**THE FEDERAL UNIVERSITY, KASHERE**

**FACULTY OF AGRICULTURE**

**DEPARTMENT OF ANIMAL SCIENCE**

Lecture Note

Course Code: ANS 1301

Course Title: General Agriculture

No of unit: Three

Course Duration: Three hours

Status Compulsory

Prerequisite: Nil

Course instructor: Sadiq M.S.

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**Course description**

This course is very important, this stems from the fact that a Good understanding and judicious use of knowledge acquired from this course would introduce the student to scope and importance of animal science, contribution of animal science to the Nigeria economy

**GRADING SYSTEM FOR THE COURSE**

This course will be graded as follows:

Class Attendance In form of random quizzes 10%

Assignments 10%

Test(s) 20%

Final Examination 60%

**TOTAL 100%**

***Attendance:*** It is expected that every student will be in class for lectures and also participate in all practical exercises. Attendance records will be in the form of random quizzes to determine each person’s qualification to sit for the final examination. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with the instructors, indicating the reason for the absence.

***Academic Integrity:*** Violations of academic integrity, including dishonesty in assignments, Examinations or other academic performances are prohibited. You are not allowed to make Copies of another person’s work and submit it as your own; that is plagiarism. All cases of Academic dishonesty will be reported to the University Management for appropriate sanctions in Accordance with the guidelines for handling students’ misconduct as spelt out in the Students’ Handbook.

***Assignments and Group Work:*** Students are expected to submit assignments as scheduled. Failure to submit an assignment by certain student as at when due will earn such student zero for that assignment. Only under extenuating circumstances, for which a student has notified the instructor in advance, will late submission of assignments be permitted.

***Code of Conduct in Lecture Rooms:*** Students should turn off their cell phones during lectures. Students are prohibited from engaging in other activities (such as texting, watching videos, *etc*.) during lectures.

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**AGR 1301 LECTURE NOTE**

**Introduction**

**Animal science:** Is a branch of Agriculture, it can be defined as the art and science of rearing farms animal, i.e. study of the management and production of farm animal which include Feeding, breeding, housing, health care, processing and marketing of domestic animal for human use.

**Example of farm animals**

**Livestock:** Cattle, sheep, goats, camels, horses, pigs, donkeys.

**Poultry:** Chickens, turkey, quails, geese, pigeons, ducks.

**Common pets:** dogs, cats’ .etc

**Non traditional animal:** Honeybees, grass cutter, snails, rabbit, Guinea pigs etc

**Key areas in animal science**

**Breeding and genetic:** This is the branch of animal science that deal which animal improvement which is achieved through the transfer of heritable character from parents to offspring.

**Nutrition:** Is the science that studies the nutrients needed by animals, why the nutrients are needed, how much of these nutrients are required in balanced diet and how the body utilizes the nutrients for maintenance, growth, work, production and reproduction

**Physiology:** Is the branch of animal science which attempts to study the function and composition of matters as it affect life.

**Animal product and processing:** This deal with the handling, processing and distribution of finished animal product.

**Pasture and range management:** This is branch of animal science that deal production of forages, and management of range land to meet livestock carrying capacity

**Financing and record:** Is the act of acquisition and use of credit, loan or capital. It deals with the supply and demand for funds to facilitate animal husbandry operations.

**Dairy science:** Deals with the production collection, handling and marketing of milk in many forms to the consuming public e.g. cheese, yoghurt.

**Animal biotechnology:** This involves the application oftechnology to its biology in order to improve genetic potential to meet world population,

**Career Opportunities in animal science**

Breeding and genetic

Poultry farming

Livestock farming

Hatchery engineering

Animal health

Marketing and distribution

Meat processing engineering

Pasture production

Feed milling

Laboratory analyses

Extension agency

**Some Terminology in animal science**

**Breed:** Refer to the group of animals that has Common ancestors and are similar in characteristics like colour, height, weight at maturity, feed conversion e.g. white Fulani and Sokoto gudali.

**Strain:** Refer to the group of animal of the same breed that have characteristic that differ from each other e. g. Holstein

**Livestock:** Domesticated animal of mammalian origin e.g. sheep, goat.

**Poultry:** Domesticated animal /bird of avian species e.g. hen, turkey.

**Polygastric:** Refer to the four chamber animal i.e. Rumen, Reticulum, Omasum, Abomasum.

**Monogastric:** Single stomach animal

**Rumination:** It is the acts of chewing the cud it involve ingestion, remastication and regurgitation.

**Gene:** Is the unit of inheritance that carries information necessary for propagation of character

**Genotype:** Genetic composition of an individual character

**Phenotype:** Physical expression of genotype example colour

**Pathogen:** They are diseases causing agent example virus, bacteria

**Pest:** Is microorganism that causes damage to animal e g tick.

**Livestock distribution in Nigeria**

About 80% of Cattle population found in Nigeria are in the savannah area, 60 – 70% of sheep and goat are also found in savannah region of Nigeria, poultry are found in high population in southern part of Nigeria and pigs are found in middle belt, Livestock became important readily available to human through the process of domestication; domestication brings about an entirely different animal species which became naturally accustomed to living among humans in a quite beneficial relationship. **Domestication of animal** is defined as the process of heredity reorganization of wild animal into domestic form according to the interest of human being.

**Significant of farm animals**

1. **Source of foreign exchange:** live animal and their products can be exported to earn foreign exchange.
2. **Provision of food:** Meat, milk and eggs obtained from farm animals provide proteins and other nutrients that are beneficial for health, growth and mental development.
3. **Source of manure:** Faeces, urine and droppings from farm animals can be used to improve soil fertility for crops and forages production
4. **Source of farm power:** Bull and Bullocks are used to till the land for crop production. Horses, camel and donkeys are used for threshing of grains and extraction of vegetables oils. Dried manure is the sources of fuel for cooking in some communities. Wet manure is also a source of biogas for cooking.
5. **They are use for festival activities:** Animals are used in ceremonies and special occasions to meet obligations. For example, during Eid-kabir, Muslims slaughter rams. Dogs are sacrificed during Ogun festivals. Pigeons are released into air during launches and celebration of special events.
6. **Provision of raw materials:** Agro-industries make use of hide and skins for the tanning industry, milk for dairy product, bone for bone meal.
7. **Generation of employment opportunities:** job are created through productive engagement in animal husbandry e.g. feed milling, marketing
8. **For research purpose :** Animal are used for field and laboratory researches e.g. rabbit, guinea pig
9. **Source of insurance:** Livestock and poultry offer insurance to crop failure in a mixed farming system i.e. where animals are incorporated into crop farming.
10. **In medicine:** honey is used to heal wounds, sinews from animal are used in surgery

**Problem facing livestock industry in Nigeria**

1. **Inadequate Finance:** Most livestock owners are poor and cannot purchase modern machine and implements; hence they do not operate large animal farms. High interests’ rate on loans charged by banks and the administration bottle neck make access to credit facilities difficult; poor and non payment of loans by farmers prevent further granting of loans.
2. **Poor Land Tenure System:** Traditionally land is shared among family members leading to land fragmentation it therefore difficult to acquire large hectare of land for animal production.
3. **Unfavourable Climatic Condition:** Excessive rainfall leads to high humidity thereby leading to rapid multiplication of livestock pathogens. High temperature causes stress which may result into abortion, drop in egg and milk production; wind aid in spread of animal disease.
4. **Disease Infestation:** Spontaneous incidence of disease outbreaks causes sickness and deaths of farm animals’ e.g. avian influenza (birth flu) causes death of birds in large numbers.
5. **High Pest Infestation:** Pest transmit diseases from one to another, pest reduce the quality and quantity of animals and their products it lead to economic loss.
6. **Low Level of Technical Know**-**how**: There is low acceptance of new methods of production because of low technical-know-how of livestock farmers which lower production.
7. **Social Cultural Constraints:** Religion beliefs, norms and taboos of some people may limit production of certain farm animal e.g. Muslims and Jews will not eat pork for religious reasons.

**Solution to the Problems of livestock industry:**

1. Loans should be provided for animal Production with enough moratoriums (time when repayment is not made) to allow for the mature period of the project; interest on loans should be low.
2. Good quality stock, proper housing and health care as well as processing and storage facilities should be provided.
3. Feed should be provided in term of quality and quantity at the appropriate time.
4. Livestock production knowledge and experience is necessary to keep animals that are adapted to a particular locality.
5. Literacy of animal farmers should be improved, extension work should be trained and encourage to disseminate information, farmer should be able to reads labels on drugs, feed and they should record activities on the farm.

**Assignment:** write on the livestock population of Nigeria for the year 2015 which emphasis on cattle, sheep, goats, camels, poultry

**Breed of farms animals**

A breed can be defined as a group of animals that has Common ancestors and are similar in characteristics like colour, height, weight at maturity, feed conversion etc. Breed is different from types; the type of animal is the production expected from a breed; for example there are beef type cattle, dairy types, in poultry there are layers and broilers.

**Poultry:** The term poultry used in animal science generally refers to all domesticated birds kept for egg or meat production, these include chickens, ducks, geese and turkey. The most common of these in Nigeria are the domestic fowls. Sometimes, the term poultry is considered synonymous with chickens.

**Breed of chicken**

1. White leghorn (good layers)
2. Light Brahma
3. Rhode Island red
4. Crosses
5. Shika brown
6. Anak

**Breed of Turkey**

1. Turkey Bronze
2. White Holland (local or indigene)
3. British united turkey
4. Crosses etc.

**Ducks Breed**

1. Pekin
2. Indian Runner
3. Crosses
4. Aylesbury etc

**Classes of poultry**

The different classes of chicken include

1. **Chicks:** These are young birds, ideally at day old which will eventually grow into adult birds that will be used for meat or egg production.
2. **Broiler:** These are fast growing chickens mainly reared for meat; they can attain a table weight of 1.8 to 2.0 kg or more in 8 to 10 weeks of age. They have two phase of growth, namely broiler starter (0- 4 weeks) and broiler finisher (5- 8 weeks).
3. **Cockerels:** These are males’ birds that grow slowly and attain a table weight of about 2.0 to 2.5 kg at 16 – 20 weeks of age.

**Cattle** They belong to the group of animals known as *Bovidae*. They are ruminants with hollow horn,hooves and even number of toes. The scientific names are *Bos indicus* (humped) and *Bos taurus* (humpless). They represent a valuable asset in both traditional and modern agriculture. They provide meat, milk, skins and draught power.

**Classification of Cattle based on function**

1. Beef cattle (meat producer)
2. Dairy cattle (milk producer)
3. Dual-purpose (meat and milk producer)
4. Work or draft type

**Differences between beef and dairy cattle production**

|  |  |  |  |
| --- | --- | --- | --- |
| **S/N** | **Dairy Cattle** | **S/N** | **Beef Cattle** |
| 1. | Milk is the main product | 1. | Flesh is main product |
| 2. | Requiring high capital | 2. | Less capital is require |
| 3. | Required high amount of concentrate feed | 3. | Can be feed on roughage may |
| 4. | They are good converter of feed to milk | 4. | They are good converter of feed to meat |
| 5. | They are more feminine | 5. | They are more muscular |
| 6. | Require very efficient skilled management | 6. | They require less skill in management |
| 7. | A good dairy cow has a triangular conformation when viewed from above | 7. | Has a blocky conformation when viewed from above. |

**Breed of cattle**

1. N’dama
2. Maturu
3. Zebu
4. White fulani
5. Sokoto gudali
6. Red bororo
7. Hereford
8. Crosses
9. Brownswiss
10. Holstein Friesian

**Characteristic of major breed of local and exotic cattle**

1. **White Fulani:** It is large white animal with black erect ears and medium size horn curved outward and inward, the coat colour of white Fulani is commonly white on a black skin with black ears, eyes, muzzles, hooves, horn tip and tip of tails.
2. **Sokoto gudali:** It is a big animal with uniformly grey or cream colour with darker spots around the shoulders. It is short legged cattle with short horn that is sometimes effectively absent, dewlap skin fold are well developed they are docile hence can be adapted for work or draft.
3. **Red bororo:** It is very large bodied breed of cattle with deep burgundy coloured coat; it is characterized with pendulous ears and by thick horns.
4. N’Dama: It is brown humpless cattle with little or no dewlap from Sierra Leone, Guinea, and Senegal. The bulls may weigh up to 600kg. They are not docile but resistant to trypanosomiasis.
5. **Muturu:** It is a small bodied animal with blocky conformation and compact body. It’s a humpless animal with a straight back as a broad head. Muturu is generally black or black as white.i.e. Mean height is about 1 metre, it weight up to 200kg at maturity.
6. **Brahman:**  This is exotic humped cattle that can weigh up to 1,200kg.
7. **Brownswiss:** (exotic bread weight 600-900kg, they are solid brown.
8. **Hereford:** Native of England, white face, medium to rich red body coat.
9. **Holstein Friesian:** Exotic good milker and good for crossing local breeds to enhance milk production of local breed.

**Goat:** The goat is one of the commonest domestic animals that is widely kept in West Africa. In Nigeria it is more common in the south. Its popularity lies in the fact that no section of the community discriminates against it on religious, social, or cultural ground. Its is a hollowed horned ruminant animal belonging to the family *bovidae* and genus capra, goat are tough and hardy animals that can be survive unfavourable environmental condition,they are small bodied animal and can produce kids twice in a year.

**Breed of Goats**

1. Maradi (Red Sokoto)
2. West African dwarf
3. Boran
4. Borno white
5. Bauchi types

Vi Kano brown

Vii Crosses

Viii boer

iX Nubian

**Sheep:** They belong to the genus *ovidae* which is the domesticated species. The present domesticated sheep originated from two wild types, namely

1. Moufflon (*Ovis musiomon*) this is common in the Mediterranean area, Europe and Western Asia.
2. Argala (*Ovis ammom*). Southern Asia and North America are the major areas where these types are commonly found. Though sheep were first domesticated in Asia. They are now widely distributed all over the world especially in the temperate regions, particularly in Britain, South Africa, New Zealand, Australia. within Africa, sheep are important in Kenya, Mali, Ethiopia, Sudan, Tanzania and Northern Nigeria.

**Breed of sheep**

i West Africa dwarf

ii Yankasa

iii Balami

iv Uda

v Barbary

vi Awassi

Vii crosses.

**Other breeds of livestock are:**

**Breed of Rabbits Breed of Horses**

1. Flemish Giant i. West African barley
2. California white ii. Western Sudan Pony
3. New Zealand white iii. Arabian
4. New Zealand red iv. Belgian

**Breed of Pigs**

1. Duroc
2. Yorkshire
3. Berkshire
4. Hampshire
5. Poland China
6. Indigenous breeds are characterized by small size, long snout various colour, slow maturity.

**Breed of Camels**

1. Dromedary ( *Camelus dromedarius*) this is a single- humped camel native of middle East and North Africa
2. Bactrian ( *Camelus bactrianus*) This is a camel with double hump native of Asia

There are basically three management systems of livestock; the system are generally the same on management of livestock.

1. Extensive system
2. Intensive system
3. Semi intensive
4. **Extensive system:** This system of production entails keeping of animals on the open range, the system is mostly practice by Fulani, the animals are left to search for feed on their own, while they came back home at night to sleep under any available shed as no special housing unit is usually provided. Under this system the Fulani moved with their livestock from North to South in search of feed and water. The system is cheap as there is little or no cost of establishment, feeding, medication and housing, but loss due to accidents, predators and theft is high under this system.
5. **Intensive system:** This is type of system of animal production in which the environment is controlled and animals are properly monitored when confined. Housing is well constructed animal health, performance, productivity, quality of animal product and economic benefit are main point of this system of animal production. The population of livestock under this system is about 3%. Animals go out to graze on pasture in the morning and evening however they return to their housing, there are provided with concentrate feed, water and salt leak. Animals are protected from environmental hazards and inclement weather, but it involves very high financial outlay for housing, feeding, medication and provision of equipment.
6. **Semi-intensive System:** This system is partly extensive and intensive, the animal are allowed to roam, a suitable housing is provided at night while the farmer provides, some feed in form of kitchen wastes and grains milling by product, some animals are kept under this system by what is known as mixed farming, some livestock owners might take their cattle out during the day and bring back to their pens in the evening.

**Nutrition in farm animal**

**Animal nutrition:** refers to the components of feed, their action, interactions and balance in relation to the well being of animals. A well fed animal is likely to be a healthy and productive compared with malnourished animal.

**Nutrient:** Is a specific element or compound derived from ingested feed and used to support the physiological processes of life i.e. provision of energy, building materials for survival, growth and other production processes in animal.

**Ration:** Is a daily allowance of feed or of the mixture of the feed stuff making up the diet.

**Balanced ration:** It is an adequate mixture of nutrients for the specific animal or animal type according to specifications. e.g. lactation, pregnant,weaners

**General function of feeds to farm animals**

1. Supply of energy to the body.
2. Provision of body nutrient for growth.
3. Production of milk, meat, egg, fat.
4. Production of hair, skeleton, muscles.
5. Maintenance of body temperature.
6. Replacement of tissues and building of new tissues.

**Major classes of Nutrients.**

1. **Carbohydrate:** Carbohydrates are energy producers. Carbohydrate is made up of carbon, hydrogen and oxygen. Sources of carbohydrates are cereal grain like maize, guinea corn millet, rice. Root and tubers crops like yam, cassava. Grasses and Forages, hay and silage are good of carbohydrates.
2. **Protein:** These are nitrogenous substances composed of carbon, hydrogen and oxygen and sometimes, small amounts of sulphur, phosphorus and iron in addition. Sources of protein in animal diet can be of plant or animal origin. The plant protein sources are groundnut cake, palm kenel cake meal, soyabean meal, cotton cake and leguminous forages. Animal protein sources include fishmeal, blood meal, skim milk powder etc.
3. **Fats and oil:** These are food nutrients of plant and animal origin that are not soluble in water but soluble in common organic solvents such as benzene. Like carbohydrate, fat and oil contain carbon, hydrogen and oxygen, but the percentage of carbon in fat is higher than that in carbohydrate. Sources of fat and oil include palm oil, ground nut cake, cotton seed cake, coconut meal.
4. **Minerals:** Minerals are inorganic substances that are essential for growth and other vital body activities. Animal require some of these mineral elements in large amounts, while others are require in small quantities. Sources of mineral elements for livestock include green plant, sodium chloride, calcium diphosphate, limestone bone meal, dicalcium phosphate.
5. **Vitamins:** These are organic substances required in small amounts in the diets of animals for growth, development and maintenance of normal body function and health. Sources of vitamins include vegetables, green fodder, fruits cereals, milk, palm oil additives, premixes etc.
6. **Water:** water, the simplest of feed nutrients, plays an important role in almost all life processes. Chemically, it is made up of hydrogen and oxygen in the ration of 2:1.it is an essential component of the body of animals. the body of most animals contain 55 – 65 % water and no animal can survive without taking water. Sources of water for farm animal include .

i.direct drinking water from taps ponds rivers

ii. as component of food e.g. fresh grass, fodder, forages, silage.

iii. as metabolic water from tissue respiration.

**Animal breeding**

**Mating**: Is bringing together of mature male and female animals for copulation with the aim of production offspring.

**Type of mating**

1. **Hand mating:** hand mating is a system in which the handler or supervisor detects heat in female animals and the animal on heat is then led to the male for mating, it involves one male and female.

2. **Pen mating:** A group of female animals on heat are brought into the male’s pen for mating. Pen mating involves one male and several female animals

3. **Pasture mating (flock mating):** this is uncontrolled mating where male and females run together in the flock or herd. In this situation the male detects the females that are on heat.

**Forestry**

**Forest:** are collections of long living (perennial) wild or planted trees growing together with shrubs, herbs, undergrowth and micro organism over a wide areaof land. Forests are also a habitatsdifferent animals, birds and fruits tress.

**Forestry:** is the scientific cultivationof trees its maintenance and systematic exploitation and replacement as well as the utilization of its products.

Agro forestry gives farmers the opportunity to spread their risk beyond traditional agricultural products, and at the same time participate in the forestry sector, for which the demand and price for product is steadily increasing. **Agro forestry** is a name for a land use system where tress / shrubs are actively and deliberately managed as part of agricultural and or livestock activities on the same land. Tree when planted in farm help to check Erosion control, provide, Shelter and Production forest - limited resources.

**Characteristic of agro forestry system**

1. Trees and shrubs which are grown and managed in certain, specific arrangement on the land, over time.
2. They have both environmental (ecological) and economic benefits.
3. It involves two or more species of plant or plant and animal of which one species at least is tree or shrubs.
4. It has two or more output (product).
5. They are more complex than single crop or single animal system.

**Some places of forestry in Agriculture**

**Agro silviculture system:** Isthe management of land for the production of agriculture crop and forest products.

**Silvo pastoral system:** Isthe management of land for the production of forest products and raising domestic livestock.

**Agro silvo pastoral system:** Isthe management of land for the production of agricultural crops, forest products and raising domestic livestock.

**Fish farming**

In the past, fishing used to be limited to areas with natural water bodies such a streams rivers and lakes emphasis was more on supplying protein through livestock and poultry farming than Aquaculture.

**Fish farming :** Is the act of rearing selected species of fish under scientifically controlled condition in enclosed bodies of water such as ponds streams, rivers etc where the condition therein stimulates the natural environment of the fishes, when fish farming include other fresh water and marine species , it is usually called **Aquaculture.** **Aquaculture:** Is defined as the propagation and husbandry of fish and other aquatic organisms in man-made pond, reservoir, cage, lagoon, sea and crystals water for commercial, recreational and scientific purposes.

**Importance of fish farming**

1. It serves as the source of food i.e. Protein to man and livestock.

2. It provides different kind of employment and valuable income for people that are engaged in the sector.

3. They provide raw material for livestock feed.

4. It can generate foreign exchange to a nation.

5. It is useful in the area of research work and other educational purposes.