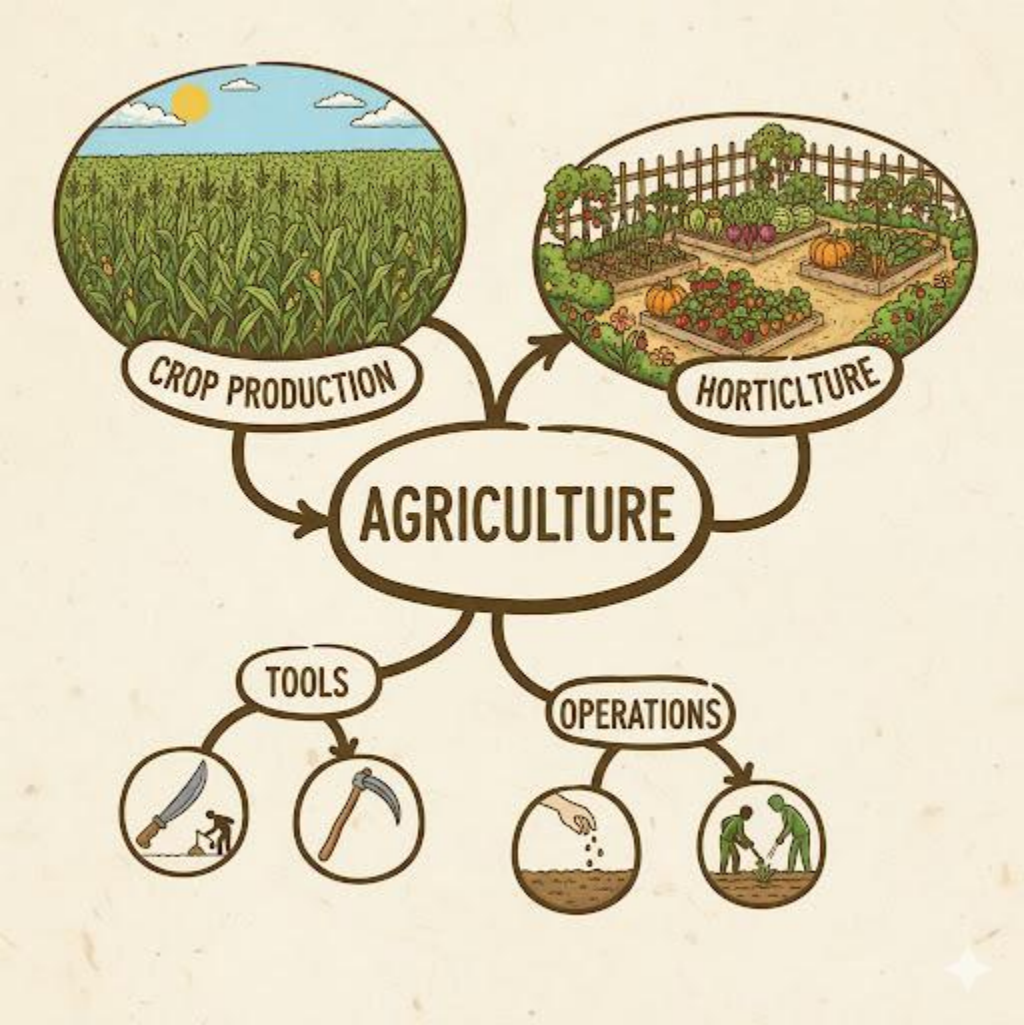
FIRST TERM - JSS 3 HORTICULTURE AND CROP PRODUCTION LESSON NOTES

WEEK 1: REVIEW OF JSS2 WORK

Breakdown (Subtopics):

- Quick revision of crop production and horticulture basics.
- Classification of crops.
- Farm tools and operations.



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Crop Production" and "Horticulture."
2. Differentiate between Crop Production and Horticulture.
3. Classify crops based on their uses (e.g., cereals, legumes, tubers).
4. Identify at least five basic farm tools and state their functions.
5. Distinguish between pre-planting, planting, and post-planting operations.

Lesson Content:

1. What is Agriculture?

Agriculture is the science, art, and business of cultivating the soil, producing crops, and raising livestock (animals) for human use. It is the backbone of human survival, providing us with food, clothing, and shelter.

Agriculture is often divided into branches:

- **Crop Production** (which we study)
- **Animal Husbandry/Production**
- **Fisheries**
- **Forestry**

2. Crop Production vs. Horticulture

- **A. Crop Production (Agronomy):**
    - **Definition:** This is the large-scale cultivation of field crops (like maize, rice, cassava, yams, and cowpea) for food, animal feed, or industrial raw materials.
    - **Focus:** It focuses on **quantity, efficiency, and large-scale** operations (hectares of land).
- **B. Horticulture:**
    - **Definition:** This is a specialized branch of crop production that deals with the intensive cultivation of specific plants.

- **Focus:** It is often done on a smaller, more detailed scale and focuses on **quality, aesthetics, and high-value crops**.
- **Branches of Horticulture:**
    1. **Pomology:** The science of growing fruits (e.g., oranges, mangoes, pineapples).
    2. **Olericulture:** The science of growing vegetables (e.g., tomatoes, peppers, okra, cabbage).
    3. **Floriculture:** The art and science of growing flowers and ornamental plants (e.g., hibiscus, roses, grasses for lawns).

3. Classification of Crops (By Use)

We can classify the crops we grow based on what we use them for:

1. **Cereals:** Grown for their edible grains. They are rich in carbohydrates (energy).
    - *Examples:* Maize (corn), Rice, Sorghum, Millet.
2. **Legumes (or Pulses):** Grown for their seeds (in pods). They are rich in protein. They also add nitrogen to the soil.
    - *Examples:* Cowpea (beans), Groundnut, Soybean.
3. **Tubers:** Grown for their swollen underground "stems." Rich in carbohydrates.
    - *Examples:* Yam, Irish Potato.
4. **Roots:** Grown for their swollen underground "roots." Rich in carbohydrates.
    - *Examples:* Cassava, Sweet Potato, Carrot.
5. **Vegetables:** Grown for their leaves, stems, or fruits, providing vitamins and minerals.
    - *Examples:* Tomato, Pepper, Okra, Onions, Cabbage, Amaranthus (green).
6. **Fruits:** Grown for their sweet, fleshy parts. Rich in vitamins.
    - *Examples:* Orange, Mango, Pawpaw, Pineapple, Banana.
7. **Spices:** Used in small quantities to add flavour and aroma to food.
    - *Examples:* Ginger, Garlic, Turmeric.

4. Basic Farm Tools and Implements

1. **Cutlass:** A long, flat blade used for **clearing bushes** and light vegetation. Also used for harvesting some crops (e.g., sugar cane).
2. **Hoe:** A metal blade attached to a wooden handle, used for **weeding, making ridges/heaps,** and tilling the soil.
3. **Rake:** A tool with "teeth" used for **levelling the soil** after ploughing and for gathering leaves and debris.
4. **Shovel/Spade:** Used for **lifting and moving** loose soil, sand, or manure.
5. **Watering Can:** A container with a spout used for **applying water (irrigating)** small plots, nurseries, and gardens.
6. **Wheelbarrow:** A single-wheeled cart used for **transporting** small loads (like fertilizer, manure, or harvested crops) around the farm.

5. Farm Operations

These are the activities a farmer carries out on the farm.

- **A. Pre-Planting Operations (Before Planting):**
  - *Clearing:* Removing bushes and trees (using a cutlass).
  - *Stumping:* Removing tree stumps (roots).
  - *Ploughing/Tilling:* Breaking up and loosening the soil (using a hoe or tractor).
  - *Harrowing:* Breaking up large soil clumps and levelling the field (using a rake).
  - *Making Ridges/Heaps:* Gathering the topsoil into mounds for planting tubers.
- **B. Planting Operations:**
  - The act of putting seeds or seedlings into the soil.
- **C. Post-Planting Operations (After Planting):**
  - *Weeding:* Removing unwanted plants (weeds) that compete with crops.
  - *Fertilizing:* Applying manure or fertilizer to add nutrients.
  - *Irrigation:* Applying water to the crops (e.g., with a watering can).
  - *Pest/Disease Control:* Protecting crops from harm.
  - *Harvesting:* Gathering the mature crops from the field.

Evaluation:

1. What is the main difference between Crop Production and Horticulture?
2. What is Olericulture?
3. Classify the following crops by their use: (a) Maize, (b) Cowpea, (c) Cassava, (d) Orange.
4. State one function for each of these tools: (a) Hoe, (b) Rake.
5. List three pre-planting operations.

Assignment:

1. Define Agriculture, Pomology, and Floriculture.
2. In a table, list three cereal crops and three legume crops.
3. What is the difference between a pre-planting operation and a post-planting operation?
4. Draw and label a Watering Can and a Cutlass.
5. Why is agriculture important to you and your family?

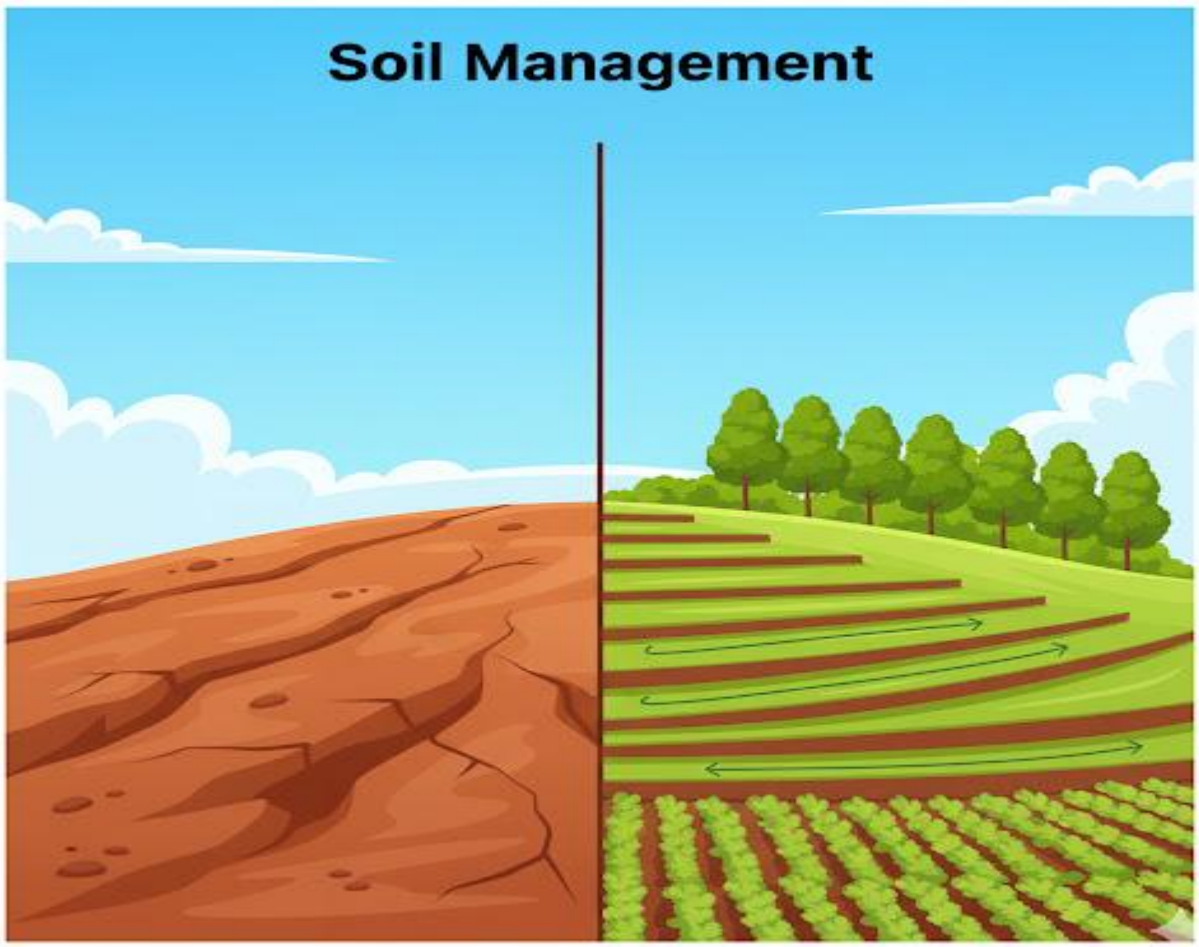
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WEEK 2: SOIL MANAGEMENT

Topic: Soil Management

Breakdown (Subtopics):

- Erosion control methods
- Crop rotation
- Cover cropping



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Soil Management" and state its importance in crop production.

2. Define "Soil Erosion" and identify its primary causes.
3. List and explain three methods of controlling soil erosion.
4. Define "Crop Rotation" and explain two of its major benefits.
5. Define "Cover Cropping" and explain its main functions.

Lesson Content:

Soil management refers to all the practices and operations used to **protect the soil** from damage (like erosion) and to **improve its quality** (its fertility) for successful crop production. Good soil is the most important asset for a farmer, and managing it well ensures good harvests year after year.

1. Soil Erosion

- **Definition:** Soil erosion is the gradual **washing or blowing away** of the rich, fertile **topsoil** from a piece of land.
- **Agents (Causes):**
    - **Water Erosion:** Caused by the impact of rain and the flow of running water, especially on slopes.
    - **Wind Erosion:** Caused by strong winds blowing across large, flat, bare fields, lifting the dry soil particles.
- **Problem:** When the topsoil is lost, the land loses its most fertile part (which contains humus and nutrients), making it very difficult for crops to grow. This leads to poor yield and food scarcity.

2. Erosion Control Methods

These are practical methods farmers use to prevent soil erosion.

- **A. Terracing:**
    - **Function:** This method is used on **steep slopes and hillsides**.
    - **How it works (Efficient):** The farmer cuts a series of flat, level "steps" (called terraces) into the slope. When it rains, the water is held by each step, allowing

it to soak into the soil slowly instead of rushing down the hill and washing the soil away.

- **B. Contour Ploughing (Contour Farming):**
    - **Function:** This is used on **gentle slopes**.
    - **How it works (Efficient):** The farmer ploughs and plants *across* the slope, following the natural contours (curves) of the land, rather than ploughing up and down.
    - **Benefit:** The small ridges created by ploughing act like tiny dams, trapping rainwater and preventing it from flowing downhill quickly.
- **C. Strip Cropping:**
    - **Function:** A method of planting different crops in alternate, narrow strips.
    - **How it works:** A strip of a "row crop" (like maize or yam, which has lots of bare soil) is planted next to a strip of a "cover crop" (like grass or beans, which covers the soil densely). The dense cover crop slows down wind and water, trapping any soil that erodes from the row crop strip.
- **D. Planting Windbreaks (Shelterbelts):**
    - **Function:** Used primarily to **prevent wind erosion**.
    - **How it works:** Farmers plant one or more rows of tall trees or shrubs along the edges of their fields. These trees act as a "wall" to block the wind, reducing its speed and preventing it from lifting the soil.

3. Crop Rotation

- **Definition:** Crop rotation is the practice of planting **different types of crops in the same field in a planned sequence**, season after season or year after year. It is the *opposite* of planting the same crop (monocropping) every single time.
- **Example:**
    - **Year 1:** Plant Maize (a "heavy feeder" that uses a lot of nitrogen).
    - **Year 2:** Plant Beans (a **legume** that *adds* nitrogen back into the soil).
    - **Year 3:** Plant Yam (a "deep feeder" that has deep roots and benefits from the improved soil structure).

- **Benefits (Why it is important):**

    1. **Pest and Disease Control:** Many pests and diseases attack only one type of plant (e.g., a yam pest). By changing the crop to beans, the yam pest's food source is removed, and it starves, breaking its life cycle.
    2. **Improved Soil Fertility:** Different crops use different nutrients. Legumes (like beans, groundnuts, cowpea) have special nodules on their roots that "fix" nitrogen from the air and add it to the soil, acting as a natural fertilizer for the next crop.
    3. **Improved Soil Structure:** Different crops have different root systems (some deep, some shallow), which helps to break up the soil at different levels and improves water infiltration.

4. Cover Cropping

- **Definition:** Cover cropping is the practice of planting crops **not for harvest**, but specifically to **cover and protect the soil** when the main cash crops are not growing (e.g., during the dry season or off-season).
- **Function (Why it is used):**
    1. **Erosion Control:** The cover crop (e.g., grasses, legumes like mucuna or vetch) forms a "mat" or "canopy" over the land. This "green blanket" protects the bare soil from being hit by rain or blown by wind.
    2. **Weed Suppression:** The cover crop grows quickly and "chokes out" or smothers unwanted weeds by competing with them for sunlight and space.
    3. **Builds Soil Fertility (Green Manure):** When it is time to plant the main crop, the farmer can plough the cover crop back into the soil. As it rots, it adds valuable **organic matter** (humus), making the soil richer.

Evaluation:

1. What is soil management?
2. Define "soil erosion" and name its two main agents (causes).

3. What is terracing, and on what type of land is it used?
4. Define crop rotation and give one reason why a farmer should practice it.
5. What is the main difference between a cash crop (like maize) and a cover crop (like mucuna)?

Assignment:

1. In your own words, define the following:
    - (a) Soil Erosion
    - (b) Crop Rotation
    - (c) Cover Cropping
2. Explain the difference between **contour ploughing** and **planting windbreaks**. (Hint: What type of erosion does each one primarily prevent?)
3. A farmer has planted only yams in the same field for 10 years in a row. What two problems is he likely to face?
4. What is a legume? Why are legumes like beans or cowpeas important in crop rotation?
5. List two examples of plants that can be used as cover crops.

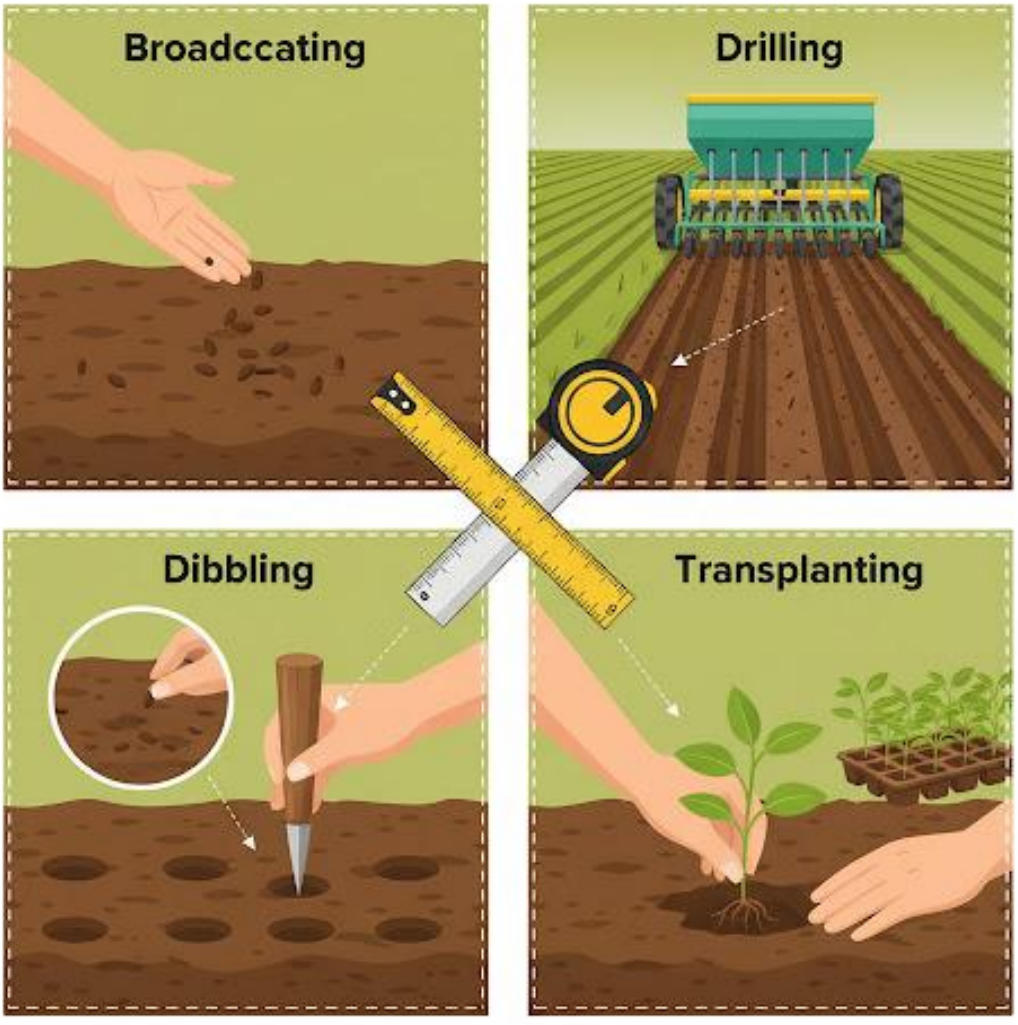
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WEEK 3: CROP PLANTING TECHNIQUES

Topic: Crop Planting Techniques

Breakdown (Subtopics):

- Advanced planting methods
- Spacing and depth
- Related operations (Thinning and Supplying)



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "planting" and list four common planting methods.
2. Differentiate between broadcasting, drilling, and dibbling.
3. Define "planting depth" and explain why it is important for seed germination.
4. Define "plant spacing" and state two reasons for correct spacing.
5. Explain the terms "Thinning" and "Supplying" as post-planting operations.

Lesson Content:

Planting (or sowing) is the act of putting seeds, or young plants (seedlings), into the soil so they can grow. The method used depends on the crop, the tools available, and the size of the farm.

1. Planting Methods

- **A. Broadcasting:**
    - **Definition:** The method of scattering seeds randomly by hand over the entire surface of the prepared field.
    - **How it works:** The farmer takes seeds in his hand and throws them to cover the land. The seeds are then lightly covered with soil using a rake.
    - **Crops:** Rice (in paddy fields), many grasses, and some vegetables (like carrot).
    - **Pros:** Very fast, requires no special equipment.
    - **Cons:** Wasteful (birds eat seeds), leads to uneven spacing and competition.
- **B. Drilling:**
    - **Definition:** The method of placing seeds in continuous furrows (shallow trenches) at a uniform depth.
    - **How it works:** A farmer (or a machine called a drill) opens a long, straight row, drops the seeds in, and covers them.
    - **Crops:** Maize, Wheat, Rice (upland), Sorghum, many vegetables.
    - **Pros:** More uniform, less seed waste, easy to weed between rows.

- **C. Dibbling:**
    - **Definition:** The method of planting seeds in specific holes (at specific distances) made in the soil.
    - **How it works:** A farmer uses a small tool (a dibbler) or a cutlass to make a hole, drops 1-3 seeds in, and covers it. This is planting "at stake."
    - **Crops:** Maize, Beans (Cowpea), Yam, Cassava (cuttings).
    - **Pros:** Very accurate spacing, very little seed waste.
    - **Cons:** Slow and labour-intensive.
- **D. Transplanting:**
    - **Definition:** This is a two-stage method. Seeds are first planted in a small, protected "nursery." When the young plants (seedlings) are strong enough, they are carefully uprooted and moved to the main field.
    - **Crops:** Tomato, Pepper, Onions, Cabbage, Rice (irrigated).
    - **Pros:** Protects young plants, ensures only strong seedlings are planted, gives a "head start."

2. Planting Depth

- **Definition:** Planting depth is **how deep** a seed is placed in the soil.
- **Importance:** This is critical for germination.
    - **If too shallow:** The seed can be eaten by birds or insects, or it can dry out in the sun.
    - **If too deep:** The seed has a small amount of stored food. It may use up all its energy trying to reach the surface and die before it sees sunlight.
- **General Rule of Thumb:** A seed should be planted at a depth of 2-3 times its own diameter. (Small seeds = shallow, Large seeds = deeper).

3. Plant Spacing

- **Definition:** Plant spacing is the **distance between plants** in a row, and the **distance between the rows** themselves (e.g., 90cm *x* 30cm for maize).
- **Importance of Correct Spacing:**

1. **Reduces Competition:** When plants are too close, they "fight" each other for limited resources (sunlight, water, and soil nutrients). This leads to weak plants and low yield.
2. **Prevents Spread of Disease:** Good spacing allows air to circulate freely around the plants, which keeps the leaves dry and makes it harder for fungal diseases to spread.
3. **Ease of Operation:** Proper rows make it easier for the farmer to walk, weed, and apply fertilizer.

4. Related Post-Planting Operations

- **A. Thinning:**
  - **Definition:** The process of removing excess, weak, or overcrowded seedlings from the field, leaving only the strongest ones at the correct spacing.
  - **When:** This is done after germination, when you plant 2-3 seeds per hole and all of them grow.
- **B. Supplying:**
  - **Definition:** The process of **re-planting** seeds or seedlings in the spots where the original ones failed to germinate (failed to grow).
  - **Why:** This ensures the farmer has a full, uniform "plant population" and no gaps in the field, maximizing the yield.

Evaluation:

1. What is the "broadcasting" method of planting?
2. What is the main difference between drilling and dibbling?
3. Why is planting a seed "too deep" a bad idea?
4. State two reasons why correct plant spacing is very important.
5. What is "Thinning"? Why is it necessary?

Assignment:

1. Define Transplanting and give two examples of crops that are transplanted.

2. What is the difference between "Thinning" and "Supplying"?
3. A farmer plants his maize by broadcasting. What are two problems he might face?
4. What is the "general rule of thumb" for planting depth?
5. Look up the recommended spacing for one of these crops: (a) Yam or (b) Cowpea.

WEEK 4: FERTILIZER MANAGEMENT

Topic: Fertilizer Management

Breakdown (Subtopics):

- Organic composting
- Fertilizer scheduling and application methods



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "fertilizer" and "manure."

2. Differentiate between organic and inorganic (chemical) fertilizers, giving an example of each.
3. Define "composting" and list three materials needed to make a compost heap.
4. Explain the process of making compost.
5. Define "fertilizer scheduling" and describe two methods of fertilizer application.

Lesson Content:

Plants, like humans, need food (nutrients) to grow strong and healthy. The main nutrients they get from the soil are **Nitrogen (N)**, **Phosphorus (P)**, and **Potassium (K)**. When the soil is "poor" and lacks these nutrients, the farmer must add them using fertilizers.

1. Types of Fertilizers

- **A. Organic Fertilizers (Manures):**
    - **Definition:** These are fertilizers made from **natural, living (or once-living) sources**. They are bulky and release nutrients slowly.
    - **Examples:**
        - Farmyard Manure: A mix of animal dung (cow, goat) and urine with straw/bedding.
        - Poultry Manure: Droppings from chickens, turkeys, etc. (Very rich in Nitrogen).
        - Compost: Decomposed organic matter (see below).
        - Green Manure: Cover crops that are ploughed into the soil to decompose (see Week 2).
    - **Pros:** Improves soil *structure* (helps it hold water), builds humus, slow-release (won't burn plants), cheap.
    - **Cons:** Bulky and difficult to transport, may contain weed seeds or diseases.
- **B. Inorganic (Chemical) Fertilizers:**
    - **Definition:** These are **man-made chemicals** produced in a factory. They provide specific nutrients in a concentrated form.
    - **Examples:**

        - NPK 15:15:15: A "complete" fertilizer that contains 15% Nitrogen, 15% Phosphorus, and 15% Potassium.
        - Urea: Provides only Nitrogen (N).
        - Single Superphosphate: Provides only Phosphorus (P).
    - **Pros:** Concentrated (easy to carry), fast-acting, nutrient content is known exactly.
    - **Cons:** Expensive, can "burn" plants if over-applied, can make soil acidic, can wash away (leach) and pollute water.

2. Organic Composting

- **Definition:** Composting is a natural process where micro-organisms (like bacteria and fungi) break down organic materials (like leaves and kitchen scraps) into a rich, dark, soil-like substance called **compost** or **humus**.
- **Materials Needed (The "Recipe"):**
    1. **"Greens" (Nitrogen-rich):** Wet materials like vegetable scraps, fruit peels, fresh grass clippings.
    2. **"Browns" (Carbon-rich):** Dry materials like dry leaves, paper, cardboard, wood chips.
    3. **Water:** The heap should be moist, like a damp sponge (not soaking wet).
    4. **Air (Oxygen):** The microbes need to breathe.
    5. **A little soil:** To introduce the microbes.
- **Process (The Heap Method):**
    1. **Start:** Begin with a bottom layer of "browns" (twigs) for air circulation.
    2. **Layer:** Add alternating layers of "greens" and "browns."
    3. **Moisten:** Sprinkle with water as you build, but don't soak it.
    4. **Turn:** Use a pitchfork to "turn" or mix the pile every 1-2 weeks. This adds oxygen, which speeds up decomposition and prevents bad smells.
    5. **Finish:** In a few months, the pile will shrink and turn into dark, crumbly, sweet-smelling compost, ready to be added to the farm.

3. Fertilizer Scheduling and Application

- **A. Fertilizer Scheduling (WHEN to apply):**
    - This means applying fertilizer at the time the plant needs it most.
    - **At Planting (Basal Application):** Fertilizer (especially Phosphorus for roots) is applied in the hole or row *before* or *during* planting.
    - **Top Dressing:** This is applying fertilizer (especially Nitrogen for leaf growth) to the surface of the soil *after* the plants have already started growing. This is often done 3-6 weeks after planting.
- **B. Application Methods (HOW to apply):**

1. **Broadcasting:** Spreading the fertilizer particles evenly over the entire field. This is used for crops like rice or lawns.
2. **Ring Method:** Applying the fertilizer in a circle (a "ring") around the base of a plant, but *away from the stem* to avoid burning it. This is used for individual plants like fruit trees (orange, mango) or tomatoes.
3. **Side/Band Placement:** Applying the fertilizer in a "band" (a continuous line) in a furrow *beside* the row of crops. This is very common for maize.
4. **Foliar Application:** Dissolving the fertilizer in water and *spraying it on the leaves* of the plant. This is a special method used for giving plants a quick "boost."

Evaluation:

1. What is a fertilizer?
2. What is the main difference between an organic and an inorganic fertilizer?
3. What is NPK?
4. Define composting. What are the "greens" and "browns" needed for it?
5. What is "Top Dressing"?

Assignment:

1. List two advantages and two disadvantages of using inorganic (chemical) fertilizers.
2. List three examples of organic manures.

3. Why is it important to "turn" a compost heap?
4. Describe the "Ring Method" of fertilizer application. What kind of crops is it good for?
5. What would happen if a farmer applied fertilizer too close to the stem of a young plant?

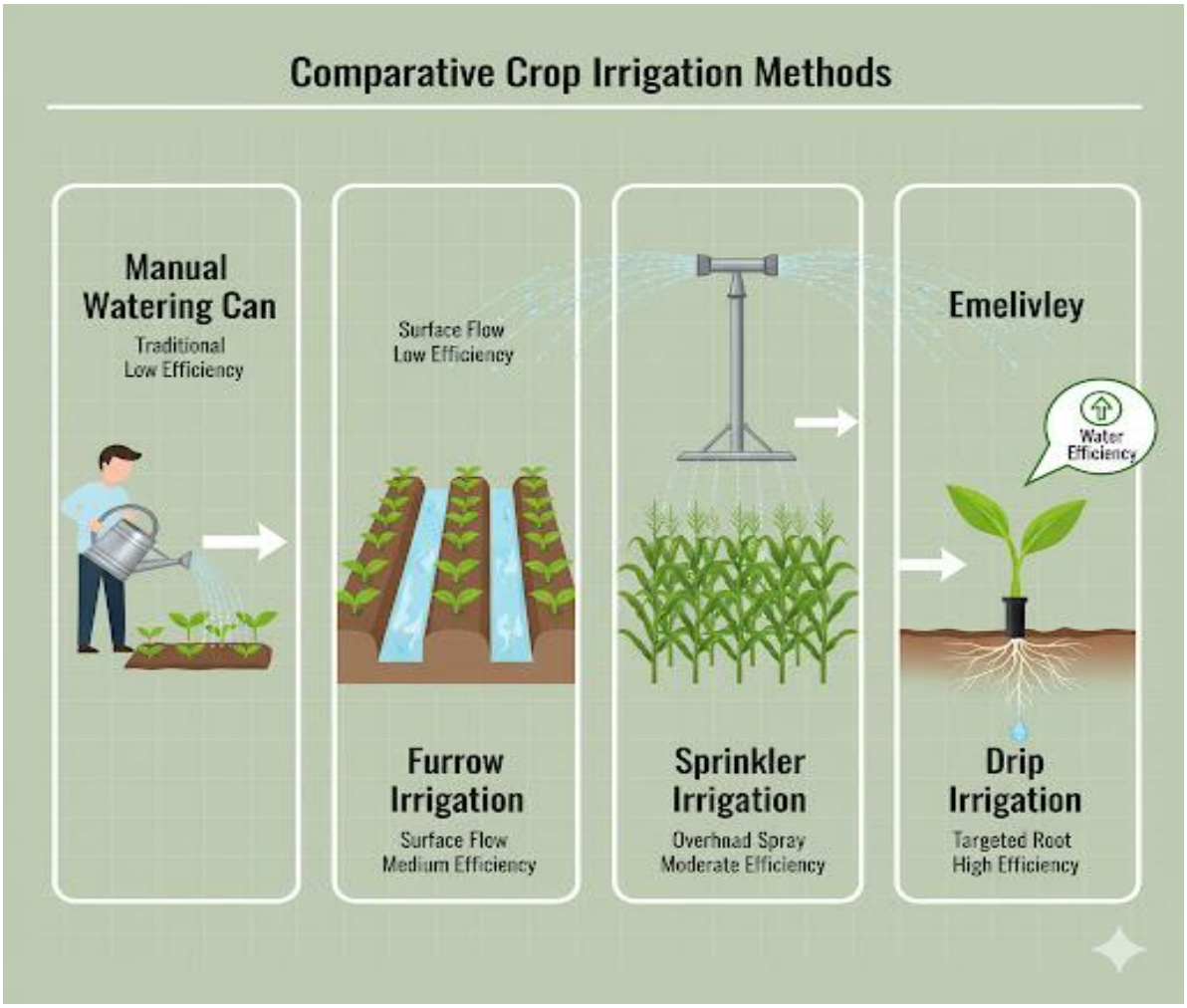
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WEEK 6: CROP IRRIGATION

Topic: Crop Irrigation

Breakdown (Subtopics):

- Meaning and methods of irrigation
- Importance and maintenance



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "irrigation" and "drainage."
2. State three reasons why irrigation is important in crop production.

3. List two traditional (surface) methods of irrigation.
4. Describe two modern methods of irrigation (sprinkler and drip).
5. Explain one basic way to maintain an irrigation system.

Lesson Content:

Water is essential for plants. They need it for photosynthesis, to absorb nutrients, and to stay cool. In many places, rainfall is not enough or does not come at the right time.

1. Meaning of Irrigation and Drainage

- **A. Irrigation:**
  - **Definition:** Irrigation is the **artificial application of water** to farmland to supply moisture for crops.
  - **Purpose:** It is done to help crops grow, especially during the dry season or in areas with low rainfall (arid regions).
- **B. Drainage:**
  - **Definition:** Drainage is the **opposite** of irrigation. It is the **removal of excess water** (waterlogging) from farmland.
  - **Purpose:** Too much water in the soil blocks oxygen and can kill plant roots. Drainage (e.g., digging channels or gutters) is needed to remove this standing water.

2. Importance of Irrigation

1. **All-Year-Round Farming:** With irrigation, farmers are no longer dependent on rain. They can plant and harvest crops even during the dry season, leading to more food and income.
2. **Increases Crop Yield:** Plants that get the right amount of water at the right time will be healthier, grow faster, and produce a much bigger harvest.
3. **Farming in Arid Regions:** Irrigation makes it possible to farm in deserts and other dry lands that would normally be barren.
4. **Cools the Soil:** Water can help to cool the soil and the plant on very hot days.

3. Methods of Irrigation

- **A. Traditional / Surface Methods (Less Efficient):**
    1. **Watering Can Method:** Using a watering can to apply water by hand.
        - *Use:* Very small gardens, nurseries, and vegetable beds.
    2. **Flood / Furrow Irrigation:** Water is brought to the field and allowed to flow over the surface or down furrows (channels) between crop ridges.
        - *Pros:* Very cheap, requires no special equipment.
        - *Cons:* Very wasteful (a lot of water is lost to evaporation and runoff), can cause soil erosion.
- **B. Modern / Localized Methods (More Efficient):** 3. **Sprinkler Irrigation:** * **How it works:** Water is pumped through pipes and sprayed into the air from rotating "sprinkler heads." The water falls on the crops like natural rain. * *Pros:* Covers a large area, good for most crops (like maize, vegetables, lawns). * *Cons:* Can be expensive, some water is lost to wind and evaporation before it hits the ground. 4. **Drip / Trickle Irrigation:** * **How it works:** A network of plastic pipes with tiny holes (called "emitters") is laid on the ground along the plant rows. Water *drips out slowly and directly* onto the soil at the base of each plant. * *Pros:* **Most efficient method.** Saves 90-95% of water. Water goes straight to the roots. Less weed growth. * *Cons:* Very expensive to install, emitters can get clogged with dirt.

4. Maintenance of Irrigation Systems

To make irrigation systems last long, they must be maintained.

- **For Watering Cans:** Wash and dry them after use to prevent rust.
- **For Sprinklers/Drips:**
    - Regularly check and clean the "emitters" or "nozzles" to remove any dirt or algae that may be clogging them.
    - Check all pipes and hoses for leaks and repair them.
    - Keep the water source (tank, well, or dam) clean.

Evaluation:

1. What is irrigation?
2. What is drainage, and why is it necessary?
3. State two reasons why irrigation is important.
4. What is the main difference between sprinkler irrigation and drip irrigation?
5. Which method of irrigation is the most efficient (saves the most water)?

Assignment:

1. Define Irrigation and Drainage.
2. Draw and label a watering can.
3. A farmer has a small vegetable garden in his backyard during the dry season. What is the best and cheapest irrigation method for him to use?
4. A large commercial farm is in a very dry, hot region and wants to grow oranges. What is the *best* (most efficient) irrigation system they should install? Why?
5. Why is flood irrigation considered wasteful?

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WEEK 8: PEST AND DISEASE CONTROL

Topic: Pest and Disease Control

Breakdown (Subtopics):

- Integrated pest management (IPM)
- Crop sanitation



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "pest" and "disease" in agriculture, giving one example of each.

2. List and explain three methods of pest and disease control (e.g., chemical, biological, cultural).
3. Define "Crop Sanitation" and list two sanitation practices.
4. Define "Integrated Pest Management (IPM)."
5. Explain why IPM is considered a better approach than using only chemicals.

Lesson Content:

Pests and diseases are major problems for farmers, as they can destroy an entire harvest.

1. Definitions

- **Pest:** A pest is **any organism** (usually an animal) that damages crops and reduces the quality or quantity of the harvest.
    - *Examples:*
        - Insects: Grasshoppers, Locusts, Stem Borers (eat maize stems), Weevils (eat stored grains).
        - Birds: Crows, Quelea birds (eat rice).
        - Rodents: Rats, Mice (eat yam tubers, grains).
- **Disease:** A disease is a condition caused by a **pathogen** (a micro-organism) that stops the plant from functioning normally, leading to poor growth or death.
    - *Examples:*
        - Fungi: Maize Rust, Black pod of cocoa.
        - Bacteria: Bacterial wilt of tomato.
        - Viruses: Cassava Mosaic Disease (causes yellow, mottled leaves).

2. Methods of Pest and Disease Control

1. **Cultural Control:**
    - **Definition:** Using good farming practices (culture) to naturally prevent or reduce pest problems.
    - **Examples:**

        - **Crop Rotation (Week 2):** Breaks the life cycle of pests that feed on one crop.
        - **Timely Planting:** Planting at the right time can help the crop avoid the "peak" pest season.
        - **Using Resistant Varieties:** Planting a type of maize that is naturally "resistant" to stem borers.
2. **Physical / Mechanical Control:**
    - **Definition:** Physically removing, trapping, or blocking pests.
    - **Examples:**
        - **Hand-picking:** Picking large insects (like caterpillars) off plants by hand.
        - **Traps:** Setting traps for rats.
        - **Fencing:** Building a fence to keep rodents or goats out.
        - **Scarecrows:** Used to scare birds away from a rice field.
3. **Biological Control:**
    - **Definition:** Using a pest's **natural enemies** (predators or parasites) to control it.
    - **Example:** Releasing **ladybugs** (a "good" insect) into a garden to eat **aphids** (a "bad" insect pest). This is using "nature to fight nature."
4. **Chemical Control:**
    - **Definition:** Using man-made chemicals (poisons) to kill pests or stop diseases.
    - **Types:** Pesticides (kill pests), Insecticides (kill insects), Fungicides (kill fungi), Herbicides (kill weeds).
    - **Pros:** Very fast and very effective in the short term.
    - **Cons:** Can be expensive, can kill "good" insects (like bees), can pollute water, can be dangerous to the farmer's health.

3. Crop Sanitation

- **Definition:** Crop sanitation simply means **keeping the farm clean**. It is one of the best and cheapest forms of cultural control.

- **Purpose:** A clean farm removes the food and hiding places for pests and diseases, preventing them from building up and spreading.
- **Sanitation Practices:**
    1. **Regular Weeding:** Weeds are unwanted plants that hide pests (like insects and snakes) and compete with crops.
    2. **Removing Diseased Plants:** If one plant is sick, pull it out and burn or bury it *far away* from the farm so the disease cannot spread.
    3. **Clearing Farm Tools:** Cleaning soil and plant sap off your cutlass and hoe after use so you don't carry diseases from one plant to another.
    4. **Destroying Crop Residues:** After harvesting maize, the old, dry stalks should be removed, as stem borers can hide in them until the next season.

4. Integrated Pest Management (IPM)

- **Definition:** IPM is a "smart," modern approach that **combines multiple control methods** (cultural, biological, physical, and chemical) to manage pests safely and effectively.
- **How it works:** An IPM farmer doesn't just spray chemicals at the first sign of a pest.
    1. First, they use **prevention** (cultural control, sanitation).
    2. Then, they **monitor** the field.
    3. If a pest appears, they try **biological** or **physical** controls first.
    4. Only as a **last resort**, if the pest is causing major damage, will they use a small amount of the *safest* possible chemical, applied at the *right* time.
- **Why it's better:** It is more sustainable, better for the environment, safer for the farmer, and prevents pests from becoming resistant to chemicals.

Evaluation:

1. What is the main difference between a pest and a disease?
2. Give one example of a cultural control method.
3. What is biological control?
4. Define crop sanitation and list two of its practices.

5. What is Integrated Pest Management (IPM)?

Assignment:

1. A farmer sees aphids (small insects) on his tomato plants.
    - (a) What is a *chemical* way to control them?
    - (b) What is a *biological* way to control them?
2. Why is it a bad idea for a farmer to *only* use chemical pesticides all the time? (Give two reasons).
3. What is a "resistant variety"?
4. Why is it important to remove and burn a plant that has a virus (like Cassava Mosaic Disease)?
5. What is a "pathogen"? Give an example of a type of pathogen.

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WEEK 9: CROP HARVESTING AND YIELD IMPROVEMENT

Topic: Crop Harvesting and Yield Improvement

Breakdown (Subtopics):

- Harvesting techniques
- Crop yield measurement



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "harvesting" and "crop maturity."
2. List two common signs of maturity for a specific crop (e.g., maize or yam).

3. Describe two different harvesting techniques and the tools used (e.g., reaping, digging).
4. Define "crop yield."
5. List three farm practices (from this term) that can improve crop yield.

Lesson Content:

Harvesting is the reward for all the farmer's hard work. It must be done at the right time and in the right way to get the best results.

1. Harvesting and Maturity

- **A. Harvesting:**
  - **Definition:** Harvesting is the process of gathering the mature crops from the field. It is the final post-planting operation.
- **B. Crop Maturity:**
  - **Definition:** This is the stage at which a crop is fully developed and ready to be harvested for its intended use.
  - **Importance:**
    - Harvesting **too early** = low yield, poor quality (e.g., unripe, small).
    - Harvesting **too late** = crop may spoil, get eaten by pests, or shatter (grains fall on the ground).
  - **Signs of Maturity:** These are the "signals" the plant gives to show it is ready. They vary for each crop:
    - **Maize (for grain):** The cobs droop downwards, the silks (hairs) turn brown and dry, and the grains are hard and dry.
    - **Yam:** The leaves and stems turn yellow and dry up (this is called senescence).
    - **Cassava:** Can be harvested after 8-12 months. The lower leaves turn yellow and drop, and the tubers are a good size.
    - **Tomato:** The fruits are firm and have a uniform colour (e.g., deep red).

- **Rice:** The grains are hard, and the panicle (head) turns from green to a golden-yellow colour.

2. Harvesting Techniques and Tools

The method used depends on the crop.

1. **Reaping / Cutting:**
    - **Definition:** Using a sharp tool to cut the stalk of the plant.
    - **Tools:** Sickle (a curved blade), Cutlass.
    - **Crops:** Rice, Millet, Wheat, Sugar cane.
2. **Digging / Lifting:**
    - **Definition:** Using a tool to dig into the soil and lift out the underground root or tuber.
    - **Tools:** Hoe, Digging fork, Spade.
    - **Crops:** Yam, Cassava, Sweet Potato, Irish Potato, Groundnut.
3. **Hand-picking:**
    - **Definition:** Using hands to pick the fruit or vegetable from the plant. This is done carefully to avoid damaging the plant or the produce.
    - **Tools:** Hands (sometimes with a small knife).
    - **Crops:** Tomato, Pepper, Okra, Oranges, Mangoes, Cotton.
4. **Mechanical Harvesting:**
    - **Definition:** Using large, complex machines to harvest on a commercial scale.
    - **Tools:** Combine Harvester (cuts, threshes, and cleans grains all at once), Potato Harvester, Tomato Harvester.
    - **Crops:** Maize, Wheat, Rice (on very large farms).

3. Crop Yield and Yield Improvement

- **A. Crop Yield:**
    - **Definition:** Crop yield is the **total amount** (measured in weight or quantity) of a crop that is harvested from a specific area of land.

- **Measurement:** It is usually measured in **tonnes per hectare** (e.g., "The farmer's yield was 5 tonnes of maize per hectare"). A "bag" or "basket" can also be used, but this is less accurate.

- **B. Yield Improvement:**
  - **Definition:** These are all the good farm practices that help a farmer get the **maximum possible harvest** (highest yield) from their land.
  - **How to Improve Yield (Review of Term's Work):**
    1. **Use Improved Seeds:** Plant high-quality seeds that are certified to be high-yielding and disease-resistant.
    2. **Good Soil Management (Week 2):** Control erosion and use crop rotation to keep the soil fertile.
    3. **Proper Planting (Week 3):** Use the correct spacing and planting depth.
    4. **Fertilizer Management (Week 4):** Apply the right compost or NPK fertilizer at the right time (scheduling).
    5. **Proper Irrigation (Week 6):** Give the crops enough water, especially during the dry season.
    6. **Good Pest & Disease Control (Week 8):** Use IPM and crop sanitation to protect the plants.
    7. **Timely Harvesting:** Harvest at the perfect time to prevent losses.

Evaluation:

1. What is "harvesting"?
2. What does "crop maturity" mean?
3. What are two signs that maize is ready for harvest as a grain?
4. What is the difference between reaping and digging as harvesting methods?
5. Define "crop yield."

Assignment:

1. What will happen if a farmer harvests his tomatoes (a) too early, or (b) too late?
2. What is a Combine Harvester, and what does it do?

3. List three harvesting "techniques" and a crop that is harvested by each.
4. What is the main tool used for harvesting yams?
5. List three things you learned this term that can help a farmer improve his crop yield.

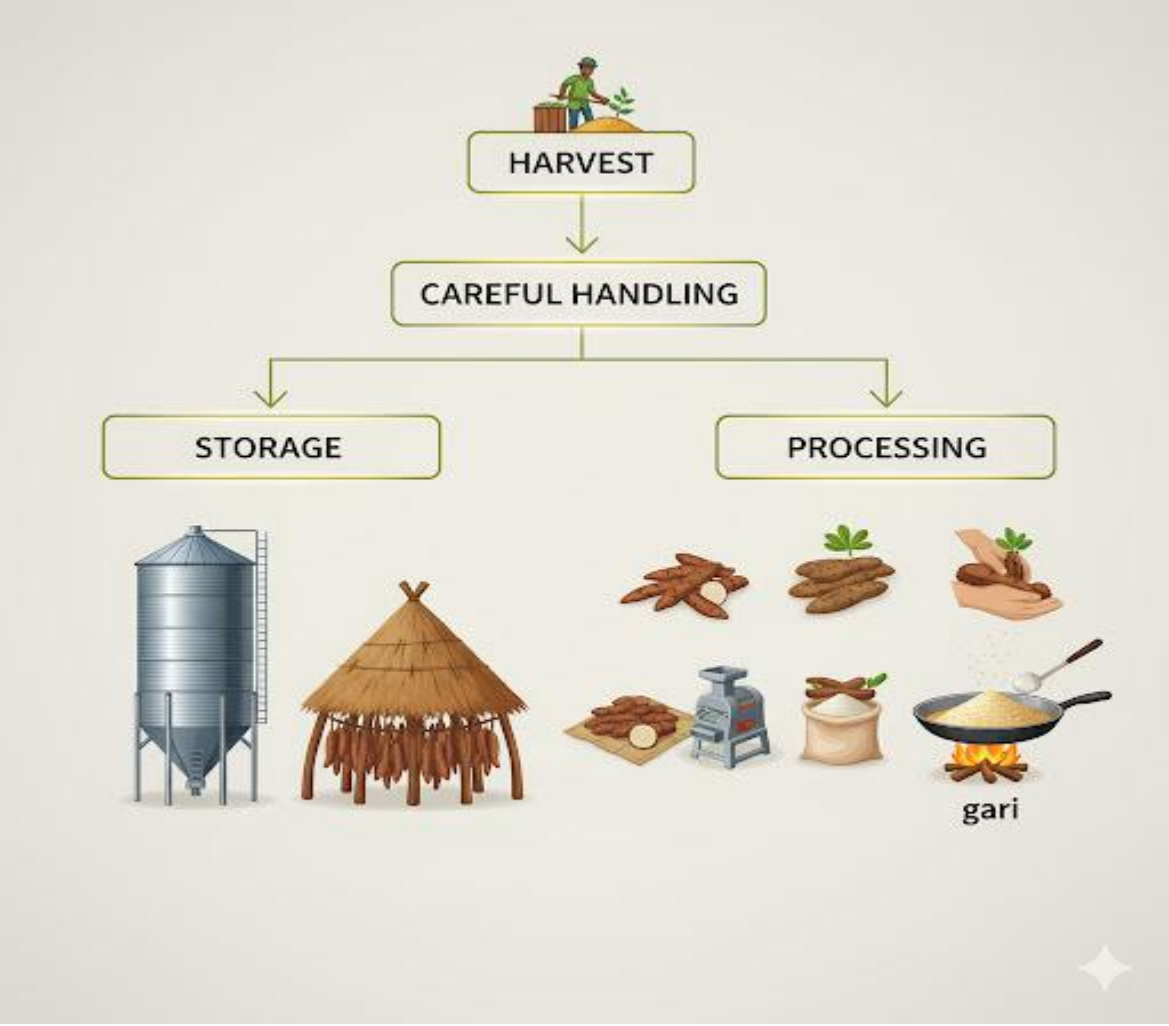
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WEEK 10: POST-HARVEST TECHNOLOGY

Topic: Post-Harvest Technology

Breakdown (Subtopics):

- Handling, storage, and processing
- Reducing post-harvest losses



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Post-Harvest Technology."
2. Define "Post-Harvest Loss" and state one cause.

3. Define "storage" and list two traditional storage methods (e.g., barn) and one modern method (e.g., silo).
4. Define "processing" and give two examples of processing a crop (e.g., cassava to gari).
5. Explain two reasons why processing is important.

Lesson Content:

Harvesting is not the end of the farmer's work. What happens *after* harvest is just as important. In many countries, 30-50% of food is lost *after* it leaves the field.

1. Post-Harvest Technology & Losses

- **A. Post-Harvest Technology:**
  - **Definition:** This includes all the activities, operations, and technologies used **after** a crop is harvested to **protect it, preserve it, and prepare it** for consumption, storage, or sale.
- **B. Post-Harvest Loss:**
  - **Definition:** This is the reduction in the quantity (amount) or quality (taste, nutrition) of a crop *after* it has been harvested.
  - **Causes:**
    - Physical Damage: Bruising, cutting, or crushing during careless harvesting and transport.
    - Pests: Insects (like weevils) and rodents (rats) eating stored grains.
    - Spoilage: Rot, mould, and decay caused by fungi and bacteria (especially if the crop is not dried properly).

2. Key Post-Harvest Operations

1. **Handling:**
   - This is the *careful* movement of harvested crops.
   - *Example:* Tomatoes must be handled gently and put in padded crates, not baskets, to prevent bruising.

2. **Threshing / Shelling:**
    - The process of separating the desired grain from the stalk, cob, or pod.
    - *Examples:* Beating rice stalks to release the grain; removing maize grains from the cob.
3. **Drying:**
    - This is the **most important** step for grains. It involves removing excess moisture to a safe level (10-13%).
    - *Why:* Wet grains will be attacked by mould (fungi) and rot in storage.
    - *Methods:* Sun-drying (on a mat or patio), using an artificial crop dryer.
4. **Cleaning:**
    - Removing stones, dirt, chaff, and insects from the grain.

3. Storage

- **Definition:** Storage is the process of keeping the crop in a safe, clean, and dry place until it is needed for food or sale.
- **Good Storage Conditions:** A good storage place must be:
    - **Dry:** To prevent mould.
    - **Cool:** To slow down spoilage.
    - **Pest-proof:** To keep out rats and insects.
    - **Well-ventilated:** To allow air to circulate.
- **Storage Methods:**
    - **Traditional Methods:**
        - Yam Barns: A structure made of poles and thatch used to tie and store individual yam tubers.
        - Rhombus: A local grain crib (store) made of mud and straw, raised off the ground.
    - **Modern Methods:**
        - Silos: Large, airtight metal or concrete towers used to store huge amounts of grain (maize, wheat) on commercial farms.

- Cold Rooms: A large, refrigerated room (like a walk-in freezer) used to store perishable fruits and vegetables (like tomatoes, peppers).

4. Processing

- **Definition:** Processing is the changing of a crop from its **raw form** into a new, different, or more valuable **product**.
- **Examples of Processing:**
  - Cassava $\rightarrow$ Gari, Fufu, Starch, Cassava flour (Lafun)
  - Maize $\rightarrow$ Pap (Ogi), Cornflakes, Maize flour, Cooking oil
  - Oil Palm Fruit $\rightarrow$ Palm Oil, Palm Kernel Oil
  - Tomato $\rightarrow$ Tomato Paste, Ketchup
  - Groundnut $\rightarrow$ Groundnut Oil, Kulikuli
- **Importance of Processing:**

1. **Increases Shelf-Life (Preservation):** Processing makes food last much longer. *Example:* Fresh cassava rots in 3 days, but Gari can last for a year.
2. **Adds Value:** Processed goods sell for much more money than raw ones. *Example:* A bottle of palm oil sells for more than the fresh palm fruits used to make it.
3. **Reduces Bulk:** Makes the product easier to transport and store (e.g., Gari is lighter and smaller than fresh cassava).
4. **Improves/Changes Taste:** Makes food more convenient or better tasting.

Evaluation:

1. What is "Post-Harvest Technology"?
2. What is a "post-harvest loss"? Give one cause.
3. Why is "drying" such an important step before storing grains?
4. What is the difference between a traditional yam barn and a modern silo?
5. Define "processing" and give one example.

Assignment:

1. List two reasons why it is important to process crops.
2. What is the main difference between "storage" and "processing"?
3. A farmer carelessly throws his harvested tomatoes into a rough basket. What kind of post-harvest loss is likely to occur?
4. Name two food products that are made from processing:
    - (a) Cassava
    - (b) Maize
5. What are four conditions of a good storage environment?

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WEEK 11: REVISION

Topic: Revision

Breakdown (Subtopics):

- Comprehensive review of all topics from the term.
- Preparation for First Term Examination.

Performance Objectives: By the end of this lesson, students should be able to:

1. Recall and define at least 10 key terms from the term's work.
2. Answer review questions from all topics (Week 2 to Week 10).
3. Connect the different topics together (e.g., how soil management affects yield).
4. Confidently prepare for the First Term Examination.

Lesson Content:

This week is dedicated to a full review of all topics covered this term. We will see how all the topics connect to the single goal of successfully producing a crop.

1. Summary of Key Topics

- **Week 2: Soil Management**
    - We learned to protect our most important resource, the soil.
    - *Key Concepts:* Soil Erosion, Terracing, Contour Ploughing, Crop Rotation, Cover Cropping.
- **Week 3: Crop Planting Techniques**
    - We learned how to plant seeds correctly.
    - *Key Concepts:* Broadcasting, Drilling, Dibbling, Transplanting, Planting Depth, Plant Spacing, Thinning, Supplying.
- **Week 4: Fertilizer Management**
    - We learned how to "feed" our plants.

    - *Key Concepts:* Organic Manure, Inorganic (NPK) Fertilizer, Composting, Ring Method, Top Dressing.
- **Week 6: Crop Irrigation**
    - We learned how to "water" our plants when there is no rain.
    - *Key Concepts:* Irrigation, Drainage, Sprinkler Irrigation, Drip Irrigation.
- **Week 8: Pest and Disease Control**
    - We learned how to protect our plants from enemies.
    - *Key Concepts:* Pest, Disease, Pathogen, Cultural Control, Biological Control, Chemical Control, Crop Sanitation, IPM.
- **Week 9: Crop Harvesting & Yield Improvement**
    - We learned when and how to gather the harvest.
    - *Key Concepts:* Harvesting, Maturity Signs, Reaping, Digging, Crop Yield.
- **Week 10: Post-Harvest Technology**
    - We learned what to do *after* the harvest to prevent waste.
    - *Key Concepts:* Post-Harvest Loss, Storage (Barns, Silos), Processing, Added Value, Shelf-life.

2. How It All Connects (The "Big Picture")

To be a successful farmer and get a **high yield** (Week 9), you must:

1. Start with good **soil** (Week 2).
2. **Plant** your crops correctly (Week 3).
3. Feed them with **fertilizer** (Week 4).
4. Give them **water** (Week 6).
5. Protect them from **pests and diseases** (Week 8).
6. Harvest them at the right time and **store/process** them correctly to prevent loss (Week 10).

Failure in any one of these steps will lead to a poor harvest.

Evaluation (Classroom Activity):

- **Rapid-Fire Questions:** The teacher will ask questions from all topics, and students will answer.
    - "What is crop rotation?"
    - "What is the most efficient irrigation method?"
    - "What is IPM?"
    - "What is the difference between a pest and a disease?"
    - "What is Gari made from?"
- **Board Work:** Students will be asked to come to the board and draw diagrams (e.g., a compost heap, a terraced hill, the "ring method" of fertilizing).

Assignment (Exam Preparation):

1. **Create a Glossary:** Define the following 15 terms in your notebook:
    1. Soil Erosion
    2. Crop Rotation
    3. Cover Cropping
    4. Transplanting
    5. Plant Spacing
    6. Composting
    7. NPK
    8. Irrigation
    9. Drip Irrigation
    10. Pest
    11. Crop Sanitation
    12. IPM
    13. Crop Yield
    14. Storage
    15. Processing
2. **Write a Paragraph:** Describe, from start to finish, the steps a farmer would take to grow a crop of maize. Use at least 5 of the key terms from the list above.
3. **Study:** Review all your notes, evaluations, and assignments from Week 1 to Week 10 to prepare for your examination.

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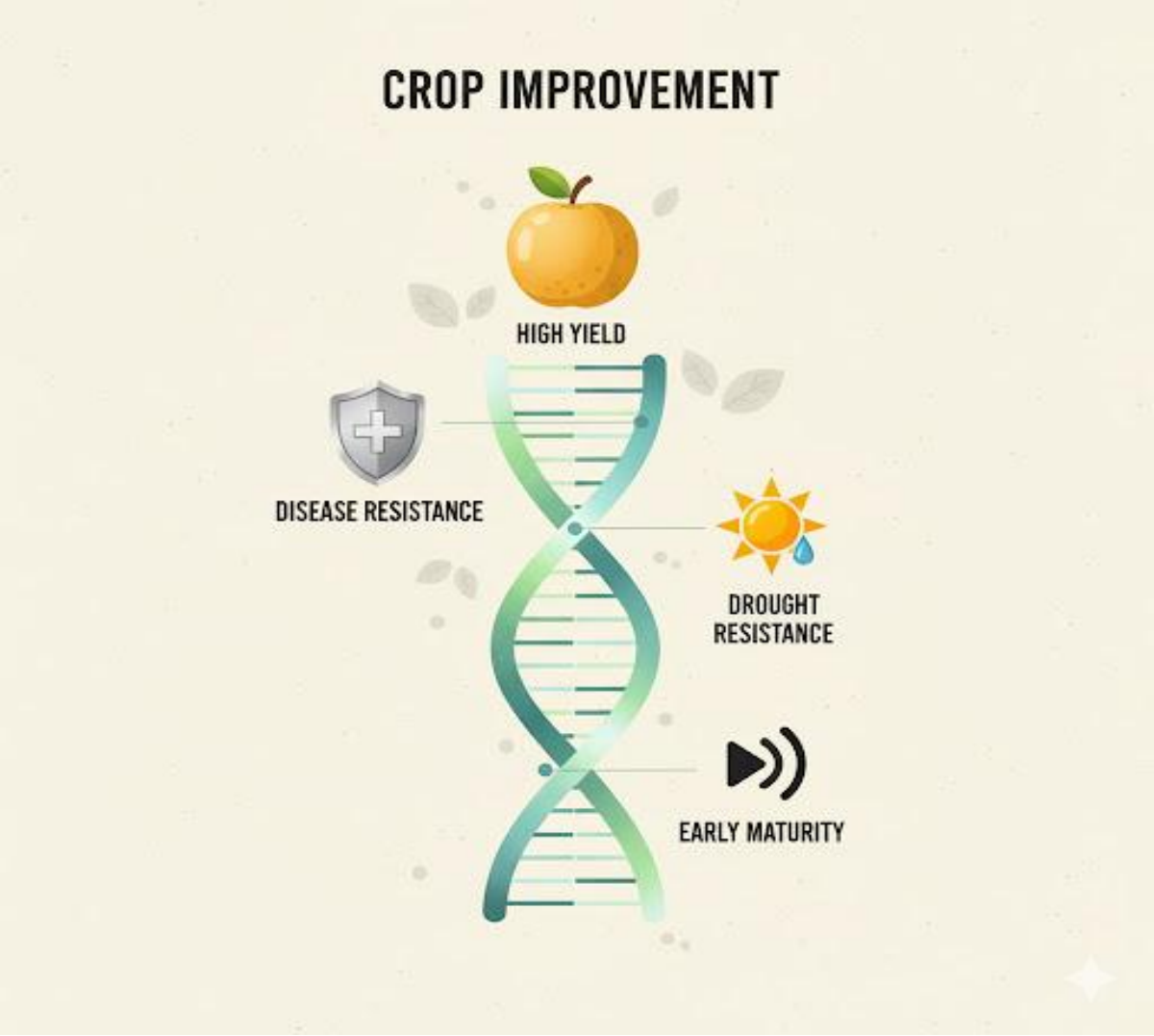
SECOND TERM - JSS 3 HORTICULTURE AND CROP PRODUCTION LESSON NOTES

WEEK 1: CROP IMPROVEMENT

Topic: Crop Improvement

Breakdown (Subtopics):

- Meaning and methods
- Selection, breeding, hybridization



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Crop Improvement."

2. State three main goals of crop improvement.
3. List three basic methods of crop improvement.
4. Differentiate between "mass selection" and "pure-line selection."
5. Define "hybridization" and state its main advantage.

Lesson Content:

1. Meaning and Goals of Crop Improvement

- **Definition:** Crop Improvement is the science of developing new varieties of crop plants that are better than the existing ones. It is the process of "improving" a plant's genetics to make it more useful to humans.
- **Goals (What we want to achieve):**
    1. **High Yield:** To produce more food (e.g., more maize grains per cob, or bigger yam tubers).
    2. **Disease/Pest Resistance:** To develop plants that can naturally fight off diseases (like Cassava Mosaic Disease) or pests (like stem borers).
    3. **Better Quality:** To improve the taste, nutritional value, or appearance (e.g., a sweeter orange, or rice with more protein).
    4. **Drought Resistance:** To develop crops that can survive with very little water.
    5. **Early Maturity:** To develop crops that are ready to harvest in a shorter time (e.g., a 90-day maize vs. a 120-day maize).

2. Methods of Crop Improvement

There are three traditional methods used to improve crops.

- **A. Introduction:**
    - **Definition:** This is the simplest and oldest method. It involves taking a high-quality crop variety from another country or region and introducing it to a new area.
    - **Example:** The *Tenera* variety of oil palm, which is very high-yielding, was introduced to Nigeria from Malaysia.

- **B. Selection:**
    - **Definition:** This is the process of choosing the "best" plants from a large population (based on their appearance) and using their seeds to grow the next generation.
    - **Types of Selection:**
        1. **Mass Selection:** The farmer walks through a field and picks all the best-looking plants (e.g., the tallest maize with the biggest cobs). He mixes all their seeds and plants them next year. This is simple but not very accurate.
        2. **Pure-Line Selection:** A more scientific method. The farmer picks the *single best plant*, grows its seeds in a separate plot, and repeats this for many generations until he gets a "pure line" where all plants are excellent.
- **C. Hybridization (or Breeding):**
    - **Definition:** This is the most powerful method. It is the process of **crossing** two different parent plants that have different desirable traits, in order to produce an offspring (a "hybrid") that has *both* good traits.
    - **How it works:**
        1. **Parent A:** Has very high yield, but gets sick easily.
        2. **Parent B:** Has low yield, but is very disease-resistant.
        3. **Cross-Pollinate:** The breeder takes pollen from Parent A and puts it on the flower of Parent B.
        4. **Result (Hybrid C):** The seeds from this cross will grow into a new "hybrid" plant that is **both high-yielding and disease-resistant**.
    - **Hybrid Vigor (Heterosis):** This is the name for the common result where the hybrid offspring is bigger, stronger, and better than both of its parents.

Evaluation:

1. What is crop improvement?
2. List three reasons why scientists try to improve crops.

3. What is the "introduction" method of crop improvement?
4. What is the main difference between mass selection and hybridization?
5. Define "Hybrid Vigor."

Assignment:

1. A farmer has two types of tomatoes. One is very sweet but small. The other is very large but sour. Which method of crop improvement should be used to get a large, sweet tomato?
2. What is the main disadvantage of "mass selection"?
3. List two traits (characteristics) a farmer might want in a (a) Cassava plant and (b) a Tomato plant.
4. What does "disease resistance" mean?
5. What does "early maturity" mean, and why is it a good trait for a crop?

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WEEK 2: SEED PRODUCTION AND CERTIFICATION

Topic: Seed Production and Certification

Breakdown (Subtopics):

- Meaning and importance
- Agencies involved



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "seed production" as a business.
2. Define "seed certification" and "certified seed."

3. List three characteristics of a certified seed.
4. State two reasons why a farmer should use certified seeds.
5. Identify the main agency responsible for seed certification in Nigeria.

Lesson Content:

1. Seed Production

- **Definition:** Seed production is a specialized, large-scale business of growing crops **specifically to produce high-quality seeds for sale**, not for food.
- **Seed vs. Grain:**
    - **Grain:** The crop that is harvested to be eaten or sold for food (e.g., maize sold at the market for *tuwo*).
    - **Seed:** The crop that is harvested, processed, and tested *specifically for planting*. It must be high-quality.
- **Who does it?** Seed production is done by specialized "Seed Companies" or "Seed Growers" who have the skills and equipment to produce pure, healthy seeds.

2. Seed Certification

- **Definition:** Seed certification is a **quality-control process**. It is a system where a special government agency inspects the seed production process (from the farm to the bag) to ensure the seeds are of the highest quality.
- **Certified Seed:** This is the final product. It is seed that has passed all the inspections and is sold in a special bag with an official **"Certified Seed" tag** or label. This tag is a *guarantee* to the farmer.
- **Characteristics of Certified Seed:**
    1. **High Purity:** The bag contains *only* the correct variety (e.g., 99% of the seeds are the new, improved maize).
    2. **High Viability (Germination Rate):** The seed is alive and will grow (e.g., 95 out of 100 seeds will germinate).
    3. **Free from Impurities:** It is clean and contains no weed seeds, stones, or dirt.

4. **Free from Disease:** The seeds are not carrying any pathogens (like fungi or viruses).

3. Importance of Using Certified Seed

A farmer should *not* just save seeds from the market to plant. They should buy certified seed because:

1. **Guaranteed High Yield:** Certified seed comes from the improved varieties (from Week 1). It has the genetic potential to produce a very high yield.
2. **Prevents Disease:** Planting seed from the market can introduce new diseases to a farmer's land. Certified seed is disease-free.
3. **Uniformity:** All the plants will grow at the same rate, to the same height, and be ready to harvest at the same time. This makes managing the farm much easier.
4. **Farmer Confidence:** The farmer is confident that what they are planting is what the label says it is.

4. Seed Certification Agencies

- **In Nigeria:** The main government agency responsible for this process is the **National Agricultural Seed Council (NASC)**.
- **Role of NASC:**
    - They regulate all seed companies in Nigeria.
    - Their inspectors visit seed farms to check for purity and health.
    - They conduct lab tests on seeds for germination and purity.
    - They issue the official "Certified Seed" tags (often blue or green) that you see on seed bags.

Evaluation:

1. What is the difference between "seed" and "grain"?
2. What is "seed certification"?
3. List three qualities you would expect from a bag of "certified seed."

4. Give two reasons why a farmer should buy certified seed instead of saving seed from the market.
5. What does NASC stand for, and what is its job?

Assignment:

1. In your own words, explain why "seed production" is a special business, different from "crop production."
2. What is a "germination rate"? Why is it important?
3. Next time you see a shop selling seeds (or a large farm), look for the bag. Draw the "certified seed" tag if you see one.
4. What problems might a farmer face if he plants seeds that are *not* certified? (List two).
5. What is a "weed seed," and why is it bad to have it in a bag of maize seed?

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WEEK 3: ORGANIC FARMING

Topic: Organic Farming

Breakdown (Subtopics):

- Meaning and principles
- Benefits and challenges



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Organic Farming."
2. Differentiate organic farming from conventional (chemical) farming.

3. List three key principles of organic farming.
4. State two benefits of organic farming.
5. State two challenges of organic farming.

Lesson Content:

1. Meaning of Organic Farming

- **Definition:** Organic farming is a method of crop production that **avoids the use of all artificial (synthetic) chemicals**. This includes chemical fertilizers (like NPK and Urea) and chemical pesticides (like insecticides and fungicides).
- **Core Idea:** It is a "back-to-nature" system that focuses on building healthy soil and a healthy environment. It uses natural methods that our great-grandparents used, but with modern scientific understanding.
- **Organic vs. Conventional:**
    - **Conventional Farming:** Uses chemical fertilizers (NPK) and chemical pesticides to get high yields. This is the most common type of farming today.
    - **Organic Farming:** Uses **compost** and **biological pest control** (IPM) to get good yields.

2. Key Principles of Organic Farming

An organic farmer lives by these rules:

1. **Feed the Soil, Not the Plant:** Instead of giving the plant "fast food" (NPK), the farmer builds healthy soil using **compost, farmyard manure, and green manure (cover crops)**. A healthy soil will then feed the plant.
2. **No Chemical Pesticides:** The farmer uses **cultural controls** (crop rotation, sanitation) and **biological controls** (IPM, using natural enemies) to manage pests (see Term 1, Week 8).
3. **No Chemical Herbicides (Weed-killers):** Weeds are controlled by hand-weeding, mulching (covering the soil), or cover cropping.

4. **Promote Biodiversity:** An organic farmer encourages "good" insects, birds, and soil microbes to live on the farm, creating a balanced ecosystem.
5. **Use Organic Seeds:** (When possible) planting seeds that were also grown organically.

3. Benefits of Organic Farming

- **A. Benefits to Health:**
  - The food produced is **free from chemical residues**, which many people believe is healthier to eat.
  - It is **safer for the farmer**, who is not exposed to dangerous pesticide sprays.
- **B. Benefits to the Environment:**
  - It **does not pollute water** (rivers, streams) with chemical runoff.
  - It **protects "good" insects** like bees (which are needed for pollination) and earthworms.
- **C. Benefits to the Soil:**
  - It **builds soil structure** and increases humus (organic matter), making the soil better at holding water and resisting erosion.

4. Challenges of Organic Farming

If organic farming is so good, why doesn't everyone do it?

1. **More Labour-Intensive:** It often requires more physical work (e.g., hand-weeding instead of spraying, making compost).
2. **Lower Yields (Initially):** When a farmer first switches from chemical to organic, their crop yield might drop for a few years as the soil recovers.
3. **Certification is Difficult:** To *legally* label your food "Certified Organic," you must pass a very strict and expensive inspection.
4. **Appearance:** Organic fruits and vegetables may not look as "perfect" or shiny as conventional ones (they might have some insect bites), even though they are healthy.

Evaluation:

1. What is organic farming?
2. What is the main difference between an organic farmer and a conventional farmer in how they:
    - (a) Control pests?
    - (b) Fertilize their soil?
3. List two principles of organic farming.
4. State two benefits of organic farming.
5. State two challenges a farmer might face when trying to farm organically.

Assignment:

1. In your own words, explain the organic principle "Feed the soil, not the plant."
2. Would you prefer to eat an "organic" tomato or a "conventional" tomato? Explain your answer.
3. What is "mulching," and how does it help an organic farmer?
4. What methods from Term 1 (Weeks 2, 4, and 8) are very important in organic farming? (List at least three).
5. What is "biodiversity," and why is it good for a farm?

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WEEK 4: GREENHOUSE TECHNOLOGY

Topic: Greenhouse Technology

Breakdown (Subtopics):

- Meaning and components
- Advantages in horticulture



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Greenhouse" (or "Screenhouse").
2. List three essential components of a greenhouse.
3. Explain the main purpose of a greenhouse.
4. List three advantages of growing horticultural crops (like tomatoes) in a greenhouse.
5. Identify one major challenge of using a greenhouse.

Lesson Content:

1. Meaning of Greenhouse Technology

- **Definition:** A greenhouse is a framed **building** (structure) covered with a **transparent or translucent material** (like glass, plastic, or insect-proof netting).
- **Purpose:** The main purpose of a greenhouse is to **create an artificial, controlled environment** for growing high-value crops. It allows the farmer to control the temperature, humidity, and water, and to protect the plants from pests and harsh weather.
- **Types:**
    - **Greenhouse:** Fully enclosed with plastic or glass to trap heat (used in cold countries, or to control heat/humidity).
    - **Screenhouse (Net house):** Enclosed with fine insect-proof netting (very common in hot places like Nigeria) to *block insects* and *reduce harsh sun* while allowing air to flow. We often use the word "greenhouse" for both.

2. Components of a Greenhouse/Screenhouse

1. **Frame:** The "skeleton" that holds the structure. It can be made of treated wood, galvanized steel, or PVC pipes.
2. **Covering (Glazing):** The "skin" that lets in light.
    - Plastic Film (Polyethylene): Most common, cheap, but needs replacing every few years.
    - Insect-proof Netting: Used for screenhouses to keep pests out.

    - Polycarbonate (Plastic sheets): More expensive, but stronger.
    - Glass: Very expensive, heavy, but lasts forever (not common in Nigeria).
3. **Ventilation System:** To control heat. This can be as simple as *side-vents* (roll-up "curtains") or as complex as large *electric fans*.
4. **Irrigation System:** This is almost always **Drip Irrigation** (from Term 1, Week 6) to deliver water and fertilizer directly to each plant.
5. **Growing Beds or Bags:** Plants are rarely grown in the natural ground. They are grown in "grow-bags" or special beds filled with a clean, sterile soil mix (called *substrate*).

3. Advantages in Horticulture (Olericulture/Floriculture)

Greenhouses are perfect for growing high-value horticultural crops (vegetables and flowers).

1. **Year-Round Production:** A farmer can grow tomatoes or peppers even in the middle of the heavy rainy season (when they are normally scarce) because the rain cannot hit them.
2. **Excellent Pest and Disease Control:** The net/plastic stops most insects (like whiteflies and *Tuta absoluta* on tomato) from entering. This *dramatically* reduces the need for chemical pesticides.
3. **Higher Yield and Quality:** Because the plants are protected and get the perfect amount of water and nutrients, they produce *more* fruit, and the fruit looks *better* (cleaner, no blemishes).
4. **Water and Fertilizer Efficiency:** Using drip irrigation means almost no water or fertilizer is wasted.
5. **Protection from Weather:** Protects plants from heavy rain (which spreads disease), strong winds, and harsh sun.

4. Disadvantages/Challenges

1. **High Initial Cost:** Building a proper greenhouse is very expensive.

2. **Heat Build-up:** If not ventilated properly, it can get *too hot* inside, and the plants will die.
3. **Requires High Skill:** A greenhouse farmer must be well-trained to manage the special irrigation and environment.

Evaluation:

1. What is a greenhouse?
2. What is the main difference between a greenhouse and a screenhouse?
3. List the three most important components of a greenhouse.
4. State two major advantages of growing tomatoes in a greenhouse.
5. What is the most common irrigation system used inside a greenhouse?

Assignment:

1. Why is a greenhouse particularly useful for a *vegetable* (olericulture) farmer?
2. What is the main disadvantage of using a greenhouse?
3. What happens if a greenhouse is not ventilated properly in a hot climate?
4. How does a screenhouse (net house) help in pest control?
5. Search online (or ask an expert) for the price of a small greenhouse in Nigeria. Is it cheap or expensive?

WEEK 6: ENTERPRISE SKILLS IN AGRICULTURE

Topic: Enterprise Skills in Agriculture

Breakdown (Subtopics):

- Creativity, innovation, problem-solving
- Agribusiness as a career



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Enterprise" and "Entrepreneur."
2. Define "Agribusiness" and give two examples.
3. Explain the meaning of "Creativity" in agriculture.
4. Explain the meaning of "Innovation" in agriculture.
5. Describe "Problem-Solving" with an agricultural example.

Lesson Content:

This section of the term moves from *how to farm* to *how to make money from farming*.

1. Enterprise and Agribusiness

- **Enterprise:** An enterprise is a project or a business, especially one that is difficult or requires effort. In short, it is a **business**.
- **Entrepreneur:** An entrepreneur is a person who **starts a business** and is willing to **take financial risks** in the hope of making a **profit**.
- **Agribusiness (or Agro-enterprise):**
    - **Definition:** This is any business that involves agriculture. It is the "business of farming."
    - **It is NOT just farming:** Agribusiness includes the *entire chain* of activities:
        1. **Input Supply:** Selling seeds, fertilizers, and tools *to* farmers.
        2. **Production:** The actual farming (growing crops, raising animals).
        3. **Processing:** Changing raw crops into new products (e.g., Gari, Palm Oil).
        4. **Marketing/Sales:** Transporting, advertising, and selling farm products. *All of these are agribusiness opportunities.*

2. Key Enterprise Skills

To be a successful "agri-preneur," you need more than just farming skills. You need business skills.

- **A. Creativity:**

    - **Definition:** This is the ability to **think of new ideas**. It is using your imagination to see new possibilities.
    - **Agricultural Example:** A farmer sees that everyone is selling yams and the price is low. He *thinks* of a new idea: "What if I cut my yams, fry them, and sell them as 'Yam Chips' in a small, clean packet?" That is creativity.
- **B. Innovation:**
    - **Definition:** This is the process of **doing the new idea**. It is turning your creative thought into a real product or service.
    - **Agricultural Example:** The farmer *buys* a fryer, designs a label, and *starts* producing and selling his "Yam Chips" at the school gate. He has innovated.
- **C. Problem-Solving:**
    - **Definition:** This is the skill of identifying a challenge and finding a practical, low-cost solution.
    - **Agricultural Example:**
        - **Problem:** A poultry farmer's chickens are always spilling their feed and water, wasting money.
        - **Solution (Creative Problem-Solving):** The farmer designs and builds a new "anti-spill" feeder and waterer using old plastic buckets, saving money.
- **D. Risk-Taking:**
    - **Definition:** An entrepreneur must be willing to invest their time and money (take a risk) without a 100% guarantee that they will succeed.

Evaluation:

1. What is an "entrepreneur"?
2. Define "Agribusiness" and give one example that is *not* actual farming.
3. What is the main difference between "creativity" and "innovation"?
4. Give one example of "creativity" in agriculture.
5. A tomato farmer finds that 30% of his tomatoes spoil before he can sell them. Describe one "problem-solving" idea he could use.

Assignment:

1. List the four parts of the agribusiness "chain."
2. Think of a common crop in your area (e.g., cassava, maize, groundnut).
    - (a) Be **Creative:** Think of a new product that could be made from it.
    - (b) Be **Innovative:** Describe how you would *start* making and selling it.
3. What is "financial risk"?
4. Why is "problem-solving" a more important skill for an entrepreneur than just "complaining"?
5. What agribusiness would you like to start? Why?

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WEEK 8: BUSINESS PLAN DEVELOPMENT



Breakdown (Subtopics):

- Steps and importance
- Practical class: drafting a simple plan

Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Business Plan."
2. State two major reasons why a business plan is important.
3. List the four essential sections of a simple business plan.
4. Explain the purpose of the "Financial Plan" section.
5. (Practical) Draft a simple, one-page business plan for a class project.

Lesson Content:

An idea (creativity) is good, but it is not a business. A business plan turns your idea into a step-by-step "map" for success.

1. What is a Business Plan?

- **Definition:** A business plan is a **formal written document** that describes an agribusiness, its goals, its market, and how it will achieve its goals (operationally and financially).
- **Purpose:** It is the "roadmap" for the business.

2. Importance of a Business Plan

Why waste time writing? Why not just start?

1. **To Get a Loan:** This is the most important reason. A bank, an investor, or even your parents will **not** give you money for your business idea unless you can present a clear, written plan that shows you have thought about the risks and the profits.
2. **To Guide the Entrepreneur:** The plan keeps you focused. It stops you from wasting money and helps you make smart decisions. It answers all the hard questions *before* you spend your money.
3. **To Measure Success:** How do you know if your business is "working"? You compare your actual results to the goals you set in your business plan.

3. Key Sections of a *Simple* Business Plan

A full business plan can be 50 pages. A simple one for a small project needs just four parts:

1. **Business Description:** (What is the idea?)
    - *What is your product or service?* (e.g., "We will sell fresh, packaged green *amaranthus*.")
    - *Who is your customer?* (e.g., "Teachers and parents at our school.")
    - *What makes you special?* (e.g., "Our greens will be fresh, clean, and neatly bunched.")

2. **Marketing Plan:** (How will you sell it?)
    - *How will customers know about you?* (e.g., "We will make a poster and announce it at assembly.")
    - *What is your price?* (e.g., "N100 per bunch.")
3. **Operations Plan:** (What do you need?)
    - *What materials do you need?* (e.g., "Seeds, 10 grow-bags, soil, water, small bags for packaging.")
    - *Who will do the work?* (e.g., "Group A will water, Group B will weed.")
4. **Financial Plan:** (What is the money?)
    - **Start-up Costs:** How much money do you need to *start*?
        - *e.g., Seeds (N200) + Bags (N500) = Total Start-up: N700*
    - **Projected Profit:** How much money will you *make*?
        - *e.g., Sales (20 bunches @ N100) = N2000*
        - *Profit = Sales (N2000) - Costs (N700) = N1300*

4. Practical Class

- The teacher will divide the class into groups.
- Each group will choose a simple "mini-project" for Week 10 (e.g., making kulikuli, growing vegetables, making liquid soap).
- Each group will use this 4-part structure to write a simple, one-page business plan.

Evaluation:

1. What is a business plan?
2. What is the *most important* reason for writing a business plan if you need to borrow money?
3. List the four key sections of a simple business plan.
4. What is the difference between "Start-up Costs" and "Profit"?
5. What is the "Marketing Plan" section about?

Assignment:

1. Using the 4-part structure, write a *very simple* one-page business plan for a small business of your choice (e.g., selling zobo, buying and re-selling fruit, etc.).
2. Why is it important to write the business plan *before* you start the business?
3. Which part of the business plan do you think is the hardest to write, and why?
4. What is a "customer"?

WEEK 9: MARKETING AND BRANDING

Topic: Marketing and Branding

Breakdown (Subtopics):

- The 4 Ps of Marketing
- Advertising and sales promotion



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Marketing."
2. List the "4 Ps" of Marketing.
3. Define "Branding" and give an example.
4. Differentiate between "Advertising" and "Sales Promotion."
5. Create a simple brand name and slogan for an agricultural product.

Lesson Content:

Marketing is not just "selling." Selling is the last step of marketing. Marketing is *everything* you do to get your product from the farm to the customer's hand.

1. The 4 Ps of Marketing (The Marketing Mix)

Marketing can be broken down into 4 key areas, called the "4 Ps":

1. **PRODUCT:**
    - *What are you selling?* It's not just "eggs." It's "fresh, large, clean eggs in a special branded carton." This includes the quality, the features, and the **packaging**.
    - *Packaging* is very important. Selling gari in a clean, well-sealed bag with a label is better than selling it from an open basin.
2. **PRICE:**
    - *How much will you charge?* You must set a price that is (a) high enough to make a profit, but (b) low enough for customers to be willing to pay. You must also see what your *competitors* are charging.
3. **PLACE:**
    - *Where will you sell your product?* (e.g., at the local market, at the school gate, by supplying to shops, online). You must choose a place that is convenient for your customers.
4. **PROMOTION:**
    - *How will you tell people about your product?* This is where advertising and branding come in.

2. Branding

- **Definition:** Branding is the process of creating a **unique name, logo, and reputation** for your product. It makes your product *memorable* and different from everyone else's.
- **Example:**
  - *No Brand:* "a bottle of palm oil"
  - *Brand:* **"Iya Kemi's Gold Standard Palm Oil"** with a red and yellow label.
- A good brand makes customers trust your product and ask for it by name.

3. Promotion: Advertising vs. Sales Promotion

- **A. Advertising:**
  - **Definition:** This is *paying* to send a message to many people to build awareness of your brand.
  - **Examples:**
    - Paying for a radio jingle.
    - Printing posters and flyers.
    - Paying for an ad on Facebook or Instagram.
    - Painting your brand name on your truck.
  - **Goal:** To build a long-term reputation.
- **B. Sales Promotion:**
  - **Definition:** This is a **short-term** activity to boost sales *right now*.
  - **Examples:**
    - "Buy 1, Get 1 Free!"
    - "Get a 10% discount this week only!"
    - Giving out free small samples (e.g., a small piece of kulikuli to taste).
    - Competitions ("Buy a bag of our rice to win a free cup").
  - **Goal:** To get the customer to buy *today*.

Evaluation:

1. What is marketing? Is it the same as selling?

2. List the "4 Ps" of Marketing.
3. What is "packaging," and which "P" does it fall under?
4. What is "branding"? Give an example.
5. What is the main difference between advertising and sales promotion?

Assignment:

1. Imagine you are selling bottled Zobo.
    - (a) Create a **Brand Name** for it.
    - (b) Create a short **Slogan** (e.g., "Just like Mama made it!").
    - (c) Describe one **Advertising** idea for it.
    - (d) Describe one **Sales Promotion** idea for it.
2. Why is "Price" a very important part of the 4 Ps?
3. What is a "competitor"?

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WEEK 10: AGRIBUSINESS PROJECT

Topic: Agribusiness Project

Breakdown (Subtopics):

- Class mini project (production, sales, records)
- Importance of Record Keeping



Performance Objectives: By the end of this lesson, students should be able to:

1. (Practical) Work in a group to produce, package, and sell a simple product.
2. Define "Record Keeping."

3. List the two main types of records a business must keep.
4. State two reasons why record keeping is essential for an agribusiness.
5. Calculate a simple profit or loss for their mini-project.

Lesson Content:

This week is for practical application of all the lessons from this term. Students will execute the simple business plans they created in Week 8.

1. Practical Class Mini-Project

- **Goal:** To experience the full agribusiness chain (planning, production, marketing, sales) as a group.
- **Activity:**
    1. **Execute Plan:** Groups will follow their 1-page business plan.
    2. **Production:** The group will create their product (e.g., plant the vegetables, make the zobo, or fry the kulikuli).
    3. **Marketing & Branding (Week 9):** The group must create a simple *brand* (name, label) for their product and decide on a price.
    4. **Sales:** The group will have a "Market Day" to sell their product to other students or teachers.

2. The Most Important Skill: Record Keeping

- **Definition:** Record keeping is the process of **writing down all activities and financial transactions** of your business.
- **Why it is ESSENTIAL:**
    1. **To Know Your Profit/Loss:** You *cannot* know if your business is successful by "guessing" or "feeling." You must *calculate* it. This is the #1 purpose of records.
    2. **To Get a Loan:** A bank will *only* lend you money if you have good, clean records to show your business is profitable.

3. **To Make Good Decisions:** Records show you *what* is selling, *what* is expensive, and *where* you are wasting money.
4. **To Pay Correct Taxes:** (For bigger businesses) Records are needed to prove your income to the government.

3. Types of Records

For a simple business, you only need two books:

- **A. Production Record (or Farm Diary):**
  - *What is it?* A book that records all *activities*.
  - *Example:*
    - *Jan 1:* Planted 10 bags of vegetables.
    - *Jan 5:* Applied fertilizer.
    - *Jan 10:* Weeded the bags.
    - *Feb 1:* Harvested 25 bunches.
- **B. Financial Record (Cash Book):**
  - *What is it?* A book that records all *money*.
  - *Example:* | Date | Item | Money In (Sales) | Money Out (Expenses) | | --- | --- | --- | --- | | Jan 1 | Bought Seeds | | N 200 | | Jan 1 | Bought 10 Bags | | N 500 | | Feb 1 | Sold 10 Bunches | N 1,000 | | | Feb 2 | Sold 15 Bunches | N 1,500 | | | | **TOTAL** | **N 2,500** | **N 700** |

4. Calculating Profit

Profit is the money left over after you have paid all your expenses.

Total Sales (Money In) - Total Expenses (Money Out) = Profit

- *From the example:*
- N 2,500 (Sales) - N 700 (Expenses) = **N 1,800 (Profit)**
- **Loss:** If your expenses are *more* than your sales, you have a loss.

Evaluation:

1. What is "record keeping"?
2. What is the most important reason for keeping financial records?
3. What is the difference between a "Production Record" and a "Financial Record"?
4. What is the formula for calculating profit?
5. If a farmer spent N5,000 on feed and sold his chickens for N12,000, what is his profit?

Assignment:

1. (Group) Based on your class project, create a simple financial record (like the table above) showing all your expenses and sales.
2. (Group) Calculate your group's final profit or loss.
3. Why is it a very bad idea to "mix" your business money with your personal (pocket) money?
4. If a business makes a "loss," what should the entrepreneur do? (Hint: Use skills from Week 6).
5. What was the most enjoyable part of the class agribusiness project?

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WEEK 11: REVISION

Topic: Revision

Breakdown (Subtopics):

- Comprehensive review of all Second Term topics.
- Preparation for Second Term Examination.

Performance Objectives: By the end of this lesson, students should be able to:

1. Recall and define key terms from the Second Term's work.
2. Answer review questions from all topics (Week 1 to Week 10).
3. Connect the topics (e.g., how crop improvement links to seed certification).
4. Confidently prepare for the Second Term Examination.

Lesson Content:

This week is dedicated to a full review of all topics covered this term. We moved from the *science* of improving crops to the *business* of selling them.

1. Summary of Key Topics

- **Week 1: Crop Improvement**
    - We learned how to create "better" plants.
    - *Key Concepts:* High Yield, Disease Resistance, Selection, Hybridization, Hybrid Vigor.
- **Week 2: Seed Production and Certification**
    - We learned how to get high-quality seeds to farmers.
    - *Key Concepts:* Certified Seed, Germination Rate, Purity, NASC.
- **Week 3: Organic Farming**
    - We learned how to farm without chemicals.
    - *Key Concepts:* Principles of Organic, Compost vs. NPK, Benefits, Challenges.
- **Week 4: Greenhouse Technology**

    - We learned how to grow crops in a controlled environment.
    - *Key Concepts:* Greenhouse/Screenhouse, Components, Drip Irrigation, Year-round Production.
- **Week 6: Enterprise Skills**
    - We learned how to think like a business owner.
    - *Key Concepts:* Agribusiness, Entrepreneur, Creativity, Innovation, Problem-Solving.
- **Week 8: Business Plan Development**
    - We learned how to create a "roadmap" for our business.
    - *Key Concepts:* Business Plan, Importance (Loans), 4 Sections (Description, Marketing, Operations, Financials).
- **Week 9: Marketing and Branding**
    - We learned how to promote and sell our product.
    - *Key Concepts:* The 4 Ps (Product, Price, Place, Promotion), Branding, Advertising, Sales Promotion.
- **Week 10: Agribusiness Project**
    - We learned the most important business skill: counting the money.
    - *Key Concepts:* Record Keeping, Financial Records, Production Records, Profit/Loss Calculation.

2. How It All Connects (The "Big Picture")

To be a successful **Agri-preneur** (Week 6), you need:

1. A great **Product** (Week 9). You get this by using *improved* crops (Week 1) that come from *certified seeds* (Week 2).
2. A good production method, like *Organic Farming* (Week 3) or *Greenhouse* tech (Week 4), to get high quality.
3. A clear plan (Week 8) and a strong brand (Week 9) to sell your product.
4. And most importantly, you *must* keep good **Records** (Week 10) to prove you are making a **Profit**.

Evaluation (Classroom Activity):

- **Rapid-Fire Questions:** The teacher will ask questions from all topics.
  - "What is hybridization?"
  - "What agency certifies seeds in Nigeria?"
  - "Name two principles of organic farming."
  - "What is the main advantage of a screenhouse?"
  - "What is the difference between creativity and innovation?"
  - "Why do you need a business plan?"
  - "What are the 4 Ps of Marketing?"
  - "What is the formula for profit?"
- **Board Work:** Ask students to create a simple financial record to calculate profit for a simple business.

Assignment (Exam Preparation):

1. **Create a Glossary:** Define the following 10 terms in your notebook:
   1. Crop Improvement
   2. Hybridization
   3. Certified Seed
   4. Organic Farming
   5. Greenhouse
   6. Agribusiness
   7. Innovation
   8. Business Plan
   9. Branding
   10. Record Keeping
2. **Write a Paragraph:** Describe how a farmer can move from being a simple "farmer" to a successful "agri-preneur." Use at least 4 of the key terms from the list above.
3. **Study:** Review all your notes, evaluations, and assignments from Week 1 to Week 10 to prepare for your examination.

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THIRD TERM - JSS 3 HORTICULTURE AND CROP PRODUCTION LESSON NOTES

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WEEK 1: INTRODUCTION TO AGRIPRENEURSHIP

Topic: Introduction to Agripreneurship

Breakdown (Subtopics):

- Meaning and scope
- Importance in modern agriculture



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Agripreneurship" and "Agripreneur."
2. Review the definition of "Agribusiness."

3. List and explain the five major components of the agribusiness "scope" or "value chain."
4. State three reasons why agripreneurship is important for national development.

Lesson Content:

This term, we move from learning *how to farm* to learning how to create a *business* and *career* from agriculture.

1. Meaning of Agripreneurship

- **Review (Term 2):** An **Entrepreneur** is a person who starts a business and takes on financial risks to make a profit.
- **Definition: Agripreneurship** is simply **entrepreneurship in the agricultural sector**. It is the business of applying creativity, innovation, and business skills to any part of the agricultural industry.
- **An Agripreneur:** Is a modern, business-minded farmer or person who sees agriculture as a profitable enterprise, not just a way to feed their family (subsistence).

2. Scope of Agripreneurship (The Agribusiness Value Chain)

Agripreneurship is not just "farming." It covers a wide and profitable chain of activities. An agripreneur can start a business in any of these five areas:

1. **Input Supply:**
    - **What it is:** Selling the "inputs" that farmers need *before* they can plant.
    - **Business Ideas:** Selling certified seeds (from Term 2, Week 2), mixing and selling fertilizer, building and selling farm tools (like hoes or watering cans), selling pesticides.
2. **Production (Farming):**
    - **What it is:** The actual act of growing crops or raising animals.
    - **Business Ideas:** A commercial vegetable farm (Olericulture), a fruit orchard (Pomology), running a greenhouse (Term 2, Week 4), a poultry or fish farm.

3. **Processing (Value Addition):**
    - **What it is:** Changing a raw farm product into something new, more valuable, and with a longer shelf-life (from Term 1, Week 10).
    - **Business Ideas:** Processing cassava into gari, maize into pap, tomatoes into paste, groundnuts into kulikuli, or palm fruits into palm oil.
4. **Marketing and Sales (Distribution):**
    - **What it is:** The business of *moving* the food from the farmer to the customer.
    - **Business Ideas:** A branding and packaging company, a transport/logistics business, owning a shop that sells fresh produce, exporting gari to other countries.
5. **Agricultural Services:**
    - **What it is:** Providing a *service* (not a product) to help other farmers.
    - **Business Ideas:** A farm consulting business, a soil testing service, renting out tractors (mechanization), or a drone service for mapping fields.

3. Importance of Agripreneurship in Modern Agriculture

Why is everyone talking about "agripreneurship" now?

1. **Job Creation:** It creates millions of jobs (in processing, marketing, services, etc.) for young people, helping to fight unemployment.
2. **Food Security:** Agripreneurs use modern methods (like irrigation and greenhouses) to produce more food, ensuring the country can feed its population.
3. **Reduces Post-Harvest Losses:** By processing (e.g., turning spoiling tomatoes into paste), agripreneurs save food that would have been wasted.
4. **Adds Value and Increases Income:** It moves farmers from selling cheap raw crops (like cassava for N50) to selling valuable processed products (like gari for N200), which increases their profit.
5. **Modernizes Agriculture:** It changes the image of farming from a "poor man's job" to a modern, profitable, and respectable career.

Evaluation:

1. What is an "Agripreneur"?
2. What is the main difference between "Input Supply" and "Processing" in the value chain?
3. List the five main parts of the agricultural "scope" or "value chain."
4. Give two examples of an agribusiness in the "Processing" category.
5. State two reasons why agripreneurship is important for Nigeria.

Assignment:

1. In your own words, what is the difference between a "subsistence farmer" and an "agripreneur"?
2. Look at the five parts of the value chain. Which part do you think is the *most* profitable? Why?
3. List two agripreneurship "service" businesses you could start.
4. How does an agripreneur who processes cassava into gari help reduce post-harvest loss?
5. Do you think agripreneurship is a good career for a young person? Give one reason for your answer.

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WEEK 2: ENTERPRISE DEVELOPMENT

Topic: Enterprise Development

Breakdown (Subtopics):

- Business idea generation
- Planning for success (SWOT Analysis)



Performance Objectives: By the end of this lesson, students should be able to:

1. Define a "Business Idea."
2. List three common sources for generating good business ideas.

3. Define "SWOT Analysis."
4. List the four components of a SWOT analysis and state what each one means (Internal/External).
5. (Practical) Perform a simple SWOT analysis on a business idea.

Lesson Content:

Every big business, from Dangote to a local gari seller, started with one thing: an idea.

1. What is a Business Idea?

A business idea is a **concept for a product or service** that can be sold for money to make a profit. It is the starting point of every enterprise. A good idea is one that solves a problem or meets a need.

2. Generating Good Business Ideas

Where do good ideas come from? You don't have to invent something new. You just have to be observant.

1. **Look for PROBLEMS:**
    - **Problem:** "My mother complains that tomatoes are too expensive in the rainy season."
    - **Business Idea:** Start a greenhouse (Term 2, Week 4) to grow and sell tomatoes during the rainy season.
2. **Look at WASTE:**
    - **Problem:** "During mango season, so many mangoes rot on the ground."
    - **Business Idea:** Start a small business that buys cheap mangoes, dries them, and sells them as "Dried Mango Chips."
3. **Look at your INTERESTS/SKILLS (Hobbies):**
    - **Interest:** "I love flowers and making the school compound look beautiful."
    - **Business Idea:** Start a floriculture/landscaping business.
4. **Look for GAPS in the Market:**

- **Gap:** "The school has a farm, but students have to go far to buy good tools."
- **Business Idea:** Open a small "Farm Store" at the school to sell cutlasses, hoes, seeds, and fertilizer.

3. Planning for Success: SWOT Analysis

An idea is not enough. You must test if it is a *good* idea. The best tool for this is a **SWOT Analysis**.

- **Definition:** SWOT is a planning tool that helps an entrepreneur identify the **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats related to their business idea.
- **Internal vs. External:**
  - **Internal Factors (About YOU and your business):** Strengths, Weaknesses.
  - **External Factors (About the WORLD outside):** Opportunities, Threats.
- **The Four Components:**
  - **S**trengths (Internal, Positive): What are you *good at*? What *advantages* do you have?
    - *Example:* "My father has 1 acre of land I can use for free." "I am very good at record keeping."
  - **W**eaknesses (Internal, Negative): What are you *bad at*? What *disadvantages* do you have?
    - *Example:* "I have no start-up money (capital)." "I am not good at marketing."
  - **O**pportunities (External, Positive): What *good conditions* exist in the market or environment?
    - *Example:* "The government is giving low-interest loans to young farmers." "A new hotel just opened and needs a vegetable supplier."
  - **T**hreats (External, Negative): What *bad conditions* or *competitors* exist?
    - *Example:* "There are three other women already selling pap on my street." "A new disease is attacking maize in my area."

How to Use it: A smart entrepreneur uses the SWOT to make a plan: *How can I use my **Strengths** to take advantage of the **Opportunities**? And how can I manage my **Weaknesses** to avoid the **Threats**?*

Evaluation:

1. What is a "business idea"?
2. List three ways you can find a good business idea.
3. What does the "W" in SWOT stand for? Is it an internal or external factor?
4. What does the "T" in SWOT stand for? Is it an internal or external factor?
5. What is the main difference between a Strength and an Opportunity?

Assignment:

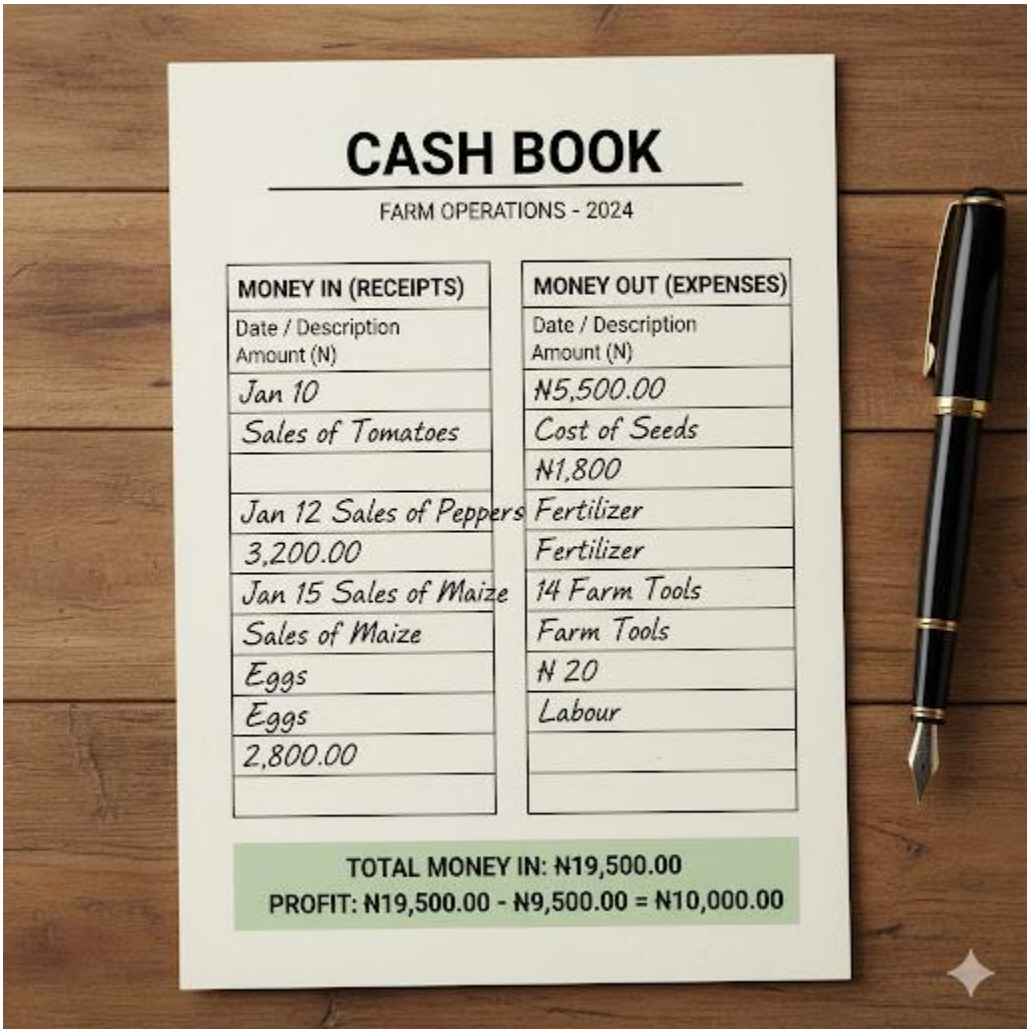
1. **Brainstorm:** Think of one agribusiness idea based on a "problem" you see in your school or community.
2. **Analyze:** Take that one idea and perform a simple SWOT analysis for it.
    - **Idea:** (e.g., "Making and selling Zobo drink at school")
    - **S:** (e.g., "I know the recipe, my mother has a big pot")
    - **W:** (e.g., "I only have N1000, I have to do it after school")
    - **O:** (e.g., "It's always hot, students are always thirsty")
    - **T:** (e.g., "The woman at the gate also sells Zobo")
3. Why is it important to do a SWOT analysis *before* you start a business?

WEEK 3: RECORD-KEEPING AND BOOKKEEPING

Topic: Record-Keeping and Bookkeeping

Breakdown (Subtopics):

- Simple bookkeeping in agribusiness
- Differentiating types of records



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Record-Keeping" (review) and "Bookkeeping."
2. Differentiate between Record-Keeping and Bookkeeping.

3. List and explain three essential types of business records (Production, Financial, Inventory).
4. Create a simple "Cash Book" ledger (Income/Expense).

Lesson Content:

In Term 2, Week 10, we learned that record keeping is the most important skill in business. Now, we focus on the specific part about *money*.

1. Record-Keeping vs. Bookkeeping

- **Record-Keeping (Broad):** This is the **overall process** of writing down *all* information related to your business. This includes your activities, your money, your customers, everything.
- **Bookkeeping (Specific):** This is the *specific part* of record-keeping that deals with **money**. It is the organized recording of *all financial transactions* (every kobo in and every kobo out).

Analogy: Record-keeping is your entire school notebook. Bookkeeping is *just* your Mathematics notebook.

2. Why is Bookkeeping So Important?

(Review from Term 2)

1. **To Calculate Profit/Loss:** You *cannot* know if you are succeeding or failing without it.
2. **To Get a Loan:** A bank will *demand* to see your "books" (your bookkeeping records) before they lend you money.
3. **To Make Decisions:** Bookkeeping shows you what is costing you the most money and what is making you the most money, so you can plan.
4. **To Prevent Theft:** If you track your money, you will know if someone is stealing from you.

3. Essential Types of Records for an Agripreneur

A simple business needs at least these three books:

1. **Production Record (Farm Diary):**
    - **What it is:** Records all farm *activities*. (This is record-keeping, not bookkeeping).
    - **Example:** "Jan 1: Planted 100 maize seeds." "Jan 5: Applied 1 bag of NPK." "Feb 10: Weeded."
2. **Inventory Record:**
    - **What it is:** Records all your "stock" or *assets* (things you own).
    - **Example:** "Tools: 5 Hoes, 2 Cutlasses." "Stock: 10 bags of feed, 25 empty chicken crates."
3. **Financial Record (The Cash Book or Ledger):**
    - **What it is:** This is the *main bookkeeping* record. It tracks all cash. It has two sides: **Income (Money In)** and **Expenses (Money Out)**.

4. Practical: How to Use a Simple Cash Book

A Cash Book (or "Income and Expenditure Statement") is a simple table.

- **Income (or "Revenue"):** Money you *receive*.
- **Expenses (or "Costs"):** Money you *spend*.

Example: A student, Femi, starts a small *kulikuli* business.

FEMI'S KULIKULI BUSINESS - CASH BOOK (JANUARY)

Date	Item Description	Money In (INCOME)	Money Out (EXPENSES)
Jan 5	Bought raw groundnuts		₦2,000
Jan 5	Bought 1 bottle of groundnut oil		₦500

Jan 5	Bought packaging (nylon)		₦100
Jan 7	Sales of kulikuli (Batch 1)	₦1,500	
Jan 9	Sales of kulikuli (Batch 2)	₦1,500	
Jan 10	Bought more raw groundnuts		₦1,000
Jan 12	Sales of kulikuli (Batch 3)	₦1,200	
TOTALS		**₦4,200**	**₦3,600**
PROFIT (Income − Expenses)		**₦600**	

- **Total Income:** N 4,200
- **Total Expenses:** N 3,600
- **Profit:** N 4,200 - N 3,600 = **N 600**

Evaluation:

1. What is the main difference between "record-keeping" and "bookkeeping"?
2. Why must an agripreneur keep a "Cash Book"? (Give two reasons).
3. What is a "Production Record"? Give one example of an entry.
4. What is an "Inventory Record"?
5. If you buy seeds for N200 and sell the vegetables for N800, what is your profit?

Assignment:

1. What is a "financial transaction"?
2. Get a new notebook (or a page in your Agric notebook). Create a "Cash Book" table like the one above.
3. Record the following transactions for a poultry business:

- *Feb 1:* Bought 10 chicks (N1,500 total).
- *Feb 1:* Bought 1 bag of feed (N2,000).
- *Feb 10:* Sold eggs (N500).
- *Feb 15:* Sold more eggs (N700).

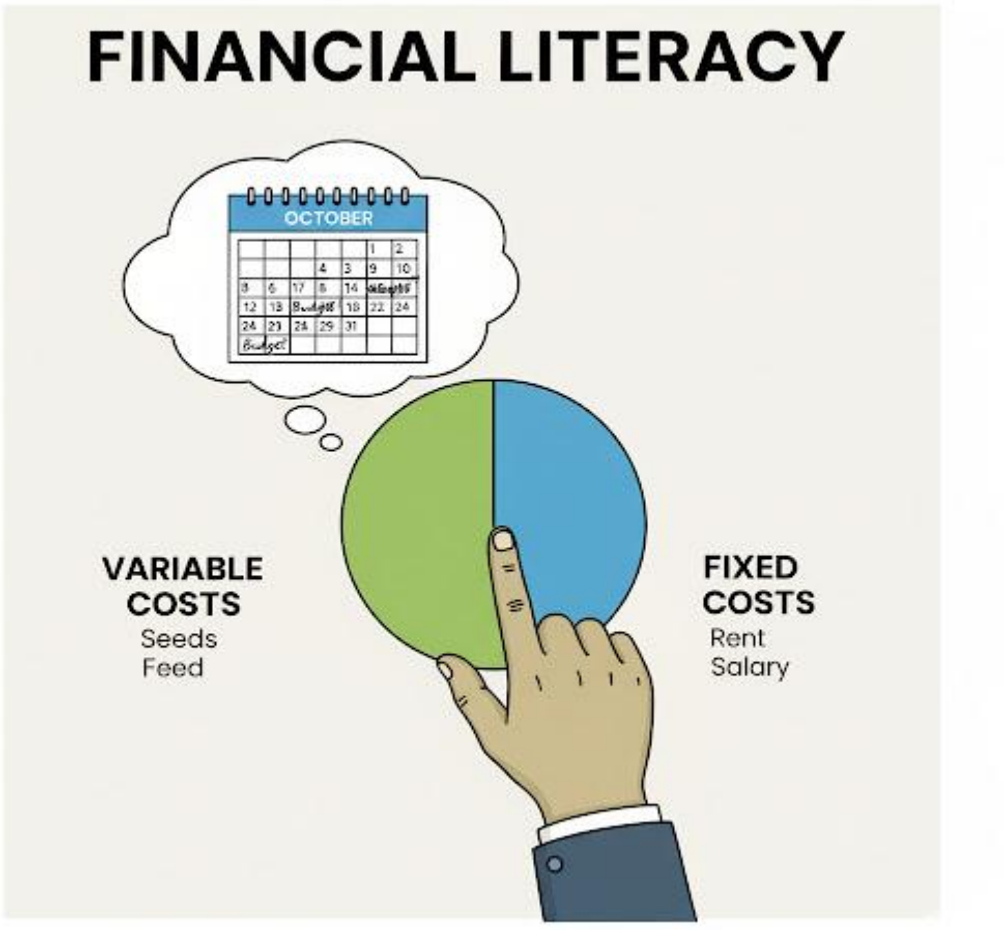
4. At the end, calculate the **Total Income**, **Total Expenses**, and the **Profit or Loss** so far.

WEEK 4: FINANCIAL LITERACY

Topic: Financial Literacy

Breakdown (Subtopics):

- Budgeting, profit, and loss
- Cost management (Fixed vs. Variable Costs)



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Financial Literacy."
2. Define "Budget" and state its importance.

3. Define "Cost Management."
4. Differentiate between a "Fixed Cost" and a "Variable Cost," giving one example of each.
5. Calculate the profit or loss from a business scenario involving both fixed and variable costs.

Lesson Content:

Bookkeeping (Week 3) is about *recording* what happened in the past. Financial literacy is about *understanding* that information to *plan* for the future.

1. What is Financial Literacy?

- **Definition:** Financial literacy is the ability to **understand and use financial skills** like budgeting, investing, and managing money. It means "being smart with money."
- An agripreneur who is financially literate knows how to use their profit (from Week 3) to grow their business, instead of just spending it.

2. Budgeting

- **Definition:** A budget is a **plan for your money *before* you spend it**.
- **Bookkeeping (Past):** "I spent N1000 on feed."
- **Budgeting (Future):** "I *plan* to spend N1000 on feed next month."
- **Importance:** A budget is your main tool for *controlling* your spending. It stops you from wasting money and ensures you have enough for the important things (like buying seeds).

3. Cost Management: Fixed vs. Variable Costs

To create a good budget, you must understand your costs.

- **Definition:** Cost management is the process of planning and *controlling* your expenses to increase your profit.
- There are two main types of costs:

- **A. Fixed Costs (or "Overhead"):**
    - **Definition:** These are costs that **do not change**, no matter how much you produce. You must pay them even if you grow 0 yams or 1,000 yams.
    - **Examples:**
        - Rent for the farmland or shop.
        - Salary of your permanent manager.
        - Cost of buying a big machine (like a tractor).
        - Security bill for the farm.
- **B. Variable Costs:**
    - **Definition:** These are costs that **change directly** with your level of production. If you grow more, you spend more.
    - **Examples:**
        - Cost of seeds or chicks (If you want 2x the chickens, you pay 2x for chicks).
        - Cost of feed, fertilizer, and pesticides.
        - Cost of packaging (nylon bags, cartons).
        - Wages for temporary workers you hire just for harvesting.

4. Calculating Profit (The Full Formula)

The full formula for profit uses these new terms:

- **Total Revenue (Sales):** The total money you get from customers.
- **Total Cost:** Fixed Costs + Variable Costs.
- **PROFIT = Total Revenue - Total Costs**

Example: A poultry farmer has a shop.

- He pays **N10,000** per month for rent (Fixed Cost).
- He buys feed and chicks for **N30,000** (Variable Costs).
- He sells all his chickens and eggs for **N50,000** (Total Revenue).
- **Total Costs:** N10,000 (Fixed) + N30,000 (Variable) = **N40,000**

- **Profit:** N50,000 (Revenue) - N40,000 (Total Costs) = **N10,000**

Evaluation:

1. What is "financial literacy"?
2. What is the main difference between "budgeting" and "bookkeeping"?
3. What is a "Fixed Cost"? Give one example.
4. What is a "Variable Cost"? Give one example.
5. Why is "cost of fertilizer" a variable cost?

Assignment:

1. A farmer, Aisha, runs a small greenhouse. Calculate her profit for the month:
    - She pays **N5,000** for the rent of the greenhouse (Fixed Cost).
    - She buys seeds and fertilizer for **N3,000** (Variable Costs).
    - She pays for water (electricity to pump) for **N1,000** (Variable Cost).
    - She sells all her tomatoes for **N12,000** (Total Revenue).
    - **First:** Calculate her Total Variable Costs.
    - **Second:** Calculate her Total Costs (Fixed + Total Variable).
    - **Finally:** Calculate her Profit or Loss.
2. Why is "rent" a fixed cost?

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WEEK 6: BUSINESS MANAGEMENT

Topic: Business Management

Breakdown (Subtopics):

- Leadership and teamwork
- Functions of Management



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Business Management."
2. List the four main functions of management (Planning, Organizing, Leading, Controlling).
3. Define "Leadership."
4. Differentiate between a "Manager" and a "Leader."
5. Define "Teamwork" and state two reasons why it is important.

Lesson Content:

Starting a business is one thing; *running* it is another. That is "management."

1. What is Business Management?

- **Definition:** Business Management is the process of **planning, organizing, leading, and controlling** the resources of a business (like people, money, and materials) to achieve its goals.
- If your goal is to make N10,000 profit (Week 4), management is the *work* you do every day to make that happen.

2. The Four Functions of Management

A manager has four main jobs:

1. **Planning:** This is the "thinking" part. It involves setting goals (e.g., "We will harvest 50 bunches of vegetables") and creating a plan to achieve them (e.g., "We need to buy seeds on Monday, plant on Tuesday...").
2. **Organizing:** This is the "arranging" part. It involves arranging all your resources. (e.g., "I will put Femi in charge of watering, Aisha in charge of weeding. We need to get N5,000 from the budget for fertilizer").
3. **Leading:** This is the "motivating" part. It involves directing and inspiring your team to do the work well. (See below).
4. **Controlling:** This is the "checking" part. It involves monitoring your progress (using your records from Week 3) and comparing it to your plan. (e.g., "Our plan said we

would harvest 50 bunches, but our records show we only harvested 30. *What went wrong?*").

3. Leadership

- **Definition:** Leadership is the ability to **inspire and motivate** a group of people to work together enthusiastically towards a common goal.
- **Manager vs. Leader:**
    - A **Manager** *tells* people what to do (e.g., "Femi, weed that row. That is your job.").
    - A **Leader** *shows* people why it's important (e.g., "Team, if we all work hard to weed these rows, our harvest will be bigger, and everyone's profit will increase!").
    - *A good agripreneur must be both a manager and a leader.*

4. Teamwork

- **Definition:** Teamwork is the **collaborative effort** of a group of people working together to achieve a common goal. It is the *result* of good leadership.
- **Importance of Teamwork in Agribusiness:**
    1. **Increases Efficiency:** Many hands make light work. A team can plant or harvest a field much faster than one person.
    2. **Better Problem-Solving (Week 2):** When a problem happens (e.g., "Pests are eating the leaves!"), a team can brainstorm more ideas (IPM, biological control, etc.) than one person.
    3. **Specialization:** Teamwork allows people to *specialize* in what they are good at (e.g., one person is good at bookkeeping, another is good at marketing, another is good at the physical farming).
    4. **Improves Morale:** Working together is less lonely and more motivating for everyone.

Evaluation:

1. What is "business management"?
2. List the four functions of a manager.
3. What is the "Controlling" function of management?
4. What is the main difference between a "manager" and a "leader"?
5. Define "teamwork" and give one reason why it's important.

Assignment:

1. Which of the four functions of management (Planning, Organizing, Leading, Controlling) do you think is the *most* important? Why?
2. Think about your class project (or any group you are in). Give one example of good teamwork and one example of bad teamwork.
3. Can a person be a good leader but a bad manager? Explain your thoughts.
4. How does a manager use "Bookkeeping" (Week 3) to "Control" (Week 6)?

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WEEK 8: MARKETING AND DISTRIBUTION

Topic: Marketing and Distribution

Breakdown (Subtopics):

- Market research
- Sales and logistics (Distribution Channels)



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Market Research."
2. List two methods of conducting market research.

3. Define "Distribution" (or "Logistics").
4. Draw and explain the three main "Distribution Channels" for an agricultural product.

Lesson Content:

In Term 2 (Week 9), we learned about the 4 Ps of Marketing (Product, Price, Place, Promotion). This week, we focus on the "Place" P, which is Distribution.

1. Market Research (Before You Do Anything)

- **Definition:** Market Research is the process of **gathering, analyzing, and interpreting information** about your customers and your competitors.
- **Purpose:** To make smart decisions *before* you start. You don't *guess* what people want; you *ask* them.
- **Key Questions for Market Research:**
    - **Who** are my customers? (e.g., Students, mothers, hotels?)
    - **What** do they want? (e.g., Do they want fresh tomatoes or tomato paste?)
    - **What price** are they willing to pay?
    - **Who** is my competition? (e.g., How many other people sell this?)
- **Methods of Market Research:**

    1. **Surveys/Questionnaires:** Creating a list of questions and asking people to answer them (e.g., "How often do you buy gari? What size bag do you prefer?").
    2. **Observation:** Simply watching and counting (e.g., "I will stand at the market junction for one hour and count how many people buy yams.").
    3. **Focus Groups:** Bringing a small group of 5-8 people together, giving them your product (e.g., your kulikuli), and asking for their honest opinions.

2. Distribution (Logistics)

- **Definition:** Distribution (also called "Logistics") is the entire process of **moving your product from the farm to the final customer**. It is the "Place" P.

- This includes: Harvesting, cleaning, packaging, storing (Term 1, Week 10), transporting, and finally, selling.

3. Distribution Channels

- **Definition:** A "distribution channel" is the *path* your product takes to reach the customer. The channel you choose affects your profit.
- **Channel 1: Direct-to-Customer (DTC)**
  - **Path:** Farmer → Final Customer
  - **Example:** Selling your eggs at a small shop at your own farm gate, or selling your vegetables at the local school market.
  - **Pro:** You keep **100% of the profit**.
  - **Con:** You sell in small quantities, and it takes a lot of your time.
- **Channel 2: The Retail Channel**
  - **Path:** Farmer → Retailer (e.g., Shoprite, local shop) → Final Customer
  - **Example:** You supply your fresh tomatoes to a supermarket in your town. The supermarket then sells them.
  - **Pro:** You sell more at once than DTC.
  - **Con:** The retailer takes a "cut" (profit margin), so your profit per item is less.
- **Channel 3: The Wholesale Channel (The "Middleman")**
  - **Path:** Farmer → Wholesaler → Retailer → Final Customer
  - **Example:** You take your 1,000 yams to a bulk trader (wholesaler) at a large market (like Mile 12). He buys *everything* at once (at a low price) and then sells it to the small market women (retailers).
  - **Pro:** You sell *all* your products in one day. Very fast, low risk of spoilage.
  - **Con:** You get the **lowest profit per item** because the wholesaler and retailer both take a large cut.

Evaluation:

1. What is "market research"?
2. Why should you do market research *before* you start your business?

3. What is a "survey"?
4. What is "distribution" (logistics)? Which of the 4 Ps is it?
5. Draw the "Wholesale Channel" (3-step path).

Assignment:

1. You want to start a business selling fresh fruit juice at your school.
    - (a) Write two "market research" questions you would ask students *before* you start.
    - (b) Which distribution channel would you use? (DTC, Retail, or Wholesale?) Why?
2. What is a "middleman" (wholesaler)? Give one advantage and one disadvantage of selling to a middleman.
3. What is a "competitor"?

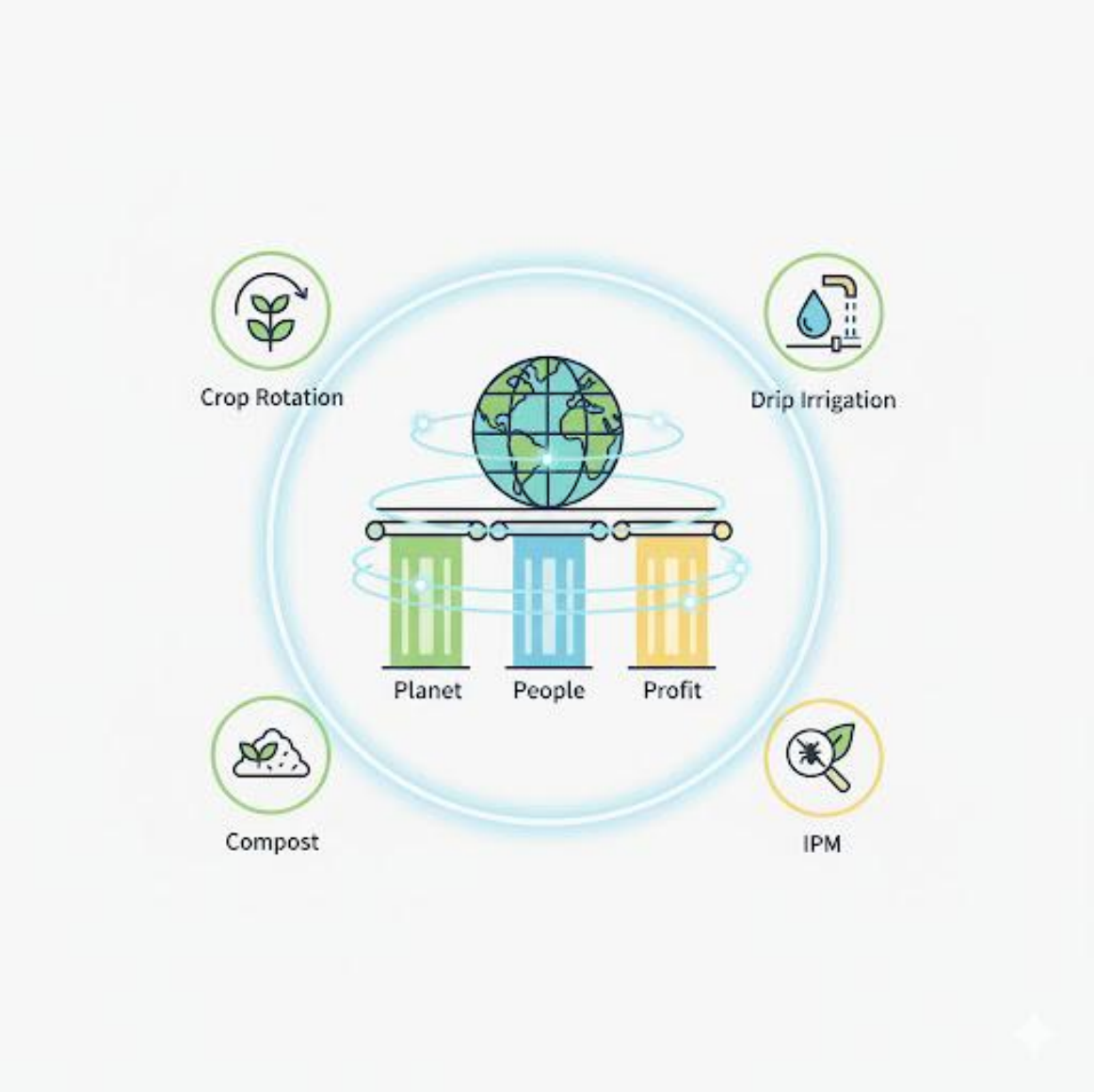
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WEEK 9: SUSTAINABLE AGRICULTURE

Topic: Sustainable Agriculture

Breakdown (Subtopics):

- Climate-smart farming
- Environmental protection



Performance Objectives: By the end of this lesson, students should be able to:

1. Define "Sustainable Agriculture."
2. List the "three pillars" of sustainability.
3. Define "Climate-Smart Agriculture."
4. List at least five sustainable farming practices (from previous terms).
5. Explain why sustainable agriculture is important for the future.

Lesson Content:

We have learned how to farm and how to make money. But what if our farming *destroys* the land for our children? This is the final, most important lesson.

1. What is Sustainable Agriculture?

- **Definition:** Sustainable Agriculture is a method of farming that meets the world's need for food **today**, *without* damaging the environment or the resources that **future generations** will need to feed themselves.
- **The Three Pillars:** For farming to be truly sustainable, it must be:
    1. **Economically Profitable:** The farmer must make a good profit (Weeks 4, 10).
    2. **Environmentally Sound:** It must *protect* the soil, water, and air.
    3. **Socially Just:** It must be good for the community, the workers, and the customers.

2. What is Climate-Smart Agriculture?

- **Definition:** Climate-Smart Agriculture is a part of sustainability. It is an approach to farming that *specifically* tries to solve the problem of **climate change** (e.g., longer dry seasons, unpredictable rain, heavy floods).
- **Its 3 Goals:**
    1. Increase farm productivity (grow more food).
    2. Help farmers *adapt* to climate change (e.g., use drought-resistant seeds).

3. Reduce greenhouse gas emissions from farming (e.g., use compost instead of chemical fertilizer, which releases gasses).

3. Sustainable Farming Practices (How to do it)

The good news is that we have already learned *all* the most important sustainable practices this year! "Good farming" *is* sustainable farming.

- **Practices that Protect the Soil (Environmentally Sound):**
  - **Crop Rotation** (Term 1, Week 2): Builds soil fertility naturally.
  - **Cover Cropping** (Term 1, Week 2): Prevents erosion and builds organic matter.
  - **Organic Farming** (Term 2, Week 3): Using **compost** (Term 1, Week 4) instead of chemicals builds healthy soil and stops pollution.
  - **Terracing / Contour Ploughing** (Term 1, Week 2): Stops water erosion.
- **Practices that Conserve Water (Climate-Smart):**
  - **Drip Irrigation** (Term 1, Week 6): The most water-efficient method.
  - **Mulching:** Covering the soil to stop evaporation.
- **Practices that Protect Biodiversity (Environmentally Sound):**
  - **Integrated Pest Management (IPM)** (Term 1, Week 8): Uses biological and cultural controls instead of harsh chemicals that kill bees and good insects.
- **Practices that Use Better Resources (Economically Profitable):**
  - Using **Certified Seeds** of **Improved Varieties** (Term 2, Weeks 1-2) that are drought or disease-resistant.

4. Why is This Important?

If we use *un-sustainable* methods (like "conventional farming" with too many chemicals and no crop rotation), we will:

- Destroy the soil (erosion).
- Pollute our drinking water.
- Kill all the bees needed for pollination.

- In 50 years, the land will be a "desert," and we will not be able to grow any food.

Sustainable agriculture protects the land *and* makes a profit, ensuring we can farm forever.

Evaluation:

1. In your own words, what is "sustainable agriculture"?
2. What are the "three pillars" of sustainability?
3. What is "climate-smart" agriculture?
4. List two sustainable practices that *protect the soil*.
5. List one sustainable practice that *conserves water*.

Assignment:

1. Is "conventional farming" (using NPK and chemical pesticides all the time) sustainable? Give two reasons for your answer.
2. How does using **Drip Irrigation** (Term 1) help a farmer be "climate-smart"?
3. How does practicing **Crop Rotation** (Term 1) help a farm be "sustainable"?
4. What is the link between **Organic Farming** (Term 2) and **Sustainable Agriculture**?
5. What is one thing you will do in your own (future) farm or garden to be more sustainable?

WEEK 10: PROJECT PRESENTATION

Topic: Project Presentation

Breakdown (Subtopics):

- Students' enterprise project
- Sharing of results and lessons learned



Performance Objectives: By the end of this lesson, students should be able to:

1. (Practical) Present their agribusiness mini-project to the class.
2. (Practical) Clearly explain their business idea and business plan.
3. (Practical) Present their financial records (Cash Book) and state their final profit or loss.
4. (Practical) Share the marketing and branding (labels, packaging) for their product.
5. (Practical) Discuss the challenges, successes, and lessons they learned from the project.

Lesson Content:

This is a practical, student-led week. All the groups that planned and executed their mini-agribusiness projects (from Term 2, Week 10 and this term) will now present their results.

1. Presentation Structure

Each group will have 5-10 minutes to present a summary of their business. The presentation should be organized and cover all the topics from this term.

- **Part 1: The Idea (Weeks 1-2)**
    - What was your business? What product/service did you sell?
    - Why did you choose this idea? (What problem did it solve?)
    - Show your (optional) SWOT analysis.
- **Part 2: The Plan (Week 8, Term 2)**
    - Briefly describe your business plan (Who, What, Where).
- **Part 3: The Marketing (Week 9, Term 2)**
    - Show the class your **Brand** (your name, your slogan).
    - Show the class your **Packaging** (your label, your bottle/bag).
    - How did you promote your product?
- **Part 4: The Money (Weeks 3-4)**
    - This is the most important part.
    - Show the class your **Financial Records (Cash Book)**.
    - List your **Total Income (Sales)**.

    - List your **Total Costs** (Fixed and Variable).
    - Announce your final **PROFIT or LOSS**.
- **Part 5: The Lessons (Week 6)**
    - What was your biggest **challenge**?
    - What was your biggest **success**?
    - What did you learn about **teamwork**?
    - If you did this again, what would you do differently?

2. Evaluation

- Groups will be evaluated by the teacher and their classmates.
- **Grading will be based on:**
    - Clarity of the presentation.
    - Quality of the branding and packaging.
    - **Accuracy and neatness of the financial records (bookkeeping).**
    - Honesty about the challenges and lessons learned.
    - Evidence of good teamwork.

Assignment (Self-Reflection):

1. Write one paragraph about your group's project. What was the *single most important lesson* you learned?
2. Watch the other groups present. Which group had the *best brand/marketing*? Why did you like it?
3. Which group had the *clearest financial records*? What did you learn from them?

WEEK 11: REVISION

Topic: Revision

Breakdown (Subtopics):

- Final review of all topics from Term 3.
- Preparation for the Final (Third Term / JSSCE) Examination.

Performance Objectives: By the end of this lesson, students should be able to:

1. Recall and define key terms from the Third Term's work.
2. Answer review questions from all topics (Week 1 to Week 10).
3. Connect the topics (e.g., how a SWOT analysis leads to a business plan).
4. Confidently prepare for the Final Examination.

Lesson Content:

This week is dedicated to a full review of all topics covered this term. This term was focused on **Agripreneurship** (the business of agriculture).

1. Summary of Key Topics

- **Week 1: Agripreneurship**
    - We learned that agriculture is a business ("Agripreneurship") with a large "Value Chain" (Input, Production, Processing, Marketing, Services).
- **Week 2: Enterprise Development**
    - We learned how to generate ideas (by solving problems) and test them with a **SWOT Analysis** (Strengths, Weaknesses, Opportunities, Threats).
- **Week 3: Bookkeeping**
    - We learned the *skill* of recording all money in a **Cash Book** (Income vs. Expenses).
- **Week 4: Financial Literacy**

    - We learned the *understanding* of money, including **Budgets** (planning for money) and the two types of costs: **Fixed Costs** (rent) and **Variable Costs** (seeds, feed).
- **Week 6: Business Management**
    - We learned the 4 functions of management (Planning, Organizing, Leading, Controlling) and the importance of **Leadership** and **Teamwork**.
- **Week 8: Marketing and Distribution**
    - We learned how to do **Market Research** (surveys, observation) and choose a **Distribution Channel** (Direct, Retail, or Wholesale).
- **Week 9: Sustainable Agriculture**
    - We learned that "good farming" is **sustainable** (protects the environment) and **climate-smart** (saves water, builds soil). This connects *all* the practical lessons from Term 1.
- **Week 10: Project Presentation**
    - We *proved* our skills by presenting our projects and calculating our **Profit or Loss**.

2. How It All Connects (The "Big Picture")

To be a successful **Agripreneur**:

1. You start with an **Idea** (Week 2).
2. You test it with a **SWOT** (Week 2).
3. You research your customers with **Market Research** (Week 8).
4. You create a **Budget** (Week 4) and a **Business Plan**.
5. You *manage* the business (Week 6) using **Sustainable** methods (Week 9).
6. You *track all your money* with **Bookkeeping** (Week 3).
7. At the end, you calculate your **Profit** (Week 4) and present your results (Week 10).

Evaluation (Classroom Activity):

- **Rapid-Fire Questions:** The teacher will ask questions from all topics.

- "What is a 'Fixed Cost'?"
- "What is the 'O' in SWOT?"
- "What is a 'distribution channel'?"
- "What is 'bookkeeping'?"
- "What is 'sustainable agriculture'?"
- "Name one sustainable practice we learned in Term 1."
- "What is the formula for Profit?"

Assignment (Exam Preparation):

1. **Create a Glossary:** Define the following 10 terms in your notebook:
    1. Agripreneurship
    2. SWOT Analysis
    3. Bookkeeping
    4. Fixed Cost
    5. Variable Cost
    6. Budget
    7. Leadership
    8. Market Research
    9. Distribution Channel
    10. Sustainable Agriculture
2. **Study:** Review all your notes, evaluations, and assignments from all three terms to prepare for your final examination.

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