

Agriculture

Year 1

SECTION

4

ANIMAL PRODUCTION AND MANAGEMENT



FOOD PRODUCTION AND NATURAL RESOURCE CONSERVATION

Principles of Agriculture in Food Production

INTRODUCTION

Welcome to section 4. This section deals with the introduction to animal production where you will be introduced to farm animals and their importance, how farm animals are classified based on particular characteristics and the distribution of farm animals in Ghana and West Africa. You will also be exposed to some of the best practices in animal production such as the management systems and husbandry practices which promote animal health and increases production for food security. You will also be equipped with the skills and ability to use agricultural tools such as an ear tag applicator, burdizzo, drenching gun and debeaker to perform some husbandry practices in animal production at the school farm. Come along as we go through the well-crafted activities to build our skills and knowledge in animal production.

At the end of this section, you will be able to:

- Explain the meaning and importance of farm animals.
- Describe the classification of farm animals with examples.
- Analyse the distribution of farm animals in Ghana and West Africa.
- Explain the meaning and objectives of the general management practices in animal production.
- Discuss the management practices involved in animal production
- Apply the skills in farm animal management practices for rearing animals

Key Ideas

- The importance of farm animals includes food production, economic value, employment and rural development, export earnings, livestock-based industries, and cultural and social significance. Farm animals can be classified based on their feeding habits.
- Farm animals can also be classified based on their uses, for example meat, milk, egg, wool/fur or both meat and milk or meat and wool. An example is the Merino breed of sheep that is primarily reared for wool while the Dorset breed is for both wool and meat.
- Some of the factors that affect the distribution of farm animals include climate and geography, cultural practices and traditions, economic considerations, resource availability, government policies and interventions and environmental and disease considerations.

- Management systems in animal production refer to the organised approaches and plans used to raise and care for animals in a way that increases productivity, animal welfare and sustainability.
- The major management systems in animal production are extensive, semi-intensive and intensive systems.
- Husbandry practices in animal production are the methods and procedures used to manage and care for farm animals to ensure their health, productivity, and well-being. Example; tagging, dehorning, disbudding, debeaking, castration and vaccination.

MEANING AND IMPORTANCE OF FARM ANIMALS

This first lesson in this section will help you to appreciate and understand the importance, classification, and distribution of farm animals in Ghana and West Africa as well as the factors that affect the distribution of the farm animals across the regions of West Africa and Ghana.

Farm Animals

Farm animals are animals typically raised or kept for various purposes, such as food production, labour, companionship and other products or services. These animals are often domesticated and require proper care, shelter, and nutrition to ensure their health and well-being.

Importance of Farm Animals

1. **Food production:** Farm animals are a major source of animal protein, including meat, milk, and eggs. These products are essential for human nutrition and are essential sources of nutrients such as vitamins, minerals, and amino acids.
2. **Economic value:** Farm animal production generates substantial economic value through the sale of livestock and livestock products. This includes revenue from meat, dairy, eggs, and other animal-derived products. The livestock sector contributes to agricultural GDP and overall economic growth.
3. **Employment and rural development:** Raising farm animals creates employment opportunities across the value chain. From animal rearing and husbandry to processing, distribution, and marketing, the livestock sector provides jobs for a diverse range of people, especially in rural areas. This helps to stimulate rural development and reduce poverty by generating income and improving livelihoods.
4. **Export earnings:** Livestock and livestock products can be significant export commodities for many countries. Countries with a competitive advantage in livestock production can earn foreign income and investment by exporting meat, dairy products, and other animal-derived goods. These exports contribute to trade balances and economic stability.

5. **Livestock-based industries:** Farm animals also support a range of ancillary industries. These include animal feed production, veterinary services, meat processing, dairy processing, leather and textile industries, and other value-added sectors. These industries provide additional economic opportunities and contribute to the overall diversification of the economy.
6. **Cultural and social significance:** Farm animals have cultural and social importance in many societies. They are used for festivals, funerals, naming ceremonies, payment of dowries and other cultural practices. Farm animals also provide companionship and emotional support to individuals.



Fig. 4.1: The importance of farm animals in agriculture and society

Activity 4.1: Brainstorming the meaning of farm animals in agricultural production

1. What comes into mind when you hear the term 'farm animals - write your idea on a piece of paper?
2. Surf the internet/text books to compare your idea about farm animals.
3. Put the ideas together to come up with your meaning of farm animals in agriculture.

Activity 4.2: Brainstorming the importance of farm animals in Agriculture

1. Watch a documentary/video/pictures on the importance of farm animals by clicking [here](#).
2. Document the types of farm animals in the documentary and their importance in the table below

Name of farm animal	Their importance

With the help of the internet and other resources, write down other important factors of farm animals in agriculture. (Click [here](#)).

Compare your findings with a peer for feedback.

CLASSIFICATION OF FARM ANIMALS

Classification of Farm Animals Based on their Feeding Habits

Ruminants

Ruminants are animals that have a specialised digestive system capable of breaking down plant material (cellulose-rich plant matter) through a process called rumination. They have a four-chambered stomach that allows them to ferment and digest fibrous plant material efficiently. Ruminants typically regurgitate their food and chew it again, a process known as “chewing the cud.” These animals primarily feed on grass, leaves, and other plant materials. Examples of ruminants are cattle (e.g., cows, bulls, oxen), sheep, goats, deer, and bison.



Fig. 4.2: Examples of Ruminants

Non-ruminant omnivores

Non-ruminant omnivores are animals that have a simple stomach like humans but can consume a variety of food sources, including both plant and animal matter. The animals can be fed a mixed diet that includes grains, seeds, fruits, vegetables and occasionally some animal protein. They have a more flexible digestive system that allows them to utilise a broader range of food sources. Examples are pigs, chickens, turkeys, and ducks.

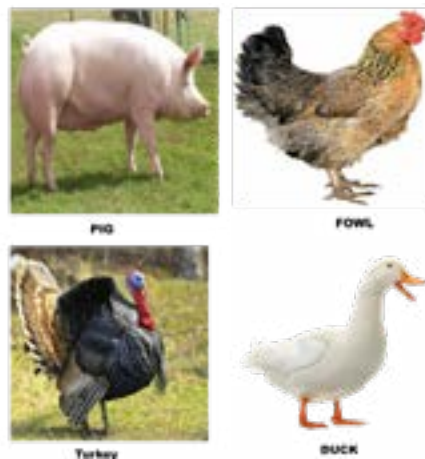


Fig. 4.3: Examples of Non-Ruminant omnivores

Non-ruminant herbivores

Non-ruminant herbivores are animals that have simple stomachs and consume a primarily plant-based diet. They lack the specialised digestive system of ruminants but are adapted to efficiently process plant material. These animals primarily consume grass, hay, and other plant material. Their digestive system is designed to extract nutrients from fibrous plant matter. e.g., horses, donkeys, rabbits, and guinea pigs.



Fig. 4.4 : Example of Non-Ruminant Herbivores

Cattle

Cattle are classified into various breeds based on their characteristics, such as size, colouration and milk or meat production.

- a. **Holstein:** Known for their high milk production. Holsteins are the most common dairy breed worldwide.
- b. **Angus:** A popular beef cattle breed known for its marbled meat and adaptability to various climates.
- c. **Hereford:** Recognised for their red body colour with a white face, Herefords are versatile beef cattle.
- d. **Brahman:** Adapted to hot climates, Brahman cattle have distinctive humps and loose skin.
- e. **Jersey:** Small-sized cattle breed known for their high butterfat content in milk.
- f. **N'dama:** Indigenous to West Africa, N'dama cattle are known for their tolerance, which enables them to resist certain diseases transmitted by tsetse flies.
- g. **Boran:** Originating from East Africa, Boran cattle are heat-tolerant and highly adapted to grazing in arid and drought-prone areas.
- h. **Afrikaner:** Indigenous to southern Africa, Afrikaner cattle are known for their adaptability to harsh environments and good meat quality.

Pigs

Pig breeds differ in terms of size, coat colour, meat quality and adaptation to specific production systems. Some notable pig breeds include:

- a. **Yorkshire:** Large white pigs known for their high-quality meat and mothering ability.
- b. **Duroc:** Reddish-brown pigs with good growth rates and excellent meat quality.
- c. **Hampshire:** Black pigs with a white belt around the shoulders, known for their meat yield and muscle quality.
- d. **Berkshire:** Black pigs with white markings on their face, feet, and tail, valued for their marbled meat.

Poultry

Poultry breeds encompass chickens, turkeys, ducks, and geese. They are categorised based on their purpose, such as egg-laying, meat production, or ornamental value. Examples include:

- a. **Leghorn:** A common breed of chicken known for its prolific egg-laying abilities.
- b. **Cornish cross:** A hybrid meat chicken breed with rapid growth and efficient feed conversion.
- c. **Broad-breasted white:** A breed of turkey that has been selectively bred for its larger size and meat production.
- d. **Pekin:** A popular breed of domestic duck known for its meat and egg production.
Rhode Island Red: Is perhaps the world's best-known fowl. It is a dual-purpose bird, hardy and peaceful.
- e. **Wyandotte's:** Are good, medium-weight fowl for small family flocks kept under rugged conditions. Their attractive "curvy" shape, generally good disposition and many attractive colour patterns make them a good choice for fanciers as well as farmers.
- f. **Rhode Island white:** Moderately sized and completely white bird. Have long, broad, and deep bodies which are carried horizontally, giving them an oblong and brick-like appearance. Their breasts are deep, full, and well-rounded. Their heads are fairly deep and are inclined to be flat on top rather than round.

Sheep

Sheep breeds vary in size, wool quality, meat production and adaptability to different environments. Some prominent sheep breeds include:

- a. **Djallonke (West African Dwarf):** Found throughout West Africa. It is a trypan-tolerant breed. A mature one measures about 40-55cm at the shoulder and weighs about 20-35kg. The coat colour is usually white or a mixture of black and white. The head is small with a strip profile and the ears are small.

- b. **Fulani or Sahel breed (Uda and Ouda):** Found throughout the Sahel and Savanna zones. A mature ram measures about 75-85 cm at the shoulder and weighs 60-70kg. It has floppy ears, a long tail, and long legs. The mane profile is convex. The coat colour is dark, head and forequarter with white hind quarter.
- c. **Merino:** Known for their high-quality fine wool, Merinos are popular for wool production.
- d. **Dorset:** A breed valued for both meat and wool, adaptable to various climates.
- e. **Suffolk:** A meat sheep breed with excellent growth rates and carcass quality.
- f. **Dorper:** Developed in South Africa, is one of the most widely distributed sheep breeds in Africa. They are known for their adaptability to arid and semi-arid regions, excellent meat quality, and fast growth rates. Dorpers have a white body with a black head or can be completely white.
- g. **Red Maasai:** Is indigenous to East Africa, particularly Kenya and Tanzania. They are adapted to tropical and semi-arid regions and are known for their high resistance to common sheep diseases and good adaptability to grazing in harsh conditions.
- h. **Karakul:** Originated in Central Asia but is found in various parts of Africa, including Namibia and South Africa. They are raised for their meat, wool, and pelts. Karakul sheep are known for their unique fat-tailed conformation and their ability to withstand extreme climatic conditions.
- i. **Afrikaner:** Is indigenous to southern Africa, primarily South Africa. They are well-adapted to harsh environments, including semi-arid regions, and are known for their hardiness and adaptability to extensive grazing systems. Afrikaner sheep have white bodies with distinctive fat tails.
- j. **Bonga:** Is found in Ethiopia, particularly in the southwestern parts of the country. They are adapted to the humid and tropical climate of the region and are raised for both meat and fibre production.

Goats

- a. **West Africa Dwarf Goat:** They are indigenous to the forest and savanna zones of West Africa but are easily adapted to humid conditions (forest zone). They are plump, small-sized animals less than 50cm high at withers. Their colour is variable, but grey-brown or dark colour is common among them.
- b. **West Africa Long-Legged Goat:** They are long-legged but medium to large-sized.
- c. **They have tall, slender bodies with long necks, small heads, and slightly convex faces. Their horn sizes are variable. The average adult weight is 30kg. Average height of withers is 50-85cm. Their colour is mainly white, black, or brown or black with white combinations.**
- d. **Nubian:** Nubian goats, also known as Anglo-Nubians, are a dual-purpose breed originating from England. They have long ears and are recognised for their high milk production and good meat quality.

- e. **Toggenburg:** Toggenburg goats come from Switzerland and are known for their distinctive light brown colour with white markings. They are a dairy breed with good milk production and are well-suited for mountainous and rugged terrains.
- f. **Nigerian Dwarf:** Originating from West Africa, Nigerian Dwarf goats are small-sized dairy goats. Despite their small stature, they produce a significant amount of milk with high butterfat content. They are also popular as pets or for exhibition purposes.
- g. **Cashmere:** Cashmere goats are primarily raised for their luxurious and valuable cashmere wool, which is highly sought after in the textile industry. They have a dual-purpose trait and can also be used for meat production.
- h. **Angora:** Angora goats are renowned for their long and silky mohair fibre, which is used in the production of high-quality textiles. They require specific shearing techniques to collect their luxurious fleece.
- i. **Red Sokoto:** Also known as Maradi or Sahel, is an indigenous breed found across West Africa. They are well-adapted to arid and semi-arid regions and are known for their high fertility, tolerance to drought, and resistance to diseases.
- j. **Cameroon:** Also known as Dwarf or African Dwarf goats are native to Cameroon and are found in various parts of West and Central Africa. **They are small-sized goats raised for meat and milk production.**

Activity 4.3: Identification and classification of farm animals in the Community

1. Identify and document the farm animals in your community by visiting local farms in the community/ watching videos/pictures of some farm animals (Click [here](#)).
2. Classify the farm animals with the help of the internet and other resources based on the following;
 - a. Type: e.g. ruminant
 - b. Example: e.g. cattle
 - c. Breeds: e.g., N'dama
 - d. Purpose: e.g. meat and milk
3. Share your findings with your peers for feedback.

Activity 4.4: Creation of diagram/chart on the classifications of farm animals and their examples

1. With the classification of farm animals from the above activity, create a chart/classification tree of the farm animals with the type of farm animals as the trunk, examples as the branches and breeds and purpose as the sub-branches.
2. Present your chart to the class for feedback.

DISTRIBUTION OF FARM ANIMALS IN GHANA AND WEST AFRICA

Distribution of Farm Animals in Ghana

1. **Cattle:** Cattle are found throughout Ghana, but they are more concentrated in the northern regions such as the Upper East, Upper West, Savannah, North East, and Northern regions. These regions have extensive grasslands and savannahs that provide suitable grazing areas for cattle. Cattle rearing is an important livelihood activity for many pastoral communities in these regions.
2. **Sheep and Goats:** Sheep and goats are distributed across the country, with varying concentrations in different regions. In the northern regions, particularly the Upper East and Upper West, there is a significant population of sheep and goats due to the suitability of the arid and semi-arid environments for these species. The Volta, Brong-Ahafo and Ashanti regions also have substantial populations of sheep and goats.
3. **Poultry:** Poultry production, including chickens, ducks, and turkeys, is widespread across Ghana. Guinea fowl production is mostly prevalent in the northern part of Ghana. Poultry farms and backyard poultry rearing can be found in both urban and rural areas. Major poultry production areas include the Greater Accra Region, Ashanti Region, Eastern Region, and Brong-Ahafo Region.
4. **Pigs:** Pig farming is prevalent in various parts of Ghana, with higher concentrations in the Ashanti Region, Eastern Region, and Greater Accra Region. Pigs are often raised in smallholder and commercial farms, providing a source of income and meat for local consumption.
5. **Aquaculture:** Fish farming is gaining prominence in Ghana, particularly in areas with access to water bodies such as rivers, lakes, and reservoirs. Regions such as Ashanti, Eastern, Central and Volta have a significant presence of fish farms and aquaculture activities.

6. **Other Livestock:** Other farm animals such as rabbits and snails are also reared in Ghana, although their distribution may vary based on local demand and cultural preferences.

Distribution of Farm Animals in Africa

1. **Cattle:** Cattle are widely distributed across Africa and are found in various regions of the continent. They are particularly prominent in sub-Saharan countries, including countries like Nigeria, Sudan, Ethiopia, Tanzania, and South Africa. The distribution of cattle is influenced by factors such as grazing land availability, water resources and cultural significance, and the demand for meat, milk, and hides.
2. **Sheep and Goats:** Sheep and goats are distributed throughout Africa and are often found in arid and semi-arid regions. They are well-suited to these environments and provide a valuable source of meat, milk, and fibre for local communities. Countries such as Sudan, Somalia, Ethiopia, Nigeria, and Morocco have significant populations of sheep and goats.
3. **Poultry:** Poultry farming is widespread across Africa, with chickens being the most common type of poultry raised. Poultry production is prevalent in both rural and urban areas, and it plays a crucial role in providing a source of protein, income, and livelihood for many communities. Major poultry-producing countries in Africa include Nigeria, South Africa, Egypt, Ethiopia, and Kenya.
4. **Swine:** Pig farming is practised in various parts of Africa, although it is more concentrated in specific regions. Countries such as Nigeria, Uganda, Kenya, South Africa, and Ghana have notable pig populations. Pig farming is often driven by factors such as market demand for pork, cultural preferences, religious beliefs, and economic opportunities.
5. **Other Livestock:** Other farm animals, such as horses, donkeys, rabbits, and various types of poultry (e.g., ducks, turkeys, geese), are also raised in different parts of Africa. Their distribution is influenced by local practices, specific cultural preferences, and economic considerations.

Factors that Affect the Distribution of Farm Animals

The distribution of farm animals is influenced by various factors such as climate, geography, cultural practices, and economic activities.

1. **Climate and geography:** Different farm animal species have specific climate and geographical requirements. Some animals thrive in hot and arid regions, while others prefer cooler and more temperate climates. The availability of suitable grazing land, water resources and the ability to tolerate specific weather conditions play a significant role in determining the distribution of farm animals.
2. **Cultural practices and traditions:** Cultural practices, traditions and historical factors can also impact the distribution of farm animals. Certain communities or ethnic groups may have preferences for specific animal species or have traditional knowledge and skills in rearing particular breeds. Cultural factors can influence

the choice of animals for farming, the husbandry practices employed, and the importance placed on different livestock species.

3. **Economic considerations:** Economic factors, including market demand, profitability, and cost of production, play a crucial role in the distribution of farm animals. Farmers are likely to raise animals that are in high demand and offer good economic returns. Market accessibility, transportation infrastructure, and the availability of support services such as veterinary care and animal feed also influence the distribution of farm animals.
4. **Resource availability:** The availability of natural resources, such as land, water, and forage, influences the distribution of farm animals. Animals that require extensive grazing areas or access to specific types of vegetation will be concentrated in regions where these resources are abundant. Conversely, animals that can adapt to limited resources or alternative feeding systems may be found in more resource-constrained areas.
5. **Government policies and interventions:** Government policies, regulations and interventions related to agriculture and livestock production can influence the distribution of farm animals. For example, subsidies or incentives provided for specific livestock species or breeds may encourage farmers to focus on those animals. Government interventions in disease control, breeding programmes and extension services can also shape the distribution of farm animals.
6. **Environmental and disease considerations:** Environmental factors such as soil quality, water availability, prevalence of specific diseases and pest pressure can affect the distribution of farm animals. Some regions may be more prone to certain diseases, making it more challenging to rear specific animal species or breeds. Farmers may choose animals that are resistant or resilient to prevalent diseases in their area.

Activity 4.5: Distribution of farm animals in Ghana and West Africa

1. Watch videos/pictures on the distribution of farm animals in Ghana and West Africa.
2. List the main types of farm animals commonly reared in Ghana and West Africa.
3. With the help of the internet and other resources such as government reports and agricultural studies, research the regions within Ghana and West Africa where these farm animals are predominantly found.
4. Come up with the factors that affect the distribution of farm animals in Ghana and West Africa by answering the following questions;
 - a. What are the climatic conditions of the various regions where the types of farm animals are raised?
 - b. What types of terrain are most suitable for different farm animals?

- c. What are the cultures of the people of the region where the various farm animals are raised?
 - d. How does the prevalence of certain diseases and pests affect the raising of farm animals in the regions?
 - e. How do government policies and agricultural programmes affect the raising of specific farm animals in the different regions?
5. Based on your answers to the above questions compile the factors that influence the distribution of farm animals in Ghana and West Africa and share with your peers for feedback.

Activity 4.6: Drawing of maps of West Africa and Ghana to show the distribution of farm animals

1. With the help of the internet and other resources, draw maps of West Africa and Ghana showing the distribution of the breeds of farm animals.
2. Make a presentation of your map to a peer for feedback.

EXTENDED READING

- Click [here](#) for more information on the importance of farm animals
- Santoze, A. and Gicheha, M. (2019). The status of cattle genetic resources in West Africa: a review. *Advances in Animal and Veterinary Sciences*. 7(2): 112-121. <http://dx.doi.org/10.17582/journal.aavs/2019/7.2.112.121> ISSN (Online) | 2307-8316; ISSN (Print) | 2309-3331
- For more information on the distribution of farm animals in Africa, click [here](#)

MEANING AND OBJECTIVES OF THE GENERAL MANAGEMENT PRACTICES IN ANIMAL PRODUCTION

Meaning of General Management Practices in Animal Production

General management systems in animal production refer to the approaches and methods used to efficiently raise and care for animals for various purposes, such as food production, fibre, or other agricultural products. These systems are made up of a wide range of practices that cover every aspect of animal husbandry, aiming to increase productivity, animal welfare and overall sustainability.

Objectives of the General Management Systems in Animal Production

The following are some objectives of management systems in animal production;

1. **Animal health and welfare:** Ensuring the well-being and health of animals is a primary objective. This involves providing proper nutrition, appropriate housing, good healthcare measures to minimise disease and stress.
2. **Genetic improvement:** Breeding management and genetic selection are used to continuously improve desirable traits in animals, such as growth rate, disease resistance, and reproductive efficiency leading to improved productivity and profitability.
3. **Resource efficiency:** Efficient use of resources, including feed, water, and land, is an important objective to minimise waste, and reduce greenhouse gas emissions and environmental impact while maximising production efficiency.
4. **Disease prevention and control:** Putting in place biosecurity and disease control measures helps prevent the spread of infectious diseases and maintains herd or flock health.
5. **Financial viability:** Ensuring that the animal production system is profitable and sustainable in the long term.
6. **Compliance with quality and safety of animal products:** Ensuring that animal products, such as meat, milk, eggs, and wool meet quality standards and are safe for human consumption is important in animal production.

ACTIVITY 4.7

1. Watch a video (click here) /pictures on how farm animals are managed and discuss with a peer the meaning and objectives of the management practices in animal production. In your discussion be guided by the following questions;
 - a. What comes to mind when you hear the term management practices in animal production?
 - b. Why is it important for a farmer to carry out management practices in animal production?
 - c. What are some of the general management practices carried out in animal production?
2. Present your work to the class for feedback and input.

MANAGEMENT SYSTEMS INVOLVED IN ANIMAL PRODUCTION

Management systems in animal production refer to the organised methods and styles used to raise and care for animals in a way that increases productivity, ensures animal welfare and sustainability. These systems can vary based on the species being raised, the scale of production, available resources, and specific goals of the operation.

The three major types of animal management systems in Ghana are

Extensive System

This system involves allowing animals to graze or feed freely in large, open areas such as pastures or rangelands. No complex housing, feeding, watering and medication are provided. Extensive grazing is commonly used for cattle, sheep, and other livestock. It promotes natural foraging behaviour and can be well-suited to regions with abundant grazing land.

Advantages

- a. Utilises natural forage resources and reduces feed costs.
- b. Allows animals to exhibit natural behaviours.
- c. Generally, it requires lower capital investment in housing and infrastructure.

Disadvantages

- a. May result in lower production efficiency compared with intensive systems.
- b. Affected by fluctuations in forage availability and quality due to weather conditions.
- c. May not be suitable for high-density production.
- d. Animals can easily be stolen or knocked down by vehicles as they roam in search of feed.
- e. Animals are also exposed to bad weather, predators, and disease conditions.

Semi-Intensive System

In this system, animals are housed and allowed to roam freely on their own in search of feed. It combines both intensive and extensive systems.

Advantages

- a. Natural forage utilisation and feed cost is better than the intensive system.
- b. Animals have better chances of showing their natural behaviour compared with the intensive system.

- c. Capital investment is less intensive compared with the intensive system.
- d. Better control of feeding and health management than the extensive system
- e. The animal also has some level of protection against predators and adverse weather and predation.

Disadvantages

- a. Capital intensive compared with the extensive system
- b. May require more land compared with the intensive system.
- c. Animals can easily be stolen or knocked down by vehicles when they are released for feeding.
- d. Animals are also exposed to some level of bad weather, predators, and disease transmission during roaming.

Intensive Systems

In this system, animals are housed in restricted spaces, such as barns or feedlots, where their environment, nutrition and health are carefully managed. Intensive confinement is commonly used for poultry and swine production, as it allows for high-density stocking and close monitoring of animals.

Advantages

- a. Allows for high-density stocking, maximising production per unit area.
- b. Provides precise control over nutrition, health, and environmental conditions.
- c. Protects animals from adverse weather and predation.

Disadvantages

- a. Requires significant capital investment in housing and equipment.
- b. Potential for environmental and welfare concerns in crowded conditions.
- c. Depending on external feed sources may increase production costs.

Other Farming Systems

Integrated farming systems (IFS): These systems involve integrating multiple components of agricultural production. For example, animal production can be combined with crop farming, allowing for nutrient recycling, and improved overall sustainability.

Advantages

- a. The combination of diverse agricultural activities can lead to increased overall productivity and income for farmers.

- b. Optimises the use of resources, such as land, water, and nutrients. For example, animal waste can be recycled as fertiliser for crops, reducing the need for external inputs, and crop residues can be used as feed for animals.
- c. By diversifying their farming activities, farmers can reduce their dependence on a single commodity and spread risks associated with climate variability or market fluctuations.

Disadvantages

- a. Implementing and managing a diverse farming system can be more complex which may require a higher level of expertise and planning and may demand more labour due to the diverse range of activities involved.
- b. Transitioning to an IFS may require significant initial investments in infrastructure and equipment which can be a barrier for some farmers.
- c. Integrating livestock and crops may increase the risk of disease transmission between animals and plants if not managed carefully.

Organic Farming Systems: Organic farming practices prohibit the use of synthetic chemicals and genetically modified organisms. In organic animal production, animals are raised under organic principles, including access to outdoor areas and organic feed.

Advantages

- a. Prohibits the use of synthetic chemicals and genetically modified organisms.
- b. Addresses consumer demand for organic products and sustainable practices.
- c. Emphasises animal welfare and environmental stewardship.

Disadvantages

- a. Stringent organic certification requirements and potential paperwork burden.
- b. Organic feed costs may be higher than conventional feed.
- c. Limitations on certain medications and treatments can be challenging.

Aquaculture Systems: Aquaculture involves raising aquatic organisms such as fish, shrimp, and shellfish, in controlled environments. Various aquaculture systems, including pond-based, cage-based, and recirculating aquaculture systems are used for different species.

Advantages

- a. Aquaculture can produce a high amount of protein-rich seafood, contributing to global food security and nutrition.
- b. Many aquatic species have a high feed conversion efficiency, meaning they convert feed into body mass more efficiently than terrestrial livestock.
- c. Well-managed aquaculture systems can help reduce the pressure on wild fish stocks and support sustainable seafood production.

Disadvantages

- a. Poorly managed aquaculture systems can lead to environmental issues such as water pollution, habitat degradation and disease transmission.
- b. Some aquaculture feeds rely on wild fish stocks which can contribute to overfishing and ecological imbalance.
- c. Escaped farmed fish can interact with wild populations, potentially affecting genetic diversity and ecological dynamics.

Integrated livestock-wildlife systems (ILWS): It involves the coexistence and interaction of domestic livestock with native wildlife in a shared environment. This approach seeks to harness the benefits of both livestock production and wildlife conservation within the same landscape.

Advantages

- a. Integrating livestock and wildlife promotes biodiversity by creating a more diverse habitat, which benefits both domestic animals and native wildlife.
- b. It enhances ecosystem services, such as nutrient cycling and seed dispersal, through the interaction of livestock and wildlife.
- c. The presence of both domestic and wild animals in the landscape can create opportunities for cultural and ecotourism experiences.

Disadvantages

- a. Coexistence with wildlife can increase the risk of disease transmission and predation between domestic animals and wildlife, potentially affecting both populations.
- b. Uncontrolled grazing can lead to overgrazing and habitat degradation, impacting both livestock and wildlife populations.
- c. In some regions, there may be legal and regulatory challenges related to the interaction between livestock and protected wildlife species.

Activity 4.8

1. Visit an animal farm in your community and observe the management systems practised on the farm.
2. Prepare a presentation on your visit and present it to the class. In preparing your presentation be guided by the following;
 - a. The types of farm animals reared on the farm.
 - b. The management system used in rearing the animals on the farm.
 - c. The characteristics of the management system being used are housing, feeding, breeding, health management, and waste management.

Activity 4.9

1. With the help of the internet and other resources, write the advantages and disadvantages of the management systems observed during your visit/ watching of the video/pictures.
2. Using the internet and other resources come up with any other farm management system used in animal production.
3. Share your findings with your peer for feedback.

SKILLS IN FARM ANIMAL HUSBANDRY PRACTICES FOR REARING ANIMALS

Husbandry practices in animal production are the methods and techniques used to manage and care for farm animals to ensure their health, productivity, and well-being. Some husbandry practices in animal production are discussed below.

Tagging

Tagging involves attaching identification tags such as ear tags, to animals for individual identification, record-keeping and tracking purposes.

Instruments: Ear tags, ear tag applicator



Ear Tagging Applicator



Ear Tagging Cutter

Fig 4.5: Ear tagging tools

Debeaking

Debeaking is the trimming or shaping of the beaks of poultry, primarily in commercial egg-laying hens, to prevent feather-pecking and cannibalism.

Instruments: Electric debeaker, infrared debeaker, or hot blade debeaker.



Automatic Debeaker



Handheld Electric Debeaker

Fig 4.6: Tools for debeaking

Dehorning/Disbudding

Dehorning is the removal of horns from certain livestock species to reduce the risk of injuries to animals and handlers and minimise aggressive behaviour.

Disbudding is the arrest of the horn growth at the early stage of the animal when the horn root is in the form of a bud.

Instruments: Dehorning saw, dehorning guillotine and dehorning paste. Disbudding iron or dehorner, pain management/local anaesthetic, haemostatic agent powder (to stop any bleeding), restraint equipment, and an assistant to restrain the calf. Safety equipment: Personal Protective Equipment (PPE), fire extinguisher, disinfectant.



Electric Dehorner



Hand-held Disbudding Iron



Dehorning Saw



Local Anesthetic Administration

Fig 4.7: Tools for dehorning/disbudding

Castration

Castration is the removal of the testicles from male animals to control breeding, improve meat quality and manage behaviour.

Instruments: Castration knife or scalpel and emasculator or burdizzo, rubber rings (elastrator) for banding.



Fig. 4.8: Tools for castration

Vaccination

Vaccination involves administering vaccines to animals to protect them from specific infectious diseases.

Instruments: Syringes, needles, vaccine bottles and appropriate vaccination techniques.



Fig. 4.9: Vaccination tools

Ear notching

Ear notching is a method of permanent identification used in some livestock species such as pigs, where specific notches or cuts are made in the ear tissue to represent unique identification codes.

Instruments: Ear notcher or ear punch.



Some ear notching equipment

Fig. 4.10: Tools for ear notching

Weaning

Weaning is the process of gradually separating young animals from their dams or herds to encourage independent feeding and promote growth and development.

Instruments: No specific instruments are required; may involve separate pens or enclosures.

Tail Docking

Tail docking involves shortening the tail of certain livestock species, such as sheep or cattle, to improve hygiene and prevent soiling and flystrike.

Instruments: Docking shears or rubber rings (elastator) for banding.

Teeth Clipping

Teeth clipping is the trimming of sharp teeth, primarily in piglets and rodents, to prevent injuries and improve feeding.

Instruments: Teeth clippers or nippers.

Hoof Trimming

Hoof trimming involves the regular trimming of hooves in livestock to maintain proper hoof health and prevent lameness.

Instruments: Hoof trimmers or hoof knives.

Mouthing

Mouthing is the examination of teeth and oral cavities in some animal species such as cattle to estimate age.

Instruments: Dental speculum, rasps.

Sex Reversal

It involves the change of sex in fish, typically from females to males. This process results in a population with predominantly one sex which is beneficial for specific production goals such as faster growth rates and reduced competition for resources.

Instruments: Hormones (e.g., 17α -Methyltestosterone) are commonly used to induce sex reversal in fish. The hormone is usually administered through feed or immersion.

Cannibalism Control

Cannibalism control involves implementing measures to prevent aggressive behaviour and the consumption of smaller or weaker animals, e.g., fish by larger individuals within a population.

Instruments: Providing sufficient hiding places, enrichment structures, or barriers within tanks or ponds can help reduce aggressive interactions. Grading fish by size can also help minimise cannibalism.

Immuno-stimulation

It involves enhancing the immune response of fish to protect them against specific diseases and pathogens.

Instruments: Vaccines specifically developed for fish are administered through various methods, such as immersion, injection, or oral delivery.

Activity 4.10

1. What comes to mind when you hear the term husbandry practices in animal production?
2. Write down your idea and share it with a peer for feedback.

Activity 4.11

1. With the help of the internet and other resources (Click [here](#)) write down some of the husbandry practices carried out in animal production and the tools required for the activity.
2. Complete the table below by indicating the husbandry practice carried out, the animal on which it is carried out and the tools used for the husbandry practice.

Husbandry practice	Animal	Tools used

Instructions for completing the table:

- a. In the husbandry practice column write the husbandry practices carried out e.g. Debeaking
 - b. In the animal column write the type of animal that the husbandry practice is carried out e.g. Chicken
 - c. The tools used column, write the appropriate tools that is used to carry out the husbandry practice, e.g. Electric debeaker.
4. Present your table to your peers for feedback

Activity 4.12

1. Observe a demonstration from a technician or watch a video/pictures (click [here](#) and [here](#)) of some husbandry practices carried out in animal production.
2. With the supervision of the technician, perform any of the animal husbandry practices, with the appropriate tools.

3. Write a report on the activity carried out and present your report to the class using the following headings
 - a. The husbandry practice performed.
 - b. Tools used for the activity.
 - c. Importance of the activity in animal production.
 - d. Step by step description of the activity.
 - e. Precautions taken during the activity.

Caution: This activity should only be carried out under the supervision of a farm technician and all the safety precautions should be observed in performing the activity

EXTENDED READING

- Santoze, A. and Gicheha, M. (2019). The status of cattle genetic resources in West Africa: a review. *Advances in Animal and Veterinary Sciences*. 7(2): 112-121. <http://dx.doi.org/10.17582/journal.aavs/2019/7.2.112.121> ISSN (Online) | 2307-8316; ISSN (Print) | 2309-3331
- For more information on husbandry practices, [click](#) here and [here](#)

REVIEW QUESTIONS

Review Questions 4.1

1. How are farm animals distinguished from other types of animals?
2. Discuss how farm animals contribute to sustainable agricultural practices.
3. Happy Acres Farm, located in the central region of Ghana, is a commercial farm that focuses on raising various types of farm animals, cultivating vegetables, and committed to sustainable agricultural practices. Happy Acres Farm currently has the following farm animals; Cattle (Holstein and Jersey cows), Sheep (Dorper and Merino), Goats (Boer and Saanen), Pigs (Yorkshire and Landrace), Chicken (Layers and Broilers), Rabbits (New Zealand and Californian), Guinea Pigs, Horses, and Donkeys. The farm also has 10 hectares of vegetables (cabbage, carrot, and sweet pepper). Based on the characteristics of the farm, answer the following questions:
 - a. Categorise the farm animals at Happy Acres Farm as ruminants, non-ruminants and non-ruminant herbivores and give reasons for your categorisation.
 - b. Based on the breeds (in the brackets) of the farm animals, indicate the purpose of each farm animal raised on the farm.
 - c. What are some of the activities on the farm that the horse and donkey can be used for?
 - d. Discuss how the farm can ensure sustainable agricultural practices.
4. Create a map to visualise the distribution of cattle across Ghana and West Africa.
5. Compare the distribution patterns of poultry in Ghana with another West African country of your choice. Highlight the similarities and differences between the two countries, providing possible explanations for these observations.
6. Discuss how seasonal climate variations and environmental challenges such as droughts, extreme temperatures and diseases impact the distribution of sheep in West Africa.

Review Questions 4.2

1. Explain the meaning of general management practices involved in animal production.
2. List the major types of management systems in animal production.
3. Why would you choose an intensive system over the extensive system of keeping farm animals?

4. State three objectives of the general management practices involved in animal production.
 5. Mrs. Owusu is an animal farmer in the Western Region of Ghana who manages a medium-sized farm with various livestock (poultry, pigs, and cattle) started experiencing the following challenges in his flock;
 - The laying hens were pecking each other, leading to injuries and stress within the flock.
 - Some of the male pigs and calves were very aggressive and difficult to handle and also not growing as expected because of indiscriminate sexing with the female animals.
 - Some new born piglet were biting the teats of the sow during nursing causing swelling of the teat.
 - Finds it difficult to properly identify individual animals, to track their health, breeding history and production data.
- a. Describe for each challenge above the husbandry practice that should be carried out to control the situation in her flock.
 - b. State the tools required for the activity and the precautions that should be taken for each husbandry practice.

ANSWERS TO REVIEW QUESTION

Answers To Review Question 4.1

1. Farm animals are distinguished from other types of animals based on the following:
 - Purpose and utility: Farm animals are primarily kept for economic purposes, food, fibre, labour, and other resources essential for human use while the other animals may live independently of human management.
 - Domestication and breeding: Farm animals have been selectively bred over generations for traits that are beneficial to humans, such as docility, productivity, and ease of handling. This process of domestication has resulted in significant genetic differences between farm animals and their wild ancestors or counterparts. For example, dairy cows have been bred specifically to produce large quantities of milk, while broiler chickens are bred for rapid growth and meat production.
 - Management and care: Farm animals are managed by humans in controlled environments such as farms, ranches, and pastures. Their diets, reproduction, health, and overall well-being are actively monitored and managed to optimize production. This level of human intervention is significantly higher compared to that of wild animals.
 - Legal and regulatory frameworks: There are specific laws and regulations governing the keeping, treatment, and use of farm animals. These regulations are designed to ensure the welfare of the animals and the safety and quality of the products derived from them. Such legal frameworks are typically distinct from those applied to pets or wildlife.
2. Farm animals contribute to sustainable agricultural practices through the following:
 - Manure production: Farm animals produce manure, which naturally enriches the soil with essential nutrients like nitrogen, phosphorus, and potassium, enhancing soil fertility and structure. This reduces the need for chemical fertilisers, promoting healthier and more sustainable soil management practices.
 - Grazing management: Livestock grazing helps manage plant growth and maintain grassland ecosystems. Properly managed grazing can prevent overgrowth, reduce wildfire risks, and promote plant biodiversity.
 - Crop-livestock integration: Integrating crops and livestock on the same farm can create a synergistic relationship where crops provide feed for animals and animals provide manure for crops. This integration enhances resource efficiency and reduces waste.

- **Agroforestry:** Livestock can be incorporated into agroforestry systems, where trees, crops and animals coexist. This enhances biodiversity, improves soil health, and provides multiple sources of income for farmers.
- **Resource use efficiency:** Animals can convert non-edible plant materials and food by-products into valuable products like meat, milk, and wool, enhancing the overall efficiency of resource use on the farm.
- **Biogas production:** Manure from farm animals can be used to produce biogas, a renewable source of energy. Biogas can be used for cooking, heating, and electricity generation, reducing reliance on fossil fuels and lowering greenhouse gas emissions.
- **Habitat preservation:** Grazing animals can help maintain habitats for wildlife by preventing the encroachment of woody plants and maintaining open landscapes.

3.

a. Categorisation of farm animals

Ruminants	Non-Ruminants	Non-ruminant herbivores
Cattle	Pigs	Horse
Sheep	Chicken	Donkey
Goats	Rabbits	
	Guinea Pigs	

Reasons for categorisation

- **Ruminants:** They all have a specialised stomach with four compartments (rumen, reticulum, omasum, and abomasum) that allows them to digest fibrous plant material efficiently.
- **Non-Ruminants:** They have single-chambered stomach and cannot digest fibrous plant material as efficiently as ruminants.
- **Non-ruminant herbivores :** They have single-chambered stomach and an extensive cecum and colon for fermenting fibrous plant material.

b.

Farm animal breed	Purpose
Cattle (Holstein and Jersey cows)	For dairy (milk) production. Holsteins are known for high milk yield, while Jerseys are valued for high butterfat content in their milk.
Sheep (Dorper and Merino)	For meat and wool. Dorper sheep are primarily raised for meat production, while Merino sheep are known for their high-quality wool.

Goats (Boer and Saanen)	For meat and milk production. Boer goats are typically raised for meat, while Saanen goats are known for their high milk production.
Pigs (Yorkshire and Landrace)	For meat production and breeding purposes. Both breeds are raised primarily for pork production, with Yorkshire pigs known for good mothering abilities and Landrace pigs for high fertility and meat quality.
Chicken (Layers and Broilers)	For meat and egg production. Layers are raised for egg production, while broilers are bred for meat production.
Rabbits (New Zealand and Californian)	For meat and fur production. Both breeds are typically raised for meat and fur production.
Guinea Pigs	For small-scale meat production and research.
Horses	Used for labour and transportation
Donkeys	Used for labour and transportation, particularly for carrying loads and working in agriculture.

c.

Activities on the farm that the horse and donkey can be used for:

- Ploughing fields: Horses and donkeys can be harnessed to plows for preparing fields for planting.
- Transporting goods: Both animals can be used to transport vegetables, feed, manure, and other supplies around the farm.
- Carrying loads: Donkeys, in particular are often used for carrying heavy loads of produce or other materials.
- Irrigation: Horses and donkeys can be used to pull water carts or irrigation equipment across fields.
- General farm labour: These animals can assist in tasks, such as hauling materials and helping with construction projects at the farm sites

d.

The following are how Happy Acres Farm can ensure sustainable agricultural practices:

- Manure from the farm animals is used to fertilise the vegetable fields, reducing the need for chemical fertilisers and improving soil health. This enhances nutrient cycling and minimises waste.

- Practicing proper grazing can prevent overgrazing, promote plant biodiversity, and maintain soil structure. Rotational grazing can enhance pasture productivity and reduce soil erosion.
 - Utilising manure for biogas production can provide renewable energy for the farm, reducing reliance on fossil fuels and lowering greenhouse gas emissions.
 - Manure and plant waste can be composted to create rich organic fertiliser, further enhancing soil health, and reducing the need for chemical inputs.
4. Map of Ghana showing the distribution of cattle across the regions.



Map of West Africa showing the distribution of cattle across the regions

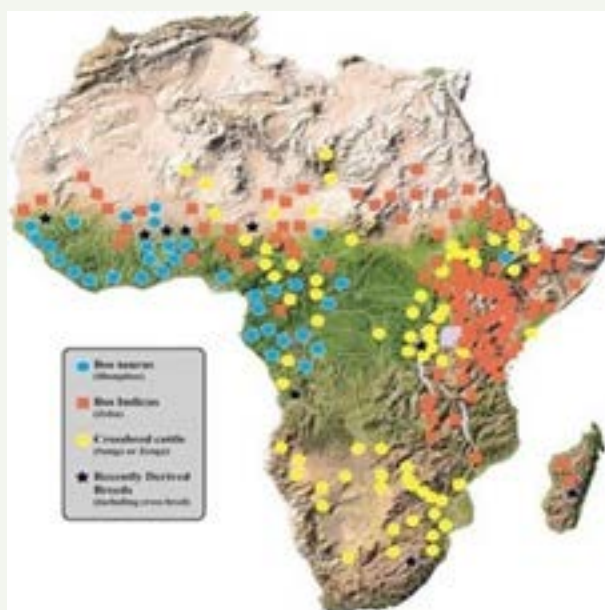


Image source : (Mwai *et al.*, 2015).

5. Comparing the distribution patterns of poultry in Ghana and Nigeria.

In Ghana, poultry farming has the following key characteristics:

- **Geographical Spread:** Poultry farming is widespread, with significant operations in regions such as Bono, Greater Accra, Ashanti, Central, and Western regions.
- **Types of Poultry:** The predominant poultry types include layers (for egg production) and broilers (for meat production).
- **Scale of Operations:** There is a mix of large commercial farms and small-scale backyard operations. Commercial farms are located typically near urban centres where there is higher demand for poultry products.
- **Feeding Practices:** Poultry in Ghana are often raised on commercial feeds, although small-scale farmers may use a combination of commercial and locally available feeds.

In Nigeria, poultry farming has the following key characteristics:

- **Geographical Spread:** Poultry farming is highly concentrated in the southwestern part of the country, particularly in states like Lagos, Ogun, and Oyo. The northern regions, such as Kano and Kaduna, also have substantial poultry farming activities.
- **Types of Poultry:** Layers and broilers dominate the poultry sector. However, there is also a significant presence of local breeds used in rural areas.
- **Scale of Operations:** Nigeria has many commercial poultry farms, especially around major cities. There are also numerous small-scale farmers and backyard poultry operations.
- **Feeding Practices:** Commercial poultry farming in Nigeria relies heavily on formulated feeds. Small-scale farmers may use locally sourced ingredients to supplement feeds.

Similarities between poultry farming in Ghana and Nigeria

- **Predominance of Layers and Broilers:** Both countries primarily raise layers for egg production and broilers for meat production.
- **Commercial and Small-Scale Farming:** Both countries, there is a mix of large commercial farms and numerous small-scale or backyard operations. This diversity in farm size helps meet local demands and provides income opportunities for many households.
- **Urban-Centric Commercial Farming:** Commercial poultry farms in both countries are typically situated near urban centers, where there is a higher demand for poultry products and better access to markets and resources.

Differences between the poultry farming in Ghana and Nigeria

- **Geographical Concentration:**

Ghana: Poultry farming is more evenly spread across the country, with significant activities in various regions.

Nigeria: There is a noticeable concentration of poultry farming in the southwestern states and some northern states, likely due to better infrastructure, access to markets, and historical development patterns.

- **Local Breeds:**

Ghana: While local breeds are present, commercial operations mainly focus on imported breeds.

Nigeria: There is a significant presence of local breeds, especially in rural areas, which are raised for both meat and eggs and are adapted to local conditions.

- **Feed and Resource Availability:**

Ghana: Generally, has a stable supply of commercial feeds, but smaller farms may face challenges in sourcing affordable, high-quality feed.

Nigeria: The availability and cost of commercial feeds can vary widely, affecting the productivity and sustainability of poultry farming. Northern regions may face more significant **challenges due to logistics and access issues.**

Explanations for Observations

- **Infrastructure and Market Access:** The concentration of poultry farming in certain areas in Nigeria can be attributed to better infrastructure and market access in those regions. The southwestern part of Nigeria, for instance, has a more developed transport network and proximity to major urban centers.
 - **Economic Conditions:** Differences in economic conditions and investment in agriculture between regions can influence the distribution patterns. Regions with more economic activity and investment in agriculture tend to have more developed poultry industries.
 - **Cultural Practices:** Cultural preferences and traditions can impact the types of poultry raised and the scale of operations. In Nigeria, the preference for local breeds in rural areas influences the distribution and practices of poultry farming.
 - **Climate and Environmental Factors:** Climate and environmental conditions can also affect poultry farming. Regions with more favourable climates for poultry health and productivity may have higher concentrations of poultry farms.
- 6. Impact of climate variations and environmental challenges on sheep distribution in West Africa.**

- **Rainfall Patterns:**

Forage availability: The amount and distribution of rainfall determine the growth of pasture and forage, which are critical for sheep nutrition. Regions with higher and more reliable rainfall, such as the Guinea and Sudan savannas, tend to have higher sheep populations due to better grazing conditions.

Seasonal variations: Wet and dry seasons influence the movement and distribution of sheep. During the wet season, sheep are more widely distributed as pastures are abundant. In the dry season, they concentrate around water sources and areas with residual forage.

- **Temperature Extremes:**

Heat stress: High temperatures, especially in the Sahelian regions, can cause heat stress in sheep, affecting their health and productivity. Farmers in these regions may adopt practices to mitigate heat stress, such as providing shade and water during the hottest parts of the day.

Cold stress: Although less common, cold snaps in highland areas can also impact sheep distribution and health.

- **Diseases and Pest infestation**

Disease incidence: The prevalence of diseases such as foot-and-mouth disease (FMD) and parasitic infections can impact sheep health and distribution. Regions with higher disease burdens may see lower sheep densities.

Veterinary services: Access to veterinary care and services, including vaccinations and treatments, is crucial for maintaining healthy sheep populations. Regions with better veterinary infrastructure support higher densities of sheep.

- **Human activities:** Human population growth, urbanization, agricultural expansion, and infrastructure development can encroach upon natural habitats and traditional grazing lands for sheep. This can fragment habitats, reduce grazing areas, and increase conflicts between humans and sheep for resources.

- **Food Availability:** Changes in vegetation cover and quality due to climate change or human activities (such as deforestation or overgrazing) can affect the availability of food for sheep. This can lead to competition for resources or force sheep to move to areas with better grazing opportunities.

Answers To Review Question 4.1

1. It is the comprehensive approaches and methodologies applied to efficiently and effectively raise and care for animals for various purposes, such as food production, fibre, or other agricultural products.
2. Refer to the major types of management systems in your textbook for the answer.
3. The intensive system of animal production is more beneficial to the farmer as compared to the extensive system since it maximises production per unit area, provides precise control over nutrition, predation and environmental conditions while is the reverse in the extensive system.
4. Refer to the objectives of the general management practices in your textbook.

5.

Husbandry practice	Procedure	Tool	Precautions
Debeaking	The removal or shortening of the part of a bird's beak to prevent feather pecking and cannibalism.	Debeaker	Tools used should be sterilised before use to prevent infections. Only the tip of the beak is removed to prevent excessive bleeding of the birds.
Castration	The removal or inactivation of the testes in male animals, which stops the production of sperm and male hormones, to control breeding, reduce aggressive behaviour, and improve meat quality.	Burdizzo, Elastrator or Emasculator	Local anaesthesia or analgesics should be provided to minimise pain and distress. Tools used must be sterilised before and after use.
Tooth Clipping	The trimming of sharp needle-like teeth of piglets shortly after birth, to prevent them from injuring each other and the sow while nursing.	Tooth Clippers	The clippers should be sterilised before and after each use to prevent the introduction of bacteria into the piglet's mouth.
Tagging	The placing of identification tags on an animal, typically on the ear, to provide a unique identifier for each animal, for record-keeping, tracking health, and managing breeding programs.	Ear Tag Applicator	Animals should be properly restrained to minimise stress and movement during the tagging process. The tagging tool and tags should be sterilised before application to prevent infections.

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GLOSSARY

- **Farm animals:** are animals typically raised or kept for various purposes, such as food production, labour, companionship and other products or services.
- **Ruminants:** are farm animals with a specialised digestive system capable of breaking down plant material (cellulose-rich plant matter) - examples are cattle, sheep, goats, deer, and bison.
- **Non-ruminant omnivores:** are farm animals with simple stomachs like humans but can consume a variety of food sources, including both plant and animal matter - examples are pigs, chickens, turkeys, and ducks.
- **Non-ruminant herbivores:** are farm animals that have simple stomach and consume a primarily plant-based diet - examples are horses, donkeys, rabbits, and guinea pigs.

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