. **Anthrax** – affects cattle, sheep, goat and pigs.
   Causal organisam – *Bacillus anthraxis*
   Symptoms
   – high fever
   – Depression
   – Blood oozes from nose, mouth and anus
   – Loss of weight
   – Lack of appetite
   – Staggering and sudden death
   Method of transmission – via contaminated feed, water, equipment and infected animals
   Control
   – Regular Vaccination
   – Proper Sanitation
   – Isolation of infected Animals
2. **Tuberculosis** – animals affected are cattle, poultry birds, pigs and sheep
   Causal Organism – *Mycobacterium tuberculosis*
   Symptoms
   – difficult breathing
   – loss of weight and appetite
   – soft and moist cough

– milk reduction
– high mortality
– constant coughing
– emaciation

Method of Transmission
Via inspiration of germs, contaminated water, feed, litters and droppings
Control
– regular sanitation
– slaughter infected animals
– proper sanitation

3. **Brucellosis or Contagious Abortion**
   Animals affected are – Pigs, sheep, cattle and goat
   Symptoms
   – High fever
   – Diarrhea
   – Dysentery
   – Inflammation of the uterus, scrotum
   – Infertility in male animals
   – Reduction in milk production
   – Still birth and premature abortions
   – Posterior paralysis

   Method of Transmission – Through contaminated feed and water
   Control
   – Proper sanitation
   – Regular Vaccination
   – Isolation of infected animals

Assessment

Mention one viral disease, state the symptoms and effects

WEEK 6

Agricultural Science SS3 Second Term
Topic: Symptoms and Effect of Diseases (II)

Fungal Diseases

1. **Ringworm** – animals affected are poultry birds, pigs
   Causal Organism – fungus

2. **Symptoms**
   – Lesions on the skin
   – Skin irritation
   – Loss of appetite and weight
   Method of Transmission
   Through infected animals, contact with infected brushes, feeders and drinkers.
   Control
   – Disinfection of all pens and equipment
   – Infected parts of animals should be treated every two to six days with mixture of Sulphur and vaseline
   – Old scabby area can be scrapped off and iodine solution applied.
3. **Aspergilosis**
   Animals affected – cattle, poultry birds, pigs and sheep
   Caused by Aspergillus fumigatus

Symptoms
– Loss of weight
– High body temperature
– Loss of appetite
– Difficulty in Breathing
– Skin irritation
– Respiratory disorder
Method of Transmission
Via contaminated (mouldy) feed, mouldy litter and contaminated

incubator
Control –
– Regular disinfection of pens and equipment
– Avoid mouldy feed
– Good sanitation
– Spry with fungicides

Protozoa Diseases

1. **Trypanosomiasis**

Animals affected – Resistant breeds of cattle are N'Dama, Muturu and Keteku while susceptible breeds are White Fulani, Red Bororo, Kuri Chad, Sokoto Gudali and Boran.
Causal Organism
It is caused by a protozoan called *Trypanosoma spp.*

Symptoms are
– Rise in body temperature
– dullness in appearance
– anaemia
– sleepiness
– weakness
– dry coat
– nervous disorder
– loss of appetite and weight

Method of Transmission
Spread by blood sucking tsetse fly.
Control
i. Clearing of bush around farm to remove the fly's habitat
ii. Biological control of insect vectors
iii. Treatment of infected animals with drugs such as antimosan, trypanosomide
iv. Eradication of wild species or animal carriers in and around pasture

2. **Coccidiosis** – animals affected are poultry birds, domestic fowl, turkey, goose, rabbit
   Causal Organism – protozoa

3. **Symptoms**
   – Loss of appetite
   – Dropping wings
   – High Mortality
   – Emaciation
   – Huddling
   – Dullness
   – Loss of hair
   – Blood stained diarrhea
   – Rough Feathers

4. **Control**
   – Changing of Litter
   – Drugs such as amprolium, nitrofurazone should be administered
   – Avoid wet litters and feed
   – Proper sanitation

2. Red water fever

Animals affected – sheep, goat, cattle, pig.
Caused by babesia spp

3. **Symptoms**
   – Emaciation and death
   – Loss of weight and appetite
   – Diarrhea
   – Increase in body temperature

4. **Mode of Transmission**
   Through bite of infected animal by vector called blue tick

Control

- Spray with insecticides to kill disease vector
- Inject animals with drugs like babesan, trypan blue and acaprin

Assessment

Mention one protozoan disease, state the symptoms and effects

WEEK 7

Agricultural Science SS3 Second Term
Topic: Parasites

Livestock Parasite

A parasite is an organism living in or on another organism called the host. The host is usually bigger and stronger than the parasite. The parasite derives benefits from the host while the host is harmed or injured during the association. Endoparasite are parasites that live inside the host e.g. tapeworm, liver fluke while Ectoparasite lives outside the host e.g ticks, lice, mites.

Endoparasites

1. Tape worm – A long flatworm with a very small head, neck and long segmented body. Taenia solium (botanical name) is found in pigs while Taenia saginata is found in cattle. The head called scolex has suckers and hooks with which it holds firmly to the intestinal wall of the host. Humans are primary host while pigs are secondary host.
   Life cycle of Tape Worm
   It is a hermaphrodite ie it has both male and female reproductive organs and as such can fertilise itself. When a matured and fertilized proglottide pulls off the body of the adult tape worm, it drops or passes out with faeces of man to the ground where pigs can pick it up during feeding. It eventually gets to the intestine of the pig where an enzyme acts on the egg and liberates the embryo which can find its way into the blood stream. Each embryo forms a cyst around itself to become bladder worm. When the raw or under – cooked pork of beef containing the bladderworm is eaten, the digestive enzymes of man dissolves the bladder worm and the young tapeworm with its head emerges.

Economic Importance of Tapeworm on Man

– Abdominal pain
– Anaemia
– Weakness
– Indigestion and Vomiting

Control of Tapeworm

– All meat should be examined for bladder worm before selling
– Meat should be properly cooked
– Good sanitary measures
– Infected people should be treated by regular deworming

2. Liver Fluke – This is a flattened, leaf like organism. It is brown in colour about 2cm long. An endo parasite of farm animals like cattle, sheep and goat. Farm animals are primary host while snail is a secondary host

   Life Cycle

   Fertilised eggs are passed out with faeces. During favourable conditions, the egg hatch into small ciliated larvae called miracidia. Each miracidium swims in water and its usually attracted to water snail which is the secondary host. It enters into the bodyof the snail during which it loses its cilia and changes to a sporocyst and reproduces asexually to give new larvae called rediae. The redia comes out of the sporocyst and goes to the digestive gland where it develops into a minute worm called cercariae. This leaves the body of the snail and swims about in water until it finds a suitable host when the animal drinks contaminated water.

   How to prevent Liver fluke from completing its life cycle

   – Eliminate all snails which are their secondary host
   – Provide clear, uninfested water and feed for animals
   – Control weeds along river side

   Economic Importance of Liver fluke

   – It causes a disease called bilharzia

– It leads to loss of blood and it also causes anaemia
– It obstructs bile duct
– It causes liver rot
– It leads to digestive disturbance

Control
– Drain pasture properly
– Use lime on pasture
– Introduce ducks and geese to eat up the snail

3. Round worm – This is an elongated, cylindrical, white worm which is pointed at both ends. The body is smooth and is covered by thick, tough, cuticle of few centimeters long.
   Life Cycle – The eggs are fertilized in a female worm and the larva develops within the egg shell. The eggs are deposited in the intestine of pig from where they are passed out with the host's faeces into the soil where it can remain for many years. When the eggs are picked by either pigs, or through feeding and drinking, the egg shells are dissolved by digestive enzymes and the young larvae emerge. The larvae then pierce through intestine wall to the blood, then to the liver, the heart and then to the lungs. The larvae develops into mature worms in the intestine and the life cycle is repeated all over again.
   Economic Importance of Round Worm
   – They reduce the growth of host
   – It destroys many of the organs during migration of the young worms.
   – Loss of appetite
   – Causes indigestion and constipation
   Control
   – Pigs should be dewormed regularly
   – Good sanitation of the environment should be maintained
   – Clean uncontaminated water and feed should be given to animals

Ecto parasites

1. Ticks – Body is divided into 2 – head and abdomen. It has four pairs of tough leathery integument and possesses a toothed hypostone. Life cycle is from Egg (a mature female tick after sucking blood from its host drops down and lays her eggs) – larva (the egg hatches into larvae with six legs. The larva crawls into the grass and attaches itself to the skin of the animal) – Nymph (The larva molts into a nymph with eight legs and attaches itself to a second host – Adult (The nymph finally molts into an adult tick which crawls into the the grass and attaches itself onto a third host).

Economic Importance

– They cause great annoyance and irritation to their host
– Damage of the skin
– Loss of blood and weight
– They cause injuries and wounds on their host
– They act as vectors of diseases

Control

– Animals should be kept in a clean surrounding
– Animals should be dipped in insecticide solutions regularly
– Rotational grazing should be practiced
– Ticks should be handpicked off animals
– Animal bedding should be changed regularly

METHODS OF PREVENTING DISEASES

1. Farm animals should be vaccinated regularly so as to be able to resist the invasion of diseases
2. All sick animals should be isolated and not allowed to mix with healthy ones
3. Disease resistant stocks should be bred
4. New stock introduced into the farm should be quarantined
5. Good and proper hygiene measures should be put in place

6. Animals should be fed balanced diet

Assessment

1. Explain the life cycle of a Tape worm
2. What are the methods of preventing diseases
3. What is the economic importance of Liver fluke