SCHEME OF WORK
JSS2 FIRST TERM AGRICULTURE E-NOTE

Meaning of Farm Structures and Types
Uses and Maintenance of Farm Structures
Meaning of Farm Buildings and Types
Uses and Maintenance of Farm Buildings
Meaning and Methods of Crop Propagation
Advantages and Disadvantages of Crop Propagation
Agricultural Cultural Practices (Meaning of Cultural Practices)
Agricultural Practices Cont'd
Agricultural Practices Cont'd
Agricultural Practices Cont'd
Agricultural Science Assessment

WEEK 1

Meaning of Farm Structures and Types

Performance Objectives

Student should be able to:

1. Define farm structure.
2. List the types of farm structures.
3. Mention the uses of farm structures.

Content

Meaning of Farm Structure

Farm structure is anything or facility which is constructed on the farm to make farming operations easier. It can also be referred to as the different types of physical constructions that are put up in a farm for crop production.

Types of Farm Structures

There are different types of farm structures which can be classified according to their uses. These structures include storage, processing, production and utility structures.

1. Storage structures: These structures are used for storing farm produce before disposal to markets or use as inputs in the next planting season. Storage structures include silos, cribs, barns and rhombus.

A. Silo: These are tall, round, tower-like structures made of cement, metal or aluminium, constructed in large farms for storing harvested grains like maize, guinea corn, millet, cowpea and prepared grass for feeding of farm animals. Silos are very expensive to construct and maintain. They are c

ommonly used in Northern Nigeria.

Picture showing silo

B. Cribs: Cribs are simple grain storage structures made of wood and wire gauze on the sides and floor with a thatch or zinc roof. The floor is well raised above the ground on the wood legs which have guards to prevent rats from climbing the crib to eat the

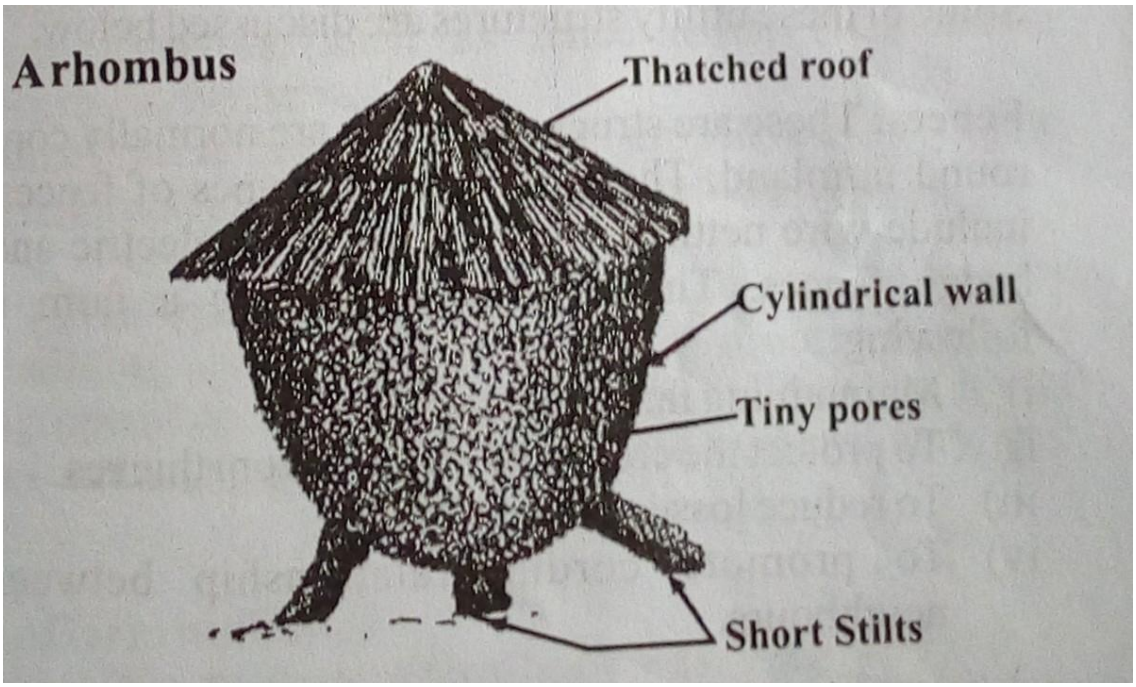
grains kept in it. Cribs are used for storing and drying maize.

Picture of a crib

C. Barn: Barn is a temporary structure made on the farm for storing yam tubers, potatoes, cocoyam, grass or hay. A barn is normally made by tying big poles vertically to the ground, supported with poles placed horizontally at fairly wide internals. It also consist of small vertical poles fixed to horizontal poles on which the yam tubers are tied.

Picture of a yam barn

D. Rhombus: These are round structures made from mud with grass or thatch roof. They are very common structures in northern Nigeria where they are mainly used for storing grains like sorghum, millet, maize, groundnut and cowpea.



Picture of a rhombus

2. Processing Structures: These are structures that are designed to handle the processing of various types of farm produce. Examples are rice mill, oil, oil palm mill, cassava mill, fish drying shed, abattoir, maize mill etc.

3. Production Structures: These are structures that used either for rearing animals or for tending crops under controlled conditions. Examples of structures that can be used for raising animals are fish pond, rabbit hutches, battery cages in poultry etc. While examples of structures for tending crops are nursery sheds or potting sheds for caring for young seedlings in the nursery.

Figure 1Picture showing battery cages in poultry

Picture showing nursery shed

4. Utility Structures: These are structures which help to facilitate or improve production on the farm. They include fences, dams, overhead sprinkler, animal dips, boreholes, road, electric pole, compost pits, electricity generating plants and water tanks. Some of these utility structures are discussed below.

A. Fences: These are structures which are normally constructed around the farm. There are different types of fences which includes wire netting, barbed wire wall, electric and strong hedge fences. The essence of fencing a farm includes the following:

a. Maintaining farm boundaries.

b. To protect the crops and animals from thieves.

c. To reduce losses of animals.

d. To promote cordial relationship between farm neighbours.

B. Animals dips: These are concrete pits in the ground situated at the entrance of the farmhouse e.g poultry house. It is used as a solution of pesticides in water to kill external parasites on the bodies of farm animals.

C. Compost pits: These special pits dug in the farm to make organic manure which supply plant food to the soil.

D. Electric poles: These are special woods or concrete used for connecting wires when installing electric light on the farm.

E. Dams: These are structures made with stones, woods and concrete across a river or stream to hold back water for irrigating crop farm**s.**

WEEK 2

Uses and Maintainance of Farm Structures

Performance Objectives

Student should be able to:

1. List the uses of farm structures

2. State the methods of maintaining farm structures.

Content

Uses of Farm Structures

Farm structures can be used in the following ways.

1. To preserve the quality and quantity of crops.

2. To protect agricultural products from pests, diseases and theft.

3. To store crops before they are sold out to the market.

4. Some farm structures such as fence assist to maintain security in the farm.

5. Farm structures are used to ensure national food security e.g the silo is usually used by the Federal Government to store food.

Maintainance of Farm Structures

Farm structures like any man-made materials are normally subjected to gradual wear and tear therefore, the following are maintenance operations carried out on-farm structures.

1. Oiling/ Coating: Farm structures such as silos should be coated with aluminium paint to prevent rust as well as to reflect light.

2. Painting: All wooden parts of farm structures are to be painted to prevent them from adverse weather conditions and make them look presentable.

3. Seasoning: This is the thorough drying of wooden materials to protect them from insect damages or quick structural deformities.

4. Regular inspection and repairs: All farm structures are to be inspected regularly to carry out repairs immediately when any fault is found.

5. Replacement of damaged roof: Damaged roofs arising from natural disasters e.g windstorm should be re-roofed.

6. Cleaning: The floors of structures should be properly cleaned after old produce have been cleared and before the stocking of new farm produce.

WEEK 3

Meaning of Farm Buildings and Types

Performance Objectives

Student should be able to:

1. Define farm buildings.
2. State types of farm buildings.
3. Explain the uses of farm buildings.

Content

Meaning

Farm buildings are structures used in farming operations which may include buildings to house families, workers as well as livestock, machinery and crops. Farm buildings are also referred to as FARMSTEAD.

Types of Farm Buildings

There are different types of farm buildings and they are as follows:

1. Workshop: This is a building used for maintenance, repairs and adjustment of farm machinery and implements. It is also where the construction of students project on industrial training is done.

2. Farm Office: This is an important building especially on large farms. The farmers and managerial staff stay there to plan and co-ordinate all the strategies of the farm business. The office is a central holding place for input/output records of the farm. The farmer's link in communication with the business world outside is based there. The farm office can also be called the ADMINISTRATIVE BUILDING.

3. Farm Shop: This refers to a building where the products from the farm are sold out to members of the public.

4. Living or Dwelling house: These are houses built to provide accommodation to the farmer and his workers. The farmers and his workers should live on the farm accommodation provided to minimize the time spent on moving from home to farm and also to ensure that crops and animals are more efficiently catered for.

5. Storage house: These are buildings specifically built for safekeeping of different items on the farm. These items could be proceeds of farm products like bags of corn, rice, millet then farm implements, feed for animals, crop protection chemicals and fertilizers. Farm storage house can also be specially equipped to provide cold storage for farm products like meat and eggs awaiting evacuation and marketing.

6. Security house: This is a central place for all the security guards in large farms. This place is headed by the CHIEF SECURITY OFFICER (CSO) who oversees all the activities of those in the security house.

7. Production house: These are houses used for running farm production projects. Examples are poultry houses, hatcheries and pens for pigs sheep and goat.

WEEK 4

Uses and Maintainance of Farm Buildings

Performance Objectives

Student should be able to:

1. State the uses of farm buildings.

2. List the methods of maintaining farm buildings.

Content

Uses of Farm Buildings

1. To protect animals and farm implements from thieves and other natural enemies.

2. To provide comfort for the farmer and his workers.

3. To prolong the lifespan of farm implements.

4. For easy identification of sick animals and their handling for treatment.

5. To protect harvested crops and farm animals from adverse weather conditions.

6. They are convenient means for processing and storing of farm animals.

Maintainance of Farm Buildings

Buildings on the farm require adequate maintenance if they are to last for a long time and perform the functions they are meant for. Therefore, the farmer must carry out frequent and regular checks on all buildings on the farm to ensure that they are in proper form. The following are some of the ways farm buildings can be maintained:

1. Concreting: This is when the floors of buildings are made of concrete (a mixture of sand and cement). This is necessary because it seals up the holes or cracks on the ground thereby preventing rodents and other pests of crops from gaining access into buildings.

2. Painting, Oiling or Greasing: The wooden parts of buildings should be painted with anti- insects chemicals such as solignum to prevent them from being damaged by termites and other insects. Also, metal parts should be painted with anti-rust paint especially tanks and other materials used in storing water. Other metal materials that are likely to become rusty after some time should be painted with oil paint, oiled or greased.

3. Seasoning: Wooden materials used in buildings should be well seasoned, that is properly dried before being used. This will protect the wood from insect attack.

4. Cleaning: It is important to keep buildings clean as this helps to prolong their life span. Water tanks should be cleaned always. Abattoirs, milking sheds and others should be cleaned and also storage house should be cleaned before stocking in new farm produce.

5. Roofing: The tops of farm buildings should be properly roofed to make them rat proof. Asbestos, iron or aluminium sheets should be used instead of thatched roofs. This helps to protect the buildings against too much sun, rainstorm and rats.

6. Bracing of walls: Walls and heavy roofs should be supported by pillars to make them strong and prevent them from collapsing.

7. Regular inspection and repairs: All farm buildings should be checked frequently and any damage should be repaired without delay. The damaged parts of any building should be replaced with new ones and openings on walls and floors should be covered immediately discovered.

WEEK 5

Meaning and Methods of Crop Propagation

Performance Objectives

Student should be able to:

1. Define the crop propagation.

2. State the methods of crop propagation.

Content

Definition of Crop Propagation

The word propagation means to grow, generate or to cultivate. Therefore, crop propagation is defined as the practice of growing or cultivating crop plants by sowing their seeds or planting their cuttings. It can also be defined as the process of raising young plants from seeds or vegetative parts.

Methods of Crop Propagation

There are two methods of crop propagation and they are as follows:

1. Sexual or seed propagation: This method of propagation makes use of the sowing of seeds. Seeds can be collected from healthy, vigorous and high yielding plants. They are down either directly on the farm or in a nursery before they are transplanted to the farm. Examples of crops propagated by seeds are maize, rice, tomato, okro, cocoa, oil palm, rubber, mango, guava and cowpea.

Before the seeds are planted, the following are some qualities one must look at for.

1. The seeds should be matured.

2. The seeds should be well dried.

3. Large seeds should be used as they give good yields.

4. The seeds should be free from holes as they will no longer be viable.

5. Seeds should not be stored for a long time before they are sowed as they may not germinate.

Seed Treatment

Before sowing, seeds should be treated and the methods used are as follows:

a. Pre-sock seeds: This is done to allow some very hard seeds to absorb water that will aid germination. Examples of such seeds are beans and carrot.

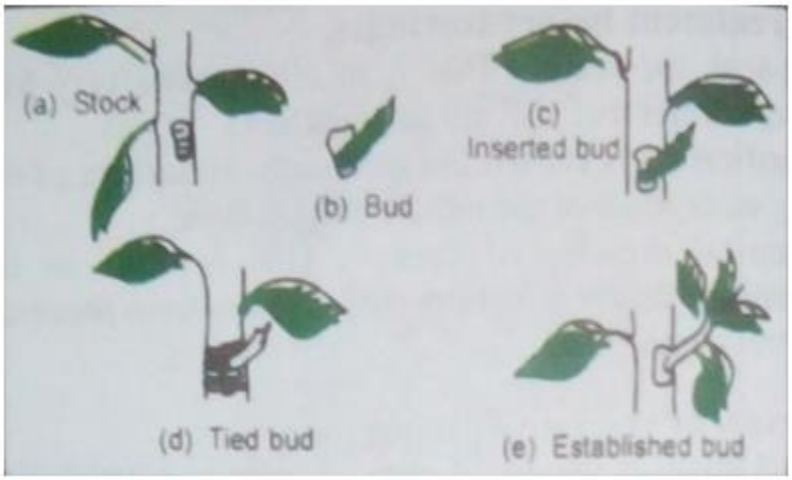
b. Scarification: This is the process whereby the surface of the seeds are loosened to enhance emergence of the plumule (the first part of a seed that grows upwards: the shoot) and radicle (first part of the seedling that grows downward; root).

c. Chemical dressing of seeds: This is done by applying chemicals to seeds. It prevents pest from destroying the seeds and disease organisms from affecting the seeds. Examples of chemicals used are magnesium sulfate ($MgSO_4$) and zinc sulfate ($ZnSO_4$).

2. Asexual or vegetative propagation: This method of propagation makes use of vegetative parts of the parent plant. For example, root, stem and leaves. Other methods here include the use of bulb, runners, rhizomes and suckers. Crops that can be sown in this way include cassava, rubber, pineapple, sugarcane, potatoes, plantain, onion, banana etc.

There are different methods of asexual propagation and they include:

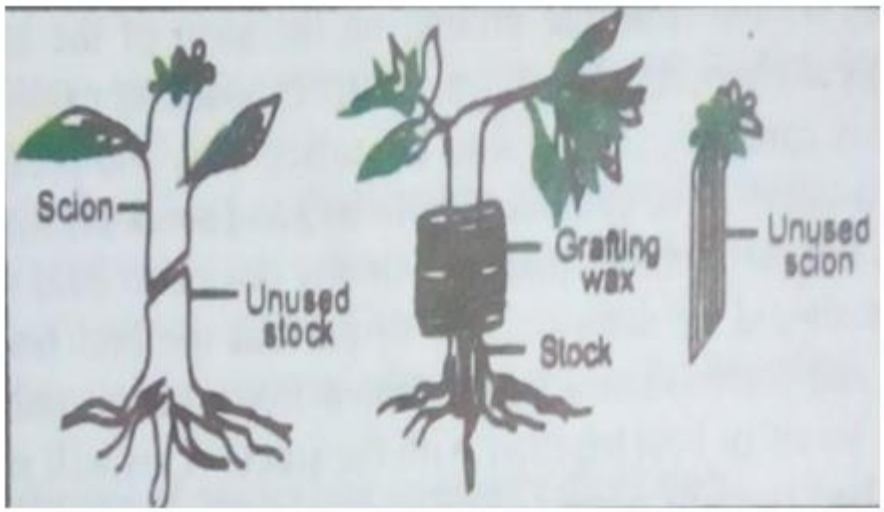
1. Budding: This is the bringing together of the bud and stock. The bud is taken from a tree already matured or producing while the stock is a young plant of about a year old. During budding, a T shaped cut is made at about 45cm from the ground on the stem of the stock plant. The cut shape is slightly raised to expose the cambium and the bud is carefully slipped into the raised bark and pressed firmly to ensure that the cambia of both bud and stock unite together, quickly tie it with rope or any material to hold it in place to avoid it (bud) from drying. This method is usually carried out in citrus.



Picture showing budding method

2. Grafting: This is the union of the stock (part of the plant whose root is on the ground) and the scion (the shoot removed from another plant). The scion is attached to the stock for grafting to take place and the two plants must be of the same species and the same age and size.

In grafting, both plants are cut in a slant V-shape to provide a good surface for contact and they are then tied together with rope or tape to keep them in place. The junction is rubbed with grafting wax to prevent the entrance of air, water and pathogens.



Picture showing grafting method

Advantages of Budding and Grafting

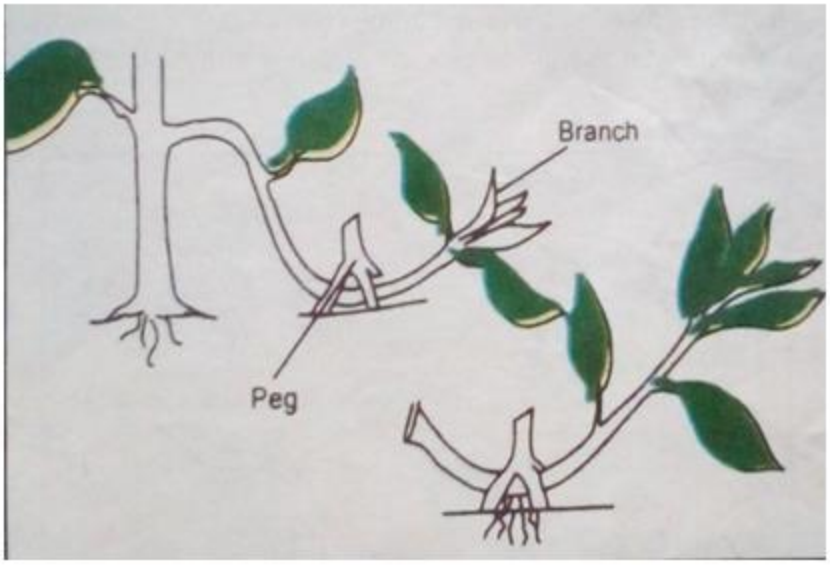
1. Budded plants mature very early because the bud tends to assume the age of the parent plant.

2. They produce plants with uniform qualities.

3. They take the advantages of the roots of a more resistant stock to thrive.

4. Destroyed parts of a plant could be replaced by grafting.

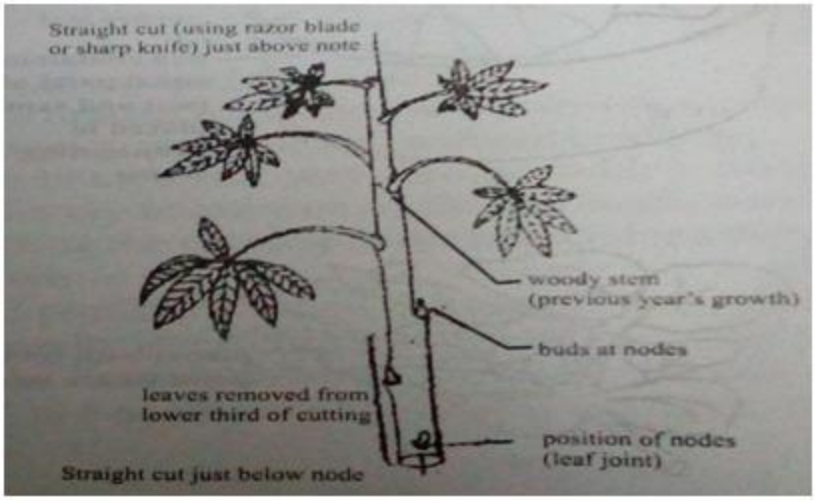
3. Layering: This involves bending a shoot or branch of a plant to the ground so that the nodes can make contact with the soil. The part that is bent to the ground is pegged on the ground and covered with rich soil to provide a good medium for root development. When the roots had emerged, the branch is cut from the parent plant and it can be transplanted after a time as rooted cuttings. Layering can be used in coffee, cocoa and Lola production.



Picture showing layering method

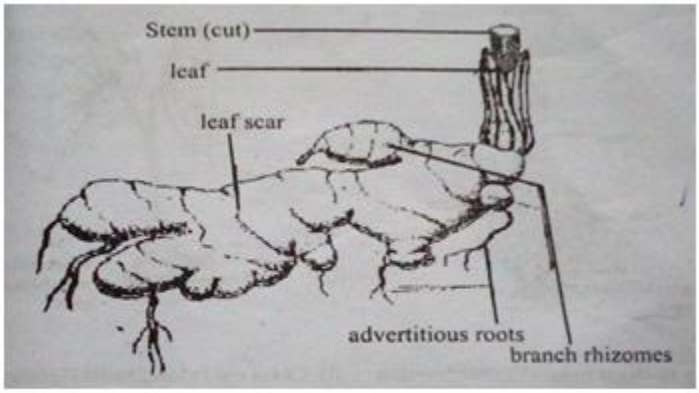
4. Cuttings: This is a method in which parts of the parent plant are detached and planted in the soil to grow. A farmer can make use of a stem as in cassava or leaf as waterleaf plant. The length of each cutting varies from 5cm - 30cm depending on the type of crop plant being propagated.

Cuttings will root better or most easily if they are taken during the rain but they also are taken during the dry season provided they are well watered and shaded while they are rooting.



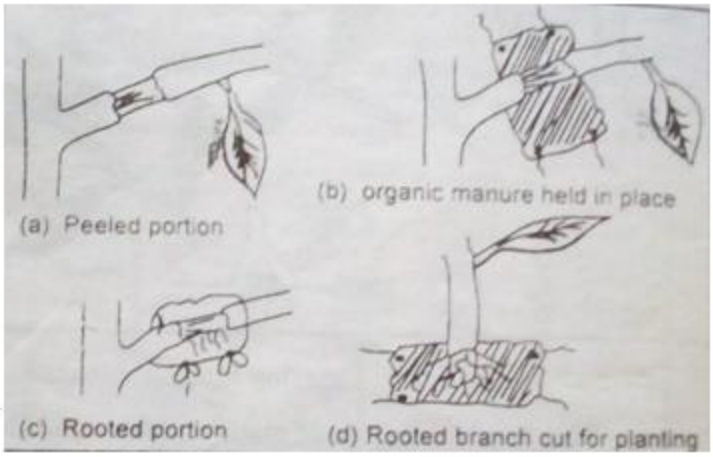
Picture showing cutting of matured shoot of cassava

5. Marcotting: This is a practical vegetative propagation method. In this method, the bark of a branch is peeled off with a knife and it should not be more than 5cm long. Soil rich in organic manure is tied to the peeled portion using coconut husk or any suitable material. It should be watered to keep moist always and after a time, roots will grow out of the peeled portion. As the roots become strong, the branch is cut off the main plant and the rooted branch is planted into the soil to give rise to a new plant. This method is used for plants whose cuttings do not produce roots easily. Such crops are mainly fruit crops like lemon and mango.

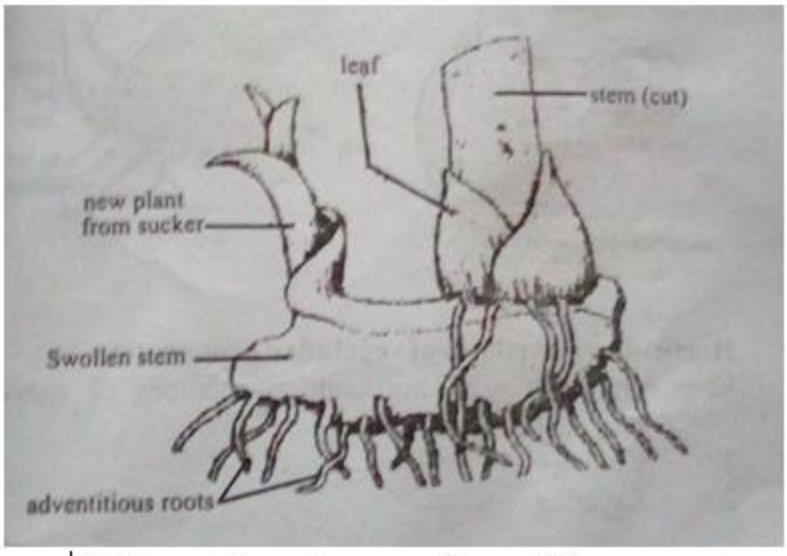


Picture showing marcotting procedures

6. Other methods: Some plants are grown or propagated using suckers as in pineapple, plantain and banana, tubers as in yam, underground stem in cocoyam, bulbs in onion, runners in Irish potatoes. Some are grown from rhizomes as in ginger, roots of plants as in breadfruit and carrot then leaf for bryophyllum.



Picture showing rhizome of ginger



Picture showing sucker of banana

Mid-Term Assessment

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1. The structure used for either rearing of animals or tending crops is known as _____

Storage Structure

Production Structure

Utility Structured

Processing Structure

2. 2. The storage structure made on the farm for storing yam tubers, potatoes etc is called _____

Crib

Silo

Barn

Rhombus

3. The essence of fencing a farm includes the following

Maintaining farm boundaries

To prevent loss of animals

To protect the crops and animals from thieves.

All of the above

4. _____ is a structure made with Stones, people,

Rivers

Compost pits

Dams

Electric poles

5. All of the following are processing structures except _____

Abattoir

Oil palm mill

Cassava mill

Rabbit hutches

6. One of the following is a use of farm structure

To prepare food

To house the farmer

To invite visitors to stay

To protect agricultural products from pests, diseases and theft.

7. _____ is a maintenance operation carried out for farm structures

Cutting

Oiling

Filling

None of the above

8. All farm structures are to be _____on a regular basis

Inspected

Changed

Transfer

Destroyed

9. The thorough drying of wooden materials to protect them from insect damages or quick structural deformities is _____

Reasoning

Seasoning

Drying

None of the above

10. The silo is usually used by _____

Federal Government

Small farm owners

Teachers

Doctors

11. The building used to house the farmer and his workers is called _____

Production house

Dwelling house

Storage house

Security house

12. Farm buildings are also known as _____

Farm structure

Farmhouse

Farm stead

Farm site

13. CSO means _____

Chief security officer

Chief service office

Chief select offer

None of the above

14. The farm shop is a building where _____

Farm produce are stored

Farm workers rest

Visitors rest

Products from the farm are sold out to members of the public

15. The farm office can also be known as _____

Office building

Agricultural building

Administrative building

None of the above

16. Farm Buildings can be used for _____

To provide comfort for the farmer and his workers

To prolong the lifespan of farm implements

To protect farm animals from thieves

All of the above

17. All of the following are methods of maintaining farm Buildings expect _____

Filling

Bracing of walls

Oiling

Roofing

18. The anti-insect chemical used in painting the wooden parts of farm buildings to prevent attacks by insect is _____

Gammalin 20

Aldrin

Solignum

None of the above

19. Concrete is a mixture of _____ and _____

Sand and Water

Cement and Water

Sand and Cement

Sand and Stone

20. _____ is a good roofing material for farm building

Palm fronds

Thatch

Asbestos

None of the above

21. This is the process whereby the surface of the seeds are loosened to enhance emergence of the plumule and radicle _____

Sacrifice

Scarification

Scarf

None of the above

22. All of the following are methods of asexual propagation except _____

Layering

Marcotting

Budding

Use of seeds

23. The process of raising young plants from seeds or vegetative parts is known as _____

Propagation

Planting

Sowing

None of the above

24. _____ plant is propagated by using sucker

Onion

Maize

Pineapple

Cassava

25. _____ and _____ are crops propagated by seeds

Ginger and Onion

Banana and Pineapple

Cassava and Yam

Cocoa and Maize

WEEK 6

Advantages and Disadvantages of Crop Propagation

Performance Objectives

Student should be able to:

1. List two advantages of crop propagation.

2. State three disadvantages of crop propagation.

Content

Advantages of Sexual or Seed Propagation

1. It is very easy to practice because seeds can be carried conveniently to the farm.

2. It brings about easy multiplication of plant population.

3. It is a very sure way to start a disease-free crop.

4. It can be used to improve crops through cross-breeding.

5. Seeds can be stored till next planting season.

Disadvantages of Sexual or Seed Propagation

1. Some crops take a long time to mature and fruit when planted by seeds e.g orange.

2. It is difficult to grow crops that are seedless with this method.

3. Some seeds are lost in the soil during propagation because of pest.

Advantages of Asexual or Vegetative Propagation

1. It enables crops to produce in a very short time e.g citrus.

2. Plants propagated vegetative have uniform growth rate.

3. Plants that do not produce viable seeds can be propagated by this method.

4. The offspring are identical to the parent plant.

5. Crops can withstand adverse soil and weather conditions.

6. The crops have high vigour.

Disadvantages of Asexual or Vegetative Propagation

1. Cuttings cannot be stored in the next planting season.

2. Spread of diseases from parent plants to offspring is possible.

3. Genetic improvement of crops is impossible.

4. It is sometimes very laborious because planting materials are bulky.

WEEK 7

Agricultural Cultural Practices (Meaning of Cultural Practices)

Performance Objectives

Student should be able to:

1. Define cultural practices.

2. State the classes of cultural practices.

Content

Definition of Cultural Practice

Cultural practice is defined as all the activities or operations carried out on the farm by a farmer at a different time of the year for food and raw materials production for mankind. It can also be referred to as all the operations performed by a farmer in the farm before, during and after crops have been planted.

Classes of Cultural Practices

There are four classes of cultural practices and they include:

1. Pre-planting operations: These are operations carried out before planting.

2. Planting operations: These are operations carried out on the farm during planting.

3. Post-planting operations: These are operations carried out on the farm after planting has been done.

4. Post-harvesting operations: These are operations carried out on crops immediately after harvesting them from the field.

WEEK 8

Agricultural Practices Cont'd

Performance Objectives

Student should be able to:

1. Describe pre-planting operations.
2. State the pre-plant operations.
3. Explain each of the pre-plant operations.

Content

Pre-planting Operations

Pre-planting operations are operations carried out on the farm before planting. They include choice of site, clearing, stumping, plotting, tillage practices (harrowing, ploughing and ridging), seed selection, nursery and nursery practices.

1. Choice of site: This is a major pre-planting operation and the following factors should be taken into consideration when choosing a farm site.

i. The type of soil: Only good or fertile soil should be chosen as it encourages an increase in crop production.

ii. The nature of the land: This is talking about topography. A flat or fairly level land should be considered. Hilly or sloppy land should be avoided as this adds to the cost of preparation and encourages runoff and erosion.

III. Availability of planting materials: Planting materials e.g. cassava stem cuttings, yam seeds etc should be readily available where the farm is located.

iv. Availability of labour: The availability of labour in the area where the farm is sites should also be considered. Workers to be engaged on the farm should be easily reached.

v. Transportation: There should be accessible roads as well as vehicles for easy evacuation of farm produce to market centres.

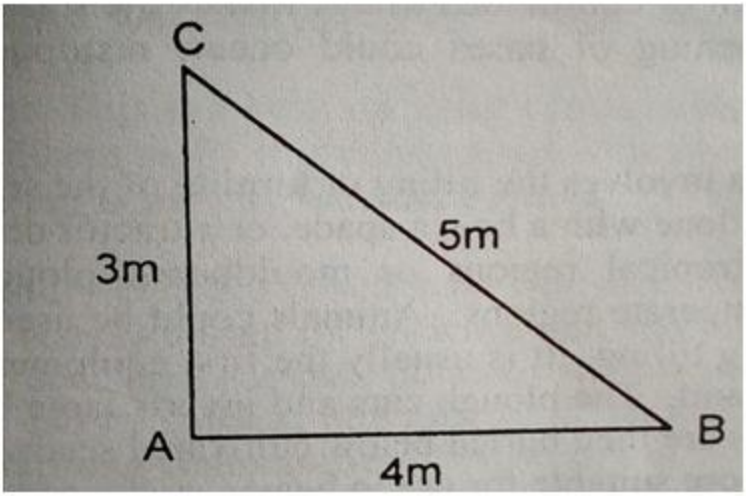
2. Clearing: The piece of land to be farmed should be cleared manually with cutlass or mechanically with bulldozer especially on large scale farms. The manual clearing is slow but it is least destructive to the soil although mechanical clearing is quicker, it, however, destroys soil structure and exposes the soil to soil erosion.

Closely associated with clearing is burning and packing. This has to do with the removal of cleared materials either by burning or packing. The burning helps to reduce the problem of packing. Burning is also advantageous as it releases ash or minerals into the soil. It also destroys humus and useful organisms such as earthworms, centipede etc.

3. Stumping: This involves the removal of large roots and tree stumps from the soil. Stumping is done by employing cutlass, axe, stumper and bulldozer. It is not usually carried out on small scale farms as it is a tedious task but a common practice on school farms and large farms owned by the government and corporate bodies.

4. Plotting or laying out: This is the act of dividing the farm into sections. This is usually done based on the report of the soil survey. Soil survey shows the nature of the land, soil type, nutrient status, soil and water conservation methods to be used on the land. It also shows where to locate the various farmstead. Plotting or laying out can be done using the 3-4-5 method.

How to use the 3-4-5 metric method in farm plotting: This method is used to align the length and breadth of a farm at right angles. In doing this, erect a pole at about the centre of the farmland. From pole **A**, take a baseline **AB 4m l**ong with a string tied to the pole. Tie another string **3m** long to the pole at **A** and extend to **C**. A third-string **5m** long is also hired to pole **B** and is extended to meet pole **C** thereby forming a triangle with a right angle at **A**. Arrange poles along the line **AB** to the end of the farm. The same is done to the sideline **AC**. Ensure that you sight them to give straight lines. The length and breadth of the farm so measured will make it easy to divide the land into plots. Paths are used to demarcate the land into blocks and the most fertile areas are used for crops and pastures while non-fertile areas are used for farmstead development.



Picture showing farm plotting or laying out

5. Tillage practices: This involves the mechanical opening up of the soil to loosen or soften it for planting. The peasant farmers use simple tools such as cutlass and hoe while in large farms, tractor-mounted implements such as ploughs, harrows, cultivators and Rodgers are used to till the soil before planting.

I. Ploughing: This is a primary tillage practice that involves the use of a plough to turn over the topsoil to soften the soil. In the absence of plough, hoe or spade could be used to till the land. In the northern part of Nigeria, animals are used to pull the plough

to till the soil. There are two types of ploughs namely the disc plough which is best suited for work in the tropical regions where it can rotate and roll over obstacles and the mouldboard which is mostly used in temperate areas devoid of obstacles.

ii. Harrowing: This is a secondary tillage practice which involves the use of a harrow. It is used after ploughing to further reduce or breakdown the large soil clods(lumps) to a fine tilt and produce a level soil surface suitable for planting. Three types of harrows exist and they include disc harrow, spike-toothed harrow and spring-toothed harrow.

III. Ridging: This is done for those crops that are not planted directly in soils after harrowing. Ridges are therefore prepared for crops such as yam, cocoyam, cotton, tomato, groundnut etc. Ridging is done either by using Indian goes or Rodgers which could be either disc ridge or mouldboard ridge. In some parts of the world including Nigeria, animals are also used to drag riggers for making of ridges. It is advisable to construct bridges across the slope of the land to help check erosion. Ridges are spaced 1m with a standard length of 25m, conically shaped crest (triangular shape). In making ridges, there should be a trench(furrow) between two ridges. Crossbars or tie ridges can be made between two ridges which help to store water in the furrow for crops use.

Importance of Tiling the Soil

1. It loosens the soil for easy penetration of plants roots.

2. It encourages easy germination and emergence of seeds.

3. It promotes aeration.

4. It assist the farmer in weed control.

5. It improves the soil physical condition such as the infiltration rate of water in the soil and water holding capacity.

6. It improves crop yield.

6. Seed selection: This is a pre-planting operation that involves the selection of most healthy and viable seeds. For high productivity, seed for planting should be selected based on genetic superiority of parent stock.

Criteria for seed selection from parent stocks and viability include:

1. High yield ability.

2. Freedom from diseases and pests.

3. Good quality in terms of flavour and size of produce.

4. Good growth and conformation.

5. Ability to germinate promptly in terms of seed viability.

7. Nursery and nursery practices: A nursery is a place where young seedlings are first raised and tended until they are matured or strong enough to be planted into their permanent fields or beds. Small seeds are nursed in nursery beds before they are transplanted to the field. Examples of crops that require to be nursed are peppers, tomato, garden egg, African spinach, oil palm, cocoa, citrus etc.

There are four types of nursery, namely, seedbox nursery, nursery bed or ground nursery, polythene bag nursery and greenhouse.

Advantages of Nursery

1. It promotes a high yield of crops since farmers will select healthy and strong seedlings for planting.

2. It helps to raise difficult seeds e.g oil palm.

3. It makes for uniformity of growth in a particular type of crop.

4. It helps to develop seeds that are very tiny and too small to be planted directly in the field.

Disadvantages of Nursery

1. It is stressful and time-consuming.

2. Sometimes, it delays planting if the nursery is not done on time.

Nursery Practice

This refers to care given to seedlings while they are in the nursery to ensure their survival and healthy growth. Such practices are watering, hand weeding, manure application, exposing seedlings to early morning sun and shading seedlings later to avoid direct heat of the sun on them. The equipment or tools used in the nursery are spade, rake, garden fork, hand trowel, watering can, hand pan, garden line and wheelbarrow.

WEEK 9

Agricultural Practices Cont'd1

Performance Objectives

Student should be able to

1. Describe planting operations.
2. Explain planting operations.

Content

Planting Operations

These are operations or activities carried out by the farmer after land preparation or during planting. They include seed treatment, planting date, planting distance, feeding zone, plant population, seed rate, and transplanting. Before planting, the following should be placed into consideration.

i. Planting materials such as seeds, seedlings, cuttings, suckers and so on should be taken from a healthy plant source.

ii. They should be free of diseases and pest infestation.

iii. They should be viable and properly stored before use.

iv. Planting materials of high quality should be brought and collected from agro service centres or the ministry of agriculture.

1. Seed treatment: This is the treatment carried out on the seed to prevent disease organisms and pest. This can be achieved using the following methods:

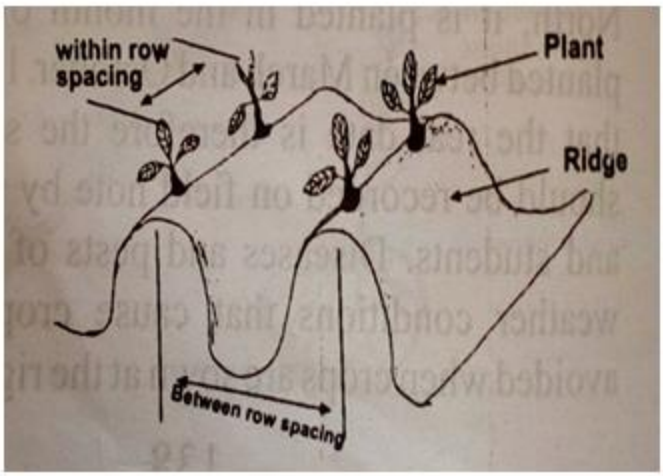
i. Chemical dressing of seeds: Seeds are treated with appropriate chemicals such as DD Force, Aldrin dust etc.

ii. Pre-sock the seeds: Here, hard seeds are soaked in warm water of 60^{o}c for 24 minutes and later sun-dry to facilitate germination.

iii. Scarification: This is the process whereby the surfaces of seeds are loosened to enhance emergence of plumule and radicle.

2. Planting Date: This refers to the period of the at which a particular crop is planted to thrive better. It depends on the crop to be sown and the area. For example, early maize is usually planted with the first rains in February and April and late maize in August or September in

Southern Nigeria while in the North, it is planted in June. Cassava is planted between March and October. It is essential to note that the real date is, therefore, the sowing date which should be recorded in field note by the farmer. Diseases and pests of crops and adverse weather conditions that cause crop failure could be avoided when crops are sown at the right or proper time.



Picture of plant feeding zone

3. Planting Depth: This refers to the hole in which a seed or seedlings or any planting material e.g cassava cuttings is planted. It depends on the type of seed, the moisture and oxygen level of the soil. For example, monocotyledonous seeds like rice, maize, millet etc need shallow planting depth than dicotyledonous seeds such as cocoa, rubber, cowpea etc that require depth planting.

4. Planting Distance or Spacing: Crops must be planted using the best spacing or planting distances. Planting distance or spacing is, therefore, the distance between crops in adjacent rows and between crops on the same row. **That is within row spacing and between row spacing.** Within row spacing is the space that exists between two adjacent crop plants that are on the same row. Between row-space on the other hand, is the space that exists between two crop plants that are not on the same row but are on adjacent or next row or ridge.

Different crops have different spacing such as:

i. Rice: 30cm between rows and 15cm along the drills or broadcast.

ii. Maize: 90cm between row and 30cm along rows.

iii. Yam and cassava: 1m between rows and 1m between plants.

iv. Groundnut: 40cm between row and 20cm along rows.

v. Carrot: 40cm x 15cm

Advantages of correct spacing

1. It gives room to high crop production.

2. It remove overcrowding which leads to unhealthy competition for sunlight, nutrients and water by crops.

3. It makes weeding and harvesting operations easy.

5. Feeding Zone: This is the area occupied by individual crop plant to enable it to derive nutrient, air and sunlight. When this feeding zone is not enough, it results in healthy competition. Feeding zone can be calculated by multiplying within row spacing by between row spacing. i.e.

Within row spacing = 30cm

Between row spacing = 90cm

Feeding zone = 30cm × 90cm

= 2700cm²

$= \frac{2700}{10,000}$ = 0.27cm²

6. Plant Population or Plant Density: This is the number of plant stand per hectare of land normally majored in plan/hectare. In calculating plant population or density, the area of land, spacing and number of seeds planted per hole must be known.

7. Seed Rate: This is the number of seeds or planting materials used to plant one hectare of land. It is usually expressed in grammes per hectare for example, maize is planted at a seed rate of 25kg per hectare or 2-3 seeds per stand or hole.

8. Transplanting: This involves lifting seedlings from the nursery and planting them out in their permanent plot or field. Transplanting is done when seedlings are grown up to four or five leave stage. It is advisable to transplant in the evening or on a full day. Transplanted seedlings should not be allowed to wilt therefore, water immediately after transplanting to enable the soil to get in contact with the roots. Transplanting is carried out in two ways:

I. The ball of earth system: This involves lifting seedlings with earth or soil around the roots. This helps to preserve the roots and minimize shock in seedlings. A hand towel is used in this method and before transplanting, the stands are marked and opened up on the field. Put in the seedlings and firm the soil around the roots and also water immediately**.**

ii. The naked root system: This involves lifting seedlings without earth or soil attached to the roots. This is used mainly in rubber, fruit and tree production. Though, a farmer may choose to use it in vegetable production but the ball of earth system is more advisable. Naked root system may be necessary if seedlings are to be transported to faraway places.

WEEK 10

Agricultural Practices Cont'd2

Performance Objectives

Student should be able to

1. Describe post-planting operations.

2. Explain post-planting operations.

3. Explain the effects of timely harvesting versus late harvesting.

4. State various post-harvest operations.

Content

Post-planting Operations

These are operations or activities carried out on the farm after planting has been done. They include thinning, supplying, mulching, fertilizer and manure application, watering, weeding, pest and disease control and harvesting.

1. Thinning: This is the act of removing extra seedlings from a stand or reducing the number of seedlings growing in a row. Thinning should be done early in the morning and evening and also when the soil is moist. Thinning is done to reduce overcrowding, crop competition for nutrients, space and sunlight and to ensure the development of only healthy and strong plants. The weakest of the plants on the stand is usually removed and the care should be taken not to damage the remaining plants when thinning. Crops mostly thinned are vegetable crops, rice, maize etc.

2. Supplying: This is the act of replacing vacant or ungerminated stands with new seeds. It is commonly observed that while some viable seeds germinate and sprouts some other seeds remain ungerminated therefore new viable seeds are taken from the store or healthy seedlings are taken from the nursery to replace them. This can also be referred to as BEATING UP in forest management.

3. Mulching: This involves the covering of the surface of the soil with any material such as dried leaves to prevent loss of water or keep down weeds. Mulching is an effective way of checking evaporation in the soil or home garden, it checks erosion, it helps controls weed and when organic mulches decay, they add to the nutrient in the soil thereby increasing production.

4. Fertilizer and Manure Application: Fertilizer and manure application help to replenish nutrients in the soil. Fertilizers can be applied to the soil to add plant food. They should be applied at the right time, proportions and recommended rates. Manure such as farmyard manure, compost or green manures are incorporated into the soil to improve crop growth and output. Manures should be applied at the right time under suitable weather conditions. Manures are applied during planting, just after planting or before flowering for a good result.

Manures must not be applied directly on the crops but a few centimetres away from each stand.

5. Watering: Water is an important factor in agricultural production and it is needed during the early stages of crops growth and development. In small scale farming, watering cans can be used to supply water to crops and I'm large scale farming, irrigation is practised especially in the dry season when the water need for crops is highest.

6. Weeding: Weeds constitutes a nuisance to crop production and it is a major problem facing farmers. They compete with crops for space, available water and essential nutrients. They also reduce the quality and quantity of crops and as a result of this, the farmer needs to get rid of weeds in its totality for maximum crop yields. Depending on the crop, plots may be weeded twice or several times before the crops are harvested. Weeding under subsistence agriculture is tedious and back-breaking exercise that is why commercial farming adopts the use of herbicides to kill and control weed growth.

7. Pest and Disease Control: Pest are organisms that feed on parts of a plant thereby causing damage if they not controlled. The control of pest can be achieved through physical destruction which involves handpicking, shaking and jeering infested crops. Chemical method can also be adopted and it involves the use of chemicals called pesticides to spray crops to kill the pest. Traps, gum and poisoned baits can also be used for pests like rats, grass cutters and birds.

The control of crop diseases is also very important in post-planting activity. Disease is an abnormal condition in crop plant that may show in some part or on the whole plant causing damages to the crop. Control of disease can be achieved through the use of healthy, clean and resistant crop varieties.

8. Harvesting: The end product of a farmer's labour is to have a good harvest from his crops. Harvesting is a process whereby matured and ripened farm produce are removed from the farm. Crops naturally mature at different times this harvesting is done at different time interval in a year. Harvesting can be carried out manually through the use of knives, sickle, cutlasses and goes an in large farms, mechanical harvesters are used.

Early harvesting of matured crops enhance good quality, quantity and market price of harvested crops. On the whole, it promotes better crop value. Delayed or late harvesting should be discouraged because of the following results:

I. Crop would rot and drop off e.g fruits such as oranges and tomatoes.

II. The longer a matured crop remains in the field, the greater the chances of pest attack.

III. The quality of seeds or fruits often decreases.

IV. There is a reduction in farmer's income and the shortage of food for the populace.

Post-harvesting Operations

These are operations or activities that are carried out after harvesting has been done and they include farm level processing and storage.

1. Farm-level processing: This is the conversion or changing of crop products into other forms to make them more attractive and acceptable for use by consumers. In some instances, processing starts from the farm site for example, the peeling of cassava takes place in the farm before final conversion into garri, fufu or starch. Other forms of processing that cannot be done on the farm site are done in factories where machines are placed for the purpose.

2. Storage: This involves the keeping of harvested farm products for future use. There are many storage methods that the farmer can use depending on the type of product. Some of this method are the use of barns for tubers, silos and cribs for grains and the use of refrigerator for fruits and vegetables.

Test : Agricultural Science JSS2 First Term Final Assessment

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1. _____ propagation can be used to improve crop through cross-breeding

Asexual

Sexual

Self

Cross

2. In asexual propagation, _____ is impossible

Genetic improvement

Production of seeds

Uniform growth

None of the above

3. _____ is a disadvantage of sexual propagation

Seeds can be stored till the next planting season

Spread of diseases from parent plant to offspring is possible

Some seeds are lost in the soil during propagation because of pest

None of the above

4. _____ is an advantage of asexual propagation

The crops have high vigour

It is a sure way to start a disease-free crop

It can be used to improve crops through cross-breeding

None of the above

5. Asexual propagation can also be referred to as _____

Seed Propagation

Parts Propagation

Bud Propagation

Vegetative Propagation

6. _____ are operations carried out during planting

Planning Operations

Planting Operations

Farming Operations

None of the above

7. Cultural Practices are classified into _____ group

5

2

8

4

8. The operations carried out by the farmer on the farm before, during and after planting is referred to as _____

Culture practices

Society practices

Cultural practices

Farm practices

9. _____ are operations carried out after planting has been done

Post-planting operations

After planting operations

Pre-planting operations

Planting operations

10. The operations carried out on crops after harvesting is called _____

Harvesting operations

After harvesting operations

Post-harvesting operations

None of the above

11. The removal of large roots and trees stumps from the soil is known as _____

Stumping

Ploughing

Ridging

Harrowing

12. When choosing a site for your farm you must consider one of the following

Nature of the land

Colour of the land

Beauty of the land

Size of the land

13. All of the following are types of nursery except _____

Seedbox nursery

Polythene bag nursery

Bathtub nursery

Ground nursery

14. _____ are the importance of tiling the soil

It promotes aeration

It assist the farmer in weed control

It loosens the soil for easy penetration of plant root

All of the above

15. In making ridges, there should be a _____ between two ridges

Furrow

Space

Cross-bar

None of the above

16. _____ chemical is used in dressing seeds

Gammalin 20

Vetox

DD Force

Sodium

17. Transplanting is done when seedlings are grown up to ____ or ___ leave stage

Four or Eight

Four or Nine

Four or Seven

Four or Five

18. All of the following are planting operations except _____

Seed treatment

Plotting

Planting date

Planting distance

19. The area occupied by individual crop plant to enable it to derive nutrient, air and sunlight is known as_____

Feeding zone

Feeding area

Feeding spaced

Feeding size

20. Early maize is usually planted with the first rains in _____ and _____

March and April

May and June

February and March

February and April

21. Early harvesting of matured crops enhances _____

Quality

Market price

Quantity

All of the above

22. The act of replacing vacant or ungerminated stands with new seeds _____

Supplying

Filling

Putting

Thinning

23. The conversion of crop products into other forms to make them more attractive and acceptable for use by consumers is known as _____

Farm-level processing

Farm-level changing

Farm-level production

Farm level manufacturing

24. Thinning is the act of _____

Covering the soil with materials

Removal of matured crops from the farm

Removing extra seedlings from a stand

Removal of soil from crops

25. Supplying can also be known as _____ in forest management

Filling up

Beating up

Standing up

None of the above

26. The cultivars of cocoa include all except one?

amelonado

cacao

amazon

criollo