

APH 202 INTRODUCTION TO ANIMAL AGRICULTURE

INTRODUCTION

Animals and birds that are kept by man are called domestic animals and birds. There are many kinds of domestic birds which include turkey, Duck, Goose, Guinea Fowl and domestic fowl. However, when we speak of domestic fowl we mean ordinary cocks and hens.

Farm animals can be divided into poultry and livestock, or small farm animals and large farm animals. The small farm animals comprise of poultry and rabbit. They have small body sizes compared with large farm animals like cattle, buffalo, camel etc. The two classes exhibit different production parameters.

The economic services rendered by poultry specie include the provision of poultry meat, egg, feathers. The meat and the egg are of both nutritional and economic importance. The poultry is used to know when the day is approaching by cock crowing. It is also used for entertainment as in cock fighting. The essential amino acids present in the egg of poultry products generally are rated highest in quality. The amino acid present in the egg is a reference standard for other proteins.

The role of farm animals in national economy

Animal production is a traditional activity in all parts of Nigeria. It forms a significant component of most farming systems in the country, whether pastoral, agro-pastoral or agricultural. According to FAO (1997), Nigeria has a population of 140 million sheep, 24.5 million goats, 7.6 million pigs, 19.61 million cattle, 126.0 million chickens.

The contribution of animal production to the national economy is multi-faceted. The ruminant animals (cattle, buffalo, sheep, goats and camels) in addition, have a dual role of being important both for utilizing natural grazing lands and for combined crop/livestock farming. Supplying animal power in many countries and by-products of great value. The role of animal production can be grouped into 3 categories.

(a) Economic roles (b) Roles in farming system (c) Socio-cultural roles.

(a) **Economic Roles**

Farm animals supply man with meat, milk and eggs which are primary sources of much needed animal protein and are sold to obtain monetary benefits. Livestock husbandry in Nigeria is an employer of labour e.g. meat sellers, farm animal attendants in both government and private institutions, veterinary doctors. It also supplies raw materials for industrial uses e.g. hides and skin in manufacturing leather materials, blood for blood meal and bone for bone meal in animal feeds, wool for clothing material, bristles of pigs for brushes, intestine for surgical use and casings for sausages, fat for cooking and manufacturing of candles, horns for musical instrument, feathers for pillow, hoofs can be turned into glue etc.

Livestock generates revenues for government and income for individuals. Considerable sub-regional trade in live sheep, goats, cattle, pig and poultry products exists between Nigeria and other neighbouring West African countries. Trade in animal skin is a source of foreign exchange earnings e.g. the "morocco leather" from Red Sokoto goat skins is very much in demand internationally. Large ruminant animals serve as power source e.g. cattle can be used to pull ploughs on the farm for tilling and cultivation of land (i.e. Animal traction) while camels and donkeys can carry farm products. Animal dungs can be used in the production of methane gas.

(b) **Roles in farming systems**

When livestock production is combined with crop production enterprise, the land becomes more effectively utilized. The animal dung when mixed with soil increases the soil nutrient status for improved and economic performance of crops. Livestock production enterprise facilitates the conversion through feeding to animal products of crop residue and by-products e.g. oil seed meals wheat

bran, etc. to produce foodstuffs for human consumption. Livestock enterprises also stabilize seasonal and yearly food production, improve net farm income, better distribution of labour and proven-requirements for production, thus supporting more profitable farming systems. Livestock enterprises in combined farming systems stabilize incomes and cash flow, improved control of plant pests, contribute to soil conservation and sustained land productivity by use of forages grown in relations to control erosion, weeds and to improve soil fertility with animal enterprises providing the income from consumption of these forages. Farm animals can be raised comfortably in land areas that are unsuitable for crop production.

(c) **Socio-cultural roles**

Livestock production enhances the social status of farmers. Livestock also play a socio-cultural role as they are of great use during cultural and religious festivals in the country. Animals like sheep, goat, poultry and rabbits serve as handy gifts to close relations and friends. They are used to pay bride price as well as sporting activities, thereby, enhancing unity and oneness.

Problems of Livestock Production in Nigeria

1. Feed Supply: Wide seasonal variations have an important influence on feed production. When there is high variation in feed supplies particularly, forages, marked fluctuations arise in the rate of weight gain of grazing animals causing low productivity and poor quality animal products.

The major part of the feed supplied thus goes just to satisfy maintenance requirements.

2. Low animal nutrition leads to high susceptibility to diseases and parasites. These cause exceedingly high losses in animal productivity.

3. Excess of animals to be supported by the environment. This is brought about largely because individual farmer and community or tribal groups do not relate their stock numbers according to available feed supplies.
4. Much of the time the prevailing temperature and humidity impose stresses on animals. When this happens, the animals must expend extra energy if they are to maintain their thermal balance. This results in a low-output efficiency of feed energy for productive processes.
5. The programmes for genetic improvement are few and this constitutes an important inhibitor to successful livestock enterprises.
6. Incentives to increase production are often low for the majority of the livestock owners because of inadequate marketing organizations, including processing and storage facilities for providing reliable supplies of products to consumers and feed to producers.
7. Poor transportation is a serious deterrent to producer incentive. For example, after cattle have been trailed a very long distance (400-600km), there may be little profit from their sales because of the weight shrinkage.
8. The system of land tenure can be a further inhibitor to potentially successful livestock enterprises since many of the owners will have to graze their animals in lands other than their own.
9. Other problems include those of insufficient capital for implementing innovations in husbandry e.g. improved variety of stock, feeding and milking devices, scarcity of appropriate technology, poor educational background of the intended users of the technology and inadequate means for informing farmers about worthwhile changes.

10. Religious beliefs and social customs are very difficult to alter and this limits the type and number of animals that can be reared or raised in some parts of the country.

TECHNOLOGIES IN ANIMAL HUSBANDRY

Cattle: This refers to the entire Bovine species

Cow: Female cattle of mature age which have had one or more parturitions

Heifer: Female cattle of immature age which has not produced any offspring

Bull: A mature male cattle

Calf: Young cattle of either sex under one year old and usually not weaned

Calve: Act of giving birth (parturition) in cattle

Bull Calf: Young male cattle under two years of age

Steer: Male cattle which has been castrated at early age

Stag: Male cattle which was castrated after reaching sexual maturity

Free Martin: refers to Female cattle born as a twin along with a male cattle which is usually sexually sterile

In-calf: Pregnant cow

SWINE: refers to entire porcine species that has reached mature age

SOW: A mature female pig that has given birth at least once

Farrowing: The act of giving birth in swine

Gilt: Female swine/pig of immature age or which has not produced any offspring

Boar: A mature male swine

Piglet: Young pig of either sex

Litter: Entire offsprings produced at a single birth (parturition)

Barrow: Male swine that has been castrated at an early age

Hog: the entire swine species reaching mature age

In-sow: Pregnant sow

SHEEP: refers to entire ovine species

Ewe: refers to female sheep after reaching sexual maturity and has produced one or more offsprings

Ram: Mature male sheep

Lamb: refers to sexually immature sheep of either sex

Lambing: act of giving birth in sheep

Ram Lamb: sexually immature male sheep

Ewe lamb: Sexually immature female sheep

Wether: Male sheep castrated at an early age

Fleece: The wool of a single sheep

GOAT: refers to the entire caprine supp

Buck or Billy: Mature male goat

Doe or Nanny: refers to female goat that has given birth once or twice

Kid: Young or sexually immature goat of either sex

Kidding: Act of giving birth in goat]

In-Kid: Pregnancy in goat

Castrate: castrated male at an early age

POULTRY: refers to entire avian species. These include domestic fowls, duck, goose, turkey, guinea fowl and pigeon.

Hen: Sexually mature female chicken

Cock: Sexually mature male chicken

Pullet: Sexually immature female chicken

Cockerel: Sexually immature male fowl

Capon: male chicken castrated at an early age

Chick: very young chicken of either sex

Chicken: domestic fowl of either sex and of any age

Fertility: the ability of an animal to reproduce. In the case of poultry it is the percent of eggs set which develops an embryo

Set: the acts of placing eggs under a hen or in an incubator

Hatch: the emergency of chick from the egg shell

Fowl: any vertebrate containing wings and feathers

Hatchability: the percent of eggs set which produce a living chick

RABBIT: refers to *oryctolagus cuniculus* group of animals. They exist in the border line between the ruminant and the non-ruminant animals i.e. they are herbivores.

Rabbit buck: refers to mature male rabbit

Kindling: act of giving birth

Rabbit Doe: refers to mature female rabbit

Broiler: Poultry of either sex produced for meat purpose and slaughtered between the ages of 8 and 12 weeks and weighing from 1.6 to 2.4kg

GENERAL

Lactation: Act of milk production

Parturition: Act of giving birth to offspring

Weaning: removal of young one from milk feeding

Concentrate: Feeds that are low in fibre but high in total digestible nutrients

Roughage: Feeds that are high in fibre but low in total digestible nutrients

Udder: refers to the milk gland of an animal

Service: This is mating, coitus, breed, sexual intercourse or copulation between male and female domestic animals. The best results are usually achieved when the female is on heat. Service can be natural or artificial. Natural service is the direct mating of male and female animals.

Artificial Insemination: Is the artificial process of placing the spermatozoa in a position for contact with the female ovum or egg by an instrument other than pennies.

Oestrus cycle: the interval from the beginning of one heat period to the start of the next

Heat or estrus: is a regular period in the female mammals when copulation is allowed or period of sexual desire in female animal.

Libido: period of sexual desire in male animals

Pregnancy: period from the time of conception to the time the animal gives birth to the offspring. It is described as the growth of foetus within the uterus of the female animal.

Still birth: when the foetus is born dead after a full time pregnancy. It could be as a result of prolonged labour in which case the foetus become tired and eventually died or infectio in the uterus or accidental blow on the foetus, in the uterus.

Abortion: when the foetus is born before time. This could be as a result of disease such those caused by *Brucella spp.* Mixing of animals of different sources can also cause abortion e.g. when the males are still struggling to mate the pregnant female.

Parturition: the act of giving birth to offspring

Lactation: the act of producing milk

Udder: the milk gland

Wean: to cease providing milk in the ration of the young animal

Ruminant herbivore: compartmented stomach animal e.g. cattle, sheep & goat

Non ruminant herbivore: simple stomach ruminant e.g. Horse

Non herbivore: Monogastrics

INTRODUCTION TO LIVESTOCK PRODUCTS AND BY-PRODUCTS

The primary livestock products include

Cattle	-	Milk, meat, hides
Sheep	-	Meat, wool, skin
Goat	-	Meat, milk
Swine	-	Meat
Poultry	-	Egg
Rabbit	-	Meat

Other by-products include: blood, bones, piths, horns, hooves, gall bladder liquid (bile), rumen digest, condemned carcasses, intestines, hair, tail hair, hides and skin, fat and feather.

CHARACTERISTICS AND FOOD VALUE OF MEAT

Meat is important in our diet because virtually everybody finds it to be highly palatable including babies and adults. The nutritive value of meat is excellent. Meat is high in good quality protein. The vitamin quality of meat is high. Meat is rich in Fe, Cu and other minerals. The quality of meat is surpassed only by milk and egg. Meat has an attractive appearance and desirable aroma. Meat has an important role in satisfaction of appetite and it is highly digestible.

The protein content of meat is 97% digestible

Fat is 95% digestible

Carbohydrate (in form of glycogen) is 98% digestible

Meat Composition

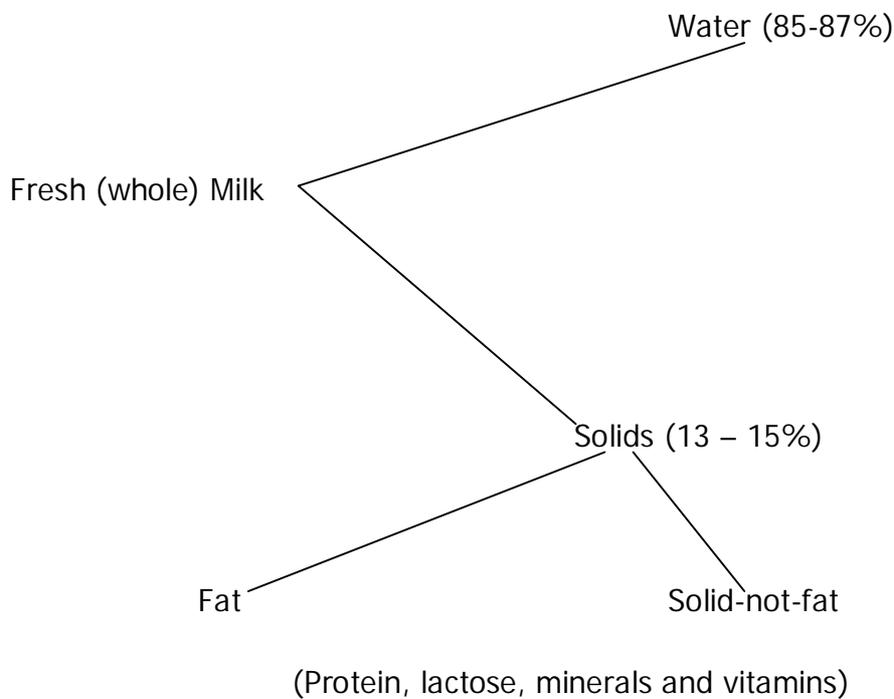
Protein - 17%

Fat	-	20%
Water	-	62%
Ash	-	1%

Food value of Milk

Milk is an important food for humans because of its high nutritive value. It is rich in proteins, minerals as well as vitamins. There is however a deficiency of Fe in milk. Living on milk alone may result in anaemia. But quite often the Fe supplied from other components of a diet would make up for the deficiency in milk. Milk is rich source of Ca & P.

Most of the vitamins, except vitamin D, are present in adequate quantities. But in order to meet the minimum body requirements of these nutrients especially for infants, milk is usually fortified with synthetic forms of vitamins and minerals.



POULTRY MEAT

Poultry meat provides man with nutrients for growth, tissue replacement and for weight control. Its usefulness in this respect is due to its lower fat content. Poultry meat is about 20 to 35% protein, 1.3 – 33.8% fat. The protein in poultry meat corresponds with that of turkey, beef and pork in amino acids. It also contains all the essential amino acids required by man and is easily digested. Poultry meat contains more protein than other meats.

Unlike red meats, most fat in poultry meat is found under the skin and not distributed throughout the tissues i.e. there is no intramuscular fat. Poultry meat is a good source of riboflavin, thiamin and ascorbic acid, and the liver is richer in these nutrients as well as vitamin A than other parts. Minerals present in poultry meat include Na, Fe, S, Ca, P and Cl.

Some uses of by-products

1. Hides and skins can be turned into glue and adhesives.
2. Blood meal is prepared from the by-product blood. The blood meal contains lysine, which is an essential amino acid in poultry feeds. Blood meal as a component of stock feed is used in calf-starter ration, swine feed mix and poultry feed mix. Dried blood is used as an organic fertilizer. It is a specially prepared organic nitrogen source in the cultivation of citrus fruits, tobacco, and flower growing.
3. Fats extracted from bones as tallow is suitable for cosmetics and soap manufacture.
4. Pure bones are also burnt and converted into lime (chalk) or animal feed (bone meal)

5. Horns and hooves, if heated they melt and are turned into gelatin, which is very good glue. Horns are locally used as musical instruments and ornaments.
6. The gall bladder liquid (Bile) if properly treated is an excellent detergent. The advantage is that there will be no need for synthetic detergent in the cleaning of slaughter house floor.
7. Cover or raw areas caused by the removal of skin for grafts.
8. Hair and tail are used in making brushes and local domestic cleaning appliances
9. Bone meal is a good source of phosphorus in that it contains 35% Ca and 17.9% P. Thus it can be used to replace the imported dicalcium – phosphate (Ca_2PO_4) in preparation of poultry feeds.
10. Tanners (Leather workers) Convert hides and skins into leather for different domestic and industrial uses.
11. Farm yard manure (FYM) is a form of organic fertilizer which aids the growth of crops plantations and vegetables.

INTRODUCTION TO ANIMAL HEALTH AND DISEASES

Health is generally considered as the state of body and mind in which disease is/are absent in the animal i.e. freedom from signs and effects of disease. It refers to a situation when an animal is in a state of maximum economic production. Physiologically it refers to a condition when the body functions properly. Health is also a matter of degree. Absolute health is virtually unknown both in man and animal. But when the body is functioning optimally and animals are growing at a rate optimum for the species and there is no sign of pain or deformity, we say that the animal is in good health.

Disease: is a departure from a state of good health by an alteration of the internal organs or external conditions of the body. It is a disruption of the normal function and performance. It is also the inability to perform physiological functions at normal levels provided nutrition and other environmental requirements are supplied at the adequate levels.

Signs of disease

- Loss of appetite and stoppage of rumination in ruminants
- Dull posture e.g. head downward, undue weariness
- Coarse and dry skin with unusual patches
- Variation from normal temperature e.g. normal body temperature of cattle is 38°C
- Pig is 39.2°C is 40°C
- Variation in pulse rate. Normal pulse rate in cattle is 50-60 beats/minute
- Variation in rate and depth of breathing (e.g. 10-20/minute is normal for pig)
- Sunken eyes with starny look
- Watery dung with gas bubbles and blood spots
- Urine normally has straw colour but dark or blood y colour and abnormal odour indicate disease.
- Low yield and low quality production from animal e.g. blood and clot in milk indicate mastitis i.e. inflammation of the udder.

Causes of diseases

1. Infection agents or pathogens e.g. bacteria, virus
2. Parasites, external e.g. ticks, lice, flea, internal e.g worms
3. Hereditary – caused by defective genes e.g. in humans, sickle cell anaemia
4. Congenital – defects caused by developmental accident during the embryonic stage or from toxic or infection agent during the prenatal development e.g. pullorum disease in chicken, brucellosis in pigs, goat, sheep and cattle.
5. Nutritional deficiencies e.g vitamin B deficiency in chicks
6. Traumatism – disorders that are as a result of an injury e.g wounds, burns
7. Environmental stress e.g. thermal stress, heat stroke, frost bite etc
8. Ovewrcrowding – animals over-crowding, poor housing and sanitation facilities.

IMMUNITY – is the degree of resistance to any specific disease organism. It can be complete immunity or partial immunity.

It is also the power to resist infection or the action of certain poisons. This immunity is either

- (a) Inherited or natural
- (b) Acquired naturally
- (c) Acquired artificially

(a) **Inherited or natural immunity** – is transferred from mother to offspring. This is done via the colostrums. It is important that newly born animals receive colostrums as soon as possible after birth even if by hand-feeding.

There are some species of animals that are not affected by diseases or poisons that are dangerous to others e.g. fowls are resistant to tetanus, the horse is not affected by foot – and – mouth disease, rats and not attacked by tuberculosis.

Keratin – prevents the entry of disease organism into the skin when it is damaged i.e. when scratched, punctured, or wounded or bleached.

Skin Secretion – largely from sebaceous glands secrete certain fatty acid (oily) which have bacteriostatic effect i.e. prevent the bacteria from multiplying. The tear from the eyes has bacteriocidal effect because it contains lysozyme which is a bacteriolytic enzyme. In the mouth there is saliva which has a secretion that stops bacteria from growing i.e. bacteriostatic.

In the lining of blood vessels there are endothelial cells, which are phagocytic. This is done by engulfing the bacterium that intends to attack the lining.

(b) **Acquired Immunity** – results from an attack of some disease from which the animal has recovered. The recovery from a disease involves a process of natural immunization against that disease; the toxins or other antigens present in the body being destroyed by antibodies elaborated by the body tissues e.g. recovery from Newcastle disease confers immunity on the fowl.

(c) **Artificially Acquired Immunity**

This is of two types:

- (i) Active (ii) Passive

- (i) Active immunity may be artificially produced by inoculating an animal with a vaccine
- (ii) Passive immunity is that form of artificial immunity obtained by injecting into the body of one animal blood serum drawn from the body of another animal which has previously been rendered actively immune by injecting particularly antigen. The serum contains antibodies or "antitoxins" which enable an in-contact animal to resist an infection, or enable an already infected animal to overcome the infection, so that an attack of illness – if it occurs at all – is milder than it would otherwise have been. A young animal may acquire passive immunity through the colostrums of its dam, which had been immunized with this purpose in mind.

General control methods of Diseases

- Prevention of exposure to infection
- Vaccination of programmes
- Immunisation
- Separation of animals of different species
- High level of hygiene procedure
- Avoid stress
- Avoid grazing animals in an infected environment
- Provide good ventilation
- Sufficient good feed/proper nourishment