

Facilitating and Learning Materials

NATIONAL CERTIFICATE 2

TRADE AREA:

CASHEW VALUE CHAIN

UNIT 1:

ESTABLISHMENT OF SCION BANKS IN CASHEW PRODUCTION



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What is a QR Code (Quick Response Code)?

A QR code (quick response code) is a type of **2D bar code** that is used to provide easy access to information through a **smartphone**.





Example of a QR code

How to scan the QR Code

- You open an app called *barcode reader* and point the phone camera at the QR code, the app works together with the phone's camera.
- The barcode scanner reads the code and takes you to either the webpage with the extra information or to a video with extra information for independent studies.

After certain information you will see a table with a QR code as well as the title of the document or video of the QR code and an icon, like the one below.

- You can either scan the QR code with your smartphone or
- Ctrl + Click on the heading which will take you to the same information.

For more information on scan the QR below or follow the URL hyperlink		
	[QR Code] How to Use QR Codes	

0. INTRODUCTION AND PRELIMINARY NOTES



Effective cashew production is dependent on good preparation and planning.

In this unit you'll learn about site selection, land preparation, lining and pegging of land, soil amendment and the importance of selection high-quality seedlings, as well and the affect it has on the overall cashew production.

LO 1: ESTABLISHMENT OF SCION BANKS IN CASHEW PRODUCTION

a) What Is Site Selection

Site selection is choosing the right piece of land to buy or rent for cashew production.

b) Factors to Consider in Site Selection

1. Financing:

When choosing a site, there are financial considerations to consider. These are some questions to ask yourself when looking for sites for starting your cashew plantation

- How will the land be obtained- is it already owned or, will the site be bought or rented?
- How much will it cost to prepare the land if it is not ready for planting?
- What are the market values of the different sites and which ones are reasonably affordable?

2. Existing Vegetation

What does the current vegetation and landscape look like? Is it heavily overgrown, full of trees, rocky? All these factors can influence the selection of the site.



3. Water

Cashew seedlings require enough amount of water to survive the seedling stage. Farmers are advised not to grow this crop in the regions where irrigation is not freely available.



4. Soil

Cashew seedlings prefer to grow where the soil is more fertile and loamier soil with a pH of 5.5 – 7. When selecting a site for the planting of be sure that the soil of the land you have chosen does not consist of clay as the cashew trees will not grow. Other factors to consider are the depth of topsoil and bedrock.










5. Climate

Cashew seedling and cashew trees will produce sufficient amounts of fruit with a temperature around 33°C - 35°C. If the temperature is higher than the temperature stated it would cause the fruits to drop onto the ground. Cashew seedlings and cashew trees thrive when they are in the sun so be sure the site that has been selected has good sun.



c) Demonstrate the safe use of tools and equipment used for site selection

<p>Soil testing kit</p>	
<ul style="list-style-type: none"> This is to test the pH of the soils on the selection site. 	
<p>Protective clothing</p>	
<ul style="list-style-type: none"> This would include boot, gloves and long pants. This is to protect the person from harmful pests and chemical that may be present on the site. 	

<p>Measuring device</p>	
<ul style="list-style-type: none"> • Usually this would be a measuring tape or anything that would help in the determination of the size of land. 	
<p>Pickaxe or hoe</p>	<ul style="list-style-type: none"> • This is so that you can dig holes and sample the density of soils on the site.
<p>Pen and notebook</p>	
<ul style="list-style-type: none"> • To take down measurements and calculations 	<p>Soil Auger</p> 
<ul style="list-style-type: none"> • Used to take soil samples and cores to ensure that samples are even. 	<ul style="list-style-type: none"> • Used for loosening up particularly difficult areas on land
<p>Cutlass</p>	
<ul style="list-style-type: none"> • Used to cut through brush and clear a site 	

d) Outline the procedure of site selection

1. Determine the way of land ownership and the cost of land with the seller.
2. Conduct appropriate soil and tests.

a. Soil Test 1: The Squeeze Test

To determine the soil type, take a handful of moist (but not wet) soil from the farm and give it a firm squeeze. Then open your hand to observe which one of these three things will happen:

- It will hold its shape, and when poked it crumbles; this means you have loam soil.
- It will hold its shape and when poked, sits stubbornly in your hand. This means you have clay soil.
- It will fall apart as soon as you open your hand. This means you have sandy soil.

b. Soil Test 2: The Percolation Test

In carrying out percolation test, the drainage pattern of the soil is tested. It is also important to determine whether there are drainage problems or not. To test the soil drainage the following steps should be performed:

- Dig a hole about 15 cm wide and 30 cm deep.
- Fill the hole with water and let it drain completely.
- Fill it with water again.
- Keep track of how long it takes for the water to drain.
- If the water takes more than four hours to drain then the soil has a poor drainage.



c. Soil Test 3: The Worm Test

Worms are great indicators of the overall health of the soil, especially in terms of biological activity. If there are earthworms, chances are the soil has beneficial microbes and bacteria that make for healthy soil for strong plants.



How to perform the worm test:

- Be sure the soil is somewhat moist but not soaking wet.
- Dig a hole one foot across and one foot deep.
- Place the soil on a piece of cardboard.
- Sift through the soil with the hands.
- Place the soil back into the hole, counting the earthworms as you go.

If at least ten worms are found, then the soil is in pretty good. Less than that indicates that there may not be enough organic matter in the soil to support a healthy worm population or that the soil is too acidic or alkaline.

d. Soil Test 4: pH Test

The pH (acidity level) of the soil has a large part to do with how well the plants grow. pH is tested on a scale of zero to fourteen, with zero being very acidic and fourteen being very alkaline. Most plants grow best in soil with a fairly neutral pH between six and seven. When the pH level is lower than five or higher than eight, plants just won't grow as well as they should.



e) Select a site for scion bank establishment in Cashew production

Job Task 1: Establishing scion bank in cashew production



Situation: You are a cashew farmer and you are aiming to produce cashew trees. You need to select the appropriate site for the planting of your cashew seedlings.

Instructions:

1. On the site you need to test the pH to check that it is correct for the growth of your cashews.
2. You need to make sure that the land you have chosen has enough sun and water.
3. You will need to check that the land is big enough for the correct spacing.
4. You have **2 hours**.

Performance Criteria:

Use the checklist to follow the stated steps in establishing scion bank operations. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Daily PM Activities	Rate
1. Wearing the necessary protective equipment.	
2. You tested the pH of the soil.	
3. You chose the site with the enough sunlight and water.	
4. You have made sure the land will be big enough for the trees.	
5. You adhered to the time given.	

LO 2: demonstrate skills for preparing land to establish scion banks in cashew production

a) Explain land preparation

Land preparation for planting for cashew seedling should be done in such a way that the trees will have enough sunlight and they are sun loving plants. In preparing the land it is recommended that you do not burn the unwanted plants and trees as the cashew trees need a lot of nutrients and by burning the unwanted growth the soil loses fertility.



b) State the Importance of land preparation

It is important to prepare the land correctly to ensure that the land does not become unusable. In proper land preparation the following is achieved:

- Recycles plant nutrients
- Provides soft soil for planting / transplanting
- Effective weed and pest control
- Enriching the soil, by using compost
- A suitable surface for direct seeding
- Quality in production

If the land is not prepared properly the following happens to the soil and land:



- Poor / bad uneven soil.
- Weedy stands or weed growth.
- Soil crusting can reduce seedling development (especially in soils high in clay and silt).
- Water not being able to be consumed by the soil efficiently.






c) State the methods of land preparation

After selecting the correct land for your cashew seedling, the production of land preparation begins.

1. Dig up soil using a spade or garden fork
2. Pour compost over the soil and mix it in
3. Plough using hand hoe, an ox plough or a tractor with to plough
4. Level your land using a rake
5. Measure and mark rows in your field using string
6. Dig holes and fill with compost for preparation of planting
7. Apply herbicides for weed control

d) Demonstrate the safe use of tools and equipment used in land preparation

<p>Hand hoe</p>	
<ul style="list-style-type: none"> • Hand tools are used in the removing of weeds, shape and clear soil, harvest root crops etc. 	
<p>Hand plough</p>	<ul style="list-style-type: none"> • Used to loosen soil or to turn soil.

<p>Rake / hand harrow</p>	
<ul style="list-style-type: none"> • Used for breaking up or moving the soil. 	
<p>Spade</p>	<ul style="list-style-type: none"> • A sharp-edged metal handheld tool used for digging or cutting into earth.
<p>Garden pick</p>	
<ul style="list-style-type: none"> • Used for digging hard surface. 	
<p>Chisel plough</p>	<ul style="list-style-type: none"> • Used to loosen the soils and get deep tillage
<p>Disc plough</p>	
<ul style="list-style-type: none"> • Economical way to get deep tillage done quickly. 	

e) Outline the procedure for land preparation

1. Clear all unwanted bushes and any other organic growth either manually or mechanically.
2. Remove all the trees that would cause shade as the cashew trees do not like shade.
3. Do not burn the unwanted bushes, trees or organic growth as this causes the land to become infertile.
4. Dig up the land to ensure the soil is broken up.
5. Level out the soil that has been dug up and separated.



f) Prepare land for scion bank establishment

Job Task 2: Establishing scion bank in cashew production



Situation: You are a cashew farmer and you are aiming to produce cashew trees. You need to prepare the land for the planting of your cashew seedlings.

Instructions:

1. You will need to clear the bushes and unwanted organic growth without burning it.
2. Remove and trees that may cause shade.
3. Dig the land and level the soil out.
4. You have **4 hours**.

Performance Criteria:

Use the checklist to follow the stated steps in establishing scion bank operations. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Daily PM Activities	Rate
1. Wearing the necessary protective equipment.	
2. The bushes and unwanted organic growth were cleared without burning.	
3. The trees causing shade were removed.	
4. The land was dug up and the soil was leveled evenly.	
5. You adhered to the time given.	

SELF ASSESSMENT

Briefly explain land preparation.

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State the importance of land preparation.

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State the methods of land preparation.

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Name the tools and equipment for land preparation.

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Briefly outline the procedure of land preparation.

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LO 3: demonstrate skills for lining and pegging to establish scion banks in cashew production

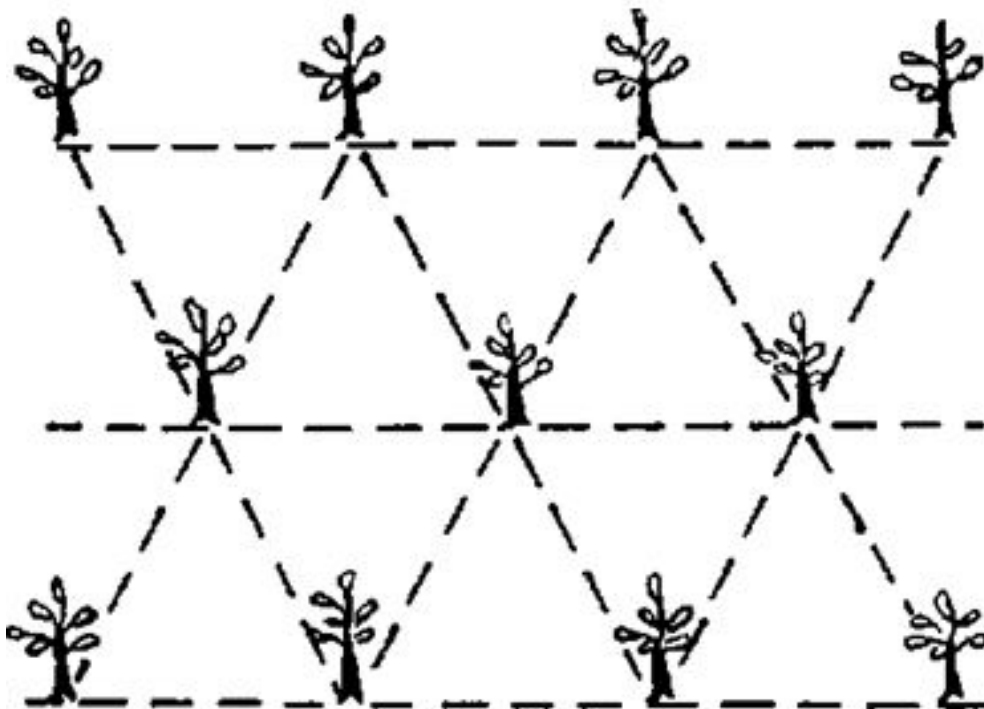
a) Explain lining and pegging

After the land is prepared, the next stage is to line and peg out the places to plant the cashew seedlings. The most commonly used method would be the triangular formation, cashew trees grow better in rectangular formation.






b) State the importance of lining and pegging

Lining and pegging are important for the following reasons:

- Well spacing of crops to reduce competition for nutrients and water.
- Optimal growth of the trees.
- Increase mango yield.
- Farm machines can work through with little damage to plants during weed control, pesticide use and fertilizer application.
- Helps with pest and disease management and weed control.
- Improve aeration of planted mango farm.
- Encourage quick and easy harvesting of matured cashew become easier due to easy movement between the trees.



c) Demonstrate the safe use of tools and equipment used in lining and pegging

<p>A peg</p>	
<p>Rope</p>	
<p>Mallet</p>	
<p>Ranging pole</p>	
<p>Measuring tape</p>	

d) Outline the procedure of lining and pegging

1. You will need to start off by forming a baseline.
2. Form the base line and peg a rectangular formation 10m x 10m which should give you 100 plants every hectar.
3. Repeat the same step until all the land has been lined and pegged.

e) Undertake lining and pegging for scion bank establishment

Job task 3: Establishing scion banks in cashew production



Situation: You are a cashew farmer and you are aiming to produce cashew trees. You need to line and peg the land for the planting of your cashew seedlings

Instructions:

1. Collect all the tools and equipment you will need for lining and pegging.
2. Decide on amount of land you would like to use.
3. From the baseline measure the distance for pegging.
4. Hammer the pegs into the ground.
5. You have **3 hours**.

Performance Criteria:

Use the checklist to follow steps 1 to 6 in lining and pegging. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Activities	Rate
1. Define the layout	
2. Peg the first ranging pole at the edge of the plantation	
3. Attach a rope to the ranging pole	
4. Measure a straight line of <u>10-meters for square layout</u> and <u>12-meters for rectangular layout</u> using the rope, measuring tape and ranging poles.	
5. Peg the stick/peg where you want to plant your cashew seedling exactly at 10-meters for square layout and 12-meters for rectangular layout	
6. Ensure that each tree has 10- or 12-meters space to each side, depending on the preferred layout	

You can be proud of yourself, just in case no one has told you yet.

SELF ASSESSMENT

Explain lining and pegging.

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State the importance of lining and pegging.

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Name the tools and equipment for lining and pegging.

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Briefly outline the procedure of lining and pegging.

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LO 4: demonstrate skills for amending soils to establish scion banks is cashew productions

a) State the importance of soils amendment in planting cashew seedling

Soil amendment is the process of adding materials to the soil or mixing different types of soils to increase the fertility of the planting soil.



Source: GIZ/ComCashew – Refilling planting holes

Dig the holes and amend the soil after the first rains in Mid-April.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec



For more information on digging planting holes, refilling and soil amendment, watch video on *Establishment of Cashew Farm* from Minute 8:42 to 14:42.

Soil amendment is important to improve:

- nutrients in the soil
- soil structure
- organic matter in the soil
- water drainage
- water retention capacity of the soil
- root development of the seedling
- soil aeration

b) Demonstrate the safe use of tools and equipment used for digging and amending soil in planting Cashew seedlings

The following tools are required for digging and amending soil:

- Use the **Spade** to dig holes in soft soils.



Source: <https://kentandstowe.com/Our-Products/Digging/Stainless-Steel-Pointed-Spade>

- Use the **Hole Pincer** to drill holes in harder soils.



Source: <https://www.amazon.co.uk/Woodside-Manual-Garden-Digger-Diameter/dp/B01G5FIO6U>

- Use the **Shovel** to take out the different types of soil from the holes.



Source: <https://www.bergfreunde.de/cold-steel-special-forces-shovel-spaten/>

- Use the **Post Hole Digger** to take out the soil from the holes.



Source: <https://www.kelsotools.com.au/product/post-hole-pincer-3/>

- Use the **Wheel Barrow** to transport manure and amended soil in the plantation. You can also use the wheel barrow to transport stones dug out in the soil.



Source: <https://www.coopsuperstores.ie/Garden/Garden-Tools/Garden-Wheelbarrow/Build-It-Galvanised-Wheelbarrow-100lt-1773313>

- Wear **Rubber Boots** to protect your feet during nursery operation



Source: <https://www.lamps2udirect.com/garden-and-outdoor-lighting/full-length-green-wellington-boots-uk-size-11-euro-size-45/143256>

- Wear **Gloves** to protect your hands during nursery operations



Source: <https://pksafety.com/pip-atg-maxiflex-cut-resistant-glove-34-8743-12-pairs/>

Other useful tools for digging and amending soil are: **Mattock, Cutlass, Earth Chisels, Spear and Jack Digger.**

c) **Demonstrate the safe use of materials for amending soil in planting Cashew seedlings**

In amending soil for planting cashew seedlings, farmers can:

- mix different types of soils
- add manure to the soil
- add compost to the soil
- add fertilizer to the soil

The most common type of soil amendment is mixing topsoil (brown) and lower layer soil (red). After digging a hole, separate the soils on two piles of topsoil (brown) and lower layer soil (red). Leave the soil dug out for at least two weeks. The soil must decompose before you can use it for planting. Otherwise your cashew seedlings will not survive.



Source: GIZ/ComCashew – Digging planting holes

During refilling, first put the topsoil (brown) in the hole. Put the lower layer soil (red) second, so the plant has better access to the nutrients of the brown topsoil. Always put the topsoil first.

The most important organic soil amendments are compost and animal dung from chicken or cows. Compost is decayed organic material used as a fertilizer for growing plants. Compost and animal dung are easily available and economically affordable.



Source: GIZ/ComCashew – Preparation of compost and manure

In areas where livestock farming is practiced, you can make your own compost during the dry season by establishing manure pits.

To prepare compost, mix the same amount of plant waste, animal dung from cow, small ruminant droppings or poultry droppings and soil.

Stir and water the compost every 15 days to maintain the humidity that is necessary to decompose the waste.

After 5 - 6 months the compost is ripe and can be applied on the field. The colour of the compost is black or brown and it smells of humus earth.

d) Outline the procedure for digging and amending soil in planting Cashew seedlings

Use the checklist to follow steps 1 to 8 in digging and amending soil. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Activities	Rate
1. Locate the marked planting hole	
2. Get a measuring tape or stick of 50 cm	
3. Measure a 50 cm wide and 50 cm long hole	
4. Dig a 50 cm deep hole, that is also 50 cm wide and 50 cm long (the distance between trees depends on your plantation layout)	
5. During hole digging, put the topsoil (brown) on one pile and the second layer soil (red) on another pile	
6. After 2 weeks, examine the soil and add manure or compost, if soil fertility is low	
7. Fill the hole with the topsoil (brown) first, followed by the second layer soil (red)	
8. Put back the stick to identify the plant hole location	

e) Dig a hole and amend soil for planting Cashew seedlings

Job task 4: Establishing scion banks in cashew production



Situation: You are a cashew farmer and you are aiming to produce cashew trees. You need amend the soil for the planting of your cashew seedlings

Instructions:

1. You need to dig and till the soil. Make sure that you dig deep into the land.
2. Mix in the material you have chosen to amend with the soil.
3. Water the soil thoroughly
4. You have **1 hour**.

Performance Criteria:

Use the checklist to follow the stated steps in establishing scion bank operations. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Daily PM Activities	Rate
1. Wearing the necessary protective equipment.	
2. You dug deep into the land.	
3. You mixed the material into the soil.	
4. You watered the soils with enough water.	
5. You adhered to the time given.	

SELF ASSESSMENT

State the importance of soil amendment in planting cashew seedlings.

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List the tools used for digging and amending soil in planting cashew seedlings.

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Name the materials used for amending soil in planting cashew seedlings.

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Outline the procedure for digging and amending soil in planting cashew seedlings.

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LO 5: Skills for planting high-quality cashew seedling to establish scion banks in cashew production

a) Outline the importance of selecting high-quality planting material

It is important to select high-quality planting material as this would affect the growth and fruit quality and quantity when it is time to harvest. Choose the right material to the ensured growth and outcome of the cashew trees needs to be done.

b) Select high-quality cashew seedlings



Good plant quality is very dependent on the selection of strong and well looked after seedlings. In the quality of seedling there is two aspects to look at:

1. Does the seedling generically have high-quality?
2. What is the physical condition of the seedling once it ready to be planted and grow?

Farmers should select a seedling if generic by the quantity of produce harvested from the previous generation of that seedling.

Some desirable parent tree characteristics are:

- Healthy trees with a large, well developed crown.
- Low branching may be desired for easier fruit harvest.
- Fast growth rate.
- Low susceptibility to (or ability to quickly recover from) disease or insect attack.

For physical quality the seedling does not have single characteristics that determine the quality. **Though there are a few factors that you could consider:**

- They are healthy, vigorously growing and free of diseases.
- They have a robust and woody (lignified) single stem free of deformities.
- Their stem is sturdy and has a large root collar diameter.
- Their crown is symmetrical and dense.
- They have a root system that is free of deformities.
- They have a dense root system with many fine, fibrous hairs with white root tips.
- They have a 'balance' between shoot and root mass.
- Their leaves have a healthy, dark green colour.
- They are accustomed to short periods without water.
- They are accustomed to full sunlight.

c) Demonstrate the safe use of tools used for planting high quality seedlings

The following tools are required for planting:

- Use a **hand trowel** to dig the planting hole for the seedling



Source: <https://www.manufactum.com/heavy-planting-trowel-p1403104/>

- Use a **hand hoe** to level the soil



Source: <https://www.hortulus-uphoff.de/krumpholz-junior-handhacke.html>

Other useful tools for planting are a **Wheel Barrow** to transport cashew seedling and a **Knife** or a **Blade** to cut the poly bags of the cashew seedlings during planting.

d) Outline the procedure for planting

- Dig a planting hole according to the same size of your grafted cashew seedling (approximately 7 cm x 10 cm)
- Cut the poly bag at the base with a sharp knife or a blade
- Place the seedling in the hole
- Carefully pull up the poly bag
- After planting, remove the empty poly bags from the field.
- Cover the plant with the soil
- Leave the collar of the plant free of soil
- Build a small heap around the plant to prevent too much water collection in the plant hole



Source: GIZ/ComCashew – Process of planting seedlings from the nursery



Source: GIZ/ComCashew – Planting cashew seedling on the field

Use the area between the trees for intercropping until your cashew trees develop their crown (canopy).

Intercrop within the first 3 years after planting the grafted cashew seedlings.

The benefits of intercropping are to:

- increase crop production per unit area
- reduce maintenance cost of your plantation
- improve soil fertility when leguminous crops are grown
- reduce weed infestation
- reduce risk of bush fire
- contribute to your family's food security in the lean season



Source: GIZ/ComCashew – Intercropping in cashew farms

Intercrop cashew with the following food crops:

- Maize
- Sorghum
- Yam
- Cassava
- Soybean
- Pineapple
- Groundnut

The planting distance of these crops from the trunk of the cashew tree should be:

- 1m on each side in year 1
- 2m on each side in year 2
- 3m on each side in year 3



Source: GIZ/ComCashew – Intercropping with groundnuts in Benin

Do not intercrop cashew with:

- Cowpea
- Pigeon pea
- Okra

These crops harbour the same major insect pests as cashew and can affect your entire plantation.



For more information on intercropping, watch video on *Farm Management and Good Agricultural Practices* from Minute 4:15 to 4:50

e) Plant high-quality Cashew seedlings for scion bank establishment

Job task 5: Establishing scion banks in cashew production



Situation: You are a cashew farmer and you are aiming to produce cashew trees. You need to plant the cashew seedlings.

Instructions:

1. Place the seedling in the hole.
2. You need to fill the hole with the amended soil.
3. Water the seedling with enough water but be sure not to drown the seedling.
4. You have **30 minutes**.

Performance Criteria:

Use the checklist to follow the stated steps in establishing scion bank operations. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Daily PM Activities	Rate
1. Wearing the necessary protective equipment.	
2. The seedling was placed inside the hole.	
3. You filled the hole with the soil.	
4. You water the seedling with enough water.	
5. You adhered to the time given.	

SELF ASSESSMENT

Why is it important to select high-quality planting material?

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What factors do you need to consider when selecting high-quality seedlings?

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Name the tools used in planting of high-quality cashew seedlings.

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Outline the procedure for planting.

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REFLECTION ON YOUR LEARNING IN THIS UNIT



You will write **short reflections** of your learning and actions relating to the knowledge you have learnt and the practical skills you have developed.

Tips for writing your Reflection/Reflection Journal: You should write in your Reflection Journal within 24 hours of completing your practical session to record your experiences while they are fresh in your memory. Use the **‘What, So What, Now What Model’** to guide your writing. Answer

the following questions:

What happened **to...**? (Describe what happened when did what you did)

So What did I learn from that? (Give at least 2 examples)

Now, What can I do better in future? (How can I improve next time?)
 What did you learn to do?

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What difficulties did you face in this unit?

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What can I do it better in future?

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How long did it take you each time you did it?

Attempt 1

Attempt 2

Attempt 3

REFERENCES

Other website about establishing a scion in cashew production

<https://summerwindsnursery.com/blog-az/prepare-your-soil-for-fall-planting>

<https://extension.colostate.edu/topic-areas/yard-garden/choosing-a-soil-amendment/>

<http://old.worldagroforestry.org/NurseryManuals/Community/SeedQuality.pdf>