**AGRICULTURAL SCIENCE**

**JS 2** **SECOND TERM**

**SCHEME OF WORK**

1. Revision of last term’s work
2. Animals feed and feeding
3. Classification of livestock feed
4. Factor to consider before deciding Animal Feeds
5. Farm animal diseases: definition and causes
6. Farm animal diseases- Bacterial
7. Farm animal diseases-Viral
8. Farm animal diseases-Fungal and Protozoan
9. Farm animal diseases-worms and nutritional
10. Revision
11. Examinations

**WEEK ONE**

**TOPIC: REVISION OF LAST TERM’S WORK**

**WEEK TWO**

## ****TOPIC: ANIMALS FEED AND FEEDING****

**CONTENT**

* Meaning of feed
* Types of animal feed
* Feeding tools

### ****DEFINITION OF FEED****

Feed refers to the food given to animals. They contain nutrient elements either alone or in combination with other substances which support the healthy growth and development of livestock.

### ****TYPES OF FEED****

### Animal feeds can be classified into four main groups according to the digestibility, quantity of fibre, quantity required and moisture in the feed. The four groups of feeds are;

1. **Concentrates**: They are fee with a low proportion of fibre and water content. They are easily digested by farm animals. Concentrates can be further be subdivided into two groups: Those containing a high proportion of carbohydrates are called carbohydrate concentrates/basal feed/energy feed e.g. maize, guinea corn, cassava etc. while those with a high proportion of proteins are called protein concentrates e.g. beans, peas, cotton seed, sunflower seeds and heads, groundnuts, palm kernel and animal products such as meat, blood meal, bone meal, fishmeal and milk.
2. **Roughages**: Roughages are very low in protein and carbohydrate but high in fibre. They are not easily digested by animals, therefore are fed together with concentrated foods for young animals and those kept for milk and meat production. Examples are hay, groundnut hulls, straw, bean pods and maize stover.
3. **Succulents**: These have high water content. They are easy to digest. Examples are freshly cut/lush grass and legume plants (soilage), pumpkin, silage, melons and most green crops.
4. **Supplements (minerals and vitamins)**: they are required in small quantities, low in energy, protein and fibre but high in vitamins and minerals. They aid digestion and increase animals’ resistance to diseases. They are available in basal and protein concentrate feeds. Other sources are bone meal, oyster shell, salt licks etc.

### ****FEEDING TOOLS AND EQUIPMENT FOR FARM ANIMALS****

Common animal feeding equipment includes:

1. Hay racks: They are used for feeding animals with hay and other forages
2. Feed troughs or bunks: These are used for feeding grain and silage. Troughs for feeding cattle are usually stationary and located on a well-drained site preferably on concrete or hard surfaces.
3. Self-feeders: These are mainly used for fattening cattle. Self-feeders may be stationary or portable.
4. Watering facilities: Farm animals cannot survive for a long time without water. Mature cattle can consume an average of 12 litres of water per head daily depending on the size of the animals, season and the type of feed consumed. Water troughs, wells, springs, streams, or lakes are the main sources of water supply for cattle. Water troughs and tanks should be of adequate size when used.

**NOTE**: Farm animals should be provided with suitable shade while feeding particularly during the dry season to reduce the heat burden.

**WEEK THREE**

## ****TOPIC: CLASSIFICATION OF LIVESTOCK FEED****

**CONTENT**

* Feed nutrients.
* Classes of feed nutrient.

### ****FEED NUTRIENTS****

These are substances obtained from feed and used by the body to promote growth, maintenance and repairs of body tissues. About 21 chemical elements make up the various feed nutrients needed for the nutrition of farm animals. The following shows the elements and their chemical symbols.

**Name of element                                         Chemical symbol**

Carbon                                                                       C

|  |
| --- |
| Non mineral elements |

Hydrogen                                                                   H

Oxygen                                                                       O

Nitrogen                                                                     N

Phosphorus                                                               P

Potassium                                                                  K

|  |
| --- |
| Macro mineral elements |

Chlorine                                                                     Cl

Magnesium                                                                Mg

Sulphur                                                                      S

Calcium                                                                       Ca

Sodium                                                                       Na

Cobalt                                                                         Co

Copper                                                                       Cu

Fluorine                                                                     F

Manganese                                                                 Mn

|  |
| --- |
| Micro mineral elements |

Zinc                                                                             Zn

Molybdenum                                                             Mo

Selenium                                                                    Se

Chromium                                                                  Cr

Iodine                                                                         I

Iron                                                                             Fe

### ****Classes of livestock feed nutrient****

There are many types of feed nutrients suitable for livestock. It is important to understand the main classes and its constituent elements and functions of animal feeds.

The major feed nutrients include:

### ****Carbohydrates****

These foods are needed by livestock for supplying the energy required by the body for doing work and for the functioning of different organs of the body. Carbohydrates occur in nature as starches, cellulose or fibre. They contain elements, such as carbon, hydrogen and oxygen which are easily ‘burnt up’ or oxidized to produce energy. Examples are yams, cassava, potato, rice and Bread.

### ****Fats****

Fats contain carbon, hydrogen, and oxygen. Fats have more carbon and oxygen than carbohydrates. They supply energy needed by the body for keeping the body temperature at the correct level. They produce two and a half times the energy produced by carbohydrates. Fat can be found in plant and animal materials. Examples are milk, fatty seeds such as groundnuts, coconuts and cotton seeds, animal by-products, fish by-products, cereals, roots and tubers.

### ****Proteins****

Proteins contain carbon, hydrogen, oxygen, nitrogen and sometimes iron, phosphorus and or sulphur. Proteins are found in the protoplasm of all animals and plants. They are required by animals for growth and for the repair of worn-out tissues and organs of the body. Examples of protein-rich foods include soybeans, cotton seeds, groundnut, peas and beans as well as fish and meat.  The common sources of protein for animal feeds are forages, animal and fish by-products, roots and tubers and cereal grains.

### ****Minerals****

Minerals are necessary in an animal’s diet. They are required in small quantities only, except phosphorus and calcium which are important for bone formation. Carbon, hydrogen, oxygen and nitrogen are four of the twenty one elements that function in animal nutrition and are called non-mineral elements. The other 17 elements are called mineral elements. Macro-elements are required by the animals in large quantities, and they are calcium, phosphorus, potassium, sodium, sulphur, chlorine and magnesium. The remaining ten elements are required in very small quantities and are called micro-elements or trace elements, and they are iron, iodine, copper, cobalt, chromium, fluorine, manganese, zinc, molybdenum and selenium.

### ****Water****

Water contains hydrogen and oxygen. Water is needed by farm animals to aid digestion and distribution of food in their body. It also helps in the regulation of body temperature through heat loss by evaporation from the skin and lungs. Water is contained in the feeds of animals.

### ****Vitamins****

These are another group of substances which must present in very tiny amounts in the rations of farm animals. They are essential for the proper and normal functioning of the animal’s body. Their deficiency leads to ill-health of the animal. Vitamins contain carbon, hydrogen and oxygen. Vitamins can be grouped into

1. Water-soluble e.g. Vitamin B and C and
2. Fat-soluble vitamins e.g. Vitamin A, D, E and K.

**WEEK FOUR**

## ****TOPIC: FACTORS TO CONSIDER BEFORE DECIDING ANIMAL FEED**** ENOTE

**Factors to consider before deciding animal feeds are**

1. Age
2. Physiological status
3. Purpose of rearing the animals
4. Management system

### ****Age****

Younger animals require more proteinous feeds than the older animals.

### ****Physiological status****

Pregnant and lactating animals will consume more feed and need nutritious feed to sustain their young ones and foetus.

### ****Purpose of rearing the animals****

Animals kept for production of milk, egg, work etc. will be fed with feed suited for that purpose and will need more in terms of quantity than other animals.

### ****Management system****

Animals kept under intensive management system would require more quantity and quality feed due to the fact that they are confined and cannot fend for themselves as compared to animals kept under other management systems.

### ****Definition of some terms associated with animal feeding****

**1. Diet** is the amount of feed formulated to meet the specific need of an animal

**2. Ration** is the total amount of feed supplied to animal per day.

**3. Abalancedration** is a feed constituent that contains all essential nutrients in their appropriate quantities before being offered to an animal. There are two types of balanced ration, they are

**4. Maintenanceration:** is the amount of feed given to an animal to within a 24 hour period just enough for the animal to maintain its normal bodily functions without adding or losing live weight.

**5. Productionration:** is the amount of feed given to a specific group of animal within a 24 hour period to enable them produce appropriately.

### ****Categories of animals fed production ration are:****

1. Lactating animals for milk production.
2. Growers/Weaning animals to support growth.
3. Fattening animals to reach desired weight in good time.
4. Flushing for female animals prior to breeding.
5. Steaming up for pregnant animals prior to parturition.
6. Pregnant animals to support growing foetus.
7. Broilers too for rapid growth.
8. Layers for quality egg production.

**WEEK FIVE**

## ****TOPIC: FARM ANIMAL DISEASE I****

**CONTENT**

* Definition of disease
* Causes of diseases in farm animal
* Mode of transmission of farm animal disease
* Symptoms of farm animals diseases

### ****DEFINITION****

Disease is any change in the normal function or well-being of farm animals caused by another organism. Animals, like human beings, suffer from many serious diseases which may make them sick and may cause their death in large numbers if they are not treated.

### ****CAUSES OF DISEASES IN FARM ANIMAL****

Five groups of organisms which commonly cause animal disease; they are:

1. Bacteria
2. Viruses
3. Protozoa
4. Worms (parasitic nematodes)
5. Fungi

### ****MODE OF TRANSMISSION OF FARM ANIMAL DISEASE****

Disease-causing organisms can transit diseases to farm animals through the following modes:

1. Air (airborne)
2. Water
3. Direct contact with organism
4. Bites from insects, ticks and mites

However, preventing exposure of farm animals to these sources of transmission of diseases, the chances of farm animals being affected by diseases which can make them sick can be reduced.

### ****SYMPTOMS OF FARM ANIMAL DISEASES****

Symptom refers to the sign or indication of the presence of an abnormal condition in an animal. Diseased animals show specific symptoms which farmers can recognize that there are changes in the normal functioning of the bodies of farm animals. Farmers can recognize symptoms of different diseases in their sick animals. Such sick animals are taken to veterinary doctors who can prescribe medicines to cure the farm animals. Common symptoms of diseases in animals include the following:

1. Stunted growth
2. Reduced food utilization
3. Rise in temperature- high fever
4. Abortion in female animals
5. Sores and exudates from the skin
6. Enlarged udder
7. Stained blood in orifices
8. Loss of hair (alopecia)
9. Loss of weight (emaciation)
10. Loss of appetite (anorexia)
11. Anaemia (shortage of blood)

**WEEK SIX**

## ****TOPIC: FARM ANIMAL DISEASES II****

**CONTENT**

* Bacteria diseases – modes of transmission, methods of control, symptoms

### ****BACTERIA DISEASES****

### ****1.** Anthrax:**

Anthrax is a bacterial disease which attacks mammals’ especially herbivorous animals, such as sheep and goats.

**Mode of transmission:**The disease is mostly transmitted by eating infected or contaminated materials. It can also be transmitted through contact with affected animals and feeding equipment and infected wounds.

**Symptoms:**Grinding of teeth, rise in temperature and convulsion. This disease can kill an animal suddenly. It starts when the animal respires rapidly and stops feeding.

**Method of prevention and control:**Sick animals should be isolated. Vaccination of the animals should be done regularly; proper sanitation should be maintained in all animal houses. Animal that dies of the disease, together with all the beddings should be buried deep in the ground. The animal house should be disinfected immediately.

**Treatment**: Sick animals should be isolated. The disease is treated with antibiotics such as penicillin.

**2. Typhoid:**

This is a bacterial disease found mainly in poultry birds. It affects the intestines of the birds.

**Mode of transmission:**Through contact with the body fluids of infected birds.

**Symptoms:**The symptoms include high fever, tiredness and reddish droppings.

**Method of prevention and control:**Consult a veterinary doctor. Poultry birds should be vaccinated against this disease.

**Treatment**: Consult a veterinary doctor.

**3. Contagious abortion:** This is a bacteria disease of cattle, goats and pigs. It is also referred to as brucellosis.

**Mode of transmission:**This disease is transmitted through food and water contaminated with discharge and aborted foetus.

**Symptoms:**This includes; still births, retained placenta, abortion during the 7th to 9th month of pregnancy and infertility in males.

**Method of prevention and control:**The affected animal should be isolated from the other animals in the herd. All animals should be vaccinated before breeding. Animals should be given food in very clean containers and surroundings.

**Treatment:**This is by vaccination.

**4. Mastitis:** This is bacterial disease that affects the breasts of cattle, sheep, goats and pigs(swine).

**Mode of transmission:**The disease is transmitted into the breasts (mammary glands) of the animals by bacteria from dirty floors and milkers through the teat and udders.

**Symptoms:**include fever, pains, swellings of the udder, blood in the milk and rise in temperature of the animal.

### ****Method of prevention and control:****

1. The udder of animals should be properly washed before and after milking.
2. Milking by hand should be done in clean environments.
3. The hands to be used for milking must be well washed with soap and clean water before commencing milking.
4. Overcrowding of diary animals should always be prevented.

**Treatment**: The disease can be treated by injecting penicillin and other antibiotics in the body of the affected animals.

**5. Cowpox**

This disease affects cows as well as sheep and poultry.

**Symptoms**

The udder of an affected cow is swollen; there are eruptions on the udder of cows.

**Method of prevention and control:**Disinfect all equipment used for feeding and milking cattle.

**WEEK SEVEN**

## ****TOPIC: FARM ANIMAL DISEASES III****

**CONTENT**

* Viral diseases- symptoms, mode of transmission, prevention and control

### ****VIRAL DISEASES****

### ****1.** Rinderpest or cattle plague:** This is a serious and very contagious viral disease that attacks cattle quickly. It can also attack sheep and goats. The disease is very deadly; it killed thousands of cattle in Nigeria several years ago. It is found in the blood, tissue fluids and secretions of affected animals.

**Mode of transmission:**it is transmitted through direct contact and also through contaminated feed and water.

**Symptoms:** include rise in temperature, loss of appetite, blood stained diarrhea, difficulty in breathing and frequent abortion. The major effect of the disease is high mortality.

**Method of prevention and control:**Immunization; vaccination is a good preventive measure as no medical treatment has been successful. Affected animals should be isolated.

**2. Foot and mouth disease:** This is a virus disease of cattle, birds, goats, sheep and pigs. The disease is highly contagious

**Mode of transmission:**The disease is transmitted by contact with affected animals.

**Symptoms:**The symptoms are fever, headache and swellings or blisters on the mouth, skin, udder and salivation.

**Method of prevention and control:**The disease is better controlled than treated. Infected animals, particularly cattle, are often destroyed by mass killing to prevent the disease from spreading to other animals. It can be controlled by immunization and good sanitation. Infected animals should be isolated from healthy animals.

**3. Newcastle Disease**

This is a viral disease of poultry.

**Mode of transmission:**it is transmitted through secretions from the birds and contact with infected dead birds on the farm. The disease is also air-borne.

**Symptoms:**include coughing and sneezing, nasal and eye discharges, difficulty in breathing, loss of appetite, diarrhea, paralysis and general weakness.

**Method of prevention and control:**proper sanitation should be maintained. Affected animals should be quarantined. All animals should be vaccinated.

**4. Bird Flu (Avian Influenza)**

Bird flu is also called Avian Influenza. This is now a very well-known disease which affects poultry in many countries, including Nigeria. It is a highly contagious viral disease that is caused by a virus affecting the respiratory, digestive and or the nervous system of poultry. In some cases, in some Asian countries, human have been reported to be affected by this disease.

**Mode of transmission:**This disease can be transmitted by direct contact with the secretions from infected birds, especially the faeces. The disease can be transmitted indirectly through contaminated water, animal feeds, equipment and even clothing. The virus penetrates into the body through the respiratory and digestive systems.

**Symptoms**: Severe depression, refusal to eat, greatly reduced egg production, difficulty in breathing, watery eyes, swollen face especially the comb and wattle which change colour to blueish black, diarrhea, sudden death, with or without showing any symptoms. Ducks may usually die without showing any symptoms.

**Method of prevention and control:**

1. Avoid contact between domestic poultry and wild birds.
2. Separate different species of poultry raised on the same farm from one another.
3. Quarantine newly acquired or re-introduced birds for example unsold birds taken to the market.
4. Do not allow unauthorized persons to visit the farm
5. Install foot baths with disinfectant at the entrance of all poultry houses in the farm.
6. Wash hands and feet with clean water before entering and leaving poultry houses on the farm.
7. Frequently disinfect soiled materials and farm equipment.
8. Make sure that the source of poultry feed and water are clean and not already contaminated so that poultry are protected from infection.
9. If poultry are dying in large numbers or you observe the symptoms described, call a veterinary doctor immediately.
10. Bury or burn all dead birds and wash your hands and feet thoroughly with soap and clean water after burning or burying the dead or infected birds.

**5. Pneumonia:** This is a virus disease of cattle. It attacks the lungs of cattle.

**Symptoms:**Symptoms include rise in temperature, vigorous breathing, loss of appetite and discharge from the nose and eyes. (pneumonia can also be caused by bacteria).

**Method of prevention and control:**Proper sanitation should be maintained. Affected animals should be quarantined. All animals should be vaccinated.

**Treatment**: The use of antibiotics or administering anti-viral medication.

**6. Kata:** This is a virus disease of goats, found in the southern parts of Nigeria. The disease affects the respiratory and intestinal tracks of animals. It is also called peste des petits ruminants/goat plague.

**Symptoms:**the signs of disease include coughing, discharge from the nostrils, scrabs on the lips and other parts of the mouth and diarrhea.

Control: avoid over-crowding of animals.

**Treatment**: vaccination against the disease, no specific treatment but outbreak of the disease should be reported to the veterinary doctor.

**WEEK EIGHT**

## ****TOPIC: FARM ANIMAL DISEASES IV****

**CONTENT**

* Fungal and Protozoa disease

### ****PROTOZOAN DISEASES****

**1. Trypanosomiasis (Nagana)**

Trypanosomiasis, also called Nagana, is a deadly disease suffered by some breeds of cattle like white Fulani and Red Bororo. The Ndama and Muturu cattle are resistant to this disease. It is caused by a protozoan called Trypanosomes. Trypanosome parasites can be transmitted by infected tsetse flies when they bite humans. Persons who are infected with this parasite suffer from a disease called sleeping sickness.

**Mode of transmission:**it is transmitted by female tsetse flies when they suck blood from an infected animal and later transmit the parasites to the healthy animals when they suck their blood. Female tsetse flies require the blood of mammals for the development of young larvae inside the flies. Male tsetse flies do not suck blood therefore they cannot transmit this parasite.

**Symptoms**: Rise in temperature, dullness in appearance, sleepiness, nervous disorder, anemia, paralysis, the infected animal loses weight, becomes drowsy and may finally die.

**Method of prevention and control:**Destroy the tsetse fly habitat by clearing the surrounding bushes and spray with recommended insecticides to kill the tsetse flies.

**Treatment**: Use drugs such as Bayer 205 or lomidine or consult a veterinary doctor.

**2. Coccidiosis**

This is a protozoan disease that attacks cattle, sheep, goats, pigs, poultry and rabbits.

**Mode of transmission:**It is transmitted through contamination with the faeces of infected animals through feed, dirty water and soil contaminated with droppings.

**Symptoms:**Symptoms include Watery discharge, loss of appetite, anemia, bloody faeces, paleness, ruffled feathers and progressive emaciation and many animals may die.

**Method of prevention and control:**Droppings from infected poultry animals should be properly separated from healthy animals. High level of sanitation should be maintained in poultry houses. Feed and water troughs should always be kept very clean. The disease can be treated with many drugs that are recommended by veterinary doctors.

### ****FUNGAL DISEASES: diseases caused by fungi****

**1. Aspergillosis**

This is a disease of poultry.

**Mode of transmission:**This disease is transmitted through the air (air-borne) by inhaling air through the nostrils of birds. It is also transmitted through mouldy litter and feed, overcrowding and contaminated incubators.

**Symptoms**: Symptoms include loss of appetite, difficulty in breathing, rise in temperature and whistling noise.

**Method of prevention and control:**All sources of contamination should be removed. The hatchery should be kept clean, water and feed spillage should be prevented.

**2. Ringworm**

This is a fungal disease that affects all farm animals.

**Mode of transmission:**This disease is spread through contact with infected animals and bushes.

**Symptoms**: Ringworm is manifested in farm animals with the appearance of lesions on the skin, skin irritation, loss of weight and loss of appetite.

**Method of prevention and control:**

1. All bushes around the farm should be cleared.
2. The affected skin should be treated with a mixture of sulphur and Vaseline.
3. In poultry, violet or iodine ointment should be rubbed on the ringworm lesions.

**WEEK NINE**

## ****TOPIC: FARM ANIMAL DISEASES V****

**CONTENT**

* Worms: identification, types of worms, symptoms, control of worms.
  + Nutritional bloat
  + General Guidelines for Prevention and Control of Animal Diseases.

### ****WORMS****

There are several types of parasitic worms that attack farm animals. An attack may lead to

the death of an animal. Some of the worms live in the intestine, respiratory tract and

various organs of the body.

### ****Examples of worms****

1. Tapeworms
2. Roundworms, and
3. Liver fluke

### ****Symptoms of worm infection****

The signs of worm infection in the animal depend on where the worms are living in the body of the animal. Generally, these signs include the following:

1. Coughing
2. Diarrhea
3. Loss of weight
4. Anaemia
5. Worms in faeces.

### ****Control of worm infection****:

Worm infection in farm animals can be controlled through the following means:

1. The affected animals should be isolated and treated with worm expellers
2. Grazing of animals on pasture should be avoided. The animal faeces should be removed at regular intervals. Water and feeds should not be contaminated by the faeces.
3. Farm animals should be well fed so that they can resist the effects of worms.

### ****Nutritional bloat****

This is a disease of cattle, sheep. Goats and rabbits.

**Mode of transmission:**It is contacted through eating succulent fodder and blockage of the digestive tract especially in cattle.

**Symptoms:**Symptoms include swollen digestive tract and enlargement of the bowel.

**Method of prevention and control:**The feeding of succulent fodder should be reduced. The animal should be fed with protein supplements. Cattle, sheep and goats should not be allowed to eat a lot of seeds.

### ****GENERAL GUIDELINES FOR PREVENTION AND CONTROL OF ANIMAL DISEASES****

To maintain animals in good, healthy condition, the farmer must pay attention to the following general guidelines:

1. Only clean and healthy animals should be brought into the herd
2. Lots should be drained in order to make them dry and free from stagnant water
3. Farm animals with contagious diseases should be isolated.
4. Farm animals should be tested at least once a year for brucellosis, tuberculosis and other diseases.
5. All farm animals should be vaccinated against diseases common in the locality as a preventive measure.
6. Disinfect housing and equipment regularly
7. Use only recommended insecticides and their application methods for the control of parasites.
8. Do not allow animals to lie on cold floors
9. Isolate newly acquired animals for a minimum of three weeks (quarantine) before they are mixed with other animals.
10. Spray newly acquired animals with insecticide to control lice; also check for internal parasites and treat infected animals.
11. Seek the advice of the veterinary doctor.

**WEEK TEN**

**REVISION**

**WEEK ELEVEN**

**EXAMINATION**