

Strand1: CONSERVATION OF RESOURCES.

1.1 Conserving of Animal Feeds: Hay.

Meaning of Conservation.

- ✓ Drought is a period of prolonged dry weather.
- ✓ Drought reduces quantity and quantity of forage. Due to this it is important to conserve forage for future use during dry periods.
- ✓ **Conservation** refers to efficient use of scarce resources through reduction of loss to minimize waste.
- ✓ Conservation therefore, requires one to make correct decisions and choices to ensure there is enough for the future.

Ways of Conserving resources include:

- ✓ Conserving of animal feeds.
- ✓ Conserving of leftover foods.
- ✓ Practicing integrated farming.

Conserving of animal feeds: Hay

- ✓ **Forage** refers to plants which grow naturally or are planted by man which are used as livestock feed or eaten by domestic animals.
- ✓ These plants can be conserved and used when there is scarcity.
- ✓ Examples of forage include: grasses, legumes or a mixture of grasses and legumes.
- ✓ Forage is either given directly to animals through grazing or it can be harvested at a certain stage and fed to animals.
- ✓ Conserving forage ensures there is enough during drought.
- ✓ Forage can be conserved inform of hay.
- ✓ **Hay** refers to grass, legumes or other plants that are cut, dried and stored to be used by livestock as feed.
- ✓ Suitable crops for making hay include:
 - × Grass.
 - × Maize stover.
 - × Napier grass.
 - × Rhodes grass.
 - × Wheat straw
 - × Desmodium.
 - × Sorghum .
 - × Baley
 - × Oats etc.

Grass	Maize stover	Napier grass	Rhodes grass.
			
Wheat straw	Desmodium	Sorghum.	
			

Methods of Conserving Forage.

✓ Forage can be conserved using three methods as follows:

- Baled hay. (baling)
- Standing forage.
- Stacked hay. (Creating haystacks)

Baled hay and Stacked hay (baling)?



Baled hay



Stacked hay

- ✓ Baled hay is dried forage that has been compacted in special structures to form bales which are stored for a long time.
- ✓ Hay making process involves cutting, spreading cut forage for faster drying and putting it in rows (**windrowing**) for easier collection.
- ✓ The structures that can be used to make bales include:
 - ✗ Metallic or wooden Box baler.
 - ✗ Wooden box



Materials required to make baled hay:

- ✧ Dried forage such as grass, maize stover or straw.
- ✧ Metallic or wooden Box baler/wooden box
- ✧ Sisal twine/strings.
- ✧ Gumboots.
- ✧ Gloves.
- ✧ Panga/sickle.
- ✧ Knife.
- ✧ Rake.

Procedure followed when making baled hay.

- ☆ Wear gloves and gumboots to protect hands and feet.
- ☆ Cut fresh forage from the field using either a panga or a sickle.
- ☆ Spread to allow the cut forage to dry for 2 to 3 days using a rake.
- ☆ You can also use already dried forage materials from the field such as maize stover or straw or grass.
- ☆ Put the dried forage materials into the box baler or wooden box such as 40cm x 50cm x 75cm.
- ☆ Put s lengths of sisal twine in the box
- ☆ Compact the materials by pressing it down tightly or applying pressure from the top.
- ☆ Tie the materials securely or bind the compressed hay using binding materials such as sisal twine, strings etc.
- ☆ Remove baled hay from the box
- ☆ Store the hay bales in a dry shaded area for use during drought.

Advantages of making hay bales.

- ✕ They are easy to transport.
- ✕ Bales offer easy and safe storage for a long time.
- ✕ It is easy to handle hay while it is in form of bales.
- ✕ Bales requires less space.

Disadvantages of bailing.

- ✧ It is laborious/ a lot of work is required.
- ✧ Depends on weather.

Locally available materials you can use to make baled hay.

- A stiff Carton box or wooden box.
- Rhodes grass or straw.
- Sisal twine /any tying materials.
- Gloves.
- Gumboots.

Reasons why baling should take place when it is completely dry.

Baling should take place when it is completely dry to;

- prevent rotting and mould growth.
- Reduce spoilage.
- Preserve nutritional quality.

Types of bales that can be made during baling process in making of hay:

Bales can be:

- ✧ Rectangular.
- ✧ Square.
- ✧ Cylindrical.

Activities involved in making baled hay:

- ✧ Cutting of forage.
- ✧ Spreading of cut forage in the sun for easy and faster drying.
- ✧ Compressing of forage into bundles(bales) of forage materials into compact units called bales.

Stacked hay.

Staking hay refers to piling of dried forage in a heap. Materials like maize stovers or wheat straws are cut and piled on a raised surface.

The forage should be kept in a well sheltered place to prevent rainwater and sunlight.



Materials required when making haystacks (Stacking)

- ✧ Dried forage materials such as grass, maize stover, Rhodes grass or straw, oats, barley,.
- ✧ Sturdy pieces of timber or metal.
- ✧ Posts, rafters, nails, hammer, wood saw, crowbar, tape measures and panga
- ✧ Gloves.
- ✧ Gumboots.

Advantages of haystacks.

- ☆ Easy to assemble.
- ☆ Suitable in areas without equipment for making baled hay.

Disadvantages of haystacks.

- Require large spaces.

Factors to consider when choosing the method of conserving hay.

- ⇒ Availability of space.
- ⇒ Availability of equipment.
- ⇒ Availability of land.

What is standing forage?



- ✓ **Standing forage** refers to pasture or forage which is left uncut/ungrazed or still growing undisturbed for either grazing or feeding livestock in the future when it is dry or there is drought.
- ✓ It should be sufficient enough to feed livestock throughout the dry seasons.

Advantages of standing forage.

- Used by livestock when fresh.
- Can be harvested despite the weather available.
- Cheap and easy method of conserving forage.

Disadvantages of standing forage.

- ✗ Requires land.
- ✗ Can be destroyed by weather elements such as hailstones, floods etc.

Reasons for conserving forage.

- To provide animal feed during dry periods of feed shortage and scarcity.
- To avoid wastage of forage.
- To ensure better and full utilization (use) of available land.
- To get income from selling surplus forage.

Importance of Conserving forage.

- ✓ It ensures stable and continuous supply of pasture for livestock.
- ✓ Reduces the cost of purchasing additional feed for livestock. This help to save.
- ✓ Enhance community commitments to climate change since drought and other extreme weather disasters are less likely to have effects when forage is well managed.

1.2 Conserving of Leftover foods.

- ✓ Leftover food is food that has been prepared and cooked but not all eaten at once.
- ✓ Conserving left over foods refers to keeping them safe for use in order to avoid or not waste it.
- ✓ Left over foods should be conserved to prevent wastage.
- ✓ They can be stored in covered containers or refrigerators to prepare them later or for consumption.

Importance of Conserving leftover foods at home.

Importance of Conserving/Reasons For reusing left over food.

- ✓ To reduce food wastage – instead of throwing away leftover food, it can be transformed into new dishes.
- ✓ To save resources and money – reusing leftovers enable saving of both food and ingredients required to make it. This helps to save money as no more food is bought.
- ✓ To save on labour -no need for the initial food preparations, the leftovers can be used to prepare a new dish.
- ✓ To save time -reheated dishes save time in the kitchen, since cooked leftover do not undergo initial preparation process of cooking again. This saves time.
- ✓ Does not require special skills – since leftover food is already available, preparing it is easier than making a new dish.
- ✓ For food security – using leftovers makes food available for everyone because nothing is wasted. This ensures everyone has enough to eat.
- ✓ Help in keeping environment healthy – reusing leftovers helps the environment as less food is wasted which is good for our environment.

Preparing Leftover foods to avoid wastage.

Various methods used to prepare leftover foods to reduce wastage.

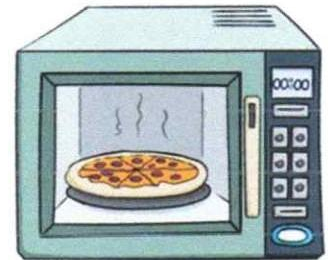
- ✧ Reheating.
- ✧ Prepare other recipes.

a.) Reheating.

- ♦ Reheating is the process of warming leftover food to make it tasty and safe to eat.
- ♦ We can do reheating by:
 - ☆ Using fire.
 - ☆ Using Stove.
 - ☆ Using a jiko.
 - ☆ Using a cooker.
 - ☆ Using a microwave.
 - ☆ Any other means of heating.



Using a jiko



Using a microwave oven

Guidelines considered when reheating leftover foods for consumption.

- ✖ Make sure the leftover food is reheated uniformly to ensure that it is safe for consumption.
- ✖ Always cover leftover food when reheating to retain the moisture and promote even heating.
- ✖ Avoid leaving reheated food at room temperature for extended period of time. This may allow diseases-causing bacteria to multiply.
- ✖ In case there is possibility, remove bones from meat before reheating. This is for thorough circulation of heat in the entire meat.
- ✖ Some food like fish go bad easily, hence it is important to inspect and ensure that the fish has not gone stale before reheating.

Safety when handling and reheating leftover foods.

When reheating food safety should be observed to avoid accidents which may lead to burns.

We can observe safety when reheating food by:

- ✧ Ensure that the cooking area is clean.

- ✧ Left over foods should be stored in clean, covered and safe containers in a refrigerator or a cool place to prevent contamination that may lead to food poisoning.
- ✧ Ensure that the working area is organized.
- ✧ Food should not be reheated more than twice.

Examples of how you can prepare different leftover foods to avoid wastage.

- a.) Preparing ugali bites (fried ugali) or fritters
- b.) Preparing vegetable fried rice.
- c.) Githeri in tomato sauce.

Using leftover foods.

Leftover foods can be used as ingredients to produce new dishes.

Leftover foods may be diced, shredded or chopped to improve the texture and appearance of the new dishes.

The art of using reheated food is called réchauffé cookery.

Reheated foods tend to dry. Gravy is used to moisten reheated dishes. Gravy must be fresh and made on that particular day.

Reheated dishes lack flavour and therefore they should be flavoured carefully.

Frying is a common method of reheating food because it provides an appetizing appearance and delicious flavor.

Reheating dishes should be served hot as soon as they are made. They must be served neatly and carefully garnished to improve their attractiveness.

1.3 Integrated Farming.

What is Integrated farming?

- ✓ **Integrated farming** refers to an agricultural practice that involves a combination of different components on the same plot of land to utilize their relational benefits.
- ✓ **Integrated farming** refers to a farming system which involves a combination of several enterprises that are carried out on land at the same time in a way that they benefit one another.
- ✓ **Integrated farming** helps to conserve resources and increase profitability of agricultural products.
- ✓ In integrated farming there is no waste. Waste from one enterprise or component becomes an input for another enterprise.
- ✓ Practicing integrated farming maximizes land use as most practices are carried out in one place.

- ✓ For example, keeping poultry over a fish pond. Poultry waste is used to fertilise the pond hence encouraging the growth of planktons which are eaten by the fish. Vegetables can be used to supplement poultry feeds reducing the cost of buying commercial feeds

Examples of components of integrated farming include:

☐ Crop production.

- ✗ Growing of crops such as cereals, legumes and forage.
- ✗ Crops provide food for both livestock and human.
- ✗ They also provide organic matter.



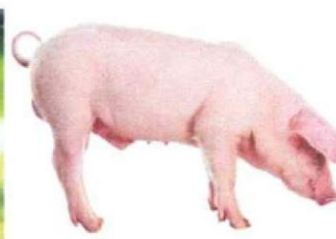
☐ Horticultural crop production.

- ✗ Growing of crops such as vegetables, fruits, herbs and spices.
- ✗ Provide food for livestock, poultry and rabbits.



☐ Livestock production.

- ✗ Keeping of livestock such as cows, sheep, goats and pigs.
- ✗ Provide food.
- ✗ Provide manure for crops



☐ Poultry rearing.

- ✗ Rearing of poultry such as chicken, ducks, turkeys and geese.
- ✗ Provide manure for crops reducing reliance on chemical fertilizers
- ✗ Provide food through eggs and meat for human.



☐ Aquaculture.

- ✖ Rearing of fish in fish ponds.
- ✖ Farmers can use water for both fish and vegetable crops.
- ✖ Waste from fish acts as nutrients rich organic fertiliser for vegetables.



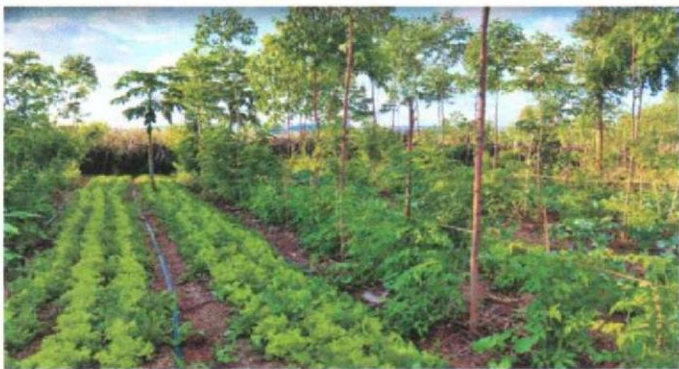
☐ Rabbit keeping.

- ✖ Keeping of rabbits.
- ✖ Source of food.
- ✖ Provide manure for crops that enhance soil fertility.
- ✖ Reduce reliance on chemical fertilizers.



☐ Agroforestry.

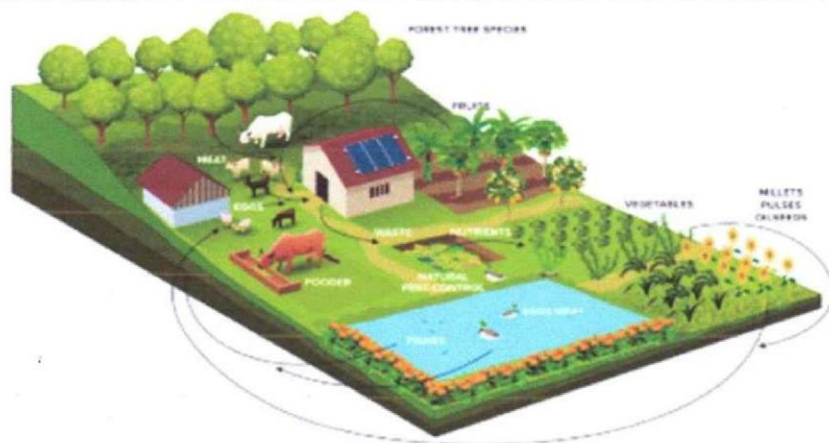
- ✖ Growing of crops, rearing of livestock and planting of tree on the same piece of land.
- ✖ Conserves soil and water for farming crops.
- ✖ Supports animals with food.



Ways in which integrated farming helps to conserve resources:

- ⇒ Waste products from livestock can be used to make organic manure used for growing crops. This reduces the use of chemical fertilisers.
- ⇒ Integrated farming involves water management practices such as agroforestry or fish rearing which maximise the use of water. Water from fish pond can be used to water livestock and crops. Crops can be irrigated through water conservation measures such as drip irrigation hence reducing water wastage.
- ⇒ Planting various crops on the field reduces pests which minimise reliance on chemical pesticides.
- ⇒ Integrated farming practices such as agroforestry and cover cropping help to prevent soil erosion. Trees and cover crops usually protect the soil hence reducing nutrient loss through runoff.

Integrated Farming model.



Materials required to make integrated farming model.

- ✗ Cartons.
- ✗ Sticks.
- ✗ Plastic containers.

- ✗ Modelling materials (clay & paper mache)
- ✗ Paints.

- ✗ Paint brushes.
- ✗ Cardboards.
- ✗ Glue.

Importance of Integrated farming.

- ✓ **Environmental friendly** - Integrated farming reduces environmental pollution by reducing the use and reliance on chemical fertiliser.
- ✓ **Sustainability** - Integrated farming helps to produce healthy foods for a longer time because it does not necessarily involve use of chemicals.
- ✓ **Income generation/enhances financial stability** - Integrated farming system can provide a steady flow of income to farmers throughout the year. It leads to financial stability for households by expanding their source of income and decreasing costs on animal feed and farm inputs such as fertiliser.
- ✓ **Balanced nutrition** - Integrated farming optimizes resource use by combining different components on the same plot of land this enables to produce a variety of crops and animal products that provide a balanced and diverse source of nutrition.
- ✓ Integrated farming promotes efficient use of water by integrating crop production with fish farming.

Strand 2: FOOD PRODUCTION PROCESSES.

What is Food production?

- ✓ Food production refers to the activities aimed at growing healthy food and ensuring it is stored safely.
- ✓ Food production can be achieved through organic gardening.
- ✓ Various crops such as vegetables, legumes, herbs and spices can be cultivated without the use of harmful chemicals.
- ✓ Food should also be effectively stored to preserve quality and safety of the food we produce.
- ✓ Proper storage practices reduce the risk of spoilage due to moisture, leakages and pests such as rodents.

2.1 Organic Gardening.

- Organic gardening refers to the use of natural compounds such as organic manure, organic pesticides and organic weed control methods from plants and animal wastes in growing of crops.
- Organic gardening is the growing of crops such as vegetables, legumes and spices without use of agricultural chemicals.
- Organic gardening avoids the use of chemical pesticides, herbicides and chemical fertilizers in growing and taking care of crops.
- **Organic gardening involves practices that involve the use of:**
 - ✗ Use of Organic manure.
 - ✗ Use of Organic pesticides.
 - ✗ Use of mechanical weed control methods
 - ✗ Organic methods of controlling weeds.
 - ✗ Organic foliar feed.

Items required when searching information on organic gardening practices.

- ♦ Textbooks.
- ♦ Print resources.
- ♦ Digital devices with internet connectivity.

a.) Use of Organic manure.

Organic manure is prepared from natural sources such as animal wastes, plant residues or kitchen waste.

Organic manure exists in three forms as follows;

- ✧ Compost manure.
- ✧ Farmyard manure.
- ✧ Green manure.

ORGANIC
MANURE

Organic manure can be made using the following methods:

- ✕ Composting.
- ✕ Green manure.
- ✕ Animal manure.
- ✕ Crop residue decomposition.

Composting is a process in which organic materials such as kitchen and animal wastes are decomposed to form manure that is rich in nutrients. Therefore, compost improves soil fertility.

Composting is done by:

- Collecting organic waste materials such as kitchen wastes, plant residues and animal wastes.
- Piling/heaping the collected materials into a heap and then allow it to decompose. A compost heap can be used.
- Pit method can also be used to make a compost.
- Compost materials should be turned regularly. This is *to enhance decomposition and aeration*.

Green manure is prepared from green plants such as legumes. To prepare green manure:

- Grow legume crops or any suitable plants for making green manure.
- When the grown crops are at a flowering stage and are still green and succulent, plough them into the soil.
- As the crops decompose in the soil, they improve soil fertility.

Animal manure is prepared from animal wastes like cow dung or droppings from other animals such as goats, sheep and poultry.

To prepare animal manure:

- ✧ Collect animal wastes.
- ✧ Carry out composting to make organic manure.
- ✧ Composting animal wastes into animal manure helps to eliminate/remove pathogens and weeds.

Crop residue decomposition are left over plant materials used to make organic manure.

Crop residue decomposition is prepared by:

- ✎ After crops are harvested, collect leftover plant materials also called crop residues.
- ✎ Decompose the crop residues to make organic manure.
- ✎ The use of this method helps to recycle plant nutrients.

b.) Use of organic pesticides.

Crop pest can be naturally controlled by use of organic pesticides.

Organic pesticides are substances made from plant parts and animal waste that are used to control pests.

Substances such as neem oil and garlic spray are used in this case.

Using organic pesticides is safer and more sustainable way to control pests.

Examples of organic pesticides you can make and use in organic gardening include

- *Neem oil.*
- *Garlic spray.*
- *Rabbit urine.*
- *Mexican marigold.*
- *Pepper.*
- *Rosemary.*

i. Neem oil.

Neem oil is extracted from neem tree.

It can be used as an insecticide that is effective against crop pests such as aphids and mites.

The pesticide is made by extracting oil from neem seeds and using it to spray crops to control pests.

How to make neem oil.

- Collect ripe neem seeds from neem tree and clean and dry the seeds.
- Crush the seeds into a container and to extract the oil.
- Remove any solid particles from the extracted neem oil and put the neem oil into a clean container.
- Dilute the neem oil with water and use it to spray crops to control pests.

ii. Garlic spray.

- It has natural ability to control pests.
- It can be made by:

Blend garlic bulbs into a fine paste.

Add warm water and stir to make thoroughly into a liquid spray.

Put the liquid in a bottle and let it stay for 24 hours in a warm place.

Sieve the solution to collect garlic spray and use it to control pests.

c.) Mechanical weed control.

- It refers to the practice of managing and suppressing weeds through physical means rather than using chemical.
- It is the manual control of weeds.
- Mechanical weed control involves controlling weeds using the following methods:

a.) *Tillage or cultivation.*

b.) *Slashing.*

c.) *Uprooting.*

d.) *Mulching.*

Tillage – involves digging the soil to remove weeds.

It is done to disrupt the growth of weeds and expose them to drying conditions where they cannot survive.

Slashing – cutting tools such as sickles, slashers and pangas are used to cut weeds and expose them to drying conditions.

Uprooting/pulling out – it is the manual removal of weeds by hand or by use of weed puller. Pulling and uprooting is convenient for smaller plots or gardens with scattered weeds.

Mulching – this is covering the soil with mulching materials such as dry grass or dry leaves to suppress weed growth.

Mulch block sunlight making it difficult for weeds to emerge or grow.

Tillage



slashing



Uprooting



Mulching to control weeds and conserve moisture



a weed puller

d.) Use of organic foliar feed.

Organic foliar feeds refer to a type of fertilizer that is usually applied on the leaves of crops. It is made from animal wastes or extracts from plants such as Mexican sunflower. Organic foliar feed is used in organic gardening to promote plant growth.

How to prepare foliar feed from animal waste.

- ✓ Collect animal manure.
- ✓ Mix it with water in a large container and let it settle for few hours to allow nutrients to dissolve.
- ✓ After soaking, sieve the mixture to separate the solid particles from the liquid.
- ✓ Dilute the liquid with water to avoid damaging the crops in the ration 1 litres of foliar feed to 10 litres of water.
- ✓ Transfer part of the liquid into a spray bottle for immediate use and store the remaining foliar feed properly for future use.
- ✓ Spray the foliar feed directly on the leaves of crops ensuring you cover both the top and bottom surfaces of the leaves.
- ✓ Apply foliar in the morning or in the evening to avoid potential damage to the crops from intense sunlight.

How to prepare Organic foliar feed using Mexican sunflower.

- Collect $\frac{1}{2}$ kg of Mexican sunflower leaves.
- Put them in a large plastic container.
- Add 5 liters of water into the container. The leaves must be completely submerged.
- Cover the mixture to ferment ensuring you stir the mixture every day. Once bubbles no longer form on the surface of the liquid when it is stirred, fermentation is complete. This might take 7 to 14 days.
- Filter the liquid and the foliar feed is ready to use.

How to prepare Organic foliar feed using rabbit urine

- Collect rabbit urine.
- Mix one litre of rabbit urine with five litres of water.
- Your foliar feed is ready is ready to use.

Guidelines on how to make foliar feed using Mexican sunflower.

- Collect one large basin of fresh Mexican sunflower leaves especially when the leaves are dark green and succulent.
- Rinse the leaves in clean water to remove dirt and chop them into small pieces.
- Add 10 litres of water into a large basin containing chopped Mexican sunflower leaves. Soak the leaves for 2 weeks and stir the mixture every 3-5 days.
- Once the foliar feed is ready and has turned dark green, use it to spray crops.
- Put the foliar feed in a spray bottle or watering can and dilute it with water.
- Spray the folia on the top and bottom parts of the leaves.

N/B: Nutrient content of the foliar feed may vary depending on:

- ✓ Quality of the Mexican sunflower used.

Growing of A Food crop using Organic gardening practices.

Examples of food crops that can be grown using organic gardening practices

Kales.

Tomatoes.

Peas etc

- ♦ Identify a suitable site or container for growing food crop. Ensure the area has good drainage and adequate sunlight.
- ♦ Use organic manure to improve soil fertility and plant the food crop.
- ♦ Manage the food crop by carrying out the following practices and any other gardening practices depending on the crop selected.
 - ✕ Water the food crop regularly.
 - ✕ Weed the crop using mechanical weed control methods such as tilling, uprooting and slashing. Mulch can be applied to suppress or smother weeds.
 - ✕ Prepare organic foliar feed using animal wastes or Mexican sunflower and apply it in the leaves of the food crop for nutrients.
 - ✕ Make organic pesticides like garlic spray or neem oil for controlling pests.
 - ✕ Harvest when the crop is mature.

Importance/advantages of Organic gardening.

- **Reduces dependence on agrochemicals** – organic gardening only allows use of organic materials and avoid use of chemicals.
- **Leads to decreased production costs** -organic gardening helps to save money used to purchase fertilizer and pesticides since it uses materials that are locally available. This reduces production cost.
- **Reduces effects of agrochemicals on the environment** -since there is no use of chemicals, the environment is protected from the effects of chemicals.
- **Access to nutrients-rich foods** -organic gardening enables production of food that is rich in nutrients.
- **Food safety** – enhances food safety as it does not involve use of synthetic pesticides and fertilizers. This reduces risk of chemical residues on crop produce.

2.2 Storage of Crop Produce.

Crop produce should be stored properly in special structures after harvesting.

Reasons for storing crop produce.

- ✓ To ensure food is available throughout/use in the future during scarcity.
- ✓ To avoid spoilage and wastage.
- ✓ To preserve quality and nutrients.

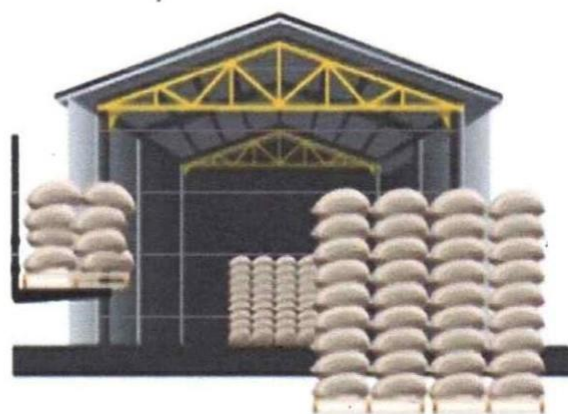
Structures/facilities used to store crop produce.

- ✧ Containers.
- ✧ Store rooms.
- ✧ Granaries.
- ✧ Storage bags.

Granary



store rooms



storage bags



storage containers



Granaries

- These are storage structures used for storing crops produce such as maize and beans.
- Granaries are designed to keep the crop produce dry, cool and safe from pests.
- Most granaries are elevated (raised above the ground) to prevent moisture from reaching the crop produce which causes damage.
- They are prepared by:
 - ▷ Cleaning.
 - ▷ Sealing cracks.
 - ▷ Dusting.
 - ▷ Repairing leakages.
 - ▷ Controlling rodents.
 - ▷ Removal of previous crops.

Store rooms

- They are enclosed structures designed for storing crop produce in large quantities.
- They can be made from various materials such as concrete, wood or metal.
- They are ventilated to regulate temperatures and moisture levels.
- They are used to store non-perishable produce such as cereals.
- They are prepared by:
 - ▷ Cleaning.
 - ▷ Sealing cracks.
 - ▷ Dusting.
 - ▷ Repairing leakages.
 - ▷ Controlling rodents.
 - ▷ Removal of previous crops.

Storage bags

- They are commonly used storage structures that are commonly used to stored crop produce such as green grams, beans and rice.
- Using airtight storage bags helps to prevent spoilage and pest infestation.
- They are prepared by:
 - Cleaning.
 - Drying thoroughly.
 - Repairing damaged bags.

Storage containers.

- Storage containers include:
 - × Gourds.
 - × Pots.
 - × Baskets.
 - × Jerricans.
 - × Wooden boxes.
- They are used to store various types of crop produce.
- Some crop produces are delicate and therefore are storage in special containers e.g. tomatoes are delicate and are stored in crates.
- The type of crop produces stored in storage containers depends on the following factors;
 - ☆ Size of the container.
 - ☆ The type of storage container.
- They are prepared by:
 - Cleaning.
 - drying.
 - Repairing leakages.
 - Dusting for those used to store grains previously.

NOTES.

- ✧ Crop produce structures should be properly prepared to minimize spoilage of crop produce when stored.
- ✧ Crop produce should be well managed to reduce the risk of spoilage caused by moisture and rodents.
- ✧ Proper storage of crop produce enhances food safety and helps to prevent contamination.

General ways of preparing storage structures and facilities before storing crop produce.

Storage of crop produce requires clean and safe storage facilities to prevent damage, spoilage and wastage of produce.

The following ways/methods are used to prepare storage structures and facilities for storing crop produce:

a.) Cleaning.

- Involve removing dirt from storage structures and facilities to prevent contamination of the crop produce.
- Helps to remove pests that may have remained in the storage structures after being used previous.

walls or floor of the storage structures to prevent leakages and safeguard the stored crop produce from loss.

b.) Dusting.

- Involves removing dust that has accumulated in the storage structures or facility to prevent it from settling on the new crop produce.
- It can be done using dusters or brooms to remove dust.

c.) Sealing cracks.

- Involves repairing any cracks or openings in the storage structures to prevent pests or insects from damaging the stored crop produce.

d.) Repairing leakages.

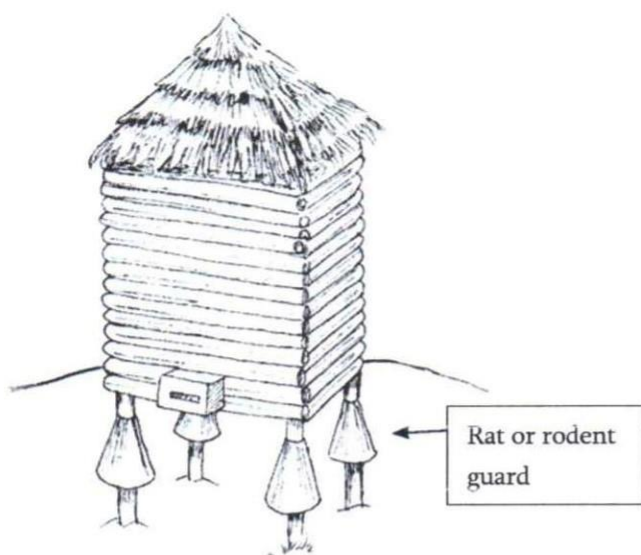
- It is the process that involves sealing any holes or gaps on the

e.) Emptying previous crop produce.

- It involves removing any remains of the crop produce from the storage structure before storing a new crop produce.
- It helps to prevent contamination of the fresh crop produce with pre-existing pests and diseases.

f.) Controlling rodents.

- These are actions or measures taken to prevent rodents from entering the storage structures.
- It helps to safeguard the crop produce from loss and damage by rodents.
- Rodents can be controlled using the following methods:
 - ✧ *Innovative Sound repellents or deterrents such as onion and garlic sprays.*
 - ✧ *Installing rat guards to prevent rodents getting into storage facilities.*



Methods used to manage stored produce:

- Ensuring that stored produce such as cereals and pulses are at the correct moisture content.
- Ensuring proper ventilation.
- Controlling rodents.
- Regular turning of stored produce to allow air circulation.
- Disposing off spoilt produce.

NOTE:

When produce is exposed to dampness, it leads to growth of fungi which cause aflatoxins. Aflatoxins is poisonous substance when consumed which caused death. Always prevent humid or damp conditions in produce stores

Preparing containers and airtight storage bags.

Clean container/airtight bags with warm soapy water to remove any contaminants.

Dry them thoroughly in the sun.

Repair any leakages or damaged parts of the container.

Features of a good container and airtight bags.

- Should be clean.
- Should be free from contaminants such as chemicals.
- Should be dry.
- Should be durable.
- Should be airtight.

Preparing granaries and storage rooms.

Empty the store if there was previous crop produce.

Clear vegetation from around the store or granary.

Clean the storage room or granary appropriately and let it dry to avoid dampness.

Repair damaged areas such as sealing leaks on the roof, damaged floors or broken walls.

Dust with appropriate chemicals to prevent pests.

Seal cracks.

Fix rodent guards or apply repellants to keep off rodents.

Features of a good store room or granary.

- Should be well ventilated.
- Should be leak proof.
- Should be raised to prevent dampness caused by moisture.
- Should have rodent guards to keep off rodents.
- Should be easy to clean.
- Should be located in a well secured place to prevent theft or damage by animals.

Importance/Reasons for preparing a storage facility.

It is important to prepare a storage structure or facility because of the following reasons.

- ⇒ **Prevent contamination**– helps to remove dirt and dust and other potential contaminants from the storage structures.
- ⇒ **Control pests** – sealing cracks and repairing leakages prevents pests and rodents from reaching crop produces in the storage structures.
- ⇒ **Preserve quality of produce** -pest, mould and diseases affect crop produce and reduce their quality. Therefore, when clearing storage structures, it helps to keep quality of the crop produce.
- ⇒ **Prevent damage** – regular maintenance such as sealing cracks and repairing leakages helps to prevent damage to the storage structures.
- ⇒ **Comply with regulations** – producers of crop produce are required to adhere to or follow certain agricultural and food safety regulations which requires proper preparation and maintenance of the storage structures. These regulations ensures that stored crop produce meets quality standards and is safe for consumption.
- ⇒ **Reduce on financial losses** – enough preparation and maintenance practices contribute to reducing the risk of crop spoilage, contamination and pests infestation.

Managing Stored Crop produce to reduce spoilage.

Ways we can manage stored produce in storage facilities.

- ☆ Ensuring that stored produce such as cereals and pulses are at the correct moisture content.
- ☆ Ensuring proper ventilation.
- ☆ Controlling rodents.
- ☆ Regular turning of stored produce to allow air circulation.
- ☆ Disposing off spoilt produce.

2.3 Cooking: Using Flour mixtures

Cooking is the process of preparing food through the application of heat.

The main reason for cooking food is make it tasty and safe for consumption.

During baking, flour is an important ingredient that is used in making different types of food.

Flour mixtures.

- Flour can be mixed with water and other ingredients to make batters or dough.
- **Flour mixture** refers to a mixture of flour as main agent with water and other ingredients such as a raising agent, sugar, margarine and salt.
- Wheat flour is mainly used to make flour mixtures.
- Wheat contains a substance called gluten which stretches and holds the flour mixture together.
- These flour mixtures are used to make food products such as
 - ⇒ Pancakes.
 - ⇒ Chapati.
 - ⇒ Mandazi.
- The final products from flour mixture depends on how thin or thick the flour mixture is.

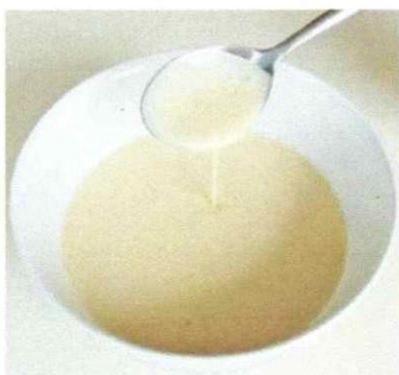
Types of Flour mixtures.

There are two types of flour mixtures used to make different types of food products.

They include:

- ***Batters.***
- ***Doughs.***

a.) Batters.



- These are mixtures made by combining flour with a liquid such as water or milk to form a semi-liquid mixture.
- There are two types of batters namely; thin batters and thick batter.
- Thin batters have running consistency for example for making crepes or pancakes.
- Thick batter has a thick consistency, for example, batter for making cakes.
- Batters are commonly used in the preparation of foods such as:
 - ✓ Pancakes.
 - ✓ Cakes.