SS1 LIVESTOCK FARMING LESSON NOTES

FIRST TERM

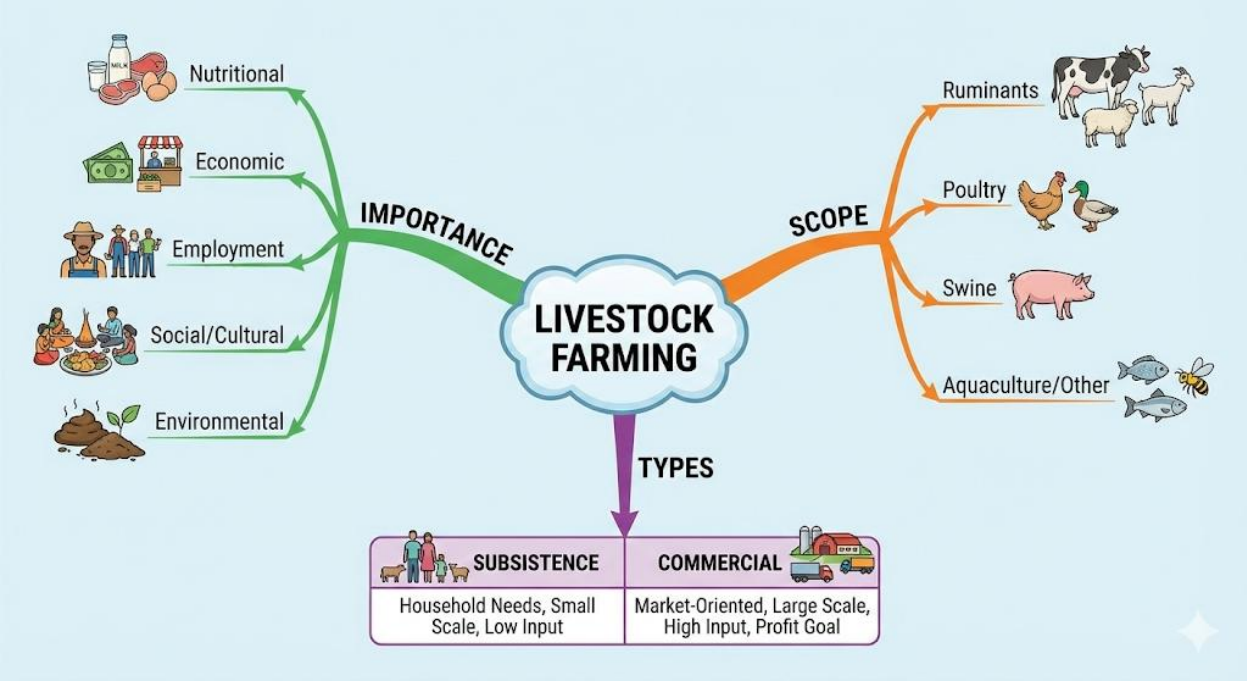
WEEK 1: INTRODUCTION TO LIVESTOCK FARMING

MEANING OF LIVESTOCK FARMING

Livestock farming, a major branch of agriculture, is the scientific and purposeful practice of breeding, raising, and managing domestic animals (livestock). These animals are kept for the primary purpose of producing valuable resources, which include:

- **Food:** Meat (beef, pork, chicken), milk, eggs.
- **Fiber:** Wool (from sheep), hides and skin (for leather).
- **Labor:** Draught animals (e.g., cattle, donkeys) used for plowing and transportation.
- **Other Products:** Manure (for fertilizer), bone meal, etc.

It is distinct from simply keeping pets, as it is an economic activity aimed at production and profit.



IMPORTANCE OF LIVESTOCK FARMING

Livestock farming is a cornerstone of a nation's economy, food security, and cultural heritage, especially in Nigeria.

1. **NUTRITIONAL IMPORTANCE:**
    - **High-Quality Protein:** Livestock products (meat, milk, eggs) are the best sources of **high-biological-value protein**, which contains all the essential amino acids required for human growth, tissue repair, and immune system function.
    - **Vitamins and Minerals:** They provide vital nutrients that are difficult to find in plant-based diets, such as **Vitamin B12** (for nerve function) and **Haem-iron** (easily absorbed iron to prevent anemia). Milk is a primary source of **Calcium** for bone health.
2. **ECONOMIC IMPORTANCE:**
    - **Income and Livelihood:** It provides a direct source of income for millions of people, from rural nomadic pastoralists to commercial poultry farmers.
    - **Employment:** It creates a vast number of jobs, not just on the farm (farmhands, veterinarians) but also in related industries (feed mills, abattoirs, transportation, marketing).
    - **Foreign Exchange:** The export of **hides and skin** (especially "Morocco" leather from Nigerian goats) is a major source of foreign currency for the country.
    - **Raw Materials:** It supplies raw materials to many industries, such as leather (for shoes, bags), textiles (wool), and animal feed (bone meal, blood meal).
3. **AGRICULTURAL AND ENVIRONMENTAL IMPORTANCE:**
    - **Draught Power:** In many rural communities, cattle (especially bulls) are used as draught animals for plowing land for crop farming, which is cheaper than buying a tractor.
    - **Manure (Fertilizer):** Animal waste (dung, poultry droppings) is an excellent, nutrient-rich organic fertilizer that improves soil structure and fertility, reducing the need for chemical fertilizers.

4. **SOCIAL AND CULTURAL IMPORTANCE:**

- **Status Symbol:** In many traditional Nigerian societies, the number of animals a person owns (especially cattle) is a direct measure of their wealth and social standing.
- **Cultural Use:** Livestock (goats, chickens, rams) are essential for festivals, ceremonies, marriages (as part of the dowry), and religious sacrifices.

SCOPE OF LIVESTOCK FARMING

The scope refers to the different types of animals that are commonly farmed.

Livestock	Primary Products	By-Products
Cattle	Meat (Beef), Milk	Hides (Leather), Manure, Draught Power
Poultry	Meat (Chicken, Turkey), Eggs	Feathers, Manure (Droppings)
Goats	Meat, Milk	Skin (Morocco Leather), Manure
Sheep	Meat (Mutton, Lamb), Wool	Skin, Manure
Pigs (Swine)	Meat (Pork, Bacon, Ham)	Skin (Leather), Lard (Fat)
Rabbits	Meat (Lean), Fur	Skin, Manure
Fish	Meat (Fish)	Fish oil, Fish meal

DIFFERENCE BETWEEN SUBSISTENCE AND COMMERCIAL LIVESTOCK FARMING

This is the primary way livestock farming is categorized by its scale and purpose.

Feature	**SUBSISTENCE FARMING**	**COMMERCIAL FARMING**
Goal	To feed the immediate family.	To make a profit by selling to the public.
Scale	**Small scale** (e.g., 5 goats, 10 local chickens).	**Large scale** (e.g., 5,000 broilers, 200 cattle).
Technology	**Low-tech.** Uses traditional methods, local breeds, free-range.	**High-tech.** Uses modern housing (battery cages), machines, veterinary medicine,

		Artificial Insemination (AI).
Input	**Low input.** Relies on free-range feeding, low labor cost, local materials.	**High input.** High cost of imported feeds, drugs, labor, and technology.
Output	**Low output.** Production is small and often inconsistent.	**High output.** Production is maximized for efficiency and profit.
Breeds	Indigenous (local) breeds (e.g., Muturu cattle, local chickens).	Exotic (foreign) or cross-breeds (e.g., Holstein-Friesian, Broilers).
Labor	Relies on family labor.	Relies on hired, specialized labor.

EVALUATION

1. Define livestock farming in your own words.
2. List and explain three economic and two nutritional importances of livestock farming in Nigeria.
3. What is the primary product of (a) Cattle, (b) Poultry, and (c) Goats?
4. Explain the term "Draught Animal."
5. In a table, state five key differences between subsistence and commercial livestock farming.

ASSIGNMENT

1. Write a 200-word essay on the topic: "How Livestock Farming Contributes to Nigeria's Food Security."
2. Interview a local farmer (e.g., a poultry keeper or goat herder) in your area. Find out (a) the number of animals they keep, (b) what they feed them, and (c) if they farm for subsistence or commercial purposes. Write a one-page report.
3. What are "Hides and Skin"? Research the "Morocco Leather" industry in Nigeria and its importance.
4. Define the terms: Pastoralism, Abattoir, Feed Mill, High-Biological-Value Protein.

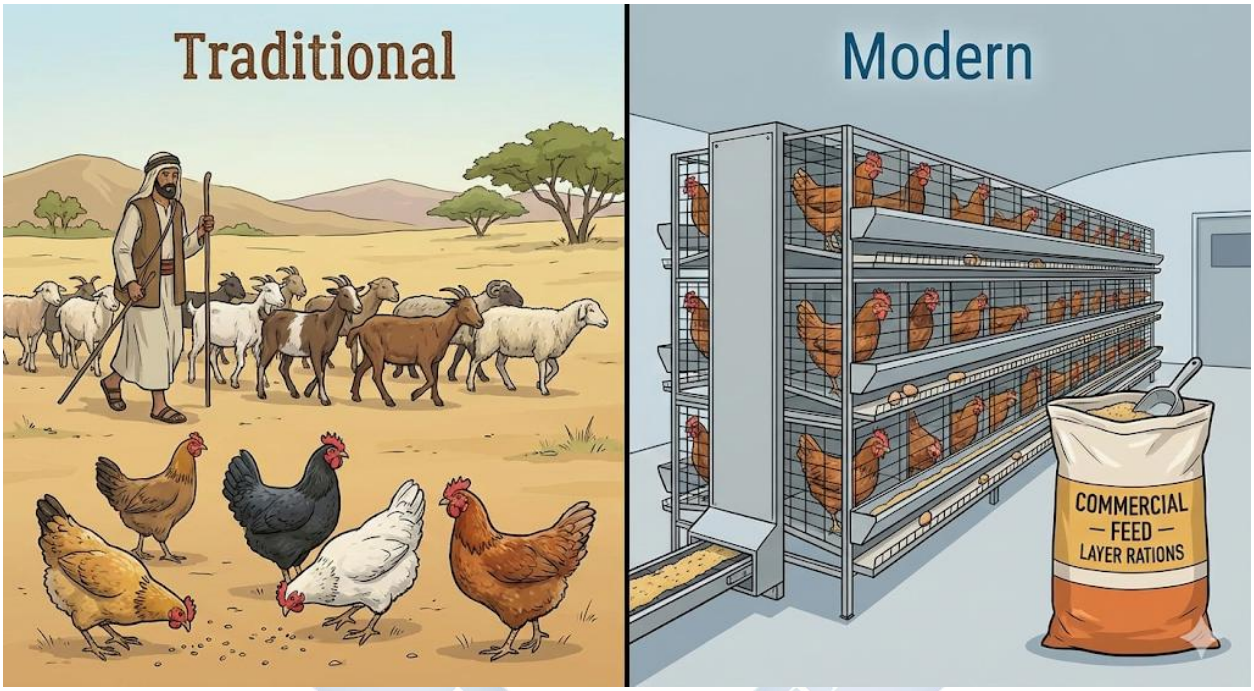
5. Create a poster illustrating the "Scope of Livestock Farming," showing at least 6 different animals and their main products.

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WEEK 2: HISTORY AND DEVELOPMENT OF LIVESTOCK FARMING IN NIGERIA

TRADITIONAL LIVESTOCK KEEPING

Livestock farming has been practiced in Nigeria for millennia, long before modern science. These traditional methods are still widely practiced today.



1. **NOMADIC PASTORALISM:**
    - **Description:** This is the most well-known traditional system, primarily associated with the **Fulani** people and their **Zebu cattle**. It is a *mobile* system where herders move their animals over large distances in search of **pasture (grass)** and **water**.
    - **Transhumance:** This is a specific type of pastoralism where the movement is *seasonal*. The herders move their cattle from the dry, savanna **North** during the rainy season to the greener **South** (Middle Belt) during the dry season.
    - **Characteristics:**
        - Animals (e.g., Zebu) are extremely hardy, disease-resistant, and can walk long distances.
        - Production (milk, meat) is low.
        - Animals are a sign of wealth and culture, not just profit.

- This system is now under severe pressure due to population growth, climate change, and conflict with crop farmers.

2. **VILLAGE / BACKYARD (FREE-RANGE) SYSTEM:**
    - **Description:** This is the most common system for **poultry, goats, and sheep** in rural and semi-urban areas.
    - **Characteristics:**
        - Animals are not confined. They "free-range" during the day, scavenging for their own food (insects, household scraps, grass).
        - They are given minimal housing (e.g., a small shed) at night.
        - Input (cost) is almost zero.
        - Output is low, and animals are vulnerable to theft, predators, and diseases (like Newcastle disease in poultry).

MODERN METHODS AND DEVELOPMENT

The development of modern livestock farming in Nigeria was a conscious effort to move from low-output traditional systems to high-output commercial systems.

1. **INTRODUCTION OF EXOTIC (FOREIGN) BREEDS:**
    - This was a major turning point. Scientists and policymakers realized that local breeds were hardy but produced very little.
    - **Cattle: Holstein-Friesian** (for high milk yield), **Hereford** (for high beef yield).
    - **Poultry: Broilers** (for meat, grow in 6-8 weeks) and **Layers** (e.g., Leghorn, for high egg production).
    - **Pigs: Large White, Landrace** (for high-quality pork).
    - **Problem:** These breeds are *not* adapted to Nigeria's climate or diseases (e.g., *Trypanosomiasis* from tsetse flies). They require intensive management.
2. **INTENSIVE HOUSING SYSTEMS:**
    - **Battery Cages:** For laying hens. This confines birds in small cages, which protects them from disease, prevents egg-eating, and makes management easy.

- **Deep Litter System:** For broilers. Thousands of birds are raised on a sawdust-covered floor in a large, ventilated "broiler house."
- **Piggeries:** Concrete pens for raising pigs, separating them from mud and waste.

3. **ADVANCEMENTS IN VETERINARY MEDICINE:**
    - The establishment of veterinary colleges and research centers allowed for the mass production of **vaccines** (e.g., against Newcastle, Gumboro) and **drugs** (antibiotics, dewormers), making it possible to keep thousands of animals in one place without them all dying.
4. **FEED FORMULATION:**
    - The shift from scavenging to **scientific feed formulation** (creating balanced rations from maize, soybean, etc.) allowed animals to reach their full genetic potential. This created the massive "animal feed" industry.
5. **ARTIFICIAL INSEMINATION (AI):**
    - The (limited) introduction of AI, especially in cattle, allowed farmers to get calves from a superior bull without owning the bull.

GOVERNMENT ROLES IN LIVESTOCK DEVELOPMENT

The Nigerian government has historically played a major role in trying to boost livestock production.

1. **RESEARCH INSTITUTES:**
    - **NAPRI (National Animal Production Research Institute):** Located in Shika, Zaria. This is the *primary* institute for research into animal breeding, nutrition, and production systems in Nigeria.
    - **NVRI (National Veterinary Research Institute):** Located in Vom, Plateau State. This is the *primary* institute for animal disease research and the production of most animal **vaccines** used in the country.
    - **KLDB (Kainji Lake Research Institute):** Researches freshwater fisheries.

2. **NATIONAL DEVELOPMENT PROGRAMS:**
    - **Agricultural Development Projects (ADPs):** State-level programs (funded by the World Bank) that provided farmers with extension services, inputs, and technology.
    - **Operation Feed the Nation (OFN):** A past military government initiative to boost all forms of agriculture, including backyard poultry.
3. **POLICY AND INFRASTRUCTURE:**
    - **Grazing Reserves:** Establishing designated areas for pastoralists to graze, in an attempt to reduce farmer-herder conflict.
    - **Import Bans:** Banning the import of frozen poultry (chicken, turkey) to protect and stimulate the local poultry industry.
    - **Border Control:** Setting up quarantine stations at borders to check animals for diseases.

EVALUATION

1. What is "Nomadic Pastoralism"?
2. Describe the "Free-Range" system of poultry keeping. What are two of its disadvantages?
3. Name two exotic breeds of cattle and one exotic breed of pig introduced to Nigeria. What is their main *disadvantage*?
4. What is the main difference between the **Battery Cage** system and the **Deep Litter** system?
5. What are the full names and primary functions of **NAPRI** and **NVRI**?

ASSIGNMENT

1. Write a 250-word essay on the challenges facing traditional "Nomadic Pastoralism" in Nigeria today (e.g., climate change, population, farmer-herder conflict).
2. In a table, compare "Traditional Livestock Keeping" with "Modern Methods" using the following criteria: Breeds, Housing, Feed, and Disease Control.

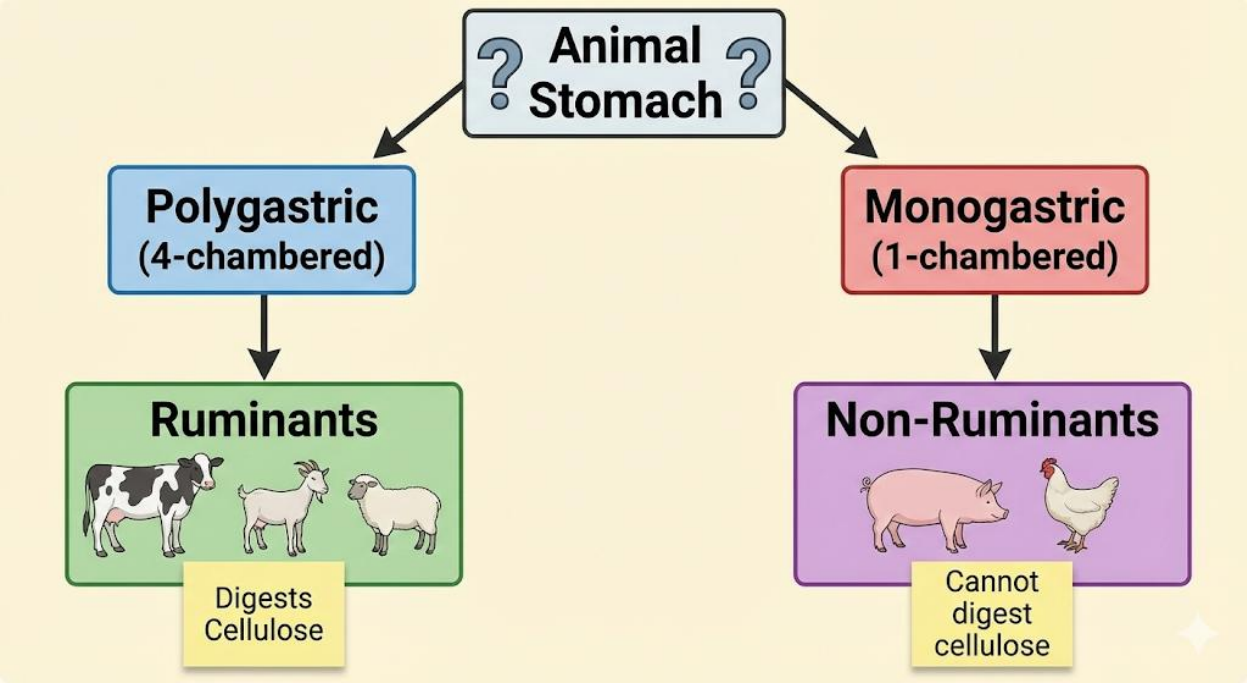
3. Research "Operation Feed the Nation (OFN)." When was it launched, and what was its main goal?
4. Define the following terms: Transhumance, Exotic Breed, Indigenous Breed, Vaccine, Extension Services.
5. What is your opinion on the "Battery Cage" system for laying hens? Write a 100-word paragraph discussing its "pros" (efficiency) and "cons" (animal welfare).

WEEK 3: CLASSIFICATION OF LIVESTOCK

INTRODUCTION

Last week, we discussed different breeds. A more fundamental way to classify farm animals is by their **digestive system (their stomach)**. This is the most important classification because it determines *what you can feed them* and *how they must be managed*.

All livestock are divided into two main groups: **Ruminants** and **Non-Ruminants**.



RUMINANTS (POLYGASTRIC ANIMALS)

- **DEFINITION:** A ruminant is a mammal that has a **complex, four-compartment stomach**. They are "polygastric" (Poly = many; gastric = stomach).
- **EXAMPLES: Cattle, Goats, Sheep.**
- **THE FOUR COMPARTMENTS:**
    a. **RUMEN:** This is the *first* and *largest* compartment. It is **not** a "true" stomach. It is a massive **fermentation vat**. It contains billions of microbes (bacteria, fungi, protozoa). These microbes do what the cow cannot: they break down **cellulose** (the tough fiber in grass) through fermentation.
    b. **RETICULUM:** This is connected to the rumen (often called the "rumen-reticulum"). It has a **honeycomb** lining. Its job is to trap heavy, non-food items (like stones or nails) and to help with **rumination**.
    c. **OMASUM:** This is a globe-shaped organ with many folds of tissue ("many-plies"). Its main job is to **absorb water** and filter the food.
    d. **ABOMASUM:** This is the **"True Stomach."** It functions exactly like a human stomach, secreting acid (HCl) and digestive enzymes (like pepsin) to digest protein.
- **KEY CHARACTERISTICS OF RUMINANTS:**
    a. **They Chew the Cud (Rumination):** This is their defining feature. The animal eats grass, swallows it into the rumen, and then later *regurgitates* the partially digested food (the "cud") back into its mouth to be chewed *again*. This (1) adds saliva and (2) breaks the food into smaller pieces, giving the microbes more surface area to work on.
    b. **They Digest Cellulose:** They can survive and thrive on high-fiber, low-quality feeds (like grass, hay, silage, straw) that humans and other animals cannot. They do not compete with humans for food (grains).
    c. **Bloat:** They are prone to a dangerous condition called "bloat," where fermentation gas gets trapped in the rumen.

NON-RUMINANTS (MONOGASTRIC ANIMALS)

- **DEFINITION:** A non-ruminant is an animal that has a **simple, single-compartment stomach**. They are "monogastric" (Mono = one).
- **EXAMPLES: Pigs, Poultry (Chickens, Turkeys), Rabbits.** (Humans are also monogastric).
- **KEY CHARACTERISTICS OF NON-RUMINANTS:**
    a. **Simple Stomach:** Their stomach produces acid and enzymes to digest food, just like the abomasum.
    b. **Cannot Digest Cellulose:** They have *no* rumen and *cannot* break down high-fiber grass. If you feed a chicken only grass, it will starve.
    c. **They Compete with Humans:** Because they cannot eat grass, their diet is based on high-energy, low-fiber foods like **grains (maize, sorghum)** and **protein meals (soybean, groundnut cake)**. These are all foods that humans can also eat.
    d. **Efficient Feed Conversion:** Many (like pigs and broilers) are extremely efficient at converting high-quality feed into meat.
- **SPECIAL CASES (PSEUDO-RUMINANTS):**
    - Some animals (like **Rabbits** and **Horses**) are non-ruminant but *can* digest fiber.
    - Rabbits have a very large **cecum** (a pouch in the intestine) that acts like a small "rumen," fermenting fiber.
    - Rabbits also practice **coprophagy** (eating their own soft, night-time feces) to re-digest the food and absorb the nutrients.

EVALUATION

1. What is the primary basis for classifying livestock into ruminants and non-ruminants?
2. What does "Polygastric" mean?
3. List the four compartments of the ruminant stomach *in order*.
4. What is the function of the **Rumen**? What is the function of the **Abomasum**?

5. What is "Rumination"?

ASSIGNMENT

1. Write a 250-word essay explaining *why* a cow can survive by eating only grass, but a pig cannot. (Use the terms "Rumen," "Microbes," "Cellulose," and "Monogastric").
2. Draw a simple, labeled diagram of the four compartments of the ruminant stomach.
3. Create a two-column table. In Column 1, list the following animals: Cattle, Pig, Goat, Chicken, Rabbit, Sheep, Turkey. In Column 2, classify them as "Ruminant" or "Non-Ruminant."
4. Research the term "Coprophagy" as it relates to rabbits. Why do they do this?
5. Define the following terms: Cellulose, Fermentation, Regurgitate, Monogastric, Abomasum.

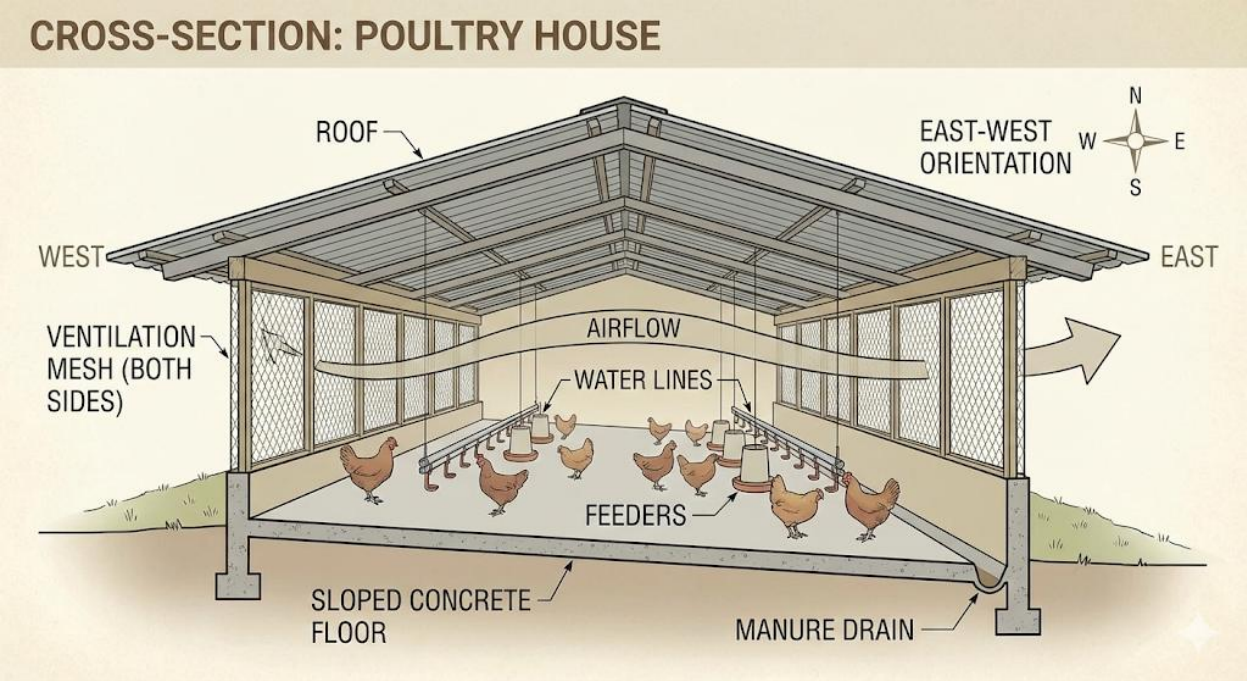
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WEEK 4: LIVESTOCK HOUSING

INTRODUCTION

In modern livestock farming (especially commercial systems), animals are not just left to wander. **Housing** is a critical management tool.

A **livestock house** is any structure built to confine, protect, and manage animals.



PRINCIPLES OF GOOD LIVESTOCK HOUSING

A well-designed animal house is not just a "box." It is a piece of technology designed to optimize health and production. The following principles are universal:

1. **ORIENTATION (SITING):**
    - The building should be sited on **high, well-drained ground**.
    - **East-West Orientation:** The *long axis* of the building (the long wall) should face **East-West**. This means the *short* walls face the rising (East) and setting (West) sun. This **minimizes** the amount of hot, direct sun that hits the long walls, keeping the inside of the building cooler.
2. **VENTILATION:**

- This is *critical*. The building must have excellent **cross-ventilation** (e.g., open sides with wire mesh).
- **Purpose:** To remove hot air, to remove harmful gases (especially **ammonia** from urine and feces), to reduce humidity, and to bring in fresh oxygen. Poor ventilation leads to respiratory diseases.

3. **SPACE (STOCKING DENSITY):**
   - The house must be large enough for the number of animals.
   - **Overstocking** (too many animals) leads to stress, competition for food/water, faster disease spread, and vices (like feather-pecking in chickens).
4. **DRAINAGE:**
   - The floor must be **sloped** (e.g., 1:20 gradient) so that water (from cleaning or urine) flows *out* of the building.
   - This prevents "water-logging" (puddles) and dampness, which breed disease.
5. **SECURITY:**
   - The house must be strong enough to **prevent predators** (e.g., snakes, foxes) from entering.
   - It must be secure enough to **prevent theft**.
6. **HYGIENE:**
   - The floor and walls (especially in a piggery) should be made of **smooth, durable concrete**.
   - This makes them non-porous and **easy to wash, clean, and disinfect**. Wooden floors absorb waste and are impossible to sanitize.
7. **ACCESSIBILITY:**
   - The house must be accessible to bring in feed and water, and to remove waste and animals.

TYPES OF HOUSING FOR LIVESTOCK

1. POULTRY HOUSING

- **A. Extensive (Free-Range):** Traditional. Birds scavenge by day and may have a simple shed for night.
- **B. Semi-Intensive:** A fixed house is provided, along with an outside, fenced-in "run" or "paddock."
- **C. Intensive (Fully Confined):**
    - **DEEP LITTER SYSTEM:**
        - **Use:** For **Broilers** (meat chickens) and young layers ("pullets").
        - **Description:** A large, well-ventilated house with a concrete floor. The floor is covered with a thick (6-8 inch) layer of absorbent "litter" (e.g., **wood shavings** or sawdust).
        - **Management:** Drinkers, feeders, and heaters (for chicks) are all inside. The litter is stirred regularly, and new layers are added.
    - **BATTERY CAGE SYSTEM:**
        - **Use:** For adult **Laying Hens**.
        - **Description:** Birds are kept in small wire cages, stacked in long rows inside a house.
        - **Management:** Feed and water are provided in troughs outside the cage. The cage floor is sloped, so when an egg is laid, it **rolls forward** out of the cage, ready for collection. Waste drops *through* the wire floor, separating the bird from its manure.
        - **Pros:** Very high production, clean eggs, easy to manage, high stocking density.
        - **Cons:** Low animal welfare, high initial cost.

2. CATTLE HOUSING

- In Nigeria, cattle are often kept in simple fenced-in areas called **paddocks** (for grazing) or **kraals** (a traditional fenced enclosure).

- Commercial dairy farms have complex **milking parlors** (a clean room for milking) and **cubicle housing** (where each cow has its own "stall" to lie in).

3. PIG HOUSING (PIGGERY / PIGSTY)

- **Key Feature:** Pigs are very strong, destructive, and produce a lot of wet manure.
- **Description:** The house *must* be made of **strong concrete blocks** and **concrete floors**.
- **Specialized Pens:**
    - **Farrowing Pen:** For the pregnant/mother sow. It contains a "farrowing crate," which is a special cage that stops the mother from accidentally crushing her piglets.
    - **Boar Pen:** A strong, individual pen for the adult male.
    - **Finishing Pen:** A larger group pen for growing pigs.
    - **Features:** Must have a water wallow (a small pool) for cooling and a good drainage gutter.

4. GOAT AND SHEEP HOUSING

- These are simpler. A basic, well-ventilated shed is often sufficient.
- A common modern design is a **raised-floor house**. The house is built on stilts (e.g., 1-2 meters off the ground) with a slatted (gapped) wooden or plastic floor.
- **Advantage:** The feces and urine fall *through* the floor, keeping the animals clean, dry, and far away from parasites (like worms).

EVALUATION

1. What is the "East-West Orientation," and why is it the most important principle for siting a livestock house in Nigeria?
2. List five *other* principles of good housing.
3. Describe the "Deep Litter" system. What animal is it used for, and what material is used for the "litter"?
4. Describe the "Battery Cage" system. What animal is it used for, and how does its design help with egg collection?

5. Why must a piggery be built with very strong materials like concrete?

ASSIGNMENT

1. Write a 250-word essay explaining the importance of **Ventilation** and **Drainage** in a livestock house. What happens if these two things are poor?
2. Draw a simple, labeled diagram of a **Battery Cage** system, showing the hen, the sloped floor, the egg, the feed trough, and the water nipple.
3. Draw a simple, labeled diagram of a **Deep Litter** house, showing the litter, drinkers, and feeders.
4. Research and describe a "Farrowing Crate." Why is it a necessary piece of equipment in a piggery?
5. What is a "slatted floor" in a goat house, and what is its main advantage?

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WEEK 6: ANIMAL NUTRITION I

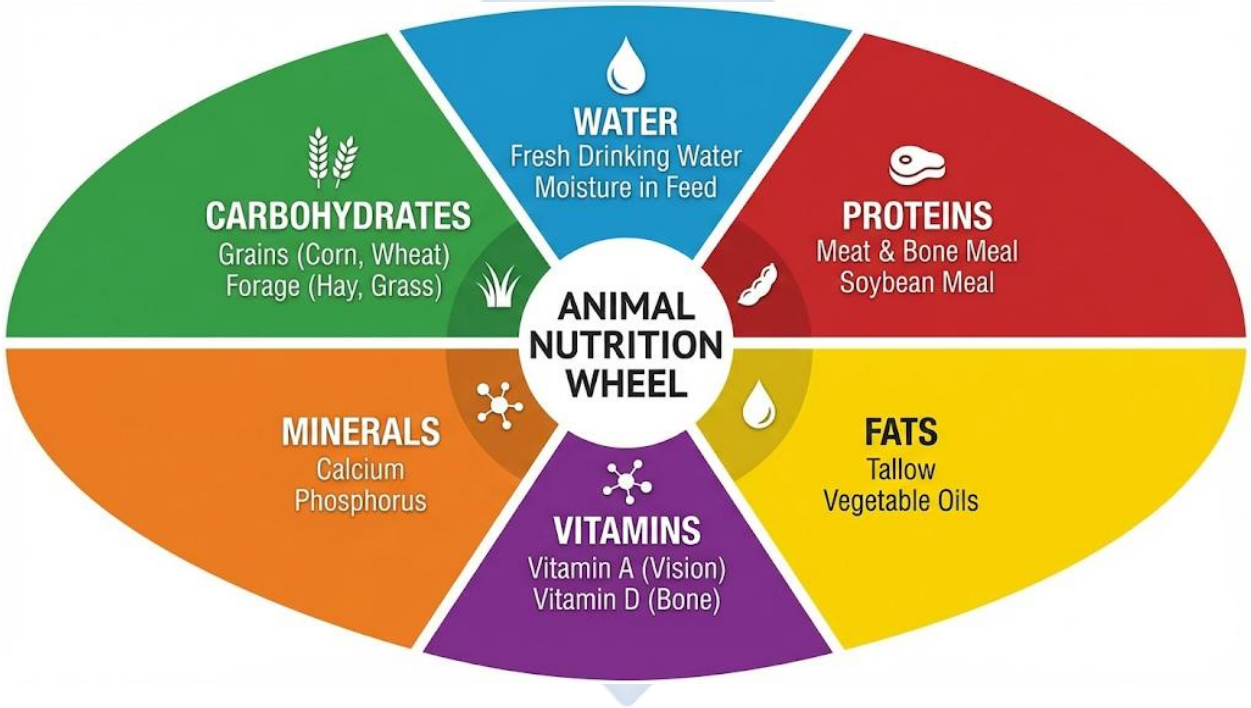
TOPIC: CLASSES OF FEED AND FEED INGREDIENTS

INTRODUCTION

Nutrition is the science of food and how the animal's body uses it for growth, maintenance, and production. **Feed** (or "feedstuff") is the food given to animals.

Feed is the **single largest cost** in commercial livestock farming (often 60-70% of the total cost). Understanding nutrition is the key to making a profit.

The nutrients an animal needs are divided into 6 essential classes.



CLASSES OF FEED (NUTRIENTS)

1. CARBOHYDRATES

- **Function:** This is the **primary energy source**. They are the "fuel" that the animal burns to walk, breathe, and stay warm.
- **Source (Ingredients):** They come from cereal grains and tubers.
    - **Examples:** Maize (corn), Sorghum, Millet, Wheat (in wheat offal), Cassava, Yams.

- **Note:** In ruminants, "carbohydrates" also include **cellulose** (fiber) from grass and hay.

2. PROTEINS

- **Function:** The "building blocks" of the body. They are essential for **growth** (building muscle), **repairing tissue**, and **production** (making eggs, milk, and developing a fetus).
- **Source (Ingredients):** They are the most expensive part of the feed.
    - **Plant-Based: Groundnut Cake (GNC), Soybean Meal,** Palm Kernel Cake (PKC).
    - **Animal-Based: Fish Meal, Blood Meal.**

3. FATS AND OILS (LIPIDS)

- **Function:** A **concentrated energy source**. They provide **2.25 times** more energy per gram than carbohydrates. They also help in the absorption of fat-soluble vitamins and provide essential fatty acids.
- **Source (Ingredients):**
    - **Examples:** Palm Oil, Groundnut Oil, Tallow (animal fat).

4. VITAMINS

- **Function:** "Protective" nutrients needed in *very small* amounts. They regulate body processes and act as "spark plugs" for chemical reactions.
- **Types:**
    - **Fat-Soluble (Vitamins A, D, E, K):**
        - **Vit A:** For eyesight.
        - **Vit D:** For calcium absorption (bone/egg health).
        - **Vit E:** For reproduction.
        - **Vit K:** For blood clotting.
    - **Water-Soluble (Vitamins B-complex, C):**
        - **Vit B:** For energy metabolism.
- **Source (Ingredients):** Green leafy plants, synthetic **Vitamin Premixes** (which are added to commercial feeds).

5. MINERALS

- **Function:** Structural and regulatory. Needed for bones, blood, and metabolic processes.
- **Types:**
    - **Macro-minerals (needed in large amounts):**
        - **Calcium (Ca) & Phosphorus (P):** Essential for **bone and teeth formation** and (in poultry) **eggshell production**.
    - **Micro-minerals (Trace minerals - needed in tiny amounts):**
        - **Iron (Fe):** For creating hemoglobin in blood (prevents anemia).
        - **Iodine (I):** For thyroid function.
- **Source (Ingredients):**
    - **Bone Meal** (for Calcium and Phosphorus)
    - **Oyster Shell** or **Limestone Flour** (for Calcium)
    - **Salt Licks** (for Sodium)
    - **Mineral Premixes**

6. WATER

- **Function:** The "forgotten nutrient," but the most essential. Life stops without it.
    - Regulates body temperature (cooling).
    - Transports all other nutrients.
    - Essential for digestion and milk/egg production.
- **Source:** Must be provided **ad libitum** (meaning "freely available at all times") and must be **clean**.

EVALUATION

1. What are the 6 classes of animal feed (nutrients)?
2. What is the primary *function* of (a) Carbohydrates and (b) Proteins?
3. Name two plant-based protein sources and one animal-based protein source used in feed.
4. Why are Calcium and Phosphorus so important for a laying hen? Name one ingredient that provides them.

5. What does "ad libitum" mean in the context of providing water?

ASSIGNMENT

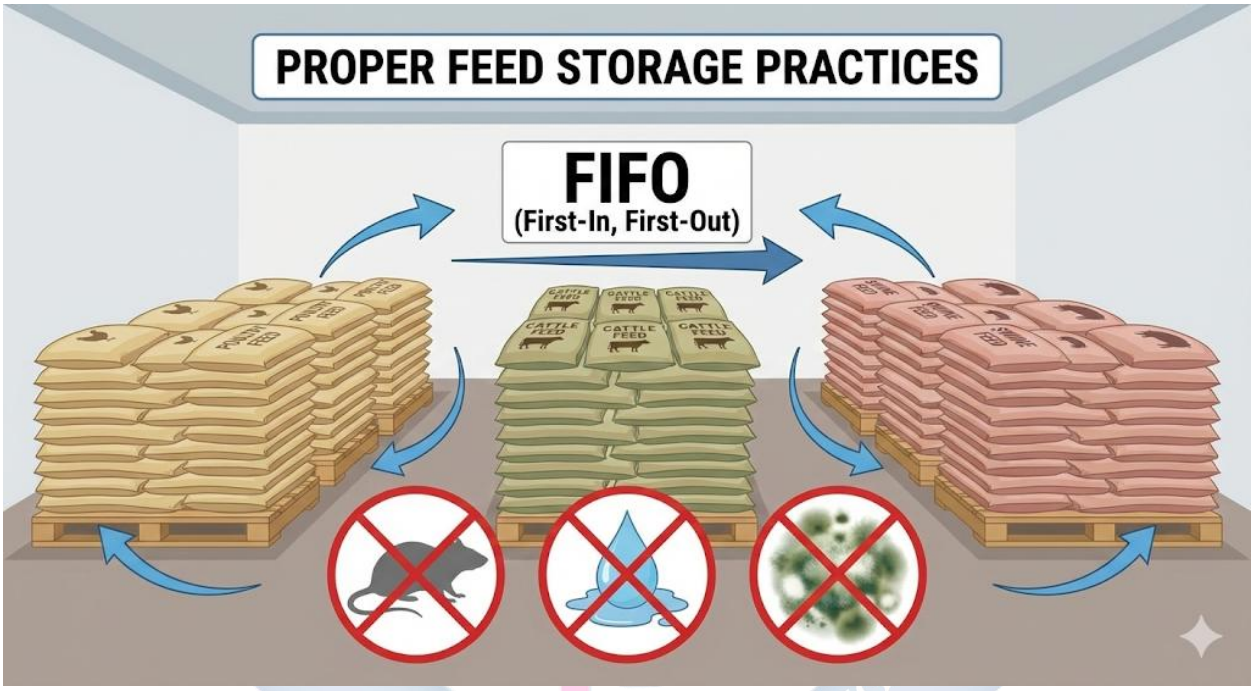
1. Write a 250-word essay on why feed is the most important factor in a commercial livestock business.
2. Fats provide 2.25 times more energy than carbohydrates. Why don't we just feed animals a very high-fat diet? (Hint: Think about cost and balance).
3. Create a large, colorful chart of the 6 classes of nutrients. For each class, list its **Main Function** and **2 Feed Examples**.
4. What is a "Vitamin Premix"? Why is it added to animal feed?
5. Define: GNC (Groundnut Cake), PKC (Palm Kernel Cake), Bone Meal, Fat-Soluble, Macro-mineral.

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WEEK 8: ANIMAL NUTRITION II

TOPIC: BALANCED RATION, FORMULATION, AND STORAGE

BALANCED RATION



- **DEFINITION:** A **ration** is the total amount of feed an animal receives in a 24-hour period. A **balanced ration** is a ration that contains **all 6 essential nutrients** (carbohydrates, proteins, fats, vitamins, minerals, water) in the **correct proportions** and **amounts** to meet the animal's specific needs.
- **THE RATION IS "SPECIFIC":** There is no single "perfect feed." The "correct proportion" changes depending on the animal.
    - **Example (Poultry):**
        - **Broiler Starter Mash:** For a 1-week-old broiler (growth). Needs very **high protein** (e.g., 23%).
        - **Broiler Finisher Mash:** For a 6-week-old broiler (fattening). Needs **lower protein** (e.g., 19%) but **high energy** (carbs).
        - **Layer's Mash:** For an egg-laying hen. Needs moderate protein but very **high Calcium** (for eggshells).

- **Example (Pigs):**
    - **Creep Feed:** A special, highly digestible feed for suckling piglets.

FACTORS AFFECTING FEED FORMULATION

"Feed Formulation" is the science of mixing different ingredients (e.g., maize, GNC, bone meal) to create a balanced ration. A farmer or nutritionist must consider these factors:

1. **THE ANIMAL'S SPECIES:**
    - A cow (ruminant) needs a high-fiber ration (grass). A chicken (non-ruminant) needs a low-fiber, high-grain ration. You cannot feed cow feed to a chicken.
2. **THE ANIMAL'S AGE:**
    - **Young animals (growth):** Need *more protein* (e.g., Broiler Starter).
    - **Adult animals (maintenance):** Need *less protein* and more energy.
3. **THE ANIMAL'S PURPOSE (PHYSIOLOGICAL STATE):**
    - **Egg/Milk Production (Lactation):** Needs high protein, high calcium, and high energy (e.g., Layer's Mash, Dairy Meal).
    - **Meat Production (Fattening):** Needs very high energy (carbohydrates and fats) (e.g., Broiler Finisher).
    - **Pregnancy:** Needs extra nutrients, especially in the last trimester.
    - **Work:** A draught animal needs a very high-energy ration.
4. **COST AND AVAILABILITY OF INGREDIENTS:**
    - This is a *business* decision. Maize might be the best energy source, but if it's too expensive, the farmer must reformulate using a cheaper alternative (like **cassava**).
5. **HEALTH STATUS:**
    - A sick or recovering animal may need a special, highly digestible ration or medicated feed.

FEED STORAGE

This is a critical management task. You can buy the best feed in the world, but if you store it incorrectly, it will be wasted or become poisonous.

- **THE GOAL:** To protect the feed from **Moisture, Pests,** and **Sunlight**.
- **THE IDEAL FEED STORE:**
    a. **DRY:** Must be 100% waterproof.
    b. **COOL:** Heat (from sunlight) can degrade vitamins.
    c. **WELL-VENTILATED:** Good airflow prevents dampness and mold.
    d. **PEST-PROOF:** Must be sealed to keep out **rats, mice, weevils,** and **cockroaches**.
- **RULES OF STORAGE:**
    a. **USE PALLETS: Never** stack feed bags directly on the bare floor (especially concrete). The floor is cold and wicks moisture, causing the bottom bags to mold. Bags *must* be stacked on **wooden pallets** (platforms) to allow air to circulate underneath.
    b. **FIFO:** "First-In, First-Out." Always use the *oldest* feed bags before opening the *new* ones.
    c. **PEST CONTROL:** Set traps and seal holes.
    d. **SEPARATE:** Keep feeds separate from chemicals like drugs, pesticides, or fuel.
- **THE DANGER OF POOR STORAGE (AFLATOXINS):**
    - If feed (especially Groundnut Cake) gets damp, a toxic mold (Aspergillus) will grow on it.
    - This mold produces a poison called **Aflatoxin**.
    - Aflatoxin is a *silent killer* in livestock. It destroys the liver, stunts growth, and causes death. It is a major economic loss.

EVALUATION

1. What is a "Balanced Ration"?
2. Why does a "Broiler Starter" feed have a different formulation than a "Layer's Mash"?
3. List 5 factors that a farmer must consider when formulating a feed.
4. What is a "pallet," and why is it essential in a feed store?

5. What is "Aflatoxin," what causes it, and why is it so dangerous?

ASSIGNMENT

1. Write a 250-word essay explaining *why* the nutritional needs of a young, growing animal are different from those of an adult animal used for production (e.g., milk or eggs).
2. What does "FIFO" stand for, and how would you implement this system in a feed store?
3. Research "Creep Feed" for piglets. What is it, and why is it given?
4. Draw a simple "cut-away" diagram of a feed store, showing bags stacked correctly (on pallets, away from the wall) and incorrectly (on the floor).
5. Define: Ration, Feed Formulation, Pallet, Aflatoxin, Medicated Feed.

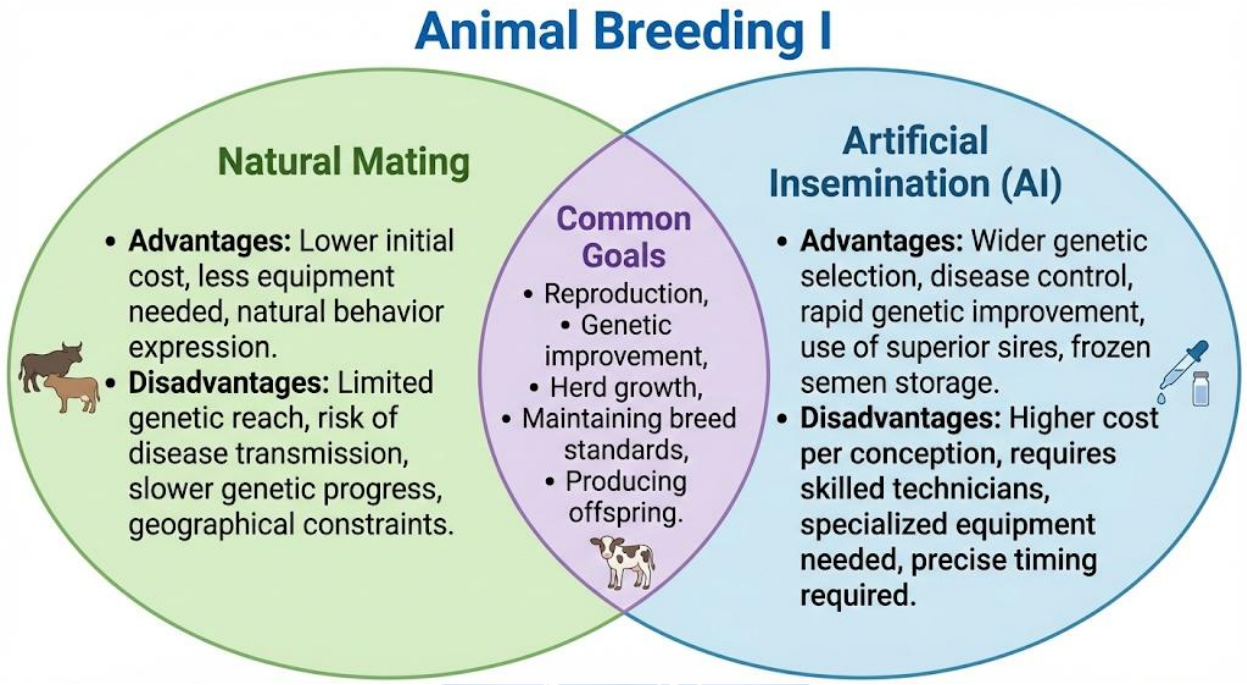
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WEEK 9: ANIMAL BREEDING I

TOPIC: NATURAL BREEDING, ARTIFICIAL INSEMINATION (AI), SELECTION

INTRODUCTION

Animal Breeding is the applied science of using the principles of genetics to improve livestock. **Breeding** is the process of mating a selected male and female to produce offspring. The goal of all breeding is to ensure that the *next* generation is *better* than the *current* generation.



SELECTION METHODS

Selection is the process of *choosing* which animals will be allowed to become parents. This is the first and most important step in any breeding program. If you breed with poor-quality animals, you will get poor-quality offspring.

1. **MASS SELECTION (INDIVIDUAL SELECTION):**
    - **Description:** The oldest and simplest method. The farmer simply looks at all their animals and selects the "best-looking" ones (the ones with the best **phenotype**) to be parents.

- **Example:** Keeping the largest hen, the fastest-growing pig, or the ram with the thickest wool.
- **Pro:** Simple, easy, and effective for highly heritable traits.
- **Con:** You cannot select for traits you can't see (like disease resistance) or traits in the opposite sex (like milk production in a bull).

2. **PEDIGREE SELECTION:**

- **Description:** Selecting an animal based on the **performance records** of its **ancestors** (its "pedigree" or "family tree").
- **Example:** Buying a young bull because his *mother* and *grandmother* were champion milk-producers.
- **Pro:** Allows you to select for traits *before* the animal is old enough to show them.
- **Con:** The records might be inaccurate, and the animal may not have inherited the good genes.

3. **PROGENY TESTING:**

- **Description:** This is the *most accurate* and most complex method. An animal (especially a male) is selected based on the **performance of his offspring** (his "progeny").
- **Example:** A bull (Male A) is mated with 100 cows. His daughters produce an average of 30L of milk/day. Another bull (Male B) is mated with 100 cows. His daughters produce 25L/day. The farmer *discards* Male B and uses Male A as the "proven sire."
- **Pro:** The *most reliable* method, as it tests the *actual genes* the male is passing on.
- **Con:** Very slow (takes years to get results) and very expensive. Used by large breeding companies.

MATING SYSTEMS

Once animals are selected, there are two ways to mate them:

1. NATURAL BREEDING (NATURAL MATING)

- **Definition:** The traditional method of allowing a male animal (e.g., bull, boar, ram) to physically mount and copulate with a female in "heat" (estrus).
- **Advantages:**
    a. **Simple and Low-Tech:** Requires no special equipment or training.
    b. **High Conception Rate:** The male is an expert at detecting the exact time the female is fertile.
- **Disadvantages:**
    a. **Disease Transmission:** A male can easily pass **Sexually Transmitted Diseases (STDs)** (e.g., Brucellosis) to all females.
    b. **Risk of Injury:** A large, heavy male (like a bull) can injure a small female (a heifer).
    c. **Cost and Risk of Keeping Males:** Large male animals are often aggressive, dangerous to the farmer, and expensive to feed and house all year.
    d. **Limited Genetics:** One bull can only service a few cows in his local area.

2. ARTIFICIAL INSEMINATION (AI)

- **Definition:** This is a high-tech breeding method. It involves:
    a. Collecting **semen** (sperm) from a genetically superior male.
    b. Processing, diluting, and freezing the semen in liquid nitrogen (in "semen straws").
    c. A trained technician **manually inserts** the thawed semen into the female's reproductive tract (uterus) at the correct time of her heat cycle.
- **Advantages (This is why it's so important):**
    a. **RAPID GENETIC IMPROVEMENT:** The semen from *one* prize-winning bull (costing millions) can be frozen and used to sire *thousands* of calves all over the world, rapidly improving the genetic quality of the entire population.
    b. **DISEASE CONTROL:** Semen is tested for STDs before being frozen. This *prevents* the spread of diseases.

c. **SAFETY AND COST:** The farmer doesn't need to own a dangerous, expensive bull. They just buy a straw of semen.

d. **BREEDING ACCESS:** A small farmer in Nigeria can use AI to get a calf from the best bull in Holland or America.

- **Disadvantages:**

a. **Requires a Skilled Technician:** You must hire a trained AI technician.

b. **Heat Detection:** The farmer must be able to accurately detect *when* the cow is in "heat." If the timing is wrong, the AI will fail.

c. **Lower Conception Rate:** Can be less successful than natural mating if not timed perfectly.

EVALUATION

1. What is "Selection" in animal breeding?
2. Describe "Mass Selection." What is its main disadvantage?
3. What is "Progeny Testing"? Why is it the most accurate method?
4. List three major *disadvantages* of Natural Breeding.
5. List three major *advantages* of Artificial Insemination (AI).

ASSIGNMENT

1. Write a 250-word essay explaining why Artificial Insemination (AI) is a more powerful tool for genetic improvement than Natural Breeding.
2. Draw a simple diagram or flowchart illustrating the entire process of AI, from semen collection to insemination.
3. What does "Heat" (or "Estrus") mean? Research and list 3 behavioral signs that a cow is in heat.
4. Define the following terms: Phenotype, Pedigree, Progeny, Semen, Conception Rate.
5. A poultry farmer wants to improve her local chickens. What selection method would be the easiest and fastest for her to use? Explain your choice.

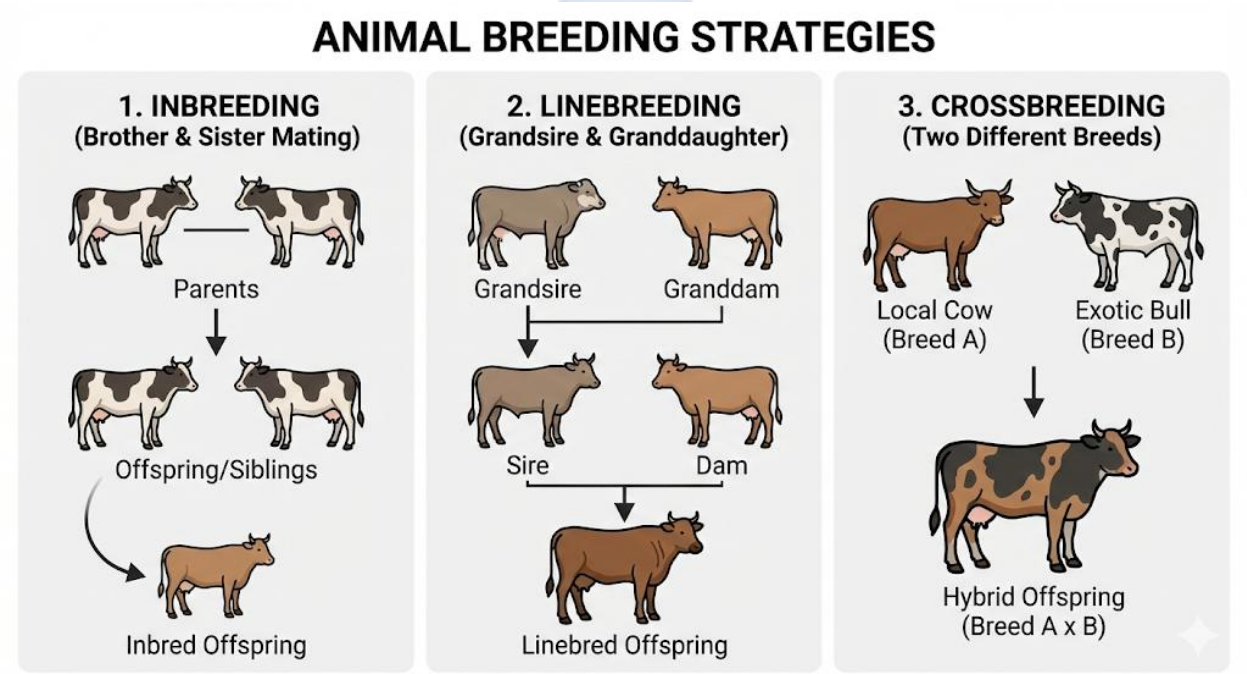
WEEK 10: ANIMAL BREEDING II

TOPIC: BREEDING SYSTEMS

INTRODUCTION

Last week, we chose our "best" animals (selection) and decided *how* to mate them (natural vs. AI). This week, we decide *which* animals to mate with *which*.

A **Breeding System** is a planned strategy for mating animals to achieve a specific goal. The system is defined by how *genetically related* the two parents are.



1. INBREEDING

- **DEFINITION:** Inbreeding is the mating of **very closely related animals**.
- **RELATIONSHIP:** Father to daughter, son to mother, or full brother to sister.
- **PURPOSE (ADVANTAGE):**
    a. **To Create "Purebreds":** This is how all "pure" breeds (like Holstein, German Shepherd) were created. By intensely inbreeding, you "fix" the traits.
    b. **To Increase Homozygosity:** It makes the genes "pure" (e.g., *AA* or *aa*). This makes the animals very uniform and predictable.

- **DISADVANTAGES (CRITICAL):**
    a. **INBREEDING DEPRESSION:** This is the *biggest* problem. Inbreeding exposes hidden, harmful **recessive genes**.
    b. **Effects of Inbreeding Depression:**
        - **Low Fertility/Sterility:** The animals cannot produce offspring.
        - **Low Vigor:** Offspring are weak and small.
        - **High Offspring Mortality:** Many are born dead or die young.
        - **Physical Deformities:** e.g., extra legs, missing eyes.
    - **In general, inbreeding is avoided by commercial farmers.**

2. LINE BREEDING

- **DEFINITION:** Line breeding is a **milder, more controlled form of inbreeding**. It is the mating of animals that are related, but *not* as closely.
- **RELATIONSHIP:** Cousin to cousin, grandsire to granddaughter, half-brother to half-sister.
- **PURPOSE:** To **maintain the influence** of a *single, outstanding ancestor*.
- **Example:** A farmer has a champion, prize-winning bull. The bull dies. To keep his "good genes" in the herd, the farmer might mate the bull's *son* back to the bull's *half-sisters*.
- **Balance:** It is a way to get the benefits of inbreeding (uniformity) without the severe risks of inbreeding depression.

3. CROSSBREEDING (OUTCROSSING)

- **DEFINITION:** Crossbreeding is the *opposite* of inbreeding. It is the mating of animals from **two completely different breeds**.
- **PURPOSE:** To combine the *best traits* from two breeds into one animal.
- **THE KEY ADVANTAGE: HYBRID VIGOR (HETEROSIS)**
    - **Definition: Hybrid Vigor** is the phenomenon where the crossbred offspring (the "hybrid") is *better* than the average of its two parents. It is often bigger, stronger, more fertile, and healthier.
    - It is the *opposite* of Inbreeding Depression.

- **CLASSIC NIGERIAN EXAMPLE:**
    - **Parent 1: Muturu** (a local Nigerian cattle breed).
        - *Pros:* Extremely hardy, tolerant of heat, resistant to local diseases (like Trypanosomiasis).
        - *Cons:* Very small, grows slowly, produces almost no milk.
    - **Parent 2: Holstein-Friesian** (an exotic breed).
        - *Pros:* The world's *best* milk producer (e.g., 50L/day).
        - *Cons:* Very delicate, cannot handle heat, will die from local diseases.
    - **THE HYBRID OFFSPRING:**
        - The crossbred calf gets the **disease resistance** from the Muturu and the **high milk potential** from the Holstein. It is an animal that *survives* in Nigeria and *also* produces good milk.
- **OTHER EXAMPLES:**
    - Mating a "Broiler" (fast-growing) with a "Layer" (egg-laying) to create a good "dual-purpose" chicken.

EVALUATION

1. What is a "breeding system"?
2. Define **Inbreeding**. What is its *main advantage* and its *biggest disadvantage*?
3. What is "Inbreeding Depression"? List three of its negative effects.
4. What is the main difference between **Inbreeding** and **Line breeding**?
5. Define **Crossbreeding**. What is **Hybrid Vigor (Heterosis)**?

ASSIGNMENT

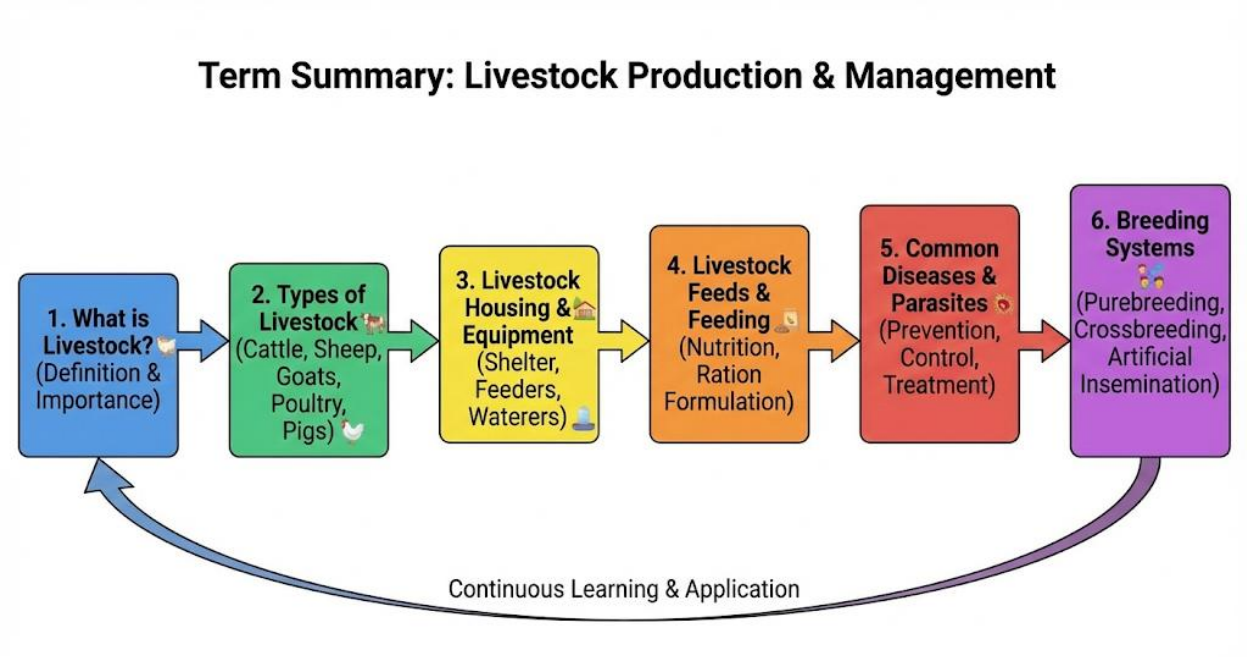
1. Write a 250-word essay comparing **Inbreeding Depression** to **Hybrid Vigor**.
2. Create a "family tree" diagram illustrating (a) an Inbreeding cross (brother-sister) and (b) a Line breeding cross (grandsire-granddaughter).

3. Research and name one official "crossbreed" of animal (e.g., the "Mule" is a cross between a horse and a donkey). What two breeds are crossed, and what is the advantage of the hybrid?
4. You are a farmer with a herd of local, hardy goats that have low meat production. You want to improve their meat production *without* the new animals dying. Which breeding system would you use, and why?
5. Define: Purebred, Recessive Gene, Homozygosity, Hybrid, Heterosis.

WEEK 11: REVISION

GENERAL REVIEW OF ALL FIRST TERM TOPICS

This week is dedicated to a comprehensive review of all topics covered in the first term, in preparation for the final examination.



- **WEEK 1: INTRODUCTION**
    - **Livestock Farming:** Rearing animals for food, fiber, or labor.
    - **Importance:** Provides **Protein** (meat, milk, eggs), **Income, Jobs, Raw Materials** (hides), and **Manure**.
    - **Subsistence (Family)** vs. **Commercial (Profit):** The key difference in scale, tech, and motive.
- **WEEK 2: HISTORY IN NIGERIA**
    - **Traditional:** Nomadic Pastoralism (Fulani) and Village Free-Range (poultry/goats).
    - **Modern:** Introduction of **Exotic Breeds** (e.g., Holstein, Broilers) and **Intensive Systems** (e.g., Battery Cages, Deep Litter).
    - **Government: NAPRI** (Research, Zaria) and **NVRI** (Vaccines, Vom).

- **WEEK 3: CLASSIFICATION**
    - Based on the stomach.
    - **Ruminants (Polygastric):** e.g., Cattle, Goats. Have 4 compartments (**Rumen, Reticulum, Omasum, Abomasum**). They **chew cud** and digest **cellulose**.
    - **Non-Ruminants (Monogastric):** e.g., Pigs, Poultry. Have 1 stomach. *Cannot* digest cellulose. Compete with humans for grain.
- **WEEK 4: HOUSING**
    - **Principles: East-West Orientation** (for coolness), **Ventilation** (removes ammonia), **Drainage** (sloped floor), **Space, Security.**
    - **Types: Deep Litter** (for broilers), **Battery Cage** (for layers), **Piggery** (concrete, with farrowing crate), **Raised Floor** (for goats/sheep).
- **WEEK 6-8: NUTRITION**
    - **6 Classes: Carbohydrates** (Energy - e.g., Maize), **Proteins** (Growth - e.g., GNC, Fish meal), **Fats/Oils** (Energy), **Vitamins, Minerals** (e.g., Calcium, Phosphorus from Bone Meal), **Water**.
    - **Balanced Ration:** A feed with *all* nutrients in the *correct proportion* for the animal's **age** and **purpose** (e.g., Starter vs. Layer).
    - **Storage:** Must be **cool, dry, pest-free,** and on **pallets**.
    - **Aflatoxin:** Poison from mold on damp feed.
- **WEEK 9-10: BREEDING**
    - **Selection:** Choosing parents (Mass, Pedigree, **Progeny Testing**).
    - **Mating: Natural** (simple, disease risk) vs. **AI** (genetic improvement, no disease risk, needs skill).
    - **Systems:**
        - **Inbreeding:** Mating close relatives. Leads to **Inbreeding Depression**.
        - **Line breeding:** Milder inbreeding.
        - **Crossbreeding:** Mating different breeds. Leads to **Hybrid Vigor**.

FINAL EXAM

The final examination will test all aspects of this term's work. Be prepared to define, compare, list, and explain all the key concepts above.

Here are comprehensive, detailed, and expansive lesson notes for the SS1 Second Term Livestock Farming scheme of work.

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SS1 LIVESTOCK FARMING LESSON NOTES

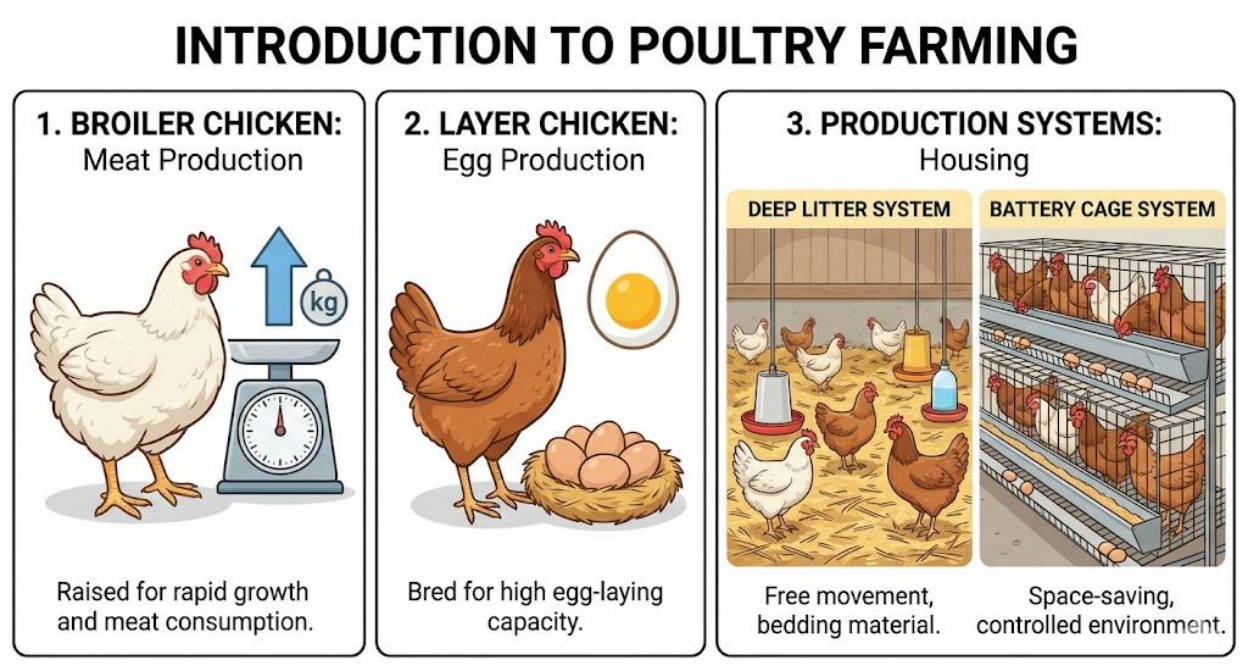
SECOND TERM

WEEK 1: INTRODUCTION TO POULTRY FARMING

🐓 MEANING OF POULTRY FARMING

Poultry farming is a specialized branch of livestock farming (which we studied in the First Term) that involves the raising of domesticated birds. These birds are bred and managed for the primary purpose of producing high-quality protein for human consumption, either in the form of **meat** or **eggs**.

It is one of the most common and fastest-growing sectors of the livestock industry in Nigeria due to the high demand for its products, the fast reproductive cycle of the birds, and their high feed-to-product conversion efficiency.



IMPORTANCE OF POULTRY FARMING

The poultry industry is a cornerstone of Nigeria's agricultural economy and food security.

1. **NUTRITIONAL IMPORTANCE:**

    - **Source of High-Quality Protein:** Poultry meat (chicken, turkey) and eggs are among the best and most affordable sources of **High-Biological-Value (HBV) protein**. This protein contains all the essential amino acids required for human growth, muscle development, and tissue repair.
    - **Vitamins and Minerals:** Eggs, in particular, are a "superfood" containing vital nutrients. The yolk is rich in **Vitamins A, D, E, K,** and **B12**, as well as **iron** and **lecithin** (essential for brain health).

2. **ECONOMIC IMPORTANCE:**

    - **Rapid Return on Investment (ROI):** Poultry farming provides one of the quickest returns in agriculture. A **broiler** can be raised and sold in just 6-8 weeks. A **layer** starts producing eggs (a daily source of income) at 18-20 weeks.
    - **Employment Generation:** The industry is a massive employer. It provides jobs for farm managers, veterinarians, feed mill workers, drivers, egg marketers (wholesalers and retailers), and food joint operators.
    - **Raw Materials for Industry:** It supplies by-products. **Feathers** are used for making pillows and decorations. **Poultry manure** (droppings) is a highly valued, nitrogen-rich organic fertilizer used in crop farming.
    - **Reduced Importation:** A strong local poultry industry makes a country self-sufficient, reducing the need to spend foreign currency on importing frozen chicken or eggs.

3. **SOCIAL AND CULTURAL IMPORTANCE:**

    - **Festivals and Ceremonies:** Chicken and turkey are staple foods for celebrations, festivals (like Christmas and Sallah), weddings, and other events.
    - **Accessibility:** Unlike beef (which is expensive and bought in small pieces), a whole chicken can be purchased by an average family.

TYPES OF POULTRY

"Poultry" refers to several different types of birds:

1. **CHICKENS (FOWL):** The most common type. They are subdivided by their purpose:
    - **BROILERS:** These are chickens specifically bred for **rapid meat production**. They are hybrids designed to grow extremely fast, reaching a market weight of 2-2.5 kg in just 6-8 weeks.
    - **LAYERS:** These are chickens specifically bred for **high egg production**. They are lighter, less meaty, and can lay 250-300+ eggs in their first year.
    - **COCKERELS:** This is the "intermediate" bird. Cockerels are **male chickens** (often the male birds from the layer-breeder hatcheries) that are raised for meat. They grow much *slower* than broilers (taking 16-24 weeks) and have tougher, but often more flavorful, meat. They are generally cheaper to buy.
2. **TURKEYS:**
    - Raised primarily for their **meat** (a "tom" is a male, a "hen" is a female). They are much larger than chickens and are very popular during festive seasons.
3. **DUCKS:**
    - Raised for their **meat** (which is dark and fatty) and their large **eggs**. They are aquatic birds and require water to be managed effectively.
4. **OTHER POULTRY:**
    - **Geese:** Raised for meat, large eggs, and sometimes for "guard" duty, as they are very noisy.
    - **Quail:** Very small birds raised for their tiny, nutritious "quail eggs" and delicate meat.
    - **Guinea Fowl:** A bird native to Africa, often raised semi-wild. It is known for its "gamey" flavor and spotted feathers.

POULTRY HOUSE DESIGN

The design of the house is critical for the success of the farm. It is the main tool for **disease prevention** and **performance management**. This connects to the "Principles of Good Housing" from the First Term.

KEY PRINCIPLES:

- **ORIENTATION:** The long axis of the poultry house *must* face **East-West**. This ensures the long walls do not face the hot afternoon sun, keeping the inside of the pen cool.
- **VENTILATION:** The house must have excellent airflow to remove ammonia (from droppings) and heat. This is usually achieved with "dwarf walls" (low concrete walls) and open sides covered with **wire mesh**.
- **FLOORING:** Must be **smooth concrete**. This makes it easy to clean, disinfect, and prevents rodents from burrowing in.
- **SECURITY:** The wire mesh and strong doors must be predator-proof (against snakes, rats, hawks) and theft-proof.
- **BIOSECURITY:** The house should be fenced, and a **footbath** (containing disinfectant) must be placed at the entrance to kill germs on visitors' shoes.

TWO MAIN HOUSING SYSTEMS:

1. **DEEP LITTER SYSTEM:**
    - **Description:** This is the most common system for **Broilers** and **Growers**. The concrete floor is covered with a 4-6 inch layer of absorbent "litter" (usually **wood shavings**).
    - **Management:** Feeders and drinkers are placed inside the pen. The litter absorbs moisture from the droppings. It must be turned regularly and kept dry to prevent diseases like Coccidiosis.
2. **BATTERY CAGE SYSTEM:**
    - **Description:** This is the most common system for **Layers**. The birds are kept in small wire cages, stacked in rows (or "batteries").

- **Management:** Feed and water are provided in troughs that run along the outside of the cages. The wire floor is sloped, so when an egg is laid, it **rolls forward** under the feed trough for easy and clean collection.
- **Pros:** Very high stocking density (many birds in one house), eggs are clean, birds cannot eat their own eggs, waste management is easy (droppings fall through the wire).
- **Cons:** High initial cost, can cause "cage fatigue" in birds.

EVALUATION

1. What is the primary difference between a **broiler** and a **layer** chicken?
2. Define **Cockerel** and explain why a farmer might choose to raise them instead of broilers.
3. List three economic and two nutritional importances of poultry farming.
4. What is the **East-West Orientation** in poultry house design, and what is its purpose?
5. Describe the **Battery Cage System**. What is its main advantage for egg collection?

ASSIGNMENT

1. Write a 250-word essay comparing the **Deep Litter System** to the **Battery Cage System**. Your essay must discuss (a) the type of bird each is best for, (b) the cost, and (c) the waste management.
2. Visit a local market (or cold room). Find out the current prices for (a) a live broiler, (b) a live layer (spent), (c) a live cockerel, and (d) a crate of eggs. Create a price list.
3. Draw a simple, labeled diagram of a poultry house on a **Deep Litter** system. You must show the: feeders, drinkers, litter (wood shavings), wire mesh, and roof.
4. What is a "footbath" in a poultry farm, and what is its purpose? (Relates to Biosecurity).
5. Define the following terms: Poultry, Broiler, Layer, Tom (Turkey), High-Biological-Value (HBV) Protein.

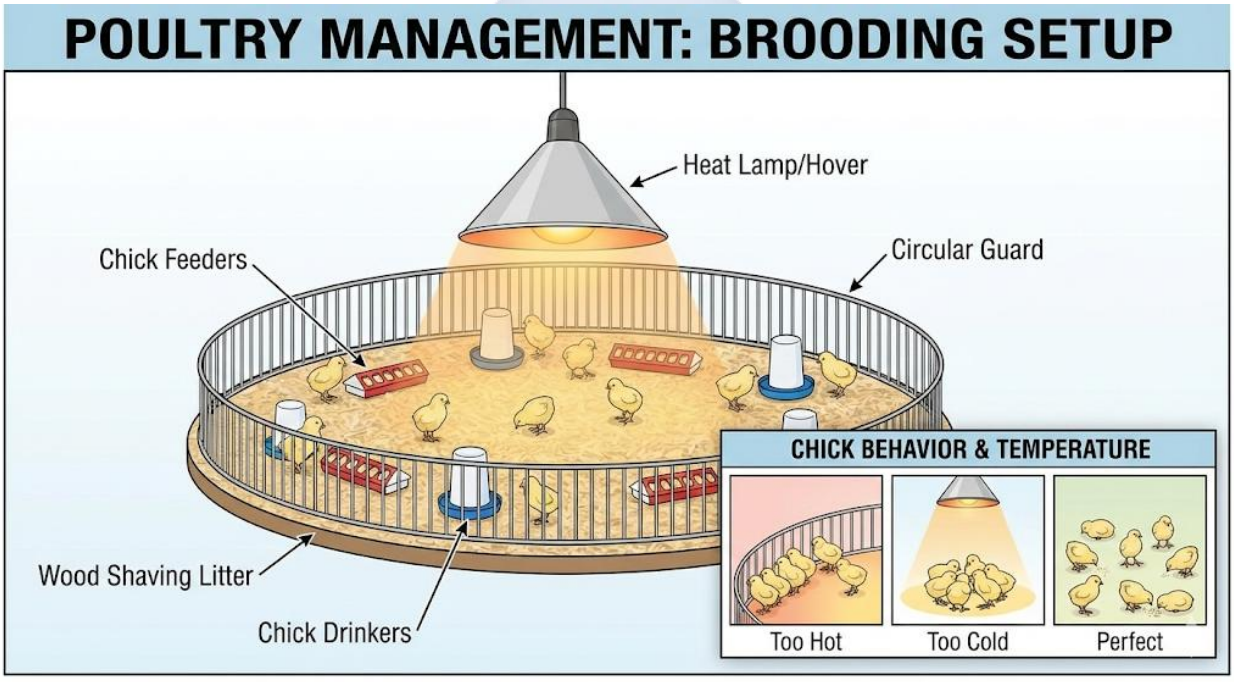
WEEK 2: POULTRY MANAGEMENT I

TOPIC: CARE OF DAY-OLD CHICKS

INTRODUCTION

The first 0-4 weeks of a chick's life is the most critical and delicate period. This period is called the **brooding stage**. Management during this time will determine the future health, growth rate, and productivity of the entire flock.

A **day-old chick (DOC)** is completely helpless. It cannot regulate its own body temperature and has a weak immune system. The farmer must act as the "mother hen."



BROODING

Brooding is the management practice of providing **artificial heat** and comprehensive care to young chicks (from day-old to 4 weeks) until they grow their own feathers and can regulate their own body temperature.

BROODING SETUP (MISE-EN-PLACE): Before the chicks arrive, the house must be fully prepared:

1. **Cleaning & Disinfection:** The house must be thoroughly washed, "swept" with disinfectant, and left empty for at least 1-2 weeks. This is to kill any diseases from the previous flock.
2. **Litter:** A fresh, dry layer of **wood shavings** (about 4 inches deep) is spread on the floor. (Newspaper should *not* be used as it is slippery and causes leg problems).
3. **The Brooding Pen (Guard):** A circular barrier (made of cardboard or metal sheets) is created in the center of the house. This **confines** the chicks to a small, draft-free area, keeping them close to the heat, feed, and water.
4. **Heat Source:** This is the most vital component.
    - **Charcoal Pot (Local):** A traditional pot filled with burning charcoal, often with a metal "hover" over it to direct heat downwards. It is cheap but requires constant monitoring and is a fire/fume risk.
    - **Electric Brooder (Modern):** A large, lamp-like heating element with a hover. It is clean but relies on constant electricity.
    - **Gas Brooder (Modern):** Connects to a gas cylinder. Very efficient and reliable.
5. **Feeders and Drinkers:** Small, chick-sized feeders (flat trays or small trough feeders) and drinkers are placed inside the brooding pen.

MANAGING THE DAY-OLD CHICKS

ON ARRIVAL:

1. **Water First:** The first thing chicks need after their long journey from the hatchery is water. The water should contain **glucose** (for energy) and **vitamins** (to reduce stress).
2. **Temperature:** The heat source should be on *before* the chicks arrive. The temperature at the edge of the hover should be **33-35°C** for the first week.
3. **Feed:** Feed (Broiler or Layer **Starter Mash**) is introduced on flat trays after the chicks have had a chance to drink.

MANAGING TEMPERATURE (THE KEY SKILL): The farmer must watch the *chicks' behavior* to know if the temperature is correct:

- **PERFECT:** The chicks are evenly spread out, moving, eating, and drinking.
- **TOO COLD:** The chicks are **huddling** (piled up) directly under the heat source. **Action: Increase the heat.**
- **TOO HOT:** The chicks are **panting** and are as far away from the heat source as possible (at the edge of the pen). **Action: Reduce the heat.**
- **DRAFTY:** The chicks are all huddling in *one corner* of the pen. **Action: Find and block the draft.**

MANAGEMENT ROUTINE:

- **Litter:** Must be kept **DRY**. Stir it daily. Remove any wet patches immediately. Wet litter is the #1 cause of **Coccidiosis**.
- **Expanding the Pen:** The brooding pen (guard) must be expanded every few days to give the growing chicks more space. It is usually removed completely after 2-3 weeks.
- **Heat Reduction:** The temperature is reduced by ≈ 2-3°C each week until the chicks are 4 weeks old and fully feathered.

FEEDING AND VACCINATION

FEEDING:

- **Feed Type:**
    - **Broiler Starter Mash:** (0-4 weeks). Very high in protein (e.g., 23%) for rapid muscle growth.
    - **Layer Starter Mash (Chick Mash):** (0-8 weeks). High in protein (e.g., 20-21%) for good frame development.
- **Practice:** Feed must be available **ad libitum** (at all times). Feeders must be cleaned daily to remove waste and caked feed.

VACCINATION:

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- **Purpose:** Vaccination is a **preventative** measure. It involves giving the chicks a *safe, weak, or dead* form of a disease, which "trains" their immune system to fight the *real* disease later.
- **This is not a cure.** A vaccine *prevents*, a drug *treats*.
- **Key Early Vaccines (Schedule):**
    - **Day 1 (At Hatchery):** Marek's Disease.
    - **Day 7 (Week 1): Newcastle Disease (NCD)** - (intra-ocular, "eye drop") + Infectious Bronchitis (IB).
    - **Day 14 (Week 2): Gumboro (IBD)** - (in drinking water).
    - **Day 21 (Week 3):** NCD (Lasota) - (in drinking water).
    - **Day 28 (Week 4):** Gumboro (Booster) - (in drinking water).

EVALUATION

1. What is "Brooding," and why is it the most critical period in a chick's life?
2. What is the purpose of the circular "brooding guard" or "pen"?
3. How can you use the *chicks' behavior* to tell if the brooding temperature is too hot, too cold, or drafty?
4. What is the main nutritional difference between a "Broiler Starter Mash" and a "Layer Starter Mash"?
5. What is the difference between a vaccine and a drug? Name the two most important diseases vaccinated against in the first 4 weeks.

ASSIGNMENT

1. Draw a detailed, labeled diagram of a complete brooding pen setup. You must include: (a) the brooding guard, (b) the heat source (hover), (c) the chick feeders, (d) the chick drinkers, and (e) the litter.
2. Write a 250-word "Standard Operating Procedure" (SOP) manual titled "How to Receive Day-Old Chicks."
3. What does "intra-ocular" vaccination mean? Research and describe the step-by-step process of administering an eye-drop vaccine.

4. What is "Biosecurity"? List 5 biosecurity rules for the brooding house (e.g., footbath, new litter, etc.).
5. Define the terms: Brooding, Litter, Culling, Ad libitum, Glucose, Vaccine.

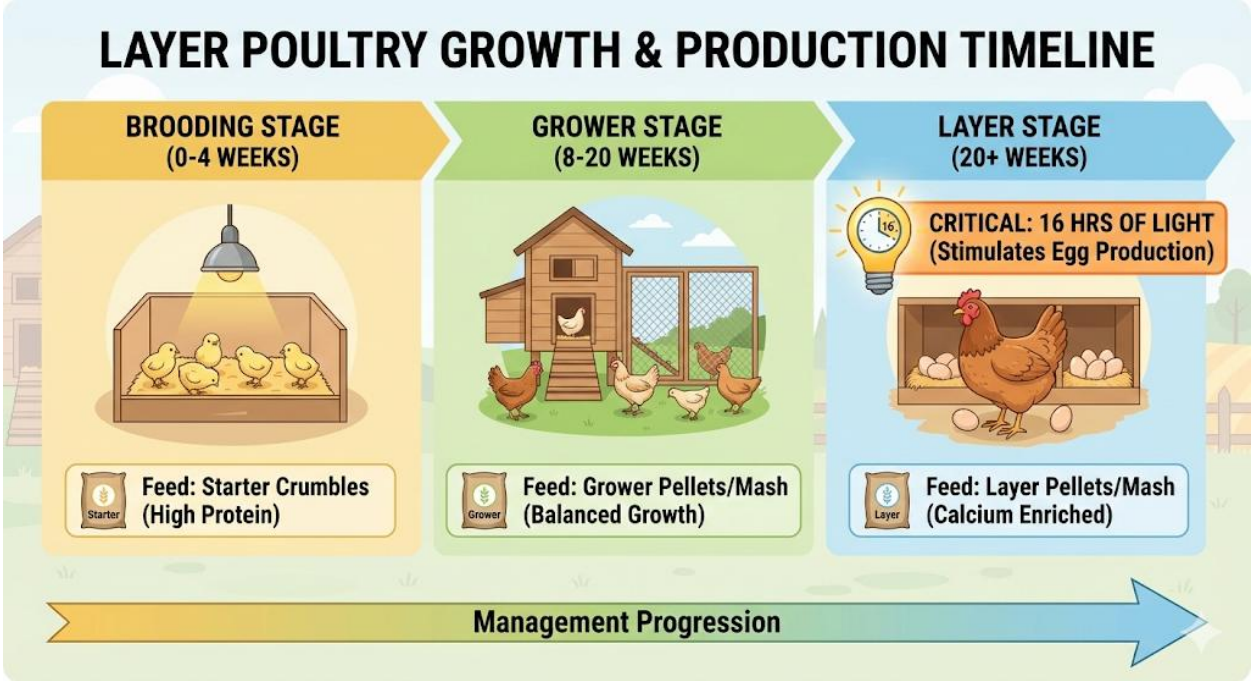
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WEEK 3: POULTRY MANAGEMENT II

TOPIC: GROWERS AND LAYERS MANAGEMENT

INTRODUCTION

After the brooding stage (0-4/8 weeks), the birds enter their "adolescent" and "adult" phases. The management goals now change from *survival* to *efficient growth* (for growers) and *maximum production* (for layers).



1. GROWERS MANAGEMENT (PULLETS)

- **Definition:** A **"Grower"** or **"Pullet"** is a young chicken (especially a future layer) in its "adolescent" stage. This period is typically from **8 weeks to 18-20 weeks** (Point-of-Lay).
- **The Goal:** The goal during this stage is *not* fat, but the development of a **strong, large skeletal frame** and reproductive system. A pullet that is too small or too fat at 18 weeks will be a poor layer.

MANAGEMENT PRACTICES:

1. **Housing:**
    - They are moved from the brooding pen to the main house.

- **Floor Space:** They need much more space per bird. Overcrowding leads to stress, feather pecking, and cannibalism.
- **Ventilation:** This is now the main tool for temperature control.

2. **Feeding:**
    - **Feed Type:** They are switched from "Chick Mash" to **"Grower's Mash."**
    - **Composition:** Grower's Mash has *less protein* (e.g., 16-18%) and *less energy* than starter mash.
    - **Purpose:** This "controlled" or "restricted" feeding program prevents the pullets from getting **fat**. It encourages their bodies to focus on skeletal and organ development, not just weight gain.
3. **Vaccination & Health:**
    - The vaccination schedule continues with boosters (e.g., NCD, Fowl Pox).
    - **Debeaking:** The sharp tip of the beak is sometimes trimmed. This is done to prevent "cannibalism" and "feather pecking," which are common vices in large, stressed flocks.
    - **Deworming:** The birds are regularly "dewormed" (given medicine to kill internal parasites) before they are moved to the laying house.

2. LAYERS MANAGEMENT

- **Definition:** A **"Layer"** is an adult female chicken kept for **egg production**. This phase begins at the **Point-of-Lay (POL)**, which is typically **18-20 weeks** of age.
- **The Goal:** To get the maximum number of high-quality eggs per bird, as cheaply as possible.

MANAGEMENT PRACTICES (CRITICAL):

1. **Housing:**
    - Layers are either kept on **Deep Litter** or, more commonly, moved into **Battery Cages**.

- The cages separate the birds from their droppings (hygiene) and allow for easy, clean egg collection.

2. **Feeding:**
    - **Feed Type:** They are switched to **"Layer's Mash."**
    - **Composition:** This feed has *massive* amounts of **Calcium** (e.g., 3.5-4%) and **Phosphorus**.
    - **Purpose:** The bird needs this calcium *every day* to form the **eggshell**. A lack of calcium will result in soft-shelled eggs or the bird's bones becoming brittle.
    - **Grit:** Birds in deep litter systems should be given "grit" (small stones) to help the gizzard grind food.
3. **Light Management (The "On Switch" for Eggs):**
    - This is the *most important* management technique for layers.
    - **The Science:** Egg-laying in a hen is stimulated by **day length** (photoperiod). Long days tell the bird's **pituitary gland** that it is "breeding season" (spring/summer).
    - **The Practice:**
        - To trigger laying, farmers provide **16 hours of continuous light** per day.
        - In Nigeria, a normal day is only 12 hours long. Therefore, farmers must use **artificial lights** (bulbs) to add 4 extra hours (e.g., from 4 AM to 6 AM, and from 6 PM to 8 PM).
        - **Rule:** This light *must be constant*. A sudden stop in artificial light (e.g., due to "NEPA failure") can shock the birds and cause them to stop laying.

3. EGG PRODUCTION AND HANDLING

- **Production Cycle:**
    - A flock will start laying around 20 weeks, rapidly increase to its **"Peak Production"** (e.g., 90% - 90 eggs per 100 birds) by 28-30 weeks, and then *slowly* decline for the rest of the year.

- After 12-14 months of laying, the bird's production drops too low to be profitable, and she is **culled** (sold for meat as a "spent layer").

- **Handling & Storage:**
  a. **Collection:** Eggs must be collected **2-3 times per day**. This prevents them from being broken, eaten by the hen, or becoming dirty.
  b. **Candling:** (Optional but professional). This involves shining a bright light *through* the egg to check for:
     - **Cracks:** Hairline cracks in the shell.
     - **Blood Spots:** Small spots of blood inside.
     - **Fertility:** (If there are roosters) to see if an embryo is developing.
  c. **Grading:** Eggs are graded by **size/weight** (e.g., Jumbo, Large, Medium, Small).
  d. **Storage:**
     - Eggs should *not* be washed, as this removes their natural protective "bloom."
     - They must be stored in a **cool, dry place** (e.g., a pantry or, commercially, a cool room).
     - They must be stored with the **pointed end pointing DOWN**. This keeps the internal air cell at the top and the yolk centered, which increases shelf life.

EVALUATION

1. What is the primary management goal for a "Grower" (pullet)? Why is their feed (Grower's Mash) lower in protein?
2. What is the primary nutritional difference between a "Grower's Mash" and a "Layer's Mash"? (Hint: a specific mineral).
3. Explain the "science" of Light Management. Why does a farmer need to provide 16 hours of light for laying hens?
4. What is "Culling" in a layer operation?
5. What is "Candling," and what three things can it detect in an egg?

ASSIGNMENT

1. Write a 250-word report on the practice of **Debeaking**. You must discuss (a) why it is done and (b) the animal welfare concerns associated with it.
2. Draw a simple line graph showing a typical "Laying Curve." The X-axis should be "Weeks (18 to 72)" and the Y-axis should be "Production % (0 to 100%)." Show the "Point-of-Lay," "Peak Production," and the "Decline."
3. What is a "spent layer"? Go to a market and compare the price of a live "spent layer" to a live "broiler." Why is the spent layer so much cheaper?
4. Draw a diagram of an egg in a storage tray. Clearly label the **pointed end** and the **blunt end**, and show which way *must* face down.
5. Define the terms: Pullet, Point-of-Lay, Cannibalism, Culling, Candling, Biosecurity.

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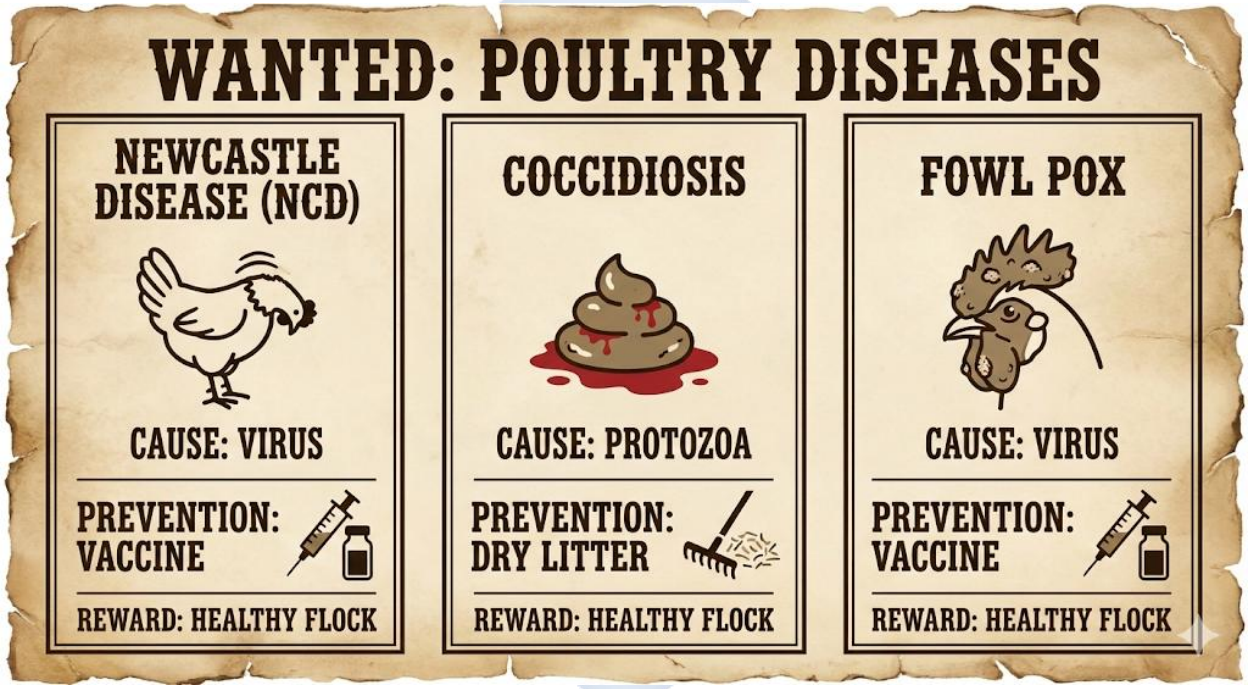
WEEK 4: POULTRY DISEASES

INTRODUCTION

In commercial poultry farming, "disease" is the farmer's greatest enemy. Because birds are kept in large numbers (thousands) in close confinement, a single disease can spread rapidly and wipe out an entire flock in days, leading to 100% financial loss.

Biosecurity is the #1 defense. This means strict hygiene, fencing, footbaths, and preventing any contact between your flock and outside birds.

If biosecurity fails, we must rely on **Prevention** (vaccination) and **Control** (medication).



COMMON POULTRY DISEASES

1. NEWCASTLE DISEASE (NCD)

- **Cause:** A highly contagious **Virus**.
- **Symptoms:** This disease is devastating and attacks three body systems:
    - **Respiratory:** Gasping for air, coughing, sneezing.
    - **Nervous: Twisting of the neck (Torticollis)**, paralysis of wings and legs, stumbling.

    - **Digestive:** Watery, greenish-white diarrhea.
    - In layers, there is a sudden, massive drop in egg production.
- **Transmission:** Spread by air, contact with infected birds, contaminated feed, water, and equipment.
- **Prevention (The ONLY Way): Vaccination.** This is *non-negotiable*.
    - **Vaccines: Lasota** (given in water or eye-drop) and **Komorov** (given by injection). The vaccination schedule (from Week 2) must be strictly followed.
- **Control/Treatment: There is no cure (it is a virus).** The mortality rate is 80-100%. The only "control" is to cull (kill and safely dispose of) the entire infected flock and deep-clean the facility.

2. COCCIDIOSIS ("COCCI")

- **Cause:** A microscopic **Protozoan parasite** (*Eimeria* species) that lives in the soil and litter. It attacks the intestinal lining.
- **Symptoms:**
    - **Bloody diarrhea (feces).** This is the classic, tell-tale sign.
    - Ruffled feathers, huddling together (as if cold), paleness, and loss of appetite.
- **Transmission:** Spreads through the "fecal-oral" route. Birds eat the parasite's eggs (oocysts) from contaminated litter, feed, or water.
- **Prevention:**
    - **Litter Management:** The #1 prevention. The *Eimeria* parasite thrives in **wet, damp litter**. The poultry house must be kept *bone dry*.
    - **Coccidiostats:** These are *preventative drugs* that are mixed into the commercial feed (Broiler Starter, Layer Mash) to suppress the parasite.
- **Control/Treatment:** This disease *can* be treated.
    - **Drugs:** Use **Coccidiostats** in the drinking water at a high dose (e.g., **Amprolium, Toltrazuril**) as soon as symptoms are seen.

3. FOWL POX

- **Cause:** A **Virus**. It is a slow-spreading but persistent disease.
- **Transmission:**

    - Through skin wounds (e.g., from pecking).
    - Spread by **mosquitoes** and other biting insects.
- **Symptoms:** It comes in two forms:
    a. **Dry Pox:** This is the most common. It causes **wart-like, scabby lesions** (sores) on the un-feathered parts of the bird (the **comb, wattles,** and eyelids).
    b. **Wet Pox:** This is more serious. It causes yellowish lesions *inside* the mouth and throat, which can make it hard for the bird to breathe or eat.
- **Prevention:**
    - **Vaccination:** A Fowl Pox vaccine is given around 6-8 weeks, usually by a **"wing-web stab."**
    - **Insect Control:** Clearing bushes and standing water around the pen to reduce the mosquito population.
- **Control/Treatment: There is no cure (it is a virus).** The disease usually runs its course in 3-4 weeks. The farmer should isolate sick birds and apply iodine to the sores to prevent secondary bacterial infections.

EVALUATION

1. What is "Biosecurity," and why is it the #1 defense against disease?
2. What is the "classic" symptom (a nervous system symptom) of Newcastle Disease?
3. What is the "classic" symptom (a digestive symptom) of Coccidiosis?
4. What is the main cause of Coccidiosis, and what is the #1 *management* practice to prevent it?
5. What are the two forms of Fowl Pox, and how is it most commonly spread?

ASSIGNMENT

1. Write a 250-word "Biosecurity Plan" for a new poultry farm. List 5 rules that all visitors and workers must follow. (e.g., footbath, fencing, "all-in/all-out" policy).
2. Research the "Gumboro" (IBD) disease. What is its cause (virus, bacteria, or protozoa), what are its main symptoms, and how is it prevented?

3. Create a "First Aid" poster for a poultry farmer, listing the 3 diseases (NCD, Cocci, Fowl Pox), their main symptom, and the immediate *action* to take.
4. What is a "Coccidiostat"? Is it a vaccine or a drug?
5. Define the terms: Torticollis, Oocyst, Protozoa, Coccidiosis, Lesion, Wing-web stab.

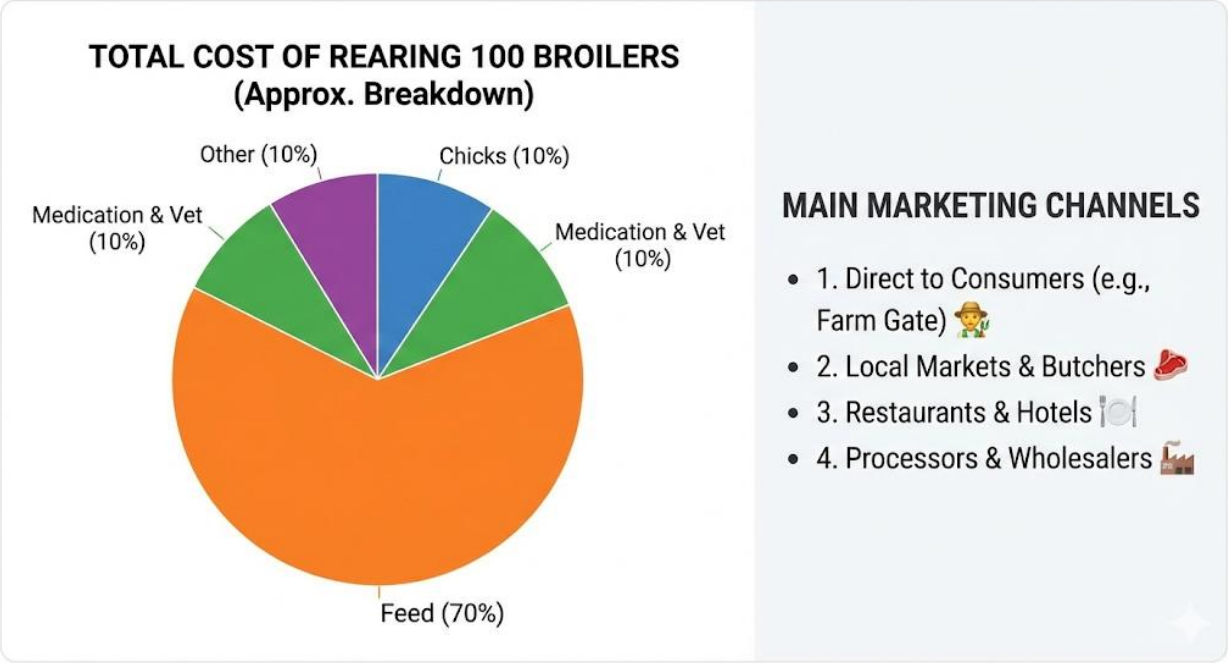
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WEEK 6: POULTRY BUSINESS

TOPIC: COST ANALYSIS, RECORD KEEPING, MARKETING

INTRODUCTION

Farming is a science. **Farming is also a business.** A farmer who does not understand the *business* side will fail, even if their birds are healthy. This week, we learn how to manage the "money" side of poultry farming.



COST ANALYSIS

This is the process of identifying *all* the money you spend (costs) to see if you are making a profit.

Costs are divided into two types:

1. **FIXED COSTS (CAPITAL COSTS):**
    - **Definition:** These are the one-time, start-up costs that *do not change* whether you raise 100 birds or 1,000 birds.
    - **Examples:**

        - Land (purchase or rent).
        - **Housing:** Building the poultry house.
        - **Equipment:** Cages, drinkers, feeders, heat source.
        - Borehole (water source).
        - Vehicle (truck).

2. **VARIABLE COSTS (OPERATING COSTS):**
    - **Definition:** These are the *running costs* that change based on the number of birds you are raising.
    - **Examples:**
        - **Day-Old Chicks (DOCs):** The cost of the birds.
        - **FEED:** This is the **#1 variable cost**, making up **60-70%** of all running costs.
        - **Medication & Vaccines.**
        - **Labor/Salaries:** Paying your farmhands.
        - **Energy:** Cost of charcoal, gas, or "NEPA" (for lights).
        - **Transportation:** Taking feed to the farm and eggs/birds to the market.

PROFITABILITY: To make a profit, the **Total Income** (from selling eggs/birds) must be *greater* than the **Total Costs** (Fixed + Variable).

- **Formula:** Profit = Total Revenue - Total Cost

RECORD KEEPING

A farmer without records is a farmer without a memory. Record keeping is the *most important* daily management task. It is the only way to know if your business is healthy.

TYPES OF RECORDS TO KEEP:

1. **PRODUCTION RECORDS:**
    - **Egg Production:** The *most important* record for a layer farm.
        - *Format:* Daily chart showing **Total Birds, Eggs Laid, % Production**.

        - *Use:* You can instantly see a problem. If production is 85% on Monday and drops to 60% on Tuesday, you know you have a *major* issue (e.g., disease, bad feed, no water).
    - **Mortality:** A daily count of all dead birds. (A few deaths are normal; a sudden spike is an alarm).
2. **FEED RECORDS:**
    - **Feed Consumption:** A daily record of how many *bags* of feed the flock is eating.
    - **Use:** This helps you calculate the **Feed Conversion Ratio (FCR)**—the *efficiency* of your farm (e.G., how many kg of feed does it take to produce 1 crate of eggs?).
3. **HEALTH RECORDS:**
    - A logbook of all **vaccinations** (dates, type).
    - A logbook of all **medications** (what, why, how long).
4. **FINANCIAL RECORDS:**
    - **Expense Sheet:** Every NGN spent (feed, drugs, salaries).
    - **Sales Sheet:** Every NGN earned (eggs sold, birds sold).
    - **Profit & Loss Statement:** (Sales) - (Expenses) = Profit (or Loss).

MARKETING OF EGGS AND BROILERS

Marketing is the process of getting your product from the *farm gate* to the *consumer's plate*.

THE PRODUCTS:

- **Eggs:** Graded by size (Jumbo, Large, Medium, Small).
- **Broilers:** Sold live at market weight (6-8 weeks).
- **Spent Layers:** Culled layers sold live (after 72 weeks).
- **Manure:** Bagged and sold to crop farmers.

THE MARKETING CHANNELS (HOW TO SELL):

1. **FARM GATE SALES:**
    - Customers (e.g., neighbors, local people) come *directly* to your farm to buy.

- *Pro:* 100% of the profit. *Con:* Low volume.

2. **RETAIL MARKET:**
    - The farmer (or a staff) takes the products to the local open-air market to sell directly to consumers.
    - *Pro:* Good profit margin. *Con:* Time-consuming, high transport cost.
3. **WHOLESALERS (MIDDLEMEN):**
    - A wholesaler (the "egg-dealer" or "chicken-dealer") comes to your farm with a truck and buys *everything* in bulk (e.g., 500 crates of eggs).
    - *Pro:* Very fast, easy, guaranteed sale, no marketing effort.
    - *Con:* The wholesaler pays a *lower price* per unit.
4. **CONTRACTS (HOTELS, RESTAURANTS, SUPERMARKETS):**
    - A formal contract to supply a business (e.g., "100 crates of eggs to Mr. Bigg's every Monday").
    - *Pro:* Very stable, predictable, long-term income.
    - *Con:* The business will demand very high, consistent quality.

EVALUATION

1. What is the difference between a **Fixed Cost** and a **Variable Cost**? Give two examples of each.
2. What is the **single largest variable cost** in poultry farming?
3. Why is "Record Keeping" so important? What can a *daily egg production record* tell a farmer?
4. What is the "Feed Conversion Ratio (FCR)"?
5. List the 4 main marketing channels for poultry products.

ASSIGNMENT

1. Write a 250-word essay on the topic: "A farmer who fails to keep records is planning to fail."

2. Create a simple "Daily Egg Production Record Sheet" for a flock of 500 layers. It should have columns for: **Date, No. of Birds, Morning Eggs, Afternoon Eggs, Total Eggs, % Production, Mortality.**
3. You are a farmer with 1,000 broilers ready for sale. Compare the "Pros" and "Cons" of selling them via **Wholesalers** vs. **Retail Market**.
4. Define the following business terms: Profit, Revenue, Fixed Cost, Variable Cost, Marketing Channel.
5. Research the "poultry value chain." List 5 jobs in the industry *other* than "farmer." (e.g., hatchery operator, feed miller, etc.).

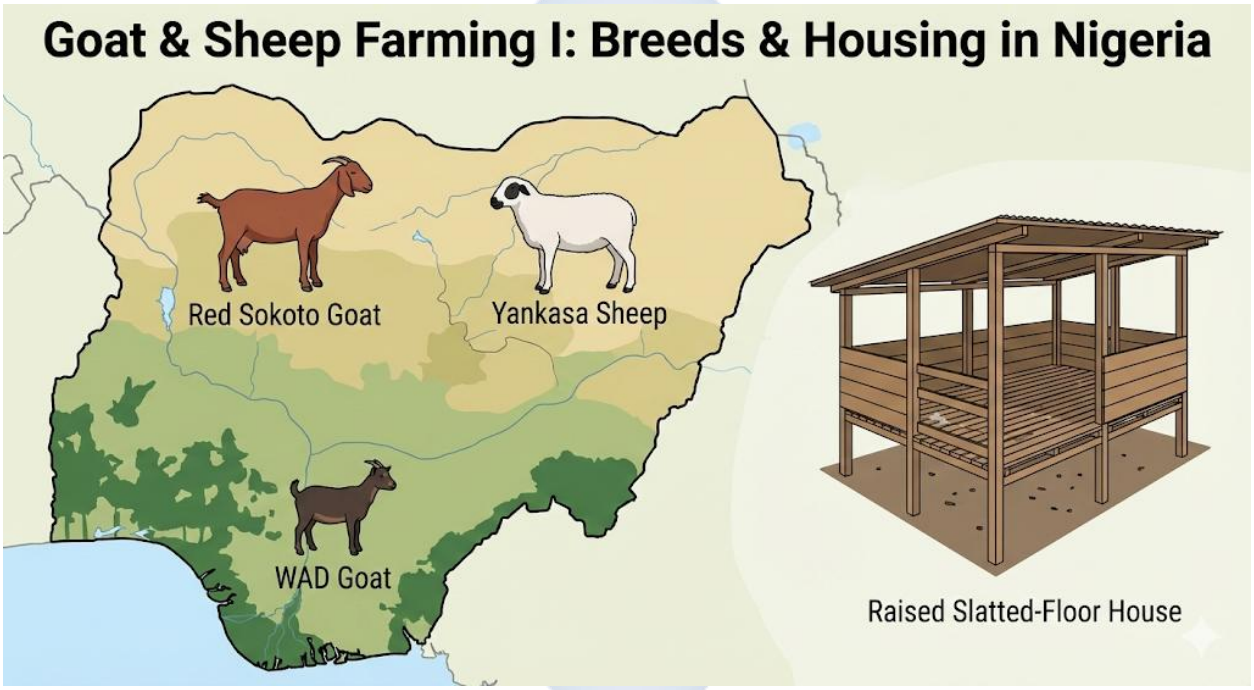
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WEEK 8: GOAT AND SHEEP FARMING I

INTRODUCTION: SMALL RUMINANTS

Goat and Sheep farming (also called "small ruminant" farming) is a major branch of livestock farming in Nigeria. These animals are hardy, have a fast reproductive rate, and are central to many cultural traditions.

- **Goats (Caprine):** Are **"browsers."** They prefer to eat *leaves, bushes,* and *twigs* (eating "up").
- **Sheep (Ovine):** Are **"grazers."** They prefer to eat *grass* and *clover* (eating "down").



BREEDS OF GOATS AND SHEEP IN NIGERIA

It is essential to know the local breeds and their unique advantages.

A. GOAT BREEDS

1. **WEST AFRICAN DWARF (WAD) GOAT:**
    - **Location:** The most common goat in **Southern Nigeria** (the forest and humid zones).
    - **Characteristics:** Small, compact, hardy.

- **Key Trait:** It is **Trypanotolerant**, meaning it is *resistant* to Trypanosomiasis (Sleeping Sickness) spread by the tsetse fly, which is common in the South.

2. **RED SOKOTO (MARADI):**
    - **Location:** The most common goat in **Northern Nigeria** (the dry savanna).
    - **Characteristics:** Large, red-colored.
    - **Key Trait:** Its skin is *world-famous* as the source of "Morocco Leather." It is Nigeria's most valuable livestock export by-product.
3. **SAANEN:**
    - **Location:** An **exotic (foreign)** breed, imported from Switzerland.
    - **Key Trait:** A pure white, "dairy" goat, bred for **high milk production**. It is not hardy and requires intensive management.

B. SHEEP BREEDS

1. **WEST AFRICAN DWARF (DJALLONKE) SHEEP:**
    - **Location:** The most common sheep in **Southern Nigeria**.
    - **Characteristics:** Small, hairy (not woolly), very hardy.
    - **Key Trait:** Also **Trypanotolerant**.
2. **YANKASA:**
    - **Location:** The most common breed in **Northern Nigeria**.
    - **Characteristics:** Medium-sized, white with a black patch on the head or chest.
    - **Key Trait:** A good "all-rounder" for meat.
3. **BALAMI:**
    - **Location:** North-Eastern Nigeria (Borno).
    - **Characteristics:** A very large, impressive, all-white sheep. The rams have large, curving horns.
    - **Key Trait:** Used for meat and is very popular for Sallah, where a large ram is a status symbol.

HOUSING FOR GOATS AND SHEEP

Housing systems can range from simple to complex.

1. **EXTENSIVE (TRADITIONAL):**
    - **Nomadic Pastoralism:** (As seen in 1st Term). Flocks are moved long distances.
    - **Free-Range:** Animals roam the village by day and are brought into a simple "kraal" (a fenced enclosure made of wood or mud) at night for protection.
2. **SEMI-INTENSIVE (PADDOCKING):**
    - This is a "cut-and-carry" or "paddock" system.
    - Goats/sheep are confined in a large, fenced area (a paddock) that contains grass and browse. They are often given supplementary feed (like PKC).
3. **INTENSIVE (RAISED-FLOOR HOUSING):**
    - **Description:** This is the most modern and hygienic method. The animals are kept 100% indoors in a house built on stilts (e.g., 1-2 meters off the ground).
    - **The Floor:** The floor is **slatted** (made of wood or plastic planks with 1-2cm gaps between them).
    - **Key Advantage:** Manure (feces and urine) falls *through* the gaps and onto the ground below. This **separates the animal from its waste**.
    - **Benefit:** This system drastically reduces the spread of disease, especially **internal parasites (worms)**, which are the #1 health problem for goats and sheep.

FEEDING PRACTICES

- **RUMINANTS:** Remember from the First Term that goats and sheep are **ruminants**. They have a 4-compartment stomach and can digest **cellulose** (fiber) from forage.
- **GRAZING / BROWSING:** In extensive systems, this is their entire diet.
- **SUPPLEMENTARY FEED:** In intensive systems, forage ("cut-and-carry" grass) is supplemented with:
    - **Energy:** Cassava peels, brewer's draff.

    - **Protein:** Palm Kernel Cake (PKC), Groundnut Cake (GNC), Urea-molasses blocks.
- **SALT LICK:** A block of mineral salt must be provided. It supplies essential **sodium** and trace minerals that are often missing from grass.

EVALUATION

1. What is the main difference in the *feeding behavior* of a goat versus a sheep?
2. What does it mean to be "Trypanotolerant," and which two breeds (one goat, one sheep) are known for this?
3. What is the **Red Sokoto** goat famous for?
4. Describe a "raised-floor, slatted-floor" house. What is its *single biggest advantage*?
5. What is a "salt lick," and why is it essential for goats and sheep?

ASSIGNMENT

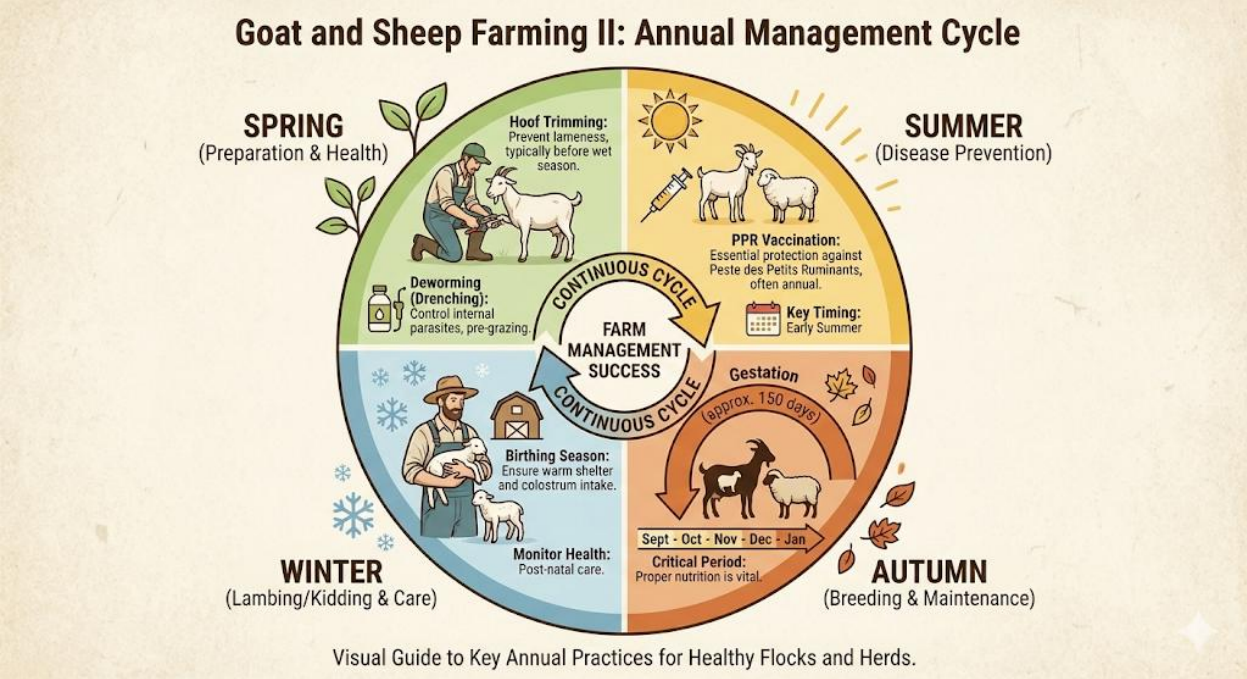
1. Write a 250-word report comparing the **West African Dwarf (WAD)** goat with the **Saanen** goat. Discuss their appearance, location, and primary use (meat vs. milk).
2. Draw a simple, labeled diagram of a **raised, slatted-floor** goat house. Show the stilts, the slatted floor, the waste on the ground, and the feed trough.
3. Visit a local goat market (or speak to a seller). Identify the main breeds being sold. Are they WAD, Red Sokoto, or crossbreeds?
4. Define the terms: Ruminant, Browser, Grazer, Trypanotolerant, Paddock, Slatted Floor.
5. What is "Morocco Leather"? Research its history and economic importance to Nigeria.

WEEK 9: GOAT AND SHEEP FARMING II

TOPIC: BREEDING, DISEASES, AND MANAGEMENT

INTRODUCTION

This week covers the "hands-on" aspects of managing a small ruminant flock, focusing on reproduction, health, and routine care.



BREEDING AND REPRODUCTION

TERMINOLOGY:

- **Goat (Caprine):**
    - Adult Male: **Buck** (or "Billy")
    - Adult Female: **Doe** (or "Nanny")
    - Young: **Kid**
- **Sheep (Ovine):**
    - Adult Male: **Ram**
    - Adult Female: **Ewe**
    - Young: **Lamb**

BREEDING MANAGEMENT:

1. **Puberty:** Females can become sexually mature very early (e.g., 6-8 months).
2. **Estrus ("Heat"):** This is the period when the female is fertile and will accept the male.
    - **Signs:** Restlessness, tail-wagging, mounting other females, swollen/red vulva, bleating.
    - **Estrus Cycle:** A doe comes on heat every 18-21 days.
3. **Mating System:**
    - **Natural Mating** is used almost 100% of the time.
    - **Flocking:** One ram is kept in a flock with many ewes (e.g., 1 ram to 25 ewes).
4. **Gestation Period (Pregnancy):**
    - This is the most important number to remember. The gestation period for *both* goats and sheep is approximately **150 days (or 5 months)**.
5. **Kidding/Lambing (Birth):**
    - **Twinning** (giving birth to two) is very common, especially in WAD goats.
    - The farmer must provide a clean, dry "kidding pen" for the mother.
    - Ensure the newborn kid/lamb gets **colostrum** (the first milk) within the first few hours. This milk is rich in antibodies.

COMMON DISEASES AND HEALTH MANAGEMENT

1. PPR (PESTE DES PETITS RUMINANTS)

- **Name:** Also known as "Goat Plague."
- **Cause:** A highly contagious **Virus** (related to Rinderpest in cattle).
- **Symptoms:** High **fever**, sores in the mouth (making it hard to eat), severe **diarrhea** (dysentery), and death. It is a "plague" and can wipe out 80-100% of a non-vaccinated flock.
- **Prevention: VACCINATION.** A highly effective PPR vaccine is available and is the *only* way to prevent the disease.
- **Control: No cure (it's a virus).** Isolate sick animals (cull).

2. INTERNAL PARASITES (WORMS)

- **Cause:** Helminths (e.g., tapeworms, roundworms, liver fluke) that live in the stomach and intestines.
- **Transmission:** Animals eat the worm *eggs* from contaminated grass (from feces).
- **Symptoms: Anemia** (pale gums and "bottle jaw" - swelling under the chin), weight loss (emaciation), rough coat, diarrhea.
- **Prevention:** Good sanitation (e.g., raised-floor housing) and regular pasture rotation.
- **Control (Treatment): Deworming (Drenching).** This is the routine practice of giving the animals an anti-worm drug (anthelmintic) orally.

3. EXTERNAL PARASITES (ECTOPARASITES)

- **Cause: Ticks, Mites, and Lice** that live on the skin.
- **Symptoms:** Intense itching, scratching, wool/hair loss, anemia (from ticks).
- **Transmission:** Ticks also transmit other serious blood diseases (e.g., Heartwater, Babesiosis).
- **Control (Treatment):**
    - **Dipping:** Walking the entire flock through a large "dip" (a trough) filled with acaricide (pesticide).
    - **Spraying:** Using a knapsack sprayer to apply the acaricide.

ROUTINE MANAGEMENT PRACTICES

1. **DEWORMING (DRENCHING):** (See above). Must be done regularly (e.g., every 3 months).
2. **HOOF TRIMMING:**
    - The hooves of goats and sheep grow continuously (like human fingernails).
    - In intensive systems, they don't walk enough to wear them down.
    - **Problem:** Overgrown hooves can cause lameness, pain, and infections (foot rot).
    - **Action:** The farmer must use a "hoof trimmer" (special clippers) to trim the hooves every 2-3 months.

3. **CASTRATION:**
    - **Definition:** The removal of the testicles from young male animals that are *not* intended for breeding.
    - **Purpose:**
        - To prevent uncontrolled, in-breeding.
        - To make the male more "docile" (calm).
        - To produce better meat quality (no "ram taint" or "buck taint" odor).
    - **Method:** Burdizzo (a "bloodless" clamp) or rubber elastrator rings.
4. **DISBUDDING:**
    - The removal of the horn "buds" from very young kids (goats).
    - **Purpose:** Goats can be aggressive and get their horns stuck in fences. Disbudding (using a hot iron to destroy the bud) is a safety measure.

EVALUATION

1. Give the correct terminology for: (a) Adult Male Goat, (b) Adult Female Sheep, (c) Young Goat.
2. What is the average gestation period for a goat?
3. What is PPR? What is its cause, and how is it prevented?
4. What is "Bottle Jaw," and what *type* of disease (internal or external) causes it?
5. What is **Castration**, and what are two reasons a farmer would do it?

ASSIGNMENT

1. Write a 250-word "Farmer's Guide" on the care of a newborn kid or lamb, starting from birth. (Must include "Colostrum").
2. What is **Hoof Trimming**? Research and draw a simple diagram of a (a) healthy hoof and (b) an overgrown hoof.
3. What is the difference between "Dipping" and "Drenching"? What is each one used to control?

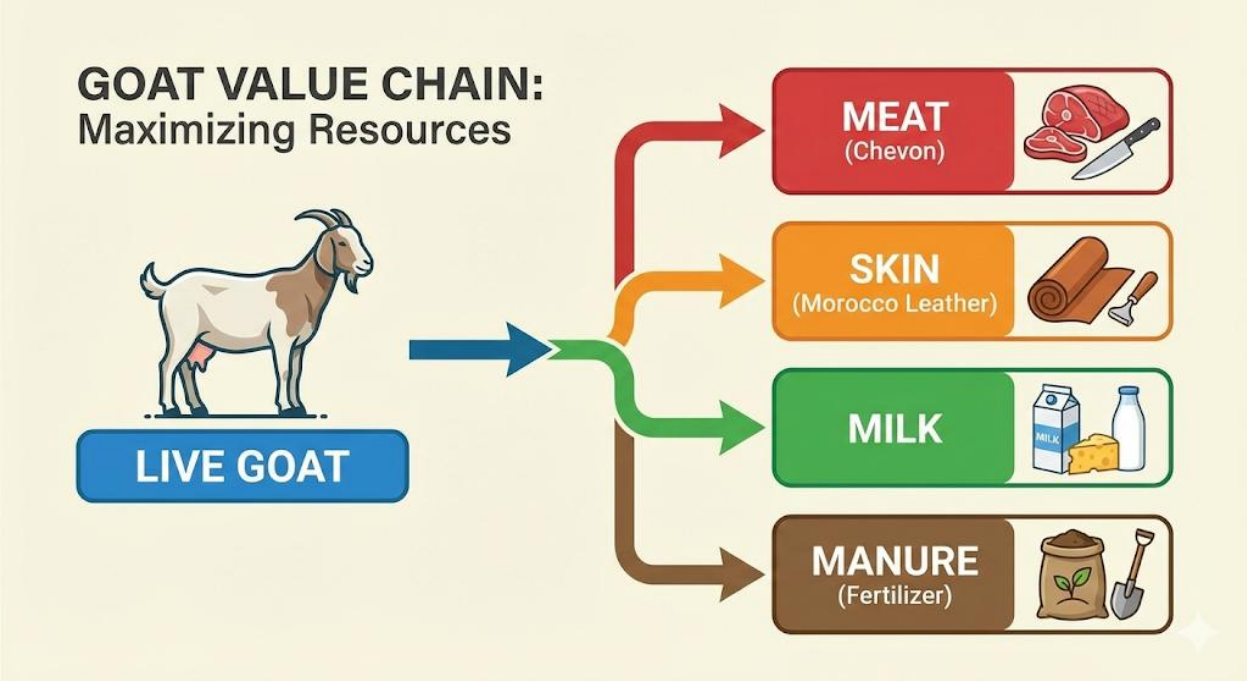
4. Create a "Health Calendar" for a small ruminant farmer, showing *when* they should deworm, vaccinate for PPR, and check hooves.
5. Define: Gestation, Twinning, Colostrum, Anthelmintic, Acaricide, Estrus.

WEEK 10: GOAT AND SHEEP BUSINESS

TOPIC: ECONOMICS AND VALUE CHAIN

INTRODUCTION

Goat and sheep farming is a highly attractive business in Nigeria because it has a **low start-up cost** (compared to cattle) and a **fast reproductive rate** (goats can kid twice a year, often with twins). The demand for the products is extremely high and consistent.



ECONOMICS OF GOAT/SHEEP FARMING

This is an analysis of the costs vs. the income.

A. ADVANTAGES (THE "INCOME" SIDE):

1. **High Demand:** There is a huge, constant demand for goat meat (chevon) and mutton/ram meat, especially during **festivals** (Sallah, Christmas, Easter) and ceremonies (marriages, funerals), where prices are highest.
2. **Fast Reproduction:** A short gestation (5 months) and high **twinning rate** (especially in WAD goats) means a flock can double in size very quickly.

3. **Low Input:** Goats/sheep are browsers/grazers and can be fed cheaply on forage, household scraps, and agricultural by-products (like cassava peels).
4. **Hardiness:** Local breeds (WAD, Djallonke) are very hardy, disease-resistant, and do not require expensive, high-tech housing.
5. **Valuable By-Products:** Unlike poultry, the *skin* of the animal is a major, high-value product.

B. COSTS (THE "EXPENSE" SIDE):

1. **Foundation Stock:** The cost of buying the first set of breeding ewes/does and a good-quality ram/buck.
2. **Housing:** Cost of building the shed (especially a raised-floor system).
3. **Feeding:** Cost of supplementary feeds (PKC, GNC) and salt licks.
4. **Veterinary:** Cost of vaccines (PPR), dewormers (anthelmintics), and acaricides (for ticks).
5. **Labor:** Cost of a herder or farmhand (if not a family-run business).

THE VALUE CHAIN (PRODUCTS)

The "Value Chain" includes all the products and processes that add value to the animal, from the farm to the consumer.

1. MEAT (THE PRIMARY PRODUCT)

- This is the main reason for farming small ruminants in Nigeria.
- **Goat Meat (Chevon):** Highly popular for pepper soup, stews, and *Asun* (roasted goat).
- **Sheep Meat (Mutton/Lamb):** Mutton is from adults, Lamb is from young. Rams are the primary meat for Sallah.
- **Value Addition:** The farmer sells the live animal. A butcher adds value by slaughtering and cutting. A restaurant adds value by cooking it (e.g., *Asun*).

2. MILK (A SECONDARY PRODUCT)

- **Goat Milk:** This is a major industry globally but is *under-developed* in Nigeria.

- **Advantages:** Goat milk is highly nutritious, easier to digest than cow's milk (due to smaller fat globules), and can be used by people with lactose intolerance.
- **Value Addition:** Can be drunk fresh or processed into high-value **goat cheese** (chevre) and **yogurt**.

3. HIDES AND SKIN (THE KEY BY-PRODUCT)

- This is the most important *non-meat* product.
- **Hide:** The skin of a large animal (like a cow).
- **Skin:** The skin of a small animal (like a goat or sheep).
- **MOROCCO LEATHER:**
    - This is the *specific* name for the high-quality, tanned leather made from the **Red Sokoto (Maradi) goat**.
    - It is famous for being **strong, soft, and flexible** with a unique, fine grain.
    - It is a **major export product** for Nigeria, highly sought after by European luxury fashion houses (for shoes, bags, and book-bindings).

4. MANURE (FERTILIZER)

- Goat and sheep manure is an excellent **organic fertilizer**. It is rich in nitrogen and phosphorus.
- **Value Addition:** The farmer can use it on their own crops (saving money on fertilizer) or bag it and sell it to vegetable and crop farmers.

EVALUATION

1. List three major *advantages* of starting a goat/sheep business compared to a cattle business.
2. What is the *primary* product of goat/sheep farming in Nigeria?
3. What is "Morocco Leather"? Which specific goat breed produces it, and why is it economically important?
4. What is "Chevon"?
5. List four different products (the "value chain") that come from a single goat.

ASSIGNMENT

1. Write a 250-word "Business Pitch" to a bank, asking for a loan to start a goat farm. You must explain *why* it is a profitable business (mentioning demand, reproduction rate, and value chain).
2. Research the current market price for a "Sallah ram" (e.g., a Balami or Yankasa) during the festival season. Compare this to the price at a non-festival time.
3. Create a "Product Flow Chart" for the Red Sokoto goat, showing the animal on the farm and its two main products (meat, skin) and where they end up.
4. What is "Goat Milk Yogurt"? Research its nutritional benefits compared to cow's milk yogurt.
5. Define: Chevon, Mutton, Lamb, By-product, Value Chain, Hides.

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WEEK 11: REVISION

GENERAL REVIEW OF ALL SECOND TERM TOPICS

This week is for a comprehensive review of all topics covered this term. We focused on two major areas: **Poultry Farming** and **Small Ruminant (Goat & Sheep) Farming**.

Revision: Poultry vs. Goat/Sheep Production Summary

	Poultry (Chickens, Turkeys, Ducks)	Goat/Sheep (Small Ruminants)
Breeds (Examples)	• **Layers**: White Leghorn, Rhode Island Red • **Broilers**: Cornish Cross, Cobb 500 • **Dual-Purpose**: Plymouth Rock, Sussex	• **Goat (Meat)**: Boer, Kalahari Red • **Goat (Milk)**: Saanen, Nubian • **Sheep (Wool)**: Merino, Romney • **Sheep (Meat)**: Dorper, Suffolk
Housing Requirements	• **Coops/Cages**: Well-ventilated, secure from predators, adequate floor space • Nesting boxes for layers • Litter management (dry bedding)	• **Sheds/Barns**: Draft-free, dry bedding, good ventilation • Fenced paddocks for grazing with shelter • Separate pens for kidding/lambing
Key Diseases/ Health Issues	• **Viral**: Newcastle Disease, Avian Influenza Influenza • **Bacterial**: *Salmonella*, *E. coli* • **Parasitic**: Coccidiosis, Mites/Lice	• **Viral**: Foot-and-Mouth Disease, PPR (Peste des Petits Ruminants) • **Bacterial**: Mastitis, Footrot • **Parasitic**: *Haemonchus contortus* (Barber's pole worm), Liver fluke
Primary Products	• **Eggs** (Table eggs, Hatching eggs) • **Meat** (Chicken, Turkey meat) • **Feathers, Manure** (Fertilizer)	• **Meat** (Chevon/Mutton, Lamb) • **Milk** (Goat milk, Sheep milk products) • **Wool/Fiber**, Skins/Hides, Manure

A. POULTRY FARMING (WEEKS 1-6)

- **Key Types: Broilers** (meat, 6-8 weeks), **Layers** (eggs, 18-20 weeks), **Cockerels** (meat, 16-24 weeks).
- **Housing:**
    - **Deep Litter:** For broilers/growers. Uses **wood shavings**. Must be kept *dry*.
    - **Battery Cage:** For layers. Allows for **clean egg collection** via sloped floors.
- **Management:**
    - **Brooding (0-4 wks):** The most critical stage. Requires **artificial heat** (33-35°C). We check temperature by *chick behavior* (huddling, panting).
    - **Growers (8-18 wks):** Fed **Grower's Mash** (low protein) to build a strong frame, not fat.

    - **Layers (18+ wks):** Fed **Layer's Mash** (high calcium). Requires **16 hours of light** per day to stimulate the pituitary gland for egg production.
- **Diseases & Health:**
    - **Newcastle (Virus):** Symptoms: **Twisting neck**, gasping, watery diarrhea. Prevent: **Vaccination (Lasota)**.
    - **Coccidiosis (Protozoa):** Symptom: **Bloody diarrhea**. Prevent: **Dry litter** and Coccidiostats in feed.
    - **Fowl Pox (Virus):** Symptom: **Warts/lesions** on comb/wattles. Prevent: **Vaccination**.
- **Business:**
    - **Costs:** Fixed (housing) vs. Variable (**Feed** is 60-70% of cost).
    - **Records: Egg Production (%)** and **Mortality** records are vital.
    - **Marketing:** Wholesalers, Retail, Farm Gate.

B. GOAT & SHEEP FARMING (WEEKS 8-10)

- **Breeds:**
    - Goats: **West African Dwarf (WAD)** (hardy, Southern), **Red Sokoto** (skin, Northern), Saanen (milk, exotic).
    - Sheep: **Djallonke (WAD)** (hardy, Southern), **Yankasa** (common, Northern), **Balami** (large, Sallah).
- **Housing: Raised, slatted-floor** housing is the best modern method to prevent **internal parasites (worms)**.
- **Feeding:** They are **ruminants** (eat forage). Need **salt licks**.
- **Breeding:**
    - Terms: Buck/Ram, Doe/Ewe, Kid/Lamb.
    - Gestation: **150 days (5 months)**.
- **Health:**
    - **PPR (Goat Plague):** Virus. Prevent: **Vaccination**.
    - **Internal Parasites (Worms):** Cause "bottle jaw." Control: **Deworming (Drenching)**.

    - **External Parasites (Ticks):** Control: **Dipping** or spraying.
- **Management: Hoof trimming**, **Castration**.
- **Business:**
    - Primary Product: **Meat** (Chevon, Mutton).
    - Key By-Product: **Skin** (e.g., **Morocco Leather** from Red Sokoto).

FINAL EXAM

The final examination will test all aspects of this term's work. Be prepared to define, compare, list, and explain all the key concepts, diseases, and management practices for both poultry and small ruminants.

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SS1 LIVESTOCK FARMING LESSON NOTES

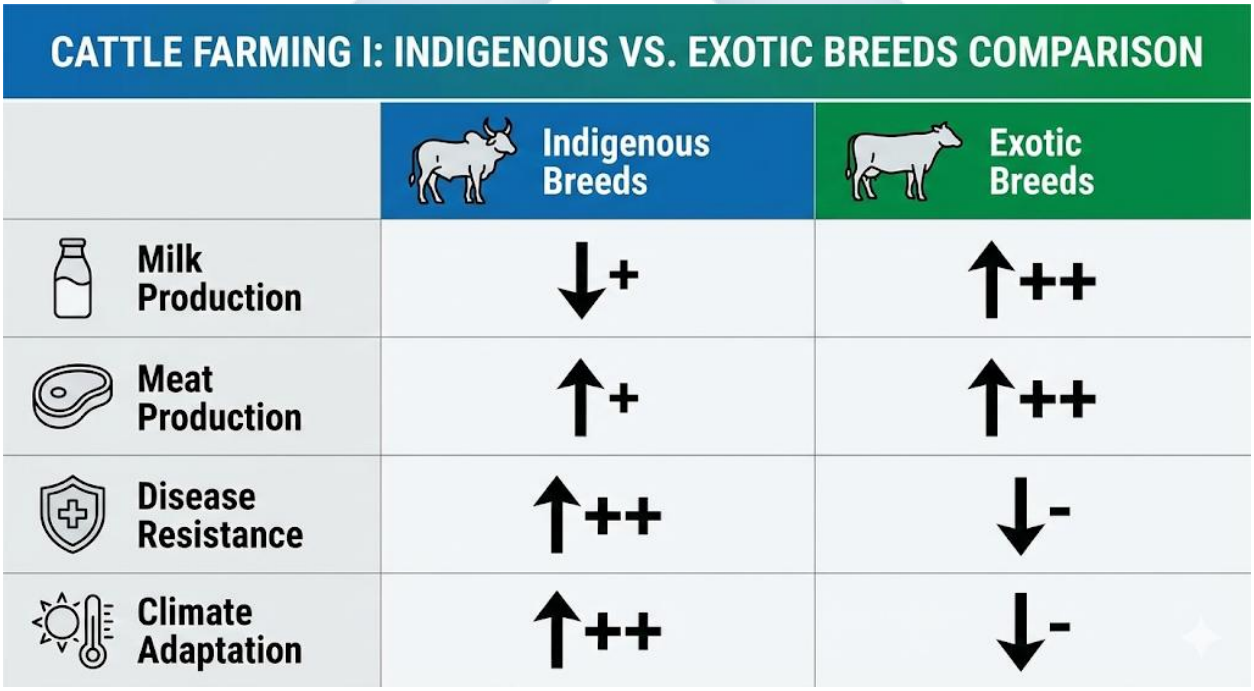
THIRD TERM

WEEK 1: CATTLE FARMING I

TOPIC: BREEDS OF CATTLE, HOUSING, AND FEEDING

🐄 INTRODUCTION TO CATTLE FARMING (BOVINE HUSBANDRY)

Cattle farming is the agricultural practice of raising cattle (bovine animals) for productive purposes. Cattle are large ruminant animals and are among the most important livestock, providing meat (beef), milk, draught power (labor), and valuable by-products like hides (leather) and manure.



BREEDS OF CATTLE

Cattle breeds are broadly classified into two groups: **Indigenous (Local)** breeds, which are adapted to the local environment, and **Exotic (Foreign)** breeds, which are imported for their high production.

1. INDIGENOUS (LOCAL) BREEDS

These breeds are adapted to Nigeria's hot climate, poor-quality forage, and prevalent diseases. They are generally low producers of milk and meat but are extremely hardy. Most are **Zebu** cattle (characterized by a hump on their back).

- **MUTURU:**
  - **Location:** Found in the **Southern forest belt** (humid zone).
  - **Characteristics:** A small, compact, black or black-and-white, *humpless* breed.
  - **Key Trait:** They are **Trypanotolerant**, meaning they are highly resistant to Trypanosomiasis (sleeping sickness), which is spread by the Tsetse fly in the South.
  - **Use:** Primarily for meat, cultural festivals, and ceremonies.
- **NDAMA:**
  - **Location:** Southern Nigeria (originally from West Africa).
  - **Characteristics:** A medium-sized, *humpless* breed, usually light brown (fawn) in color.
  - **Key Trait:** Also highly **Trypanotolerant**.
  - **Use:** Used for meat and sometimes draught work.
- **SOKOTO GUDALI:**
  - **Location:** Northern Nigeria (Sokoto, Zamfara).
  - **Characteristics:** A large Zebu (humped) breed, usually light grey or white with dark markings.
  - **Key Trait:** A good "all-rounder" for the North. It is a decent meat producer, an average milk producer, and a very strong draught animal.
- **RED BORORO (M'BORORO):**
  - **Location:** Northern Nigeria, kept by the nomadic Fulani.
  - **Characteristics:** A large, long-horned Zebu, dark red in color.
  - **Key Trait:** Extremely hardy, can travel long distances (pastoralism).
  - **Use:** Kept primarily for milk (for the family) and as a sign of wealth.

2. EXOTIC (FOREIGN) BREEDS

These breeds are imported from temperate (cool) climates. They are **high-production** animals but are **not resistant** to local diseases (like Trypanosomiasis) and suffer from heat stress. They *must* be kept in intensive or semi-intensive systems.

- **FOR DAIRY (MILK PRODUCTION):**
    - **HOLSTEIN-FRIESIAN (FRIESIAN):** The classic black-and-white (or red-and-white) cow. It is the **highest milk-producing cow in the world**. It is very large but very delicate.
    - **JERSEY:** A smaller, fawn-colored dairy cow. It produces *less* milk than a Friesian, but the milk is much **richer in fat (cream)**, making it excellent for butter and cheese.
- **FOR BEEF (MEAT PRODUCTION):**
    - **HEREFORD:** A large, red-bodied cow with a distinctive white face. Known for high-quality beef.
    - **ABERDEEN ANGUS:** A Scottish breed, all black and *polled* (naturally hornless). Famous for its tender, "marbled" beef.

CATTLE HOUSING

Housing depends on the system of farming.

- **TRADITIONAL (EXTENSIVE) SYSTEMS:**
    - **Nomadic Herding:** No permanent housing. Herders (pastoralists) move with their animals.
    - **Kraal:** A simple enclosure or "pen" made of thorn bushes or wood, where the cattle are kept at night to protect them from theft and predators.
- **MODERN (INTENSIVE/SEMI-INTENSIVE) SYSTEMS:**
    - **Paddocks:** Fenced-in fields of planted grass (pasture). Cattle are moved from one paddock to another (**rotational grazing**) to allow the grass to regrow.

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- **Feedlot:** An intensive system for *beef fattening*. Cattle are kept in outdoor pens and are brought a high-energy diet.
- **Dairy Barns (Cubicle Housing):** A large, well-ventilated building (with East-West orientation) for dairy cows. Each cow has its own "cubicle" or stall for resting. This system is designed for hygiene and comfort to maximize milk production.

FEEDING CATTLE

Cattle are **ruminants**. Their 4-compartment stomach (Rumen, Reticulum, Omasum, Abomasum) is designed to digest **cellulose** (the tough fiber in plants).

- **FORAGE (ROUGHAGE):** This is the *base* of all cattle diets. It is high in fiber.
  - **Pasture:** Fresh grass (e.g., Guinea grass, Elephant grass).
  - **Hay:** Dried grass, used as a "standing" food.
  - **Silage:** Grass that is harvested, chopped, and *fermented* in an airtight container (a silo). This preserves the nutrients and is highly palatable.
- **CONCENTRATES:** This is the high-energy, high-protein "supplement" feed.
  - **Energy:** Maize, sorghum, cassava peels.
  - **Protein:** Groundnut cake (GNC), Palm kernel cake (PKC), Soybean meal.
- **MINERALS & VITAMINS:**
  - **Salt Licks:** A block of mineral salt must be provided. It supplies essential sodium and trace minerals (like selenium, cobalt) that are missing from grass.
  - **Vitamin Premixes:** Added to the concentrate feed.
- **WATER:** A single cow can drink **40-60 liters** of water per day. A clean, constant supply is essential.

EVALUATION

1. What does it mean if a breed (like the Muturu) is **Trypanotolerant**? Why is this trait important in Southern Nigeria?

2. What is the **Sokoto Gudali** breed famous for?
3. Compare the **Holstein-Friesian** and the **Jersey** breeds. (One is high-volume, one is high-fat).
4. Describe the "East-West Orientation" for a livestock house and explain its purpose.
5. What is **Silage**, and how is it different from Hay?

ASSIGNMENT

1. Create a table comparing **Indigenous Breeds** and **Exotic Breeds** using the following criteria: Milk Production, Meat Production, Disease Resistance, and Climate Adaptability.
2. Write a 250-word essay on the challenges of "Nomadic Pastoralism" (herding) in Nigeria today.
3. Draw a simple diagram of a "Paddock" system showing "Rotational Grazing."
4. Research and list the 4 compartments of the ruminant stomach. What is the main function of the **Rumen**?
5. Define: Zebu, Bovine, Polled, Draught Animal, Feedlot.

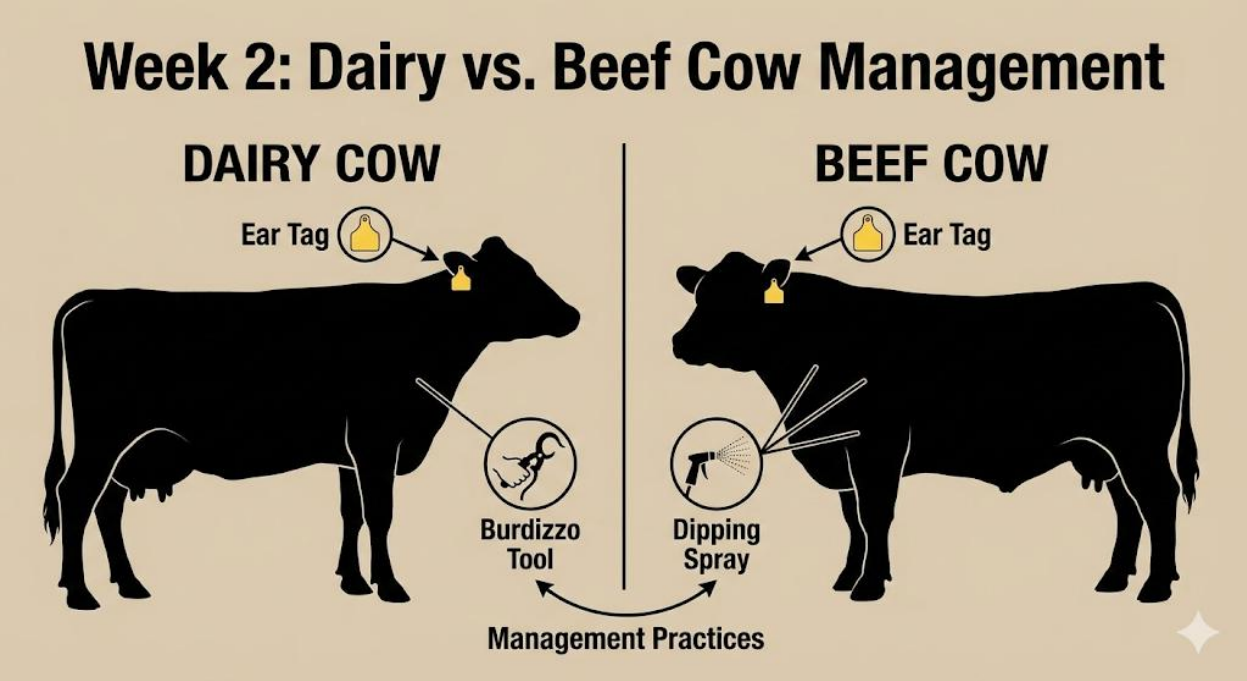
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WEEK 2: CATTLE FARMING II

TOPIC: DAIRY VS. BEEF CATTLE; MANAGEMENT PRACTICES

INTRODUCTION

While all cattle can be used for meat, modern commercial farming has specialized the breeds into two distinct paths: **Dairy farming** (for milk) and **Beef farming** (for meat). The animal's shape (conformation) and its management are completely different.



DAIRY CATTLE VS. BEEF CATTLE

Feature	**DAIRY CATTLE**	**BEEF CATTLE**
Primary Purpose	High **milk** production.	High-quality **meat** (beef) production.
Key Breeds	Holstein-Friesian, Jersey, Brown Swiss.	Aberdeen Angus, Hereford, Sokoto Gudali, Ndama.
Body Shape	**Angular & "Dairy" Shape.** Thin, bony, triangular. All the animal's energy goes to the udder, not muscle.	**Blocky & "Beef" Shape.** Square, thick, and muscular. Wide and deep. All energy goes to building muscle.

Key Feature	A very large, well-developed **udder**.	Heavy muscling, especially in the **hindquarters** (back legs) and **loin** (back).
Ration	Needs a high-protein, high-calcium, high-energy diet to *sustain lactation*.	Needs a high-energy "fattening" ration to *build muscle* quickly.

MANAGEMENT PRACTICES IN CATTLE FARMING

These are the routine tasks required to keep the herd healthy and productive.

1. IDENTIFICATION

- **Purpose:** To keep individual records for breeding, health, and management.
- **Methods:**
    - **Ear Tagging:** The most common. A plastic or metal tag with a number is clamped onto the animal's ear.
    - **Branding:** (Hot or Freeze) Creating a permanent scar on the hide. More common in large ranches.
    - **Ear Notching:** Cutting small, V-shaped notches in the ear in a specific pattern.

2. DEHORNING

- **Definition:** The removal of the horns from cattle (calves).
- **Purpose:** This is a **safety** procedure.
    - Prevents the cattle from injuring *each other* (in fights or at the feed trough).
    - Prevents the cattle from injuring the *farmer* or *herders*.
    - Reduces the amount of space needed per animal at a trough.
- **Methods (done on young calves):**
    - **Hot Iron (Disbudding):** Using a hot, circular iron to destroy the "horn bud" (growth point) before it grows.
    - **Chemical:** Using a caustic paste to burn the horn bud.

3. CASTRATION

- **Definition:** The removal or destruction of the testicles of a male calf.
- **Terminology:** A castrated male is called a **Steer** or **Bullock**.
- **Purpose:**
    - To prevent uncontrolled mating in the herd.
    - To make the males more **docile** (calm, less aggressive), making them easier to handle.
    - To improve the **quality of the meat** (prevents the "bull taint" odor).
- **Methods:**
    - **Burdizzo:** A "bloodless" method using a large clamp to crush the spermatic cord.
    - **Elastrator Ring:** A tight rubber ring is placed at the base of the scrotum, cutting off circulation.

4. HEALTH MANAGEMENT (ROUTINE)

- **Dipping / Spraying:** The regular application of **acaricides** (chemicals) to kill **ticks**. Ticks are a major problem as they suck blood (causing anemia) and transmit deadly diseases (like Heartwater and Babesiosis).
- **Deworming:** The regular drenching (giving oral medicine) to kill **internal parasites (worms)**.
- **Vaccination:** A planned schedule to prevent major diseases (e.g., FMD, Anthrax).

5. CALF MANAGEMENT (CRITICAL)

- **Colostrum:** The newborn calf *must* drink its mother's **first milk (colostrum)** within 6 hours of birth. This milk is not "true" milk; it is a thick, yellowish fluid packed with **antibodies** that gives the calf its *first immunity*.
- **Weaning:** The process of gradually separating the calf from its mother's milk and moving it onto solid food (grass and concentrates). This is usually done between 3-6 months.

EVALUATION

1. What is the main difference in body *shape* between a dairy cow and a beef cow?
2. What is "Dehorning," and what are two reasons a farmer would do it?
3. What is a "Steer," and what is the primary purpose of castration?
4. Why is "Dipping" or "Spraying" a critical management practice for cattle?
5. What is "Colostrum," and why is it essential for a newborn calf?

ASSIGNMENT

1. Draw a simple diagram of a **Dairy Cow** and a **Beef Cow**. Label the key features (angular shape vs. blocky shape, udder vs. muscling).
2. Write a 250-word report on the practice of **Ear Tagging**. Why is "record keeping" so important in a modern cattle farm?
3. Research the "Burdizzo" castration tool. Draw a simple diagram and explain how it works "bloodlessly."
4. Define "Weaning." What challenges does a calf face during this period?
5. Define: Bovine, Heifer, Steer, Polled, Acaricide, Lactation.

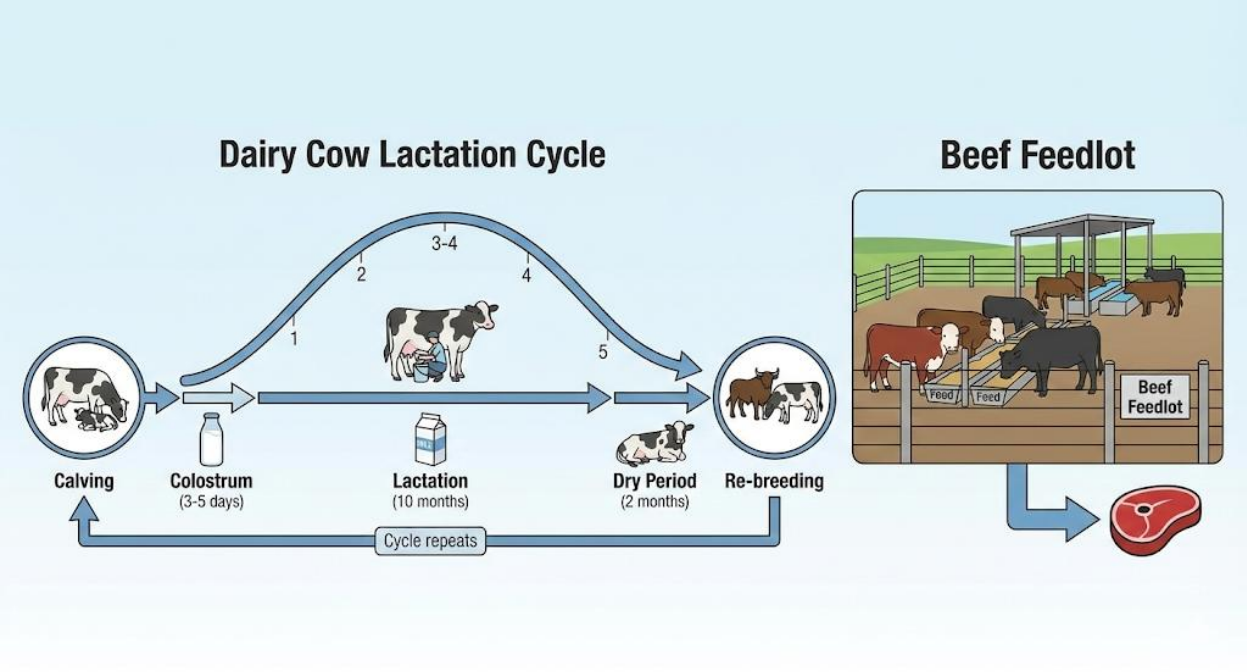
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WEEK 3: CATTLE BREEDING AND PRODUCTION

INTRODUCTION

Cattle breeding and production are the core "business" activities of the farm.

- **Breeding** is the science of *creating* the next generation of animals.
- **Production** is the process of *harvesting* the final product (milk or meat).



CATTLE BREEDING METHODS

1. NATURAL MATING

- **Definition:** The traditional method where a **Bull** (male) is allowed to detect "heat" (estrus) in a **Cow** (female) and physically mount and mate with her.
- **Systems:**
    - *Pasture Mating:* One bull is left to run with a herd of cows (e.g., 1 bull per 25-30 cows).
    - *Hand Mating:* The farmer controls the mating, bringing a specific cow to the bull's pen when she is on heat.
- **Pros:** Simple, high success rate (the bull is an expert at detecting heat).

- **Cons: Disease transmission** (STDs), risk of injury, cost of keeping a large, dangerous bull.

2. ARTIFICIAL INSEMINATION (AI)

- **Definition:** The most important modern breeding technology. It involves a trained technician manually depositing **semen** (collected from a superior bull) into the cow's uterus.
- **Process:**
    a. Semen is collected from a prize bull (e.g., in Europe) and frozen in **liquid nitrogen** in a "semen straw."
    b. The farmer must detect when their cow is in "heat."
    c. The AI technician thaws the straw and uses a long "AI gun" to inseminate the cow.
- **Key Advantages:**
    - **Rapid Genetic Improvement:** A small farmer in Nigeria can get a calf from the *best* bull in the world *without* owning him.
    - **Disease Control:** Prevents STDs.
    - **Cost & Safety:** Cheaper and safer than owning a 1000kg bull.
    - **Crossbreeding:** Makes it easy to crossbreed (e.g., use Holstein semen on a Muturu cow).
- **Disadvantage:** Requires a skilled technician and accurate **heat detection**.

3. BREEDING SYSTEMS

- **Crossbreeding:** This is the most *important* system for Nigeria. It involves mating an **Exotic breed** with an **Indigenous breed**.
- **Example:** (Holstein × Sokoto Gudali)
    - **Goal:** To get a "hybrid" calf that has the **high milk yield** of the Holstein and the **disease/heat resistance** of the Gudali.
    - **Result: Hybrid Vigor (Heterosis)**. The offspring is often better than both parents.

MILK PRODUCTION (DAIRY)

This is the process of managing a dairy cow for milk.

- **THE LACTATION CYCLE:**
    a. **Gestation (Pregnancy):** A cow's pregnancy lasts **9 months** (just like a human).
    b. **Calving (Birth):** The cow gives birth.
    c. **Colostrum:** For the first 3-5 days, she produces **colostrum** (not for sale).
    d. **Lactation:** Milk production begins, rising to a "peak" at 6-8 weeks, and then slowly declining over **305 days** (10 months).
    e. **Dry Period:** The farmer "dries off" the cow (stops milking her) for 2 months *before* her next calf is born, to let her body rest.
- **THE MILKING PROCESS (HYGIENE IS KEY):**
    a. **Clean the Udder:** The cow's teats must be washed with a disinfectant and dried.
    b. **Milking:** Can be done by **hand** (traditional) or by a **milking machine** (commercial).
    c. **Teat Dipping:** After milking, the teats are dipped in an **iodine** solution. This seals the teat opening and prevents **Mastitis**.
- **PASTEURIZATION:**
    - Raw milk contains bacteria. **Pasteurization** is the process of **heating** the milk (e.g., to 72°C for 15 seconds) and then **rapidly cooling** it.
    - This *kills* the harmful bacteria, making the milk safe to drink and extending its shelf life.

BEEF FATTENING (BEEF PRODUCTION)

This is the process of preparing beef cattle for slaughter.

- **THE FEEDLOT SYSTEM:** This is the intensive system used for beef fattening.
- **Process:**
    a. Young cattle (steers) are bought at 1-2 years old.

b. They are confined to a "feedlot" (a pen) and are not allowed to run around (this wastes energy).
c. They are fed a **high-energy ration** for 90-120 days.

- **The Ration:** The diet is the *opposite* of a normal cattle diet.
  - **High Energy (Carbs):** 70-80% of the feed (e.g., maize, sorghum, cassava).
  - **Low Fiber (Roughage):** Just enough hay/grass to keep the rumen healthy.
- **The Goal:** To make the animal gain weight *as quickly as possible* and to promote **marbling** (fat within the muscle), which makes the beef tender and flavorful.

EVALUATION

1. What is "Hand Mating"?
2. List three major advantages of Artificial Insemination (AI).
3. What is "Hybrid Vigor"? Give a common example of a crossbreed in Nigeria.
4. What is "Pasteurization," and why is it essential for milk?
5. What is a "Feedlot," and what kind of ration (high-fiber or high-energy) are cattle fed in it?

ASSIGNMENT

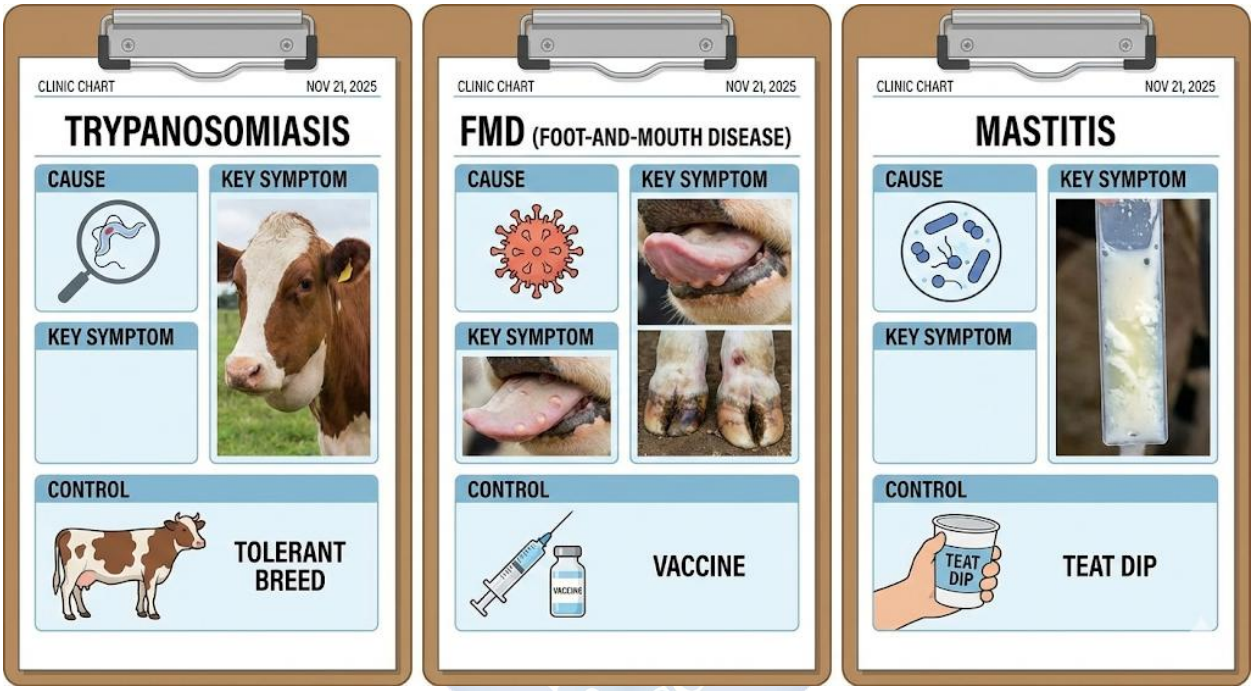
1. Write a 250-word essay comparing "Natural Mating" to "Artificial Insemination."
2. A cow's gestation period is 9 months, and her standard lactation period is 10 months (305 days). What does this tell you about the breeding cycle? (Hint: When must she be re-bred after calving?).
3. Draw a simple line graph showing a cow's "Lactation Curve" over 12 months. (Show the peak at 2 months, the decline, and the "dry period").
4. Research and describe the steps of **hand-milking** a cow. What are the 3 most important hygiene rules?
5. Define: Estrus (Heat), Gestation, Colostrum, Pasteurization, Marbling (in beef).

WEEK 4: CATTLE DISEASES

INTRODUCTION

Cattle, like all livestock, are vulnerable to diseases that can cause massive economic loss. Disease control relies on **Biosecurity** (preventing entry), **Vaccination** (prevention), and **Treatment** (control).

This week, we focus on three of the most significant diseases affecting cattle in Nigeria.



1. TRYPANOSOMIASIS ("NAGANA" OR SLEEPING SICKNESS)

- **CAUSE:** A microscopic **Protozoan** (a single-celled parasite) called a **Trypanosome**.
- **VECTOR (TRANSMISSION):** The disease is transmitted *only* by the bite of the **Tsetse Fly**. The fly acts as a "hypodermic needle," sucking blood from an infected animal and injecting the parasite into a healthy one.
- **LOCATION:** This is a *regional* disease. It is rampant in the **humid, southern "forest" and "middle-belt" zones** of Nigeria where the Tsetse fly lives.
- **SYMPTOMS (The "Wasting" Disease):**
    - High, intermittent fever.

- **Anemia:** The parasite destroys red blood cells, leading to pale gums and "bottle jaw" (swelling).
- **Emaciation:** Extreme weight loss, even though the animal is eating.
- Lethargy and weakness (the "sleeping" sickness).
- Eventual death.

- **CONTROL MEASURES:**
  a. **Vector Eradication:** Controlling the Tsetse fly by clearing bushes, setting "tsetse traps," and using insecticides.
  b. **Drugs (Trypanocides):** Using drugs (like Samorin) to prevent or treat the infection.
  c. **BREEDING (The Best Solution):** Using **Trypanotolerant** breeds of cattle, like the **Muturu** and **Ndama**, which can survive and produce in Tsetse-fly zones.

2. FOOT AND MOUTH DISEASE (FMD)

- **CAUSE:** A highly contagious **Virus**.
- **TRANSMISSION:** Spreads *extremely* easily through direct contact, airborne particles, and on contaminated equipment, shoes (biosecurity risk), and vehicles.
- **SYMPTOMS (The "Blister" Disease):**
  - High fever.
  - **Vesicles (Blisters):** Forms painful blisters on the **tongue, gums, and lips** (the "mouth").
  - **Vesicles (Blisters):** Forms painful blisters on the **feet** (in the hoof cleft) and on the **teats** of the udder.
  - **Result:** The animal **drools** excessively ("ropy" saliva), is in great pain, **refuses to eat**, and becomes **lame** (cannot walk). In dairy cows, milk production crashes.
- **CONTROL MEASURES:**
  a. **Vaccination:** Regular vaccination is the key to prevention.
  b. **Quarantine:** *Immediately* isolate any sick animal and restrict *all* movement on/off the farm. This is a "notifiable" disease.

c. **Disinfection:** Strict disinfection of the entire premises, vehicles, and footbaths.

d. **Culling:** In severe outbreaks, infected animals may be culled (slaughtered and buried) to stop the spread.

3. MASTITIS

- **CAUSE:** A **Bacterial** infection of the **udder** (mammary gland). This is *not* a contagious disease from animal to animal, but an infection from the environment.
- **TRANSMISSION (The "Hygiene" Disease):**
  - Caused by bacteria (like *Staphylococcus aureus* or *E. coli*) entering the udder through the **teat canal**.
  - **Main Cause: Poor milking hygiene.** (e.g., dirty hands, dirty milking machines, dirty/muddy pens).
- **SYMPTOMS:**
  - The udder (or one-quarter of it) becomes **hot, hard, swollen,** and **painful** to the touch.
  - The cow may have a fever and refuse to be milked.
  - The **milk** itself becomes abnormal:
    - Watery, discolored.
    - Contains **clots, pus, or blood**.
- **CONTROL MEASURES:**

a. **HYGIENE (Prevention):** This is the *only* way to control Mastitis.
   - Wash and dry the udder *before* milking.
   - Ensure the milker's hands or the milking machine are *sterile*.
   - **Post-Milking Teat Dipping:** Dip every teat in an iodine solution *after* milking to seal the canal.

b. **Treatment:**
   - Identify the specific bacteria (by testing the milk).
   - Administer **antibiotics** directly into the infected teat canal via a "mastitis tube."

EVALUATION

1. What is the *vector* (transmitter) of Trypanosomiasis?
2. What is the *best* long-term solution for raising cattle in a Tsetse-fly-infested area?
3. What are the "classic" symptoms of Foot and Mouth Disease (FMD)? Where do the blisters appear?
4. What is Mastitis? What is the *main cause* of this disease?
5. What are the 3 key steps to preventing Mastitis (milking hygiene)?

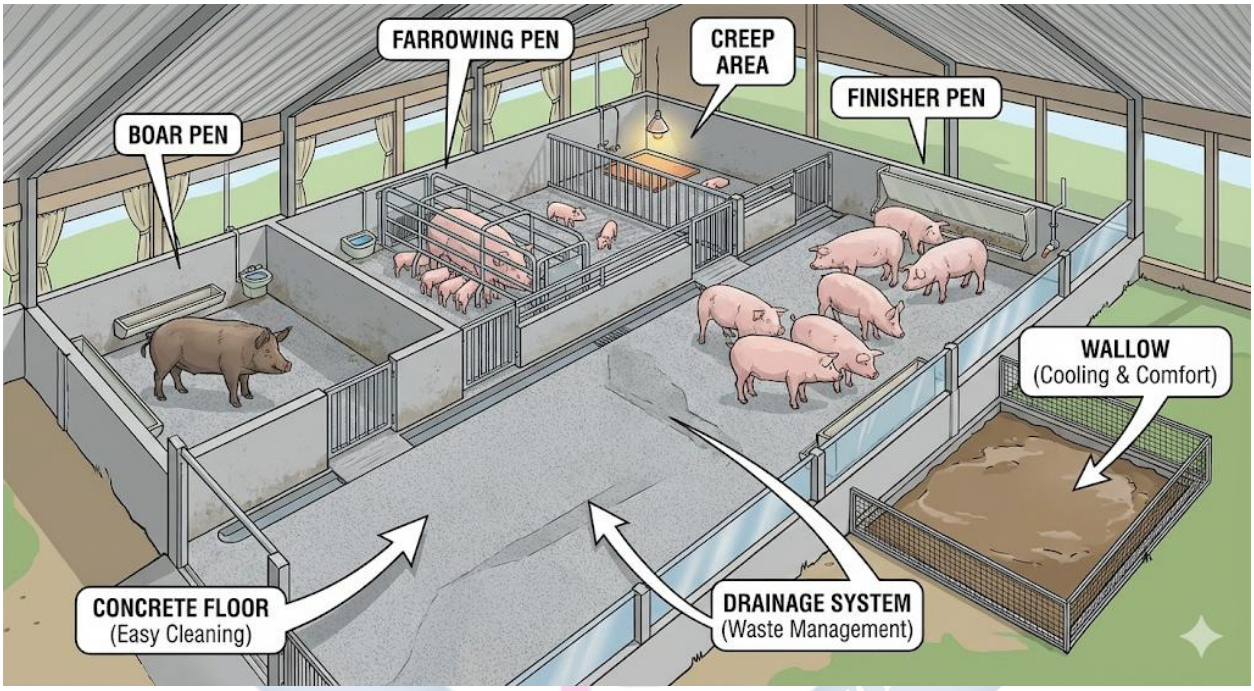
ASSIGNMENT

1. Write a 250-word report on the economic impact of a Foot and Mouth Disease (FMD) outbreak on a farm and the local community.
2. Research the "Tsetse Trap." Draw a diagram of one and explain how it works.
3. What is "Bottle Jaw"? Which cattle disease (from this week) and which sheep/goat disease (from last term) both cause this symptom? What is the *underlying* cause (e.g., anemia, worms)?
4. Define: Vector, Protozoa, Trypanotolerant, Vesicle, Ropy Saliva, Teat Dipping.
5. What is a "notifiable disease"? Why is it important for a farmer to report a case of FMD to the government?

WEEK 6: PIG FARMING I

TOPIC: BREEDS, HOUSING, AND FEEDING

INTRODUCTION TO PIG FARMING (SWINE HUSBANDRY)



Pig farming is the raising of domestic pigs (swine) for **meat (pork)**. It is a highly profitable branch of livestock farming because pigs have two major advantages:

1. **High Fecundity:** They produce large *litters* (8-14 piglets at a time).
2. **Fast Growth Rate:** A pig can reach "market weight" (90-100kg) in just **5-6 months**.

Terminology:

- **Boar:** An adult, uncastrated male.
- **Sow:** An adult female (after she has given birth).
- **Gilt:** A young female (before her first litter).
- **Piglet:** A very young pig (from birth to weaning).
- **Weaner/Shoat:** A piglet that has been separated from its mother.
- **Farrowing:** The act of giving birth (parturition) in pigs.

BREEDS OF PIGS

Most pigs in Nigeria are either exotic or crossbreeds.

- **EXOTIC (FOREIGN) BREEDS (The "White Pigs"):** These are the standard for all commercial farming.
    - **LARGE WHITE:** The most popular breed in Nigeria. An all-white pig with *erect (upright) ears*. Known for being hardy, a good mother, and producing good meat (pork and bacon).
    - **LANDRACE:** A Danish breed. All-white with very large, *droopy (floppy) ears* that cover its eyes. It is very long in the body, known for excellent bacon.
    - **DUROC:** An American breed. Reddish-brown in color with droopy ears. Known for being very hardy and having fast growth.
- **INDIGENOUS (LOCAL) BREED:**
    - **Nigerian Indigenous Pig:** A small, slow-growing, usually black pig. It is very hardy and disease-resistant but is not commercially viable. It is often kept in free-range, subsistence systems.

PIG HOUSING (PIGGERY / PIGSTY)

Housing for pigs is *critical* because they are non-ruminants and must be kept separate from their waste.

- **PRINCIPLES:**

    a. **STRONG CONSTRUCTION:** Pigs are *powerful* and *destructive* animals. The pens **must** be built from strong **concrete blocks** and **metal rails**. Wooden fences are useless.

    b. **CONCRETE FLOOR:** The floor must be solid concrete for hygiene.

    c. **EXCELLENT DRAINAGE:** The floor *must* be sloped to a deep drainage gutter. Pig waste is very wet (urine and feces), and a "water-logged" pen leads to disease.

    d. **VENTILATION:** Good airflow is needed to remove toxic **ammonia** gas.

e. **COOLING:** Pigs have no functional sweat glands and *cannot* cool themselves. They suffer badly from heat stress.

- **SPECIALIZED PENS (THE PIGGERY):**
    - **Boar Pen:** A strong, individual pen for the adult male.
    - **Farrowing Pen:** The "maternity ward" for the sow. It must contain:
        - **Farrowing Crate:** A special metal stall that "cages" the sow. This prevents the large, clumsy mother from accidentally *lying on and crushing* her tiny piglets.
        - **Creep Area:** A small, warm area (with a heat lamp) that *only* the piglets can enter, to keep them safe and warm.
    - **Weaner Pen:** A group pen for weaned piglets.
    - **Finisher (Fattening) Pen:** A larger group pen for pigs growing to market weight.
    - **Wallow:** A shallow concrete pool of water. This is *essential* for pigs to cool themselves down by wallowing in the water/mud.

FEEDING PIGS

- **DIGESTIVE SYSTEM:** Pigs are **MONOGASTRIC (NON-RUMINANT)** and **OMNIVORES**.
    - This means they have a **simple stomach** (like humans).
    - They **cannot** digest cellulose (grass).
    - They **compete directly with humans** for food (grains).
- **FEED RATION:**
    - **Energy:** Maize, Corn, Cassava, Sorghum.
    - **Protein:** Soybean Meal, Groundnut Cake (GNC), Fish Meal.
    - **Supplements:** Vitamin/Mineral premixes, Bone Meal.
- **FEEDING SYSTEMS:**
    - **Intensive (Commercial):** Fed on specially formulated "Pig Starter," "Pig Grower," and "Pig Finisher" mash.

- **Semi-Intensive (Swill Feeding):** This is very common. Pigs are fed **"swill,"** which is household scraps, kitchen waste, and leftover food.
- **Swill Safety Rule:** Swill (especially if it contains meat scraps) **MUST** be **boiled for at least 30 minutes** before being fed to pigs. This is a critical biosecurity rule to *kill* parasites and viruses (like African Swine Fever).

EVALUATION

1. What are the two main reasons pig farming is considered highly profitable?
2. Give the correct terminology for: (a) an adult male pig, (b) a young female, and (c) the act of giving birth.
3. What are the key differences (ears and color) between a **Large White** and a **Landrace** pig?
4. Describe a **Farrowing Crate**. What is its *exact* purpose?
5. What is "Swill," and what is the *most important safety rule* for feeding it?

ASSIGNMENT

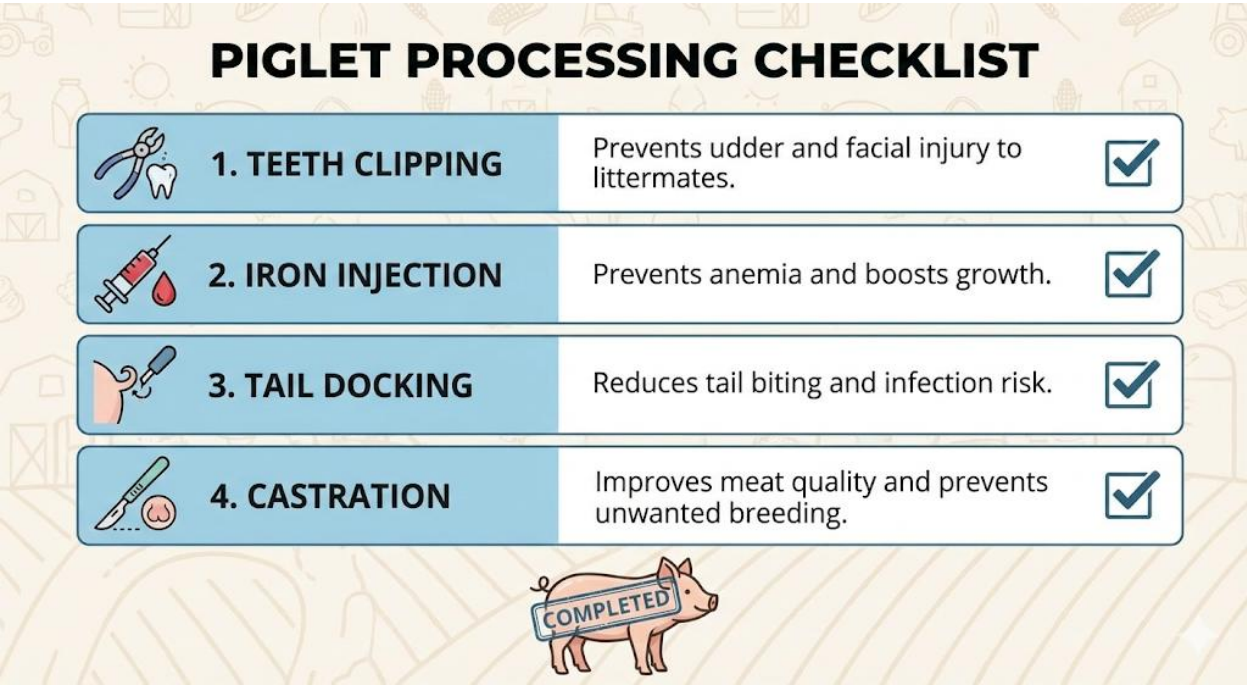
1. Write a 250-word essay on the challenges of pig farming in Nigeria (e.g., high feed cost, disease, religious/cultural taboos).
2. Draw a simple layout of a piggery. Your diagram must show a Boar Pen, a Farrowing Pen, a Weaner Pen, and a Wallow.
3. Why do pigs *need* a wallow? (Hint: What do they lack?).
4. Pigs are "monogastric." What does this mean, and how does it affect their diet?
5. Define: Gilt, Litter, Farrowing, Swine, Omnivore.

WEEK 8: PIG FARMING II

TOPIC: BREEDING, DISEASE CONTROL, AND MANAGEMENT

INTRODUCTION

This week, we cover the operational cycle of a piggery: breeding new piglets, managing their health, and getting them to market weight.



PIG BREEDING

Pig breeding is a numbers game, focused on high reproduction and large litters.

- **REPRODUCTION CYCLE:**
    - **Puberty:** A gilt (young female) reaches puberty at 6-8 months.
    - **Estrus ("Heat"):** The sow/gilt comes on heat every 21 days. The heat period itself lasts for 2-3 days.
        - **Sign of Heat:** The *only* reliable sign is the **"standing reflex."** The female will stand *rigidly* and allow the farmer to press on her back with their full weight.
    - **Mating:** Usually **natural mating**. The sow is taken to the boar's pen.

- **Gestation (Pregnancy):** The easiest number to remember in all livestock farming.
  - **3 MONTHS, 3 WEEKS, 3 DAYS** (approx. 114-115 days).
- **Farrowing (Birth):** The sow gives birth to a large **litter** of 8-14 piglets.
- **Weaning:** Piglets are weaned (removed from the mother) at 3-6 weeks old.

CRITICAL PIGLET MANAGEMENT (PROCESSING)

Newborn piglets are very vulnerable and require intensive management within their *first 3 days* of life.

1. **NEEDLE TEETH CLIPPING:**
   - **Problem:** Piglets are born with 8 very sharp "needle teeth" (or "wolf teeth").
   - **Action:** Within 24 hours of birth, the farmer uses a **teeth clipper** (a special plier) to clip the sharp tips off these 8 teeth.
   - **Purpose:** To prevent the piglets from **damaging the sow's teats** (udder) during suckling, and to prevent them from *lacerating* each other's faces as they fight for a teat.
2. **IRON INJECTION:**
   - **Problem:** Sow's milk is **100% deficient in Iron**. Piglets kept on a clean concrete floor (with no access to soil) will become **anemic** very quickly (pale, weak, high mortality).
   - **Action:** On Day 3, *every* piglet is given an **intramuscular injection** (usually in the neck or ham) of **Iron Dextran**.
   - **Purpose:** To prevent "Piglet Anemia."
3. **TAIL DOCKING:**
   - **Problem:** In a crowded pen, weaner pigs get bored and stressed and will start **"tail-biting,"** which leads to chewing, bleeding, infections, and cannibalism.
   - **Action:** On Day 3, the piglet's tail is **docked** (shortened) using an elastrator or hot docker.
   - **Purpose:** To prevent tail-biting.

4. **CASTRATION:**
    - **Action:** Male piglets *not* intended for breeding are castrated (surgically) at 1-2 weeks old.
    - **Purpose:** To prevent **"Boar Taint,"** a strong, unpleasant odor/flavor that appears in the meat of uncastrated adult males.

DISEASE CONTROL

Biosecurity is *paramount* in a piggery.

1. **AFRICAN SWINE FEVER (ASF):**
    - **Cause:** A highly contagious **Virus**.
    - **Symptoms:** High fever, huddling, red/purple blotches on the skin (especially ears and snout), bloody diarrhea, sudden death.
    - **Transmission:** Ticks, contaminated feed (uncooked swill), direct contact.
    - **Control: THERE IS NO CURE AND NO VACCINE.**
        - Mortality is 90-100%.
        - The *only* control is **Biosecurity** (fencing, disinfecting, *boiling swill*) and **culling** (slaughtering) the entire herd if an outbreak occurs.
2. **INTERNAL PARASITES (WORMS):**
    - **Cause:** Ascaris (large roundworm) is very common.
    - **Symptoms:** Stunted growth, coughing, liver damage ("milk spots").
    - **Control: Strict hygiene** (cleaning the concrete pens daily) and a regular **deworming** schedule with drugs (anthelmintics).
3. **SKIN DISEASES (MANGE):**
    - **Cause:** External parasites (mites) that burrow under the skin.
    - **Symptoms:** Intense itching, scratching, thick crusty skin, hair loss.
    - **Control:** Spraying or injecting the pigs with an **acaricide** (e.g., Ivermectin).

EVALUATION

1. What is the gestation period of a sow?
2. What is the "standing reflex"?
3. What are the "3 C's" of piglet processing (Needle Teeth **C**lipping, **C**astration, Iron Inje**c**tion/Tail Do**c**king)?
4. Why *must* a farmer give a 3-day-old piglet an iron injection?
5. What is the *only* control method for African Swine Fever (ASF)?

ASSIGNMENT

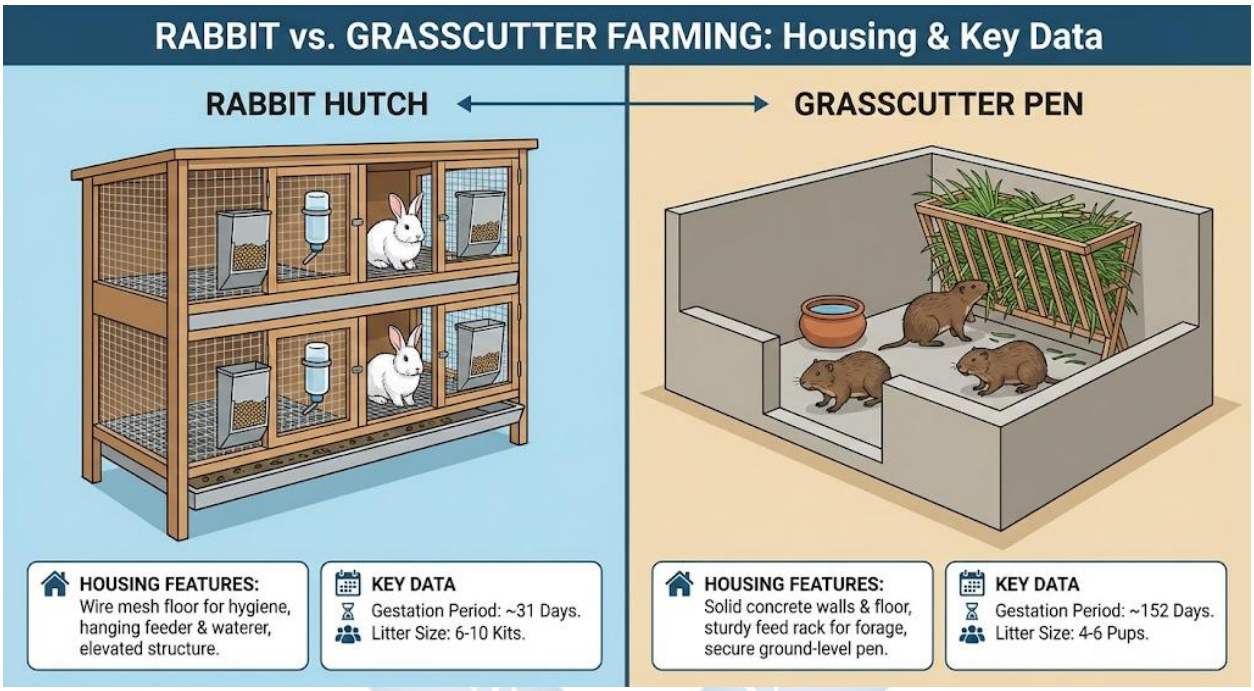
1. Write a 250-word report on the "Farrowing Crate System." You must discuss the **advantages** (protects piglets) and the **disadvantages** (animal welfare concerns for the sow).
2. Draw a diagram of a piglet's head and show which 8 "needle teeth" must be clipped.
3. What is "Boar Taint," and what management practice prevents it?
4. Create a "Biosecurity Poster" for a pig farm, listing 5 rules to prevent African Swine Fever. (e.g., "BOIL ALL SWILL," "NO VISITORS," etc.).
5. Define: Gilt, Sow, Farrowing, Litter, Weaning, Anemia.

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WEEK 9: RABBIT AND GRASSCUTTER FARMING

INTRODUCTION: MICRO-LIVESTOCK

Micro-livestock refers to small, fast-reproducing animals that can be raised in small spaces with a low start-up cost. **Rabbit** and **Grasscutter** farming are two of the most popular forms in Nigeria, providing a quick source of high-quality protein and income.



RABBIT FARMING (CUNICULTURE)

- **IMPORTANCE:**
    - **Fast Reproduction:** A doe (female) can have 5-8 litters *per year*.
    - **Low Cost:** Can be fed cheaply on forage (grasses/weeds).
    - **Space:** Can be raised in a small backyard using stacked cages.
    - **Lean Meat:** Rabbit meat is white, fine-grained, low in fat, and high in protein.
- **TERMINOLOGY:**
    - **Buck:** Adult male.
    - **Doe:** Adult female.
    - **Kit:** A newborn/young rabbit.
    - **Kindling:** The act of giving birth.

- **HOUSING (THE HUTCH):**
    - Rabbits are kept in cages called **hutches**.
    - **Floor:** The floor **must** be made of **wire mesh (netting)**.
    - **Why?** Rabbit urine is very strong. A wire mesh floor allows the urine and feces (pellets) to fall *through*, keeping the rabbit clean and dry. A solid floor will cause diseases (like Coccidiosis and sore hocks).
    - **Nest Box:** A "nest box" filled with straw must be given to the doe *before* she gives birth (kindling).
- **FEEDING:**
    - Rabbits are **pseudo-ruminants**. They are herbivores (eat plants).
    - **Diet:** A combination of **forage** (grasses, weeds, vegetable leaves) and **concentrate** (pelleted feed).
    - **Coprophagy (Cecotrophy):** Rabbits produce two types of droppings: hard pellets (waste) and soft pellets (cecotropes, "night feces"). They *eat* the soft pellets directly from their anus. This is **normal and essential**. It is how they digest fiber and absorb B-vitamins (similar to a cow chewing its cud).
- **MANAGEMENT & BREEDING:**
    - **Gestation: 31 days** (approx. 1 month).
    - **Litter Size:** 6-10 kits.
    - **Health:** The main disease is **Coccidiosis**, caused by a protozoa in dirty, damp conditions. Prevention is a *clean wire floor*.

GRASSCUTTER FARMING (THRYONOMY)

- **IMPORTANCE:**
    - **High Demand:** Grasscutter (also known as "Bush Meat" or "Cane Rat") is a popular delicacy in Nigeria and West Africa, commanding a very high price.
    - **Domestication:** Farming grasscutters **reduces hunting pressure** on wild populations, which is good for conservation.
    - **Hardy:** They are native to Africa and well-adapted to the climate.

- **HOUSING:**
    - **Problem:** Grasscutters are *rodents*. They **chew wood** and **burrow (dig)**.
    - **Solution:** They *cannot* be kept in wooden hutches. Their pens must be made of **strong concrete blocks** with a **smooth concrete floor** (to prevent digging) and a secure mesh lid.
    - **Colony System:** They are often kept in "colonies" (1 male with 4-5 females).
- **FEEDING:**
    - They are strict **herbivores**.
    - **Diet:** Their main food is **Elephant Grass** or **Sugarcane**. This is supplemented with cassava, maize, or fruit.
- **MANAGEMENT & BREEDING:**
    - **Gestation:** Much longer than rabbits (approx. **150 days / 5 months**).
    - **Litter Size:** Smaller (2-6 young).
    - **Handling:** They are *not* fully domesticated. They can be flighty, aggressive, and must be handled with care (using gloves or handling by the tail).

EVALUATION

1. What is "Micro-livestock"? List two major advantages of farming them.
2. What is a rabbit's house called? Why *must* its floor be made of wire mesh?
3. What is "Coprophagy," and why is it essential for a rabbit's health?
4. Why can't a grasscutter be kept in a wooden hutch?
5. Compare the gestation period and average litter size of a rabbit vs. a grasscutter.

ASSIGNMENT

1. Write a 250-word essay on the "Business Case for Grasscutter Farming," focusing on demand and conservation.
2. Draw a simple, labeled diagram of a rabbit **hutch** showing the wire mesh floor, feeder, and waterer.

3. Draw a simple, labeled diagram of a grasscutter **pen** showing the concrete walls/floor and the feed area.
4. What is the main disease of rabbits, and how is it prevented?
5. Define: Cuniculture, Thryonomy, Coprophagy, Kindling, Hutch.

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WEEK 10: BUSINESS OPPORTUNITIES IN LIVESTOCK

INTRODUCTION

The "livestock business" is not just about *farming* (raising animals). The **"Value Chain"** refers to *all* the activities that get a product from the farm to the final consumer.

Value Addition is the process of taking a *raw* product (like a live goat) and changing it into a *processed* product (like *suya* or leather), which sells for a much higher price. This is where the *real* profit is made.



MEAT PROCESSING (VALUE ADDITION)

- **PRIMARY PROCESSING (ABATTOIR):**
    - **Business:** Running a hygienic **abattoir** (slaughterhouse).
    - **Process:** Slaughtering, skinning, eviscerating (removing organs), and cutting the carcass into primary cuts.
    - **Value:** A farmer sells a cow for N300,000. The butcher sells the cut pieces for a *total* of N400,000.
- **SECONDARY PROCESSING (TERTIARY):**
    - **Business:** Taking the raw meat and processing it into new products.

- **Examples:**
    - **Sausages:** Grinding meat, adding spices, and stuffing it into casings.
    - **Bacon/Ham:** Curing and smoking pork.
    - ***Kilishi* (Beef Jerky):** Spicing, sun-drying, and smoking beef.
    - ***Suya* / Roasting:** Grilling or roasting meat for immediate consumption.
    - **Packaging:** Freezing and packaging meat in attractive, branded bags for supermarkets.

HIDES AND SKIN (LEATHER)

- **THE RAW PRODUCT:**
    - **Hides:** The skin of large animals (Cattle).
    - **Skins:** The skin of small animals (Goats, Sheep).
- **THE PROCESS (TANNING):**
    - **Business:** A **Tannery**.
    - **Process:** Tanning is the chemical (or vegetable) process of converting the raw, perishable skin into **leather**, which is durable, flexible, and will not rot.
- **THE FINAL PRODUCTS (VALUE ADDITION):**
    - **Leather** is the *real* value. The skin of a Red Sokoto goat might be N1,500. The *tanned leather* from it is worth many times more.
    - **Business:** Manufacturing finished leather goods:
        - Shoes, bags, belts
        - Upholstery (car seats, furniture)
        - *Pomo* (a local food product from cooked cowhide).

MANURE (WASTE) USE

Animal waste ("waste" is a bad word; it's a *resource*) is a major business opportunity.

- **ORGANIC FERTILIZER:**

    - **Business:** Fertilizer production.
    - **Process: Poultry manure** (from deep litter) and **cattle/goat manure** are collected, dried, bagged, and sold to **crop farmers** (vegetable, maize farmers).
    - **Value:** It improves soil structure and provides rich nutrients (Nitrogen, Phosphorus).
- **BIOGAS PRODUCTION:**
    - **Business:** Energy production.
    - **Process:** Manure (especially from pigs or cattle) is loaded into an airtight container called a **Biogas Digester**.
    - Bacteria *ferment* the manure in an anaerobic (no oxygen) environment.
    - This produces **Methane Gas**, which is captured and can be "scrubbed" and used for **cooking** or to run a **gas generator** to create electricity for the farm.
    - The "slurry" left over is *still* an excellent fertilizer.

OTHER MAJOR OPPORTUNITIES

1. **FEED PRODUCTION (FEED MILL):** The single biggest cost for a farmer is feed. The person who *makes and sells* the feed has a huge, stable market.
2. **HATCHERY:** A specialized business that does *not* raise chickens for meat, but only *produces and sells* **Day-Old Chicks (DOCs)** to other farmers.
3. **VETERINARY SERVICES & PHARMACY:** Selling the drugs, vaccines, and supplements that all farmers need.

EVALUATION

1. What is "Value Addition"? Give one example.
2. What is the difference between "Primary Processing" and "Secondary Processing" of meat?
3. What is "Tanning"? What raw material does it use, and what product does it create?
4. What is "Morocco Leather"?

5. List two business opportunities for using animal manure.

ASSIGNMENT

1. Write a 250-word "business plan" for *one* of the opportunities listed (e.g., "Suya Spot," "Bagged Manure," "Small Tannery").
2. Visit a local market. Find and list 5 "processed" meat products (e.g., *Kilishi*, sausages, *Banda* (smoked fish), bacon).
3. Draw a flowchart for the "Leather Value Chain," starting from a "Goat" and ending with a "Shoe."
4. Research "Biogas Digester." Write a 1-page report on how it works and its benefits for a farm.
5. Define: Abattoir, Tanning, Leather, Kilishi, Biogas, Hatchery.

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WEEK 11: REVISION

GENERAL REVIEW OF ALL THIRD TERM TOPICS

This week is for a comprehensive review of all topics covered this term. We focused on four major livestock groups: **Cattle, Pigs, Rabbits,** and **Grasscutters**, as well as the **Business** of livestock.

LIVESTOCK SUMMARY MATRIX

	DIGESTIVE TYPE	KEY PRODUCT	KEY HOUSING FEATURE	MAJOR DISEASE
CATTLE	Ruminant (4-compartment stomach)	Milk, Meat (Beef), Hides	Well-ventilated Barns/Sheds, Clean Bedding	Mastitis, Foot-and-Mouth Disease
PIGS	Monogastric (Single stomach)	Meat (Pork, Bacon)	Clean, Dry Pens, Temp. Control, Solid/Slatted Floors	Swine Fever (ASF/CSF), Pneumonia
POULTRY	Monogastric (with Crop & Gizzard)	Eggs, Meat (Chicken, Turkey)	Coops/Cages, Perch Space, Nesting Boxes	Newcastle Disease, Avian Influenza
GOATS/ SHEEP	Ruminant (4-compartment stomach)	Meat (Mutton/Chevon), Milk, Wool	Draft-free Shelters, Secure Fencing, Raised Floors	Footrot, Internal Parasites (Worms)
RABBIT	Monogastric (Hindgut Fermenter)	Meat, Fur/Pelt	Hutches with Solid Floor Area, Protection from Predators	Myxomatosis, Coccidiosis

A. CATTLE FARMING (WEEKS 1-4)

- **Breeds:**
    - **Indigenous: Muturu/Ndama** (Trypanotolerant, S), **Sokoto Gudali** (All-rounder, N), **Red Bororo** (Pastoral, N).
    - **Exotic: Friesian** (high milk), **Jersey** (high fat), **Angus/Hereford** (beef).
- **Systems: Dairy** (angular, udder) vs. **Beef** (blocky, muscle).
- **Feeding:** Ruminant (Forage, Hay, **Silage**, Concentrates, **Salt Licks**).
- **Breeding: AI** is key. **Gestation: 9 months**. **Lactation: 10 months**. **Crossbreeding** (for Hybrid Vigor) is vital.
- **Management: Ear Tagging, Dehorning, Castration**. **Colostrum** is vital for calves.
- **Diseases:**

- **Trypanosomiasis:** (Protozoa, **Tsetse Fly** vector, "Nagana," use tolerant breeds).
- **FMD:** (Virus, highly contagious, **Blisters** on mouth/feet, quarantine, vaccinate).
- **Mastitis:** (Bacteria, **Udder** infection, caused by **poor hygiene**, use teat-dipping).

B. PIG FARMING (WEEKS 6 & 8)

- **Breeds: Large White** (erect ears), **Landrace** (floppy ears), Duroc (red).
- **Terms:** Boar (M), Sow (F), Gilt (young F), Farrowing (birth), Litter (group of piglets).
- **Housing: Piggery** (must be concrete, good drainage, with a **wallow**). **Farrowing Crate** is essential to prevent crushing piglets.
- **Feeding: Monogastric** (cannot eat grass). Fed on grains or **Swill** (which *must be boiled*).
- **Breeding: Gestation: 3 months, 3 weeks, 3 days** (115 days).
- **Piglet Management: Needle Teeth Clipping**, **Iron Injection** (to prevent anemia), **Tail Docking** (to prevent biting). **Castration** (to prevent boar taint).
- **Diseases: African Swine Fever (ASF)** (Virus, no cure, no vaccine, culling only), Parasites (Mange, Worms).

C. MICRO-LIVESTOCK (WEEK 9)

- **Rabbits (Cuniculture):**
  - **Housing: Hutch** with **wire mesh floor** (to drop feces/urine).
  - **Feeding:** Pseudo-ruminant, eats forage. Practices **Coprophagy**.
  - **Breeding:** Gestation: **31 days**.
- **Grasscutter (Thryonomy):**
  - **Housing: Concrete pens** (they chew and burrow).
  - **Feeding:** Herbivore (Elephant grass, sugarcane).
  - **Breeding:** Gestation: **150 days (5 months)**.

D. BUSINESS (WEEK 10)

- **Value Addition:** The key to profit.
- **Meat Processing:** Abattoir (slaughter), *Suya*, *Kilishi*, Sausages.
- **Hides/Skins: Tanning** to make **Leather** (e.g., "Morocco Leather" from Red Sokoto).
- **Manure:** Sold as **Fertilizer** or used in a **Biogas Digester** to make Methane.

FINAL EXAM

The final examination will test all aspects of this term's work. Be prepared to define, compare, list, and explain all the key concepts, diseases, and management practices for all four livestock groups.

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