

LEARNING FACILITATING MATERIALS

NATIONAL PROFICIENCY LEVEL 1

TRADE AREA: **CASHEW PRODUCTION**

UNIT 3

ESTABLISHMENT OF A CASHEW PLANTATION





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UNIT INTRODUCTION

Welcome to Unit 3 of your learning journey in cashew production. This guide explains the main steps for establishing cashew plantations.

Do you already know why it is important to follow Good Agricultural Practices (GAP) when establishing cashew plantations?

If you follow the steps for establishing cashew plantations in the right sequence, you will produce a lot of high-quality raw cashew nuts and cashew apples for more than 25 years. Do not miss a step! Apply your knowledge and skills perfectly to establish your cashew plantation.



In this unit, you will learn about the main steps for establishing cashew plantations for raw cashew nut and cashew apple production. The learning material covers six sub-units:

- 1) Site selection
- 2) Manual land clearing
- 3) Manual land preparation
- 4) Lining and pegging
- 5) Digging and amending soil
- 6) Planting

Each sub-unit contains theoretical and practical exercises. Each module includes written materials, visuals as well as self-assessments to test your knowledge and skills.

Follow the recommended Good Agricultural Practices (GAP) for land selection, preparing the land and planting to establish a high-yielding cashew plantation and to produce high-quality raw cashew nuts and cashew apples.

Establishing your cashew plantation correctly is the first step in setting up a successful business in cashew production. If you establish your plantation well, you will produce a lot of raw cashew nuts and cashew apples at a good quality.

Even though, this learning material provides essential information on establishing your cashew plantation for National Proficiency Level 1, you should also look out for new information, innovations and technological advances during your practical work that expand your knowledge and skills.

Are you ready to start your cashew learning journey? Let's start!

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ICONS



LEARNING
OBJECTIVES



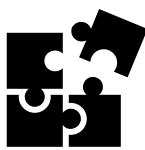
ATTENTION



PRACTICALS
HANDS ON



CROPPING
CALENDAR



SELF ASSESSMENT



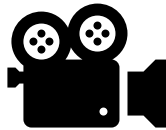
WELL DONE!



TAKE A BREAK!



DEMONSTRATE
USE OF
TOOLS



WATCH VIDEO

ABBREVIATIONS

Here are some commonly used abbreviations.

°C	Celsius Temperature
cm	Centimeter (1 cm = 10 millimeter)
GAP	Good Agricultural Practices
m	Meter (1 m = 100 cm)
ha	Hectare
mm	Millimeter
m ²	Square Meter

1. DEMONSTRATE SKILLS IN SITE SELECTION

a) Outline the factors relevant for site selection

The main factors relevant for site selection are:

1. Farm location
2. Soil suitability
3. Water availability
4. Climate



Source: GIZ/ComCashew – Selecting a site to establish a cashew plantation



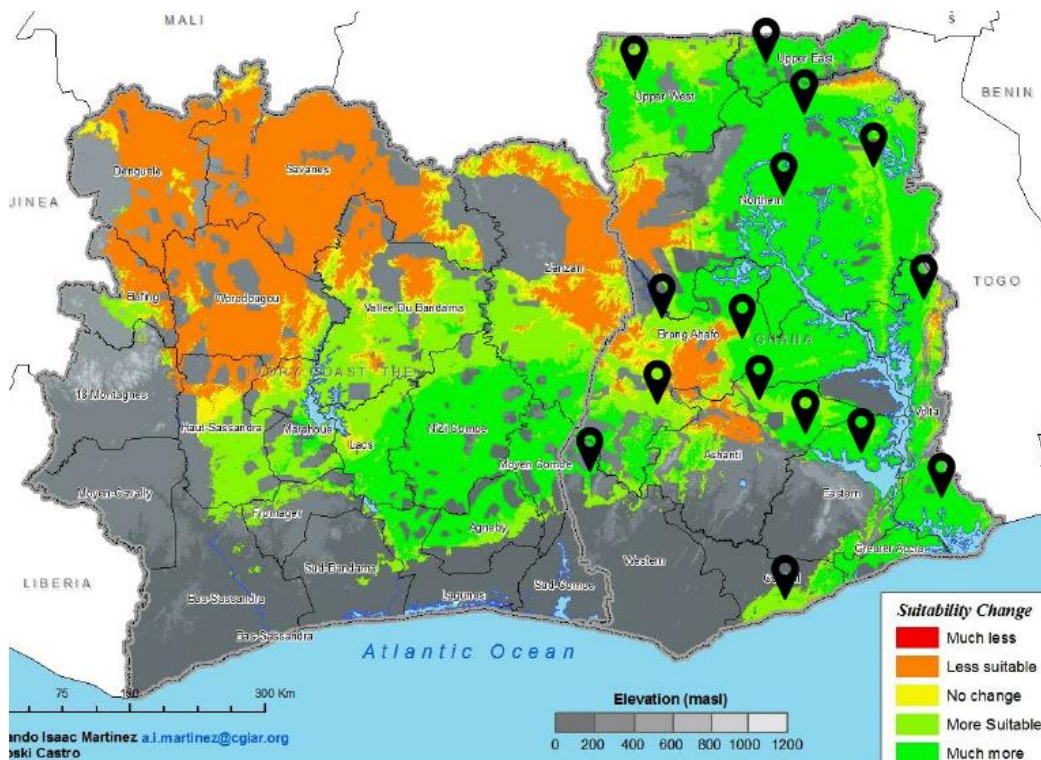
The sudan savanna, guinea savanna and transitional zones are the most suitable areas for cashew cultivation.

In Ghana, the regions that are most suitable for cashew cultivation are:

- Savannah Region (former Northern Region)
- Northern Region (former Northern Region)
- North East Region (former Northern Region)
- Bono Region (former Brong-Ahafo Region)
- Bono-East Region (former Brong-Ahafo Region)
- Ahafo Region (former Brong-Ahafo Region)
- Oti Region (former Volta Region)
- Volta Region (former Volta Region)
- Upper West Region
- Upper East Region

Cashew is also cultivated in:

- Central Region
- Eastern Region
- Ashanti Region
- Western North Region



Source: GIZ/ComCashew – Suitability for cashew growing in Ghana and Côte d’Ivoire

Cashew requires the following climatic conditions:

- Rain of 500 – 1.500 mm per year
- Temperatures of 30 – 35°C
- Altitude of 170 m – 1.200 m
- Flat grounds



Cashew is a sun-loving plant and does not tolerate shade.

Cashew trees grow and produce well on these types of soil:

- Deep soil
- Fertile soil
- Well-drained soil
- Loamy soil
- Sandy soil
- Laterite soil

Cashew prefers soils with pH rates ranging from 5.5 - 7.0

Cashew trees **do not** grow and produce well on these types of soil:

- Heavy clay soil with poor drainage condition
- Alkaline soil
- Saline soil
- Soil prone to water logging
- Hard pan soil



Select your site in January and February.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
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For more information on site selection, watch video on *Establishment of Cashew Farm* from Minute 1:12 to 3:12

b) Outline the procedure for site selection

Use the checklist to follow steps 1 to 4 in site selection. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Activities	Rate
1. Inspection of land suitability	
2. Inspection of soil suitability	
3. Check water availability	
4. Ensure appropriate climate conditions	

In the midst of difficulty always lies an opportunity. Enjoy your learning journey.

c) **Identify tools and equipment used for site selection**

The following tools and equipment are required for site selection:

- Use **Cutlass** to cut your pathway in the bush to select your site. The cutlass also protects you from bush animals, such as snakes, rats and lizards.



Source: <https://hosstools.com/product/farm-machete/>

- Wear **Rubber/Wellington Boots** to protect your feet from cuts and bites from snakes, bush rats and lizards.



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 from cuts and bites from snakes, bush rats and lizards.



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

Other useful protective clothes for site selection are: **Overalls, Protective Glasses, Hat or Cap**

d) Use tools and equipment for site selection



Practical Exercise: Go to the farm for your apprenticeship and demonstrate the safe use of tools and equipment for site selection. Apply the knowledge that you have gained so far!

e) Select a site for cashew production



Practical Exercise: Go to the farm for your apprenticeship and select a site that is suitable for cashew production. Follow the recommended practices!

SELF ASSESSMENT



1. State four (4) factors to consider in site selection.

2. Describe the use of three (3) tools and equipment used for site selection.

3. State the months in which site selection takes place.



*Congratulations! You have completed the first set of questions.
Take a break before you move on to the next chapter.*

2. DEMONSTRATE SKILLS FOR MANUAL LAND CLEARING

a) Outline the factors relevant for land clearing

During land clearing:

- Cut all the bushes and clear undergrowth (roots and stumps) with cutlass and mattock.
- Remove all cut woods and twigs, because the young cashew trees do not tolerate shade.
- Gather all cut woods and twigs onto different piles of sticks
 - Long sticks are used for the staking
 - Short sticks are used for fencing to protect the young trees after planting



Source: GIZ/ComCashew – Manual land clearing

Depending on the amount of crop residue, land clearing can be:

- manual (by hand)
- mechanical (by machine)

Sometimes, chemicals (weedicides) are applied to complement manual and mechanical land clearing.



Caution! Do not burn the land. Burning destroys organic matter in the soil, causes erosion and loss of soil fertility.

Manual clearing leaves the soil relatively undisturbed, but it takes longer than mechanical clearing. Manual clearing is labour intensive and expensive. Manual clearing is more suitable for the establishment of small farms.



Clear your land during the dry season in March.

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



For more information on manual land clearing, watch video on *Establishment of Cashew Farm* from Minute 1:12 to 3:12

b) Outline the procedure for manual land clearing

Use the checklist to follow steps 1 and 4 in manual land clearing. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Activities	Rate
1. Cut trees, bushes, roots, stumps	
2. Remove all woods and twigs	
3. Gather one pile with long sticks for stacking	
4. Gather another pile with short sticks for fencing to protect the planted seedlings	

Everything that you need to accomplish your goals is already in you.

c) Use tools for manual land clearing



Practical Exercise: Go to the farm for your apprenticeship and demonstrate the safe use of tools for manual land clearing.

The following tools and equipment are required for manual land clearing:

- Use a **Mattock** for digging the soil, removing stumps from the field and chopping undergrowth. Use a mattock for hard and rocky soils.



Source: <http://tools-pmc.com/en/hand-tools/347-pick-mattock.html>

- Use a **Hoe** to remove weeds, shape and clear the soil off old root.



Source: <https://seymourmidwest.com/42441>

- **Chain Saws** are used for cutting trees and stumps.



Caution! Only use a chain saw after you have been trained on the use and maintenance of a chain saw. Find a chain saw operator to help you with land clearing.



Use **Protective Glasses or Face Shield, Safety Helmet, Hearing Protection, Chain Saw Chaps and Gloves** when operating a chain saw.

Source: <https://www.murdochs.com/products/power-equipment/saws/heavy-duty-chainsaws/>

- Use a manual **Tree Saw** for cutting trees, sticks and stumps.



Source: <https://www.obi.at/handsaegen-feilen/lux-baumsaege-holz-350-mm-classic/p/3028891>

Other useful tools for manual land clearing are: **Earth Chisels**



d) Undertake manual land clearing for cashew production



Practical Exercise: Go to the farm for your apprenticeship and conduct manual land clearing with the tools that are available to you. Apply the knowledge that you have already gained from this section.



SELF ASSESSMENT

1. State two (2) different methods of land clearing.

2. Explain why burning the land is not a good practice for land clearing.

3. State three (3) tools used for manual land clearing.



Well done! You are doing great on your path to success.

3. DEMONSTRATE SKILLS IN MANUAL LAND PREPARATION

a) Outline factors relevant for manual land preparation

During manual land preparation:

- Plough to loosen and turn the soil
- Harrow to break up and smoothen the soil
- Ridge to prepare the soil for
 - better water absorption
 - improve the soil-air composition
 - prepare topsoil for use during planting
- Conduct organic mulching to
 - reduce soil erosion
 - contain nutrients and water in the soil
 - fertilize the soil
 - prevent weed growth



Source: GIZ/ComCashew – Manual land preparation

Land preparation is conducted for:

- debushing
- removing stones and rocks
- ripping the soil
- levelling the soil
- fertilizing the soil

Land preparation is necessary to:

- release nutrients to the soil
- destroy weeds and insect nests
- increase soil fertility
- improve plant-soil contact
- reduce the incidence of pest and diseases infestation after planting



Caution! Inadequate land preparation can result in crop failure

The most suitable time for manual land preparation is dependent on the specific regional climatic conditions.



Prepare your land during the dry season in late March.

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



For more information on manual land preparation, watch video on *Establishment of Cashew Farm* from Minute 1:12 to 3:12

b) Outline the procedure for manual land preparation

Use the checklist to follow steps 1 to 4 in manual land preparation. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Activities	Rate
1. Plough to loosen and turn soil	
2. Harrow to break up and smoothen soil	
3. Ridge to prepare the soil for better water absorption, soil-air composition and use of topsoil	
4. Conduct organic mulching to reduce soil erosion, contain nutrients and water in the soil, fertilize the soil and inhibit weed growth	

Be gentle with yourself. You are doing the best you can.

c) **Use tools for manual land preparation**



Practical Exercise: Go to the farm for your apprenticeship and demonstrate the safe use of tools for manual land preparation.

The following tools are required for manual land preparation:

- Use a **Mattock** loosen and to turn soil. Use a mattock for hard and rocky soils.



Source: <http://tools-pmc.com/en/hand-tools/347-pick-mattock.html>

- Use a **Rake** to loosen and level the soil and for weeding.



Source: <https://www.krafttool.com/GG871>

- Use a **Hoe** to ridge and prepare the soil for better water absorption.



Source: <https://seymourmidwest.com/4244>

Other useful tools for manual land preparation are: **Cutlass** and **Chainsaws**.



SELF ASSESSMENT

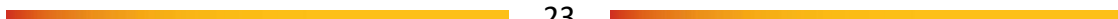
1. State five (5) reasons for conducting of land preparation.

2. State the tools used for land preparation.

3. State the four (4) steps for land preparation.



Congratulations! You completed half of this training on establishing cashew plantation. Take a deep breath and continue to the next chapter. You are doing great!



4. DEMONSTRATE SKILLS FOR LINING AND PEGGING

a) Outline factors relevant for lining and pegging

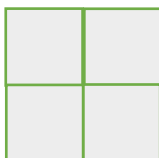
Mark the plant holes with the long sticks that you collected during land clearing. Use a measuring tape and a rope to ensure that the plants are planted in a straight line with the appropriate plant spacing.



Source: GIZ/ComCashew – Lining and pegging

There are two (2) layouts for spacing during planting:

1. Planting according to the square requires plant spacing of 10 meters by 10 meters - 100 trees per hectare (ha).



2. Planting according to the rectangle requires plant spacing of 12 meters by 10 meters - 83 trees per hectare (ha).





Define the layout before lining and pegging to get the spacing right!



Line and peg at the end of March and at the beginning of April before the rains start.

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



For more information on lining and pegging, watch video on *Establishment of Cashew Farm* from Minute 3:12 to 8:42

b) Outline the procedure for lining and pegging

Use the checklist to follow steps 1 to 8 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. Assemble sticks collected during clearing or use pegs	
3. Assemble tools	
4. Peg the first ranging pole at the edge of the plantation	
5. Attach a rope to the ranging pole	
6. Measure a straight line of <u>10 meter for square</u> layout and <u>12 meters for rectangular</u> layout using the rope, measuring tape and ranging poles.	
7. 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	
8. 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.

c) **Use tools for lining and pegging**



Practical Exercise: Go to the farm for your apprenticeship and demonstrate the safe use of tools during lining and pegging. Use the tools that are available to you. Define a layout and measure the tree spacing accordingly.

The following tools are required for lining and pegging:

- Use **Ranging Poles** or **Long Sticks** collected during land clearing to set out straight lines on the field and to mark the distances between the plants.



Source: <https://www.reasawmillsdirect.co.uk/wooden-pegs-06m-x-50mm-x-50mm-pack-of-25-242-p.asp>

- Attach a **Rope** between the ranging poles to set a straight line between the trees.



Source: <https://ansojo-outdoor.de/produkt/barnitz-polyester-seil-hochfest-4-mm/>

- Use a **Measuring Tape** to measure the distance between the plants, depending on the layout you chose for your plantation.



Source: <https://de.dhgate.com/product/120-inch-tape-measure-meter-tape-rule-of/428378912.html>

- You can also use a **Surveyor's Tape** to measure the distance between the plants. Surveyor's tape can be practical because you can measure longer distances than with measuring tapes



Source: <https://ukrigging.net/shop/all-items/10m-surveyors-tape-measure/>

- Place **Pegs** or **Short Sticks** collected during land clearing to mark where you want to plant your seedling.



Source: <https://www.allstakesupply.com.au/product/hardwood-38mm-x-38mm/>



SELF ASSESSMENT

1. Draw two (2) layout designs for planting cashew trees.

2. Explain the process of lining and pegging.

3. State in which months lining and pegging takes place.



Well done! You have completed another set of questions. This is very encouraging. Let's move on.

5. DEMONSTRATE SKILLS FOR DIGGING AND AMENDING SOIL

a) Outline factors relevant for digging and amending soil

For digging and amending soil:

- Measure a stick of 50 cm to determine the width, length and depth of the hole.
- Dig a hole of 50 cm long x 50 cm wide x 50 cm deep on the field to plant grafted cashew seedlings.
- Dig each hole at a distance of 10 to 12 meters, depending on the layout of your plantation.
- Use a hole pincer and spade to dig the hole and remove the soil with a hoe, shovel or post hole digger.
- Put the top soil (brown) on the left side of the hole.
- Put the lower layer soil (red) on the right side of the hole.



Leave the soil dugout for at least two weeks. The soil must decompose before you 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.

Refilling takes place 2 to 4 weeks after digging.



For refilling, note that the top soil (brown) is more fertile than the lower level soil (red). Always put the topsoil first.



After refilling, put back the sticks to identify the plant hole location.



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

b) Outline the procedure for digging and amending soil

Use the checklist to follow steps 1 to 7 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. Get a measuring stick of 50 cm	
2. Take out the pegged stick and measure a 50 cm wide and 50 cm long hole	
3. 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)	
4. Put the top soil (brown) on one pile and the second layer soil (red) on another pile	
5. After 2 weeks, examine the soil and add manure, if needed from compost of cow dung	
6. Fill the hole with the top soil (brown) first, followed by the second layer soil (red)	
7. Put back the stick to identify the plant hole location	

You do not need to master everything in one day. Take your time and progress at your own pace.

c) **Use tools for digging and soil amendment**



Practical Exercise: Go to the farm for your apprenticeship and demonstrate the safe use of tools during digging and amending soil. Use the tools that are available to you.

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 soils from the holes.



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

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



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

- Use the **Wheel Barrow** to transport manure and amended soil to 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>

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

d) Dig a hole according to requirements



Practical Exercise: Go to the farm for your apprenticeship to dig planting holes and to amend planting soil. Follow the recommended practices that you have already learned.



SELF ASSESSMENT

1. State the size of the planting holes (width, length and depth).

2. State the factors to consider in refilling the planting hole.

3. State four (4) tools used for digging planting holes.

4. State in which month digging and amending soil takes place.



*Bravo! One more chapter before you have completed this unit.
Take a short break and move on to the last chapter.*

6. DEMONSTRATE SKILLS FOR PLANTING

a) Outline factors relevant for planting

For planting, you have two (2) options to obtain your planting material:

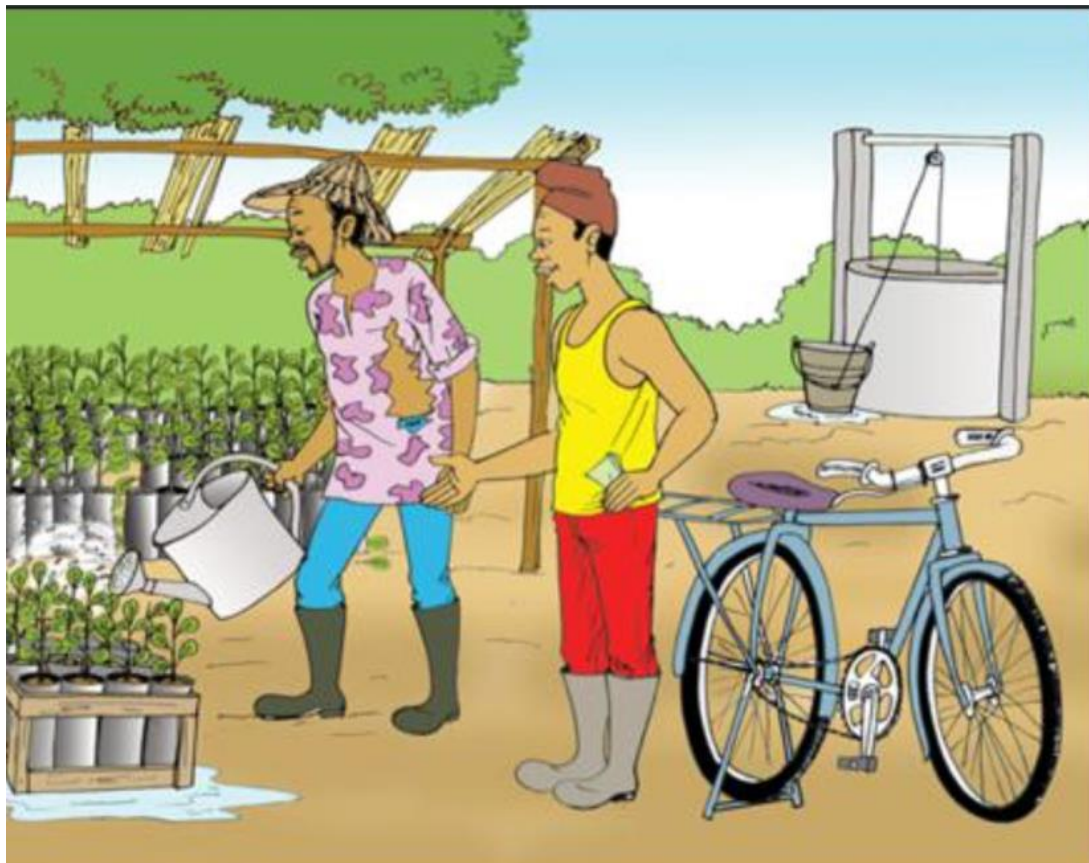
1. Planting grafted seedlings (plants)
2. Sowing polyclonal cashew seeds (polyclonal raw cashew nuts)



Grafted seedlings have better yields than polyclonal seeds. Grafted seedlings are also more pest and disease-resistant.



It is recommended to obtain grafted seedlings in a certified nursery close to your cashew plantation to reduce transportation time and costs.



Source: GIZ/ComCashew – Obtaining grafted cashew seedlings in community nursery

For planting grafted seedlings:

- 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 grafted seedlings from the nursery



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

Mulching of grafted seedling is important when establishing cashew plantations to:

- conserves moisture
- controls weed growth
- releases nutrients to the soil

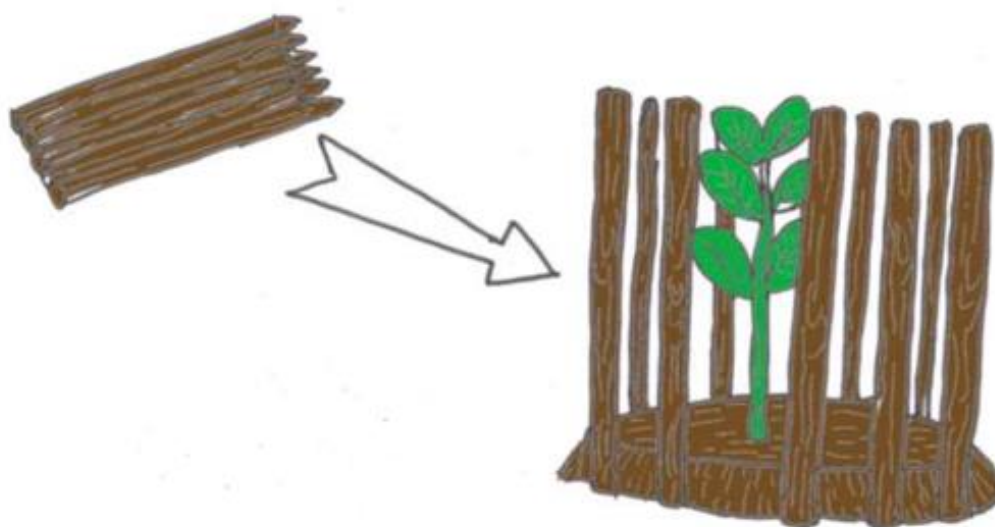
In mulching, apply a 5 cm layer of organic material or residues such as leaves, slashed weeds or saw dust after planting. If the soils are low in nutrients, you can also use animal manure such as cow dung to increase soil fertility.



Planting grafted cashew seedlings should be done from the beginning of June till mid-July, after rainfall, to ensure high survival rates of the young plants.

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

Fence the grafted cashew seedling one week after planting (end of July). Use the small sticks that you collected during clearing of your land. Build a fence to protect the young plant from animals.



Source: GIZ/ComCashew – Fencing young cashew seedlings



In the southern zones, replace un-germinated seeds, dead, diseased and weak seedlings in the minor rainy season. In the northern zones, replace plants in the following year’s rainy season.



For more information on purchasing and planting grafted cashew seedlings, watch video on *Establishment of Cashew Farm* from Minute 14:19 to 16:20

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: GLZ/ComCashew – Intercropping with groundnuts in Benin

Do not intercrop cashew with:

- Cowpea
- Pigeon pea
- Okra



These crops harbor 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

b) Outline the procedure for planting

Use the checklist to follow steps 1 to 11 in planting. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Activities	Rate
1. Purchase grafted seedlings at a nursery close to your new cashew plantation	
2. Dig a planting hole in the same size of the grafted seedling (7 cm x 10 cm)	
3. Cut poly bag at the base of the seedling, using a knife or a blade	
4. Place the seedling in the hole and carefully pull up the poly bag	
5. Remove the poly bag from the field	
6. Cover the plant with the soil but leave the collar free	
7. Build a small heap to prevent water from collecting in the plant hole	
8. Mulch area around the seedling	
9. Fence the seedling	
10. Choose suitable intercrops	
11. Plant intercrops at the appropriate distance from the tree trunk	

Whenever you find yourself doubting how far you can go, just remember how far you have come already.

c) **Use tools for planting**



Practical Exercise: Go to the farm for your apprenticeship and demonstrate the safe use of tools during planting.

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 and for mulching.



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

Another useful tool for planting is a **Wheel Barrow**.

d) Plant cashew for production



Practical Exercise: Go to the farm for your apprenticeship and conduct planting of grafted cashew seedlings.



SELF ASSESSMENT

1. State two (2) reasons for using grafted cashew seedlings.

2. Explain the procedure for planting grafted cashew seedlings.

3. State three (3) reasons for mulching.

4. List the crops that are suitable for intercropping with cashew.



Fantastic! You completed this unit. Be proud of what you have achieved.

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