

Facilitating and Learning Materials

NATIONAL CERTIFICATE LEVEL 1

TRADE AREA:

CASHEW VALUE CHAIN

UNIT 1:

MECHANICAL LAND PREPARATION FOR ESTABLISHING A CASHEW PLANTATION



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INTRODUCTION AND PRELIMINARY NOTES

The purpose of land preparation is to provide the necessary soil conditions which will enhance the successful establishment of the young offshoots or the tissue culture plants received from the nursery.

Site preparation can be accomplished through mechanical means, prescribed fire, the use of herbicides, or any combination of these approaches. Mechanical site preparation accomplishes two goals: It facilitates planting, direct seeding and natural regeneration.

When establishing a plantation, certain actions need to be implemented to ensure the long term success of the plantation. One of these actions involve the initial land preparation which should be done prior to transplanting of the plant material (offshoots or tissue culture-derived plants).



LO.1 DEMONSTRATE SKILLS IN MECHANICAL LAND CLEARING FOR ESTABLISHING A CASHEW PLANTATION

PC (a) Explain Mechanical Land Clearing

Generally, before preparing to do anything on a piece of land, it is important to know that land clearing needs to be the first step. If this step does not take place, a lot of unwanted saplings, weeds, roots etc will later become a problem. It is also important to know that certain clearing can only be done by professionals using equipment such as bulldozers and excavators. Having a license to operate these certain machines is necessary and will come in handy for the future.



You also need to consider the most environmentally friendly way to dispose of the debris you remove from the property. A professional contractor will know which licenses need to be obtained for each step in the process.

It is important to know that all your workers on site meet the suitable requirements to operate certain equipment and to do certain tasks.

PC(b) Importance Of Mechanical Land Clearing

- **Enhances the usability of land**
Tree removal and land clearing help to make it accessible and usable for building houses, parks, parking lots, and more.
- **Safety purposes**
When a piece of land is filled with rotting wood and dead trees, it may pose all kinds of threats and hazards to the surrounding neighbourhood. By using land clearing services, you can remove this danger.
- **Prevents disease from spreading**
Clearing the land can make it healthier and remove any disease that have spread or have infiltrated the vegetation.
- **Promotes healthy growth of trees & plants**
An advantage of land clearing is it helps with the healthy growth of plants and trees. When a plot is crowded with vegetation, the chance of plants surviving on it decreases. Clearing land provides more room for them to grow and gives the plants better access to water, nutrients, and sunlight.
- **Improves soil health**
When plants and trees are overgrown, it isn't beneficial for the land as it promotes weeds and other undesirable plant growth, contributing to soil erosion. When you clear the land, it helps to redistribute the soil evenly, making it healthier.

- **Decreases chances of fire**

When a plot has overgrown vegetation, the risk of fire increases. Land clearing can be used to remove dead plants, rotting tree stumps, and other such threats, preventing the spread of wildfire and protecting the structures on the plots nearby.

- **Reduces pests**

Dense areas with a lot of trees and plants provide natural shelter for pests, increasing their population. The structures around such pieces of land have a higher risk of pest infestation. To eliminate the chances of their nesting, clearing the plot is recommended.

PC(c) Mechanical Land Clearing Methods

When removing undeveloped land, there are various methods to do so. Removing weeds, brush, and difficult vegetation can be a difficult task.

Slashing

Slashing is a form of agriculture where the natural vegetation is cut down as a method of clearing the land for cultivation.

Ploughing

Ploughing is the turning and loosing of the soil before sowing can happen.

Harrowing

Harrowing is generally to break up clods (lumps of soil) and to provide a finer finish, a good tilth or soil structure that is suitable for seedbed use.



PC(d) The safe use of tools, equipment and machines in mechanical land clearing

Working with machines, tools and equipment can be very helpful. However, interacting with them has potential for serious injuries or fatalities if they are not used and maintained properly.

To avoid injuries or fatalities:

1. **Read and comply with the manual.** Always thoroughly read the manual for each piece of equipment. Your new tractor may function differently than your old one, for example. Then, comply with the instructions and rules.
2. **Dress appropriately.** An untied shoelace, flowing long hair and stray threads from an old shirt have, in the past, led to horrendous injuries when operating farm equipment. Dressing appropriately can mean reducing risk of such injuries.
3. **Ensure you're well rested.** Feeling fatigued when operating machinery can be dangerous. Make sure you're taking breaks from work when you need rest.
4. **Avoid alcohol.** Even one drink can affect your ability to operate machinery. Keep alcohol out of the picture until you're done for the day.
5. **Maintain awareness.** Stay focused. Be aware of what you are doing and where you are going.
6. **Adjust equipment accordingly.** This means keeping all guards, shields and access doors in place when operating equipment, and making necessary alterations to equipment to fit operational conditions.



PC(e) The Procedure For Mechanical Land Clearing

Procedure to clearing land:

1. Demolish any existing structures.
2. Remove standing debris.
3. Mark and protect all desired vegetation that cannot be temporarily moved.
4. Fell any trees.
5. Grub any remaining tree stumps.
6. Clear brush.
7. Fill in holes and grade the land.
8. Plough if you want to farm or landscape the area.

NOTE:

- If you have low ground vegetation, you can use grazing animals like sheep or goats to clear it. Sometimes, these animals can work surprisingly quickly.
- Goats can even eat poison ivy without being harmed, saving you from some potentially irritating trouble.
- In some locations, you can rent grazing animals for this purpose.

PC(f) Perform Mechanical Land Clearing For Establishing A Cashew Plantation



Job Task 1: Mechanical Land Clearing

Situation: You are the co-owner on a new small cashew plantation. The first process is to clear the land you want to work on. Your job is to perform mechanical land clearing for establishing a cashew plantation.

Instructions:

1. Select the equipment to mechanically clear land.
2. Select the method used to clear land.
3. Clear the land.
4. You have **1 hour**

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



Excellent



Okay



Try Again

Daily PM Activities	Rate
1. Correct tools were selected for the activity.	
2. Correct methods used to clear land.	
3. The procedure for land clearing is correctly done.	
4. The time limit is adhered to.	

Self-Assessment Task

PC (a) What is land clearing?

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PC (b) Why is land clearing important?

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PC (c) List 3 land clearing methods.

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PC (d) What is the safe ways to use land clearing equipment?

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PC (e) Explain the land clearing procedure.

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LO.2 Demonstrate skills in ploughing for establishing a cashew plantation

PC(a) What is ploughing?

Used for initial cultivation to loosen or turn the soil in preparation for sowing seed or planting.



Tractor with ploughing blades

PC(b) Importance of ploughing

1. ploughing helps to increase the friendly microbes and worms in the soil which helps in further turning of the soil.
2. ploughing makes the soil loose, which makes the plants easier to breathe through the porous soil.
3. ploughing kills the weeds present in the soil and suffocates them to death.
4. it brings the fresh nutrients to the upper layer of the soil so, that the plants can use them.
5. ploughing helps the plant's roots to penetrate deep into the soil.

Advantages:

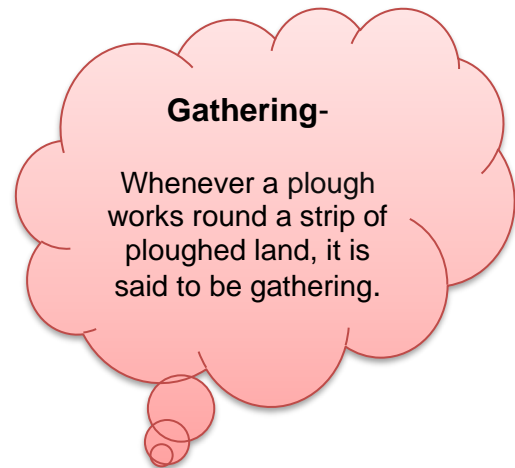
- The loosening and turning of soil during ploughing bring nutrient-rich soil to top.
- It improves air circulation so that roots can respire easily.
- Ploughing improves the water retaining capacity of the soil.
- It loosens the soil, such that the roots can penetrate deeper into the soil thus hold the plant tightly.
- It helps in uprooting weeds.
- It helps in the proper mixing of manure in the soil.
- Organic matter decomposition is hastened to result in higher nutrient availability to the plants.
- Ploughing helps in growth of microbes and worms (like earthworms) present in soil which are considered as farmer friends.
- Since the capacity to absorb rainwater increases atmospheric nitrate mixed with water enters the soil and it increases soil fertility.

PC(c) Ploughing Methods

Gathering

Whenever a plough works round a strip of ploughed land, it is said to be gathering

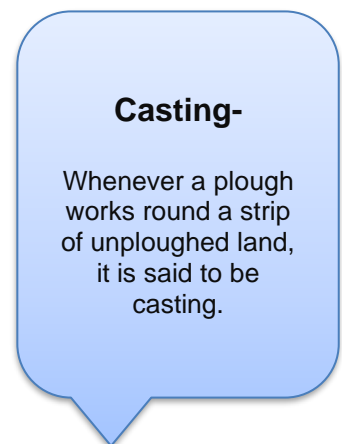
- This leaves a shallow furrow where the finish comes.
- After this, the driver turns right and gathers round the land already ploughed on the first ridge.
- Gathering is continued till the unploughed strip in first three-quarter land has been ploughed and completed.
- This gathering reduces the first full land by a quarter.
- The remaining three quarter land can be treated in exactly the same manner as the original three quarter land.
- This process is repeated for all other lands in the field.

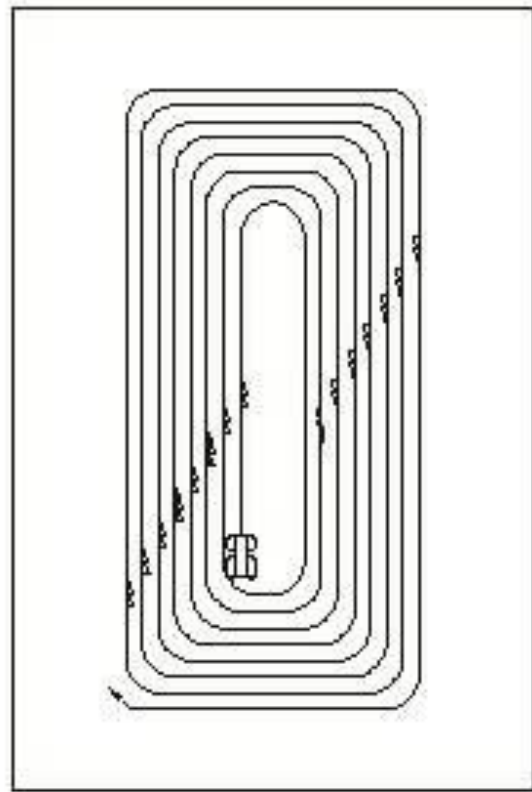
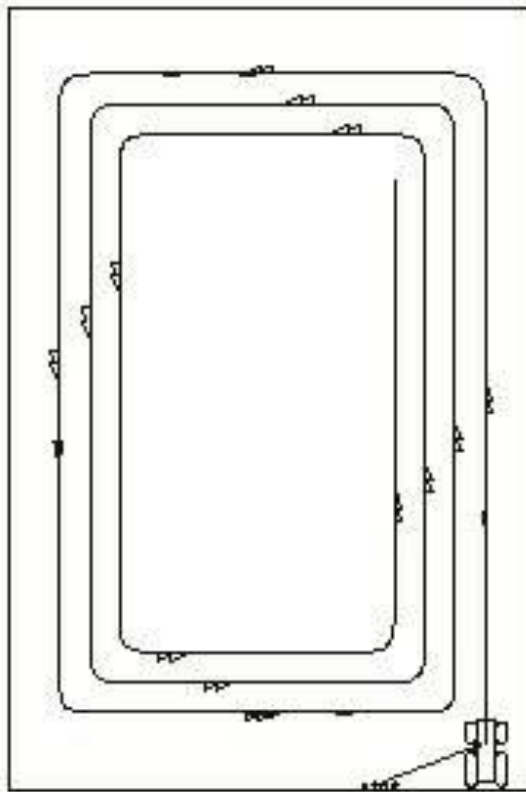


Casting

Whenever a plough works round a strip of unploughed land, it is said to be casting

- Tractor starts ploughing at one end of the field and then moves on all the sides of the plot and comes gradually from the sides to the centre of the field.
- Wide diagonals are left unploughed to avoid turning with the plough.
- There are no back furrows in this method.
- Conventional ploughing is usually done by this method.
- This system requires the use of a special type of plough known as reversible plough or one way plough.
- Such a plough turns furrows to the left or right.
- After the headland has been marked, the operator plough along a straight side land mark.
- At the end of the first trip, he turns his tractor in a loop and returns down the same furrow.
- No dead and back furrows are left in the field. In gently sloping fields, this method is suitable.





PC(d) The Safe Use Of Ploughing Equipment, Tools And Machines

Equipment, Tools And Machines Used	
<p>A circular, concave revolving steel plate used for cutting and inverting the soil.</p>	
<p>Similar in design to the moldboard plow, reversible plows use two or more blades to cover a wider area of land. Each blade makes one furrow. Blades are mounted back-to-back, with one set positioned to turn the earth right and the other positioned to turn the earth left.</p>	

Chisel plows are generally used to till the soil with less disruption for better conservation. It relies on a curved shank that penetrates the soil without digging it up and turning it.



Disc plows are rows of concave steel discs that revolve as they are pulled. Most commonly, disc type garden tractor plows are used to plow exceptionally hard or sticky ground. They work very well in rough ground or to plow a field with hard stubble left behind by a combine.



A sub-soiling plow is used to break up the ground beneath a hardpan layer without turning the soil and bringing it to the top. This tilt and aerates the soil to create drainage. Pan, or hardpan layers are formed by chemical treatments of soil. They must be broken in order for plants to grow.



PC(e) Procedure For Ploughing

1. Ensure that the field to be ploughed is free of plant material that could clog up the plough – it should be mowed close to the ground and the cuttings allowed to dry, reducing their bulk. Don't plough on wet ground or allow your wheels to spin as this will damage the soil structure.
2. Connect the plough to the three point linkage and make sure that the 'check chains' are nice and loose but not so loose that the plough hits the back tyres when it swings from side to side.
3. Starting at the right hand side of the field, drop the plough onto the ground with the 3 point linkage, drive the tractor 6 foot forwards and then inspect the results. The first cut is always more difficult as there is no adjacent furrow for the turf to fall into. This won't make much sense at the moment, so don't worry about it! Assuming you are using a 2 furrow plough, you'll eventually want the two rows of upturned turfs to be fairly similar in size, however, in the first cut this is difficult, if not impossible.
4. Drive the tractor back to the start of the first furrow and position the right hand wheels in the furrow itself.
5. The first adjustment is the depth wheel, and this should be set to get an 8m furrow – don't try to get any deeper than your plough is designed for or else the turfs will not fold over neatly.
6. The next adjustment is the top link which will alter the angle of the plough to the ground. If you lengthen the top link, the back plough will be lowered and create a deeper furrow, but if you lower it too much it can send the plough pointing upwards and it will not dig into the ground properly.
7. Ploughing is just the first step in cultivating the land and should be followed by further tillage such as rotovating or harrowing before planting.



PC(f) Perform Ploughing For Establishing A Cashew Plantation

Job Task 2: Ploughing



Situation: You are the co-owner on a new small cashew plantation. The first process is to clear the land you want to work on. Your job is to perform mechanical ploughing for establishing a cashew plantation.

Instructions:

1. Select the equipment to mechanically plough your land.
2. Select the method used to plough.
3. Plough the land.
4. You have **1 hour**

Use the checklist to follow the stated steps in mechanical ploughing. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Daily PM Activities	Rate
1. Correct tools were selected for the activity.	
2. Correct methods used to plough.	
3. The procedure for land ploughing is correctly done.	
4. The time limit is adhered to.	

Self-Assessment Task

PC(a) What is ploughing?

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PC(b) Why is ploughing important?

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PC(c) Explain the ploughing methods.

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PC(d) What is the safe ways to use ploughing equipment?

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PC(e) Explain the ploughing procedure.

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LO.3 DEMONSTRATE SKILLS IN HARROWING FOR ESTABLISHING A CASHEW PLANTATION

PC(a) What Is Harrowing?

Harrowing is often carried out on fields to follow the rough finish left by ploughing operations. The purpose of this harrowing is generally to break up clods (lumps of soil) and to provide a finer finish, a good tilth or soil structure that is suitable for seedbed use.



PC(b) Importance Of Harrowing

Harrowing is typically done after ploughing. The importance is:

- Making a bed fit for the seed you're growing, here the harrow's work is sorting the soil and breaking clumps, so that the seeds will have a substrate fit for growth of their roots.
- Mixing fertiliser with the soil. If manure is surface spread on ploughed soil you need to mix it down quite fast to keep most of the nitrogen.
- Smoothing the surface, the surface left by the plough is in most cases too rough and uneven. Only if the harrow has a levelling plank, otherwise this is the job for the leveller.
- in some cases, the harrow does a bit of weeding as well, by breaking apart and bringing roots to the surface so they can desiccate (common couch) and by burial of newly sprouted weeds (although the tined weeder does much more of this work, some is done by the harrow).

PC(c) Harrowing Methods

1. Spring tine harrow.

A spring tine harrow more specifically refers to a largely outdated type of soil cultivation implement that is used to smooth the ground as well as loosen it after it has been ploughed and packed.



2. Chain harrow




Chain harrowing can be used on pastureland to spread out dung, and to break up dead material (thatch) in the sward, and similarly in sports-ground maintenance a light chain harrowing is often used to level off the ground after heavy use, to remove and smooth out boot marks and indentations.



3. Rotary hoe.

The rotary hoe is based on a circular wheel ringed by dozens of tiny, spoon-shaped “hoes”. Cultivating implement consisting of a row of wheels each with many fingers like prongs, pulled over the ground to break up the soil and destroy weeds.



PC(d) The Safe Use Of Harrowing Equipment, Tools And Machines

Equipment, Tools And Machines Used	
Disk Harrow	
Spring Tine Harrow	
Drag Tine Harrow	

<p>Spike Tine Harrow</p>	
<p>Chain-Disk Harrow</p>	

PC(e) Procedure Of Harrowing

1. Ensure that the field to be harrowed is free of plant material that could clog up the harrow – it should be mowed close to the ground and the cuttings allowed to dry, reducing their bulk. Don't harrow on wet ground or allow your wheels to spin as this will damage the soil structure.
2. Connect the harrow to the three point linkage and make sure that the 'check chains' are nice and loose but not so loose that the harrow hits the back tyres when it swings from side to side. This adjustment is made in case you hit a large rock, enabling the harrow to skid sideways rather than breaking anything on the tractor.
3. Starting at the right hand side of the field, drop the harrow onto the ground with the 3 point linkage, drive the tractor 6 foot forwards and then inspect the results. The first cut is always more difficult as there is no adjacent furrow for the turf to fall into. This won't make much sense at the moment, so don't worry about it! Assuming you are using a 2 furrow harrow, you'll eventually want the two rows of upturned turfs to be fairly similar in size, however, in the first cut this is difficult, if not impossible.
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5. The first adjustment is the depth wheel, and this should be set to get an 8m furrow – don't try to get any deeper than your harrow is designed for or else the turfs will not fold over neatly.
6. The next adjustment is the top link which will alter the angle of the harrow to the ground.



PC(f) Perform Harrowing For Establishing A Cashew Plantation



Job Task 2: Harrowing

Situation: You are the co-owner on a new small cashew plantation. The first process is to clear the land you want to work on. Your job is to perform mechanical harrowing for establishing a cashew plantation.

Instructions:

1. Select the equipment to mechanically harrow your land.
2. Select the method used to harrow.
3. Harrow the land.
4. You have **1 hour**

Use the checklist to follow the stated steps in mechanical harrowing. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Daily PM Activities	Rate
1. Correct tools were selected for the activity.	
2. Correct methods used to harrow.	
3. The procedure for land harrow is correctly done.	
4. The time limit is adhered to.	

Self-Assessment Task

PC(a) What is harrowing?

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PC(b) Why is harrowing important?

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PC(c) Explain the harrowing methods.

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PC(d) What is the safe ways to use harrowing equipment?

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PC(e) Explain the harrowing procedure.

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