Learner Guide
Primary Agriculture

My name: ..................................................
Company: ..........................................
Commodity: ................................. Date: .................

The availability of this product is due to the financial support of the National Department of Agriculture and the AgriSETA. Terms and conditions apply.
Before we start...

Dear Learner - This Learner Guide contains all the information to acquire all the knowledge and skills leading to the unit standard:

| Title: Developing a harvesting plan for the specific agricultural crop | US No: 116297 | NQF Level: 4 | Credits: 3 |

The full unit standard will be handed to you by your facilitator. Please read the unit standard at your own time. Whilst reading the unit standard, make a note of your questions and aspects that you do not understand, and discuss it with your facilitator.

This unit standard is one of the building blocks in the qualifications listed below. Please mark the qualification you are currently doing:

<table>
<thead>
<tr>
<th>Title</th>
<th>ID Number</th>
<th>NQF Level</th>
<th>Credits</th>
<th>Mark</th>
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</thead>
<tbody>
<tr>
<td>National Certificate in Animal Production</td>
<td>48979</td>
<td>4</td>
<td>120</td>
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<tr>
<td>National Certificate in Plant Production</td>
<td>49009</td>
<td>4</td>
<td>120</td>
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Please mark the learning program you are enrolled in:

Your facilitator should explain the above concepts to you.

This Learner Guide contains all the information, and more, as well as the activities that you will be expected to do during the course of your study. Please keep the activities that you have completed and include it in your **Portfolio of Evidence**. Your PoE will be required during your final assessment.

What is assessment all about?

You will be assessed during the course of your study. This is called *formative assessment*. You will also be assessed on completion of this unit standard. This is called *summative assessment*. Before your assessment, your assessor will discuss the unit standard with you.

Assessment takes place at different intervals of the learning process and includes various activities. Some activities will be done before the commencement of the program whilst others will be done during programme delivery and other after completion of the program.

The assessment experience should be user friendly, transparent and fair. Should you feel that you have been treated unfairly, you have the right to appeal. Please ask your facilitator about the appeals process and make your own notes.
Your activities must be handed in from time to time on request of the facilitator for the following purposes:

- The activities that follow are designed to help you gain the skills, knowledge and attitudes that you need in order to become competent in this learning module.
- It is important that you complete all the activities, as directed in the learner guide and at the time indicated by the facilitator.
- It is important that you ask questions and participate as much as possible in order to play an active role in reaching competence.
- When you have completed all the activities hand this in to the assessor who will mark it and guide you in areas where additional learning might be required.
- You should not move on to the next step in the assessment process until this step is completed, marked and you have received feedback from the assessor.
- Sources of information to complete these activities should be identified by your facilitator.

Please note that all completed activities, tasks and other items on which you were assessed must be kept in good order as it becomes part of your Portfolio of Evidence for final assessment.

Enjoy this learning experience!
How to use this guide …

Throughout this guide, you will come across certain re-occurring “boxes”. These boxes each represent a certain aspect of the learning process, containing information, which would help you with the identification and understanding of these aspects. The following is a list of these boxes and what they represent:

**What does it mean?** Each learning field is characterized by unique terms and definitions – it is important to know and use these terms and definitions correctly. These terms and definitions are highlighted throughout the guide in this manner.

**My Notes …**
You can use this box to jot down questions you might have, words that you do not understand, instructions given by the facilitator or explanations given by the facilitator or any other remarks that will help you to understand the work better.
Developing a harvesting plan for the specific agricultural crop

Primary Agriculture
NQF Level 4
Unit Standard No: 116297

What are we going to learn?

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What will I be able to do?

When you have achieved this unit standard, you will be able to:

- A learner achieving this unit standard will be able to develop, implement and supervise different plans impacting on the harvesting of crops according to the necessary procedures making use of harvesting tools as described in the harvest plan.
- Learners will gain specific knowledge and skills in harvesting processes and will be able to operate in a plant production environment, implementing sustainable and economically viable production principles.
- They will be capacitated to gain access to the mainstream agricultural sector in plant production, impacting directly on the sustainability of the sub-sector. The improvement in production technology will also have a direct impact on the improvement of agricultural productivity of the sector.

Learning Outcomes

At the end of this learning module, you must is able to demonstrate a basic knowledge and understanding of:

- The person is able to demonstrate a basic knowledge of:
  - Principles of harvesting a crop are understood.
  - Names and functions of tools and materials.
  - Safe handling procedures of tools and materials.
  - Different harvesting methods are understood.
  - Elements of maturity indexing are understood.
  - Plant physiology and anatomy.
  - Management of waste and pollution.
  - The occupational health and safety act is understood and can be implemented.
  - Regulatory procedures of the market are understood and can be managed.

What do I need to know?

It is expected of the learner attempting this unit standard to demonstrate competence against the unit standard:

- It is assumed that a learner attempting this unit standard will show competence against the following unit standards or equivalent:
  - NQF 3: Monitor and co-ordinate the harvesting of agricultural crops.
  - NQF 3: Supervise the collection of agricultural data.
  - NQF 3: Explain the planning and scheduling of tasks in a production environment.
  - NQF 4: Implement a food safety and quality management system in the agricultural supply chain.
Aims and Objectives

- **Aims**
  - Identify, plan and obtain tools / equipment for the harvesting of an agricultural enterprise's crop.
  - Develop a maturity-indexing plan and interpret the data.
  - Develop the harvesting plan for the crops according to the maturity indexing data.
  - Develop health, hygiene and safety plans for the harvesting operation and moving the product to the processing point.
  - Develop a plan for the disposal of waste as prescribed by the different rules and regulations and adhering to company policy.
  - Develop a plan for the proper care and maintenance of the equipment used.

- **Objectives**
  - Plans are developed for the use of harvesting equipment to ensure a smooth and problem free harvesting period.
  - Equipment is obtained timely and checked to ensure that it is in good working order.
  - The use of the equipment is demonstrated to ensure that all safety precautions are implemented.
  - All the factors and processes that need to be considered when developing a plan for the use of specific equipment are explained.
  - Such a plan is illustrated and the required record keeping is explained.
  - The importance of a maturity-indexing plan is explained.
  - The factors that would have an influence on the maturity of the crop of the specific agricultural enterprise are identified and discussed.
  - The influence of these factors on the maturity of the crop is explained.
  - The maturity indexing plan and how the data influences the harvesting plan is illustrated and described.
  - Samples are taken and processed.
  - The maturity indexing plan information is recorded and how this could fit in with tracing and tracking of certain post-harvest problems maturity.
  - The different factors that need to be considered when developing a harvesting plan are explained.
The influence of the type of market on the harvesting plan is described.

The visual maturity aspects of the harvesting plan are conveyed to the workers to ensure that the crop is harvested according to the information.

A harvesting plan with the different aspects that fit into each other is developed.

How the process (harvesting plan) is managed and records are kept and processed are explained.

How the harvesting plan incorporates the principles of good agricultural practices (GAP).

The health, hygiene and safety plan and the regulations of the company and how this relates to the different rules and regulations of the market are described.

The plan is implemented to the benefit of the worker and the company.

Health, hygiene and safety checks are included in the plan to ensure that both the worker and product is protected.

Access to facilities such as toilets, wash basins, etc are included in the plan.

The plan and supporting record keeping processes are implemented.

A waste audit is performed to identify all the possible waste produced by the harvesting process.

Waste is classified and collected accordingly.

The plan includes the re-cycling of most of the waste.

How waste is disposed of to adhere to the requirements of the different regulations, such as EUREPGAP and GAP.

Records are kept and what information is recorded and why.

The elements that are needed when a plan is considered are described.

The different procedures that need to be implemented to comply with GAP is explained.

The maintenance plan for all equipment used as a basic component of the care and maintenance plan is developed.

The plan is managed and supporting procedures are implemented to the maintenance plan.

Irregularities are dealt with and recorded.
Session 1

Harvesting crops

After completing this session, you should be able to:
SO 1: Identify, plan and obtain tools / equipment for the harvesting of the crop of the agricultural enterprise

In this session we explore the following concepts:

♦ Harvesting tools
♦ Produce maturity

This session provides a review of background information on harvesting crops

1.1 Harvesting tools

As with any other activity, harvesting can not come about without specific tools and skills. Harvesting tools may be simple; such as only clean hands required for hand picking, or complicated; a combine harvester which requires an operator with specialised training.

Using the correct harvesting tools and techniques will ensure that a crop is not damaged during harvesting and the shelf-life is therefore optimised. These tools and techniques vary from one crop to another, and may even differ within the same crop, depending on the target market to which the produce is aimed at. An emerging farmer may harvest green (not yet ripened) maize cobs for the small street vendor’s market, whilst a commercial farmer may harvest dry (ripened) cobs by using a combine harvester for the maize meal market. Similarly, a citrus farmer will harvest mandarins for the local market using the hand snap picking method, whilst clippers will be use when harvesting mandarin for export purposes, thereby preventing damage to the peel.

The tools required are specific to a crop or crop type and even site specific tools may be required, depending on the circumstances of the farm. It is thus essential that suitable and in good condition tools and equipment are selected for a specific crop in order to guarantee the standard required by a target market.

It is further important that a sufficient quantity of tools and equipment, according to the size of the crop, is made available to that the workers whom are fully trained in the use of this equipment or tools.
Harvest tools and equipment includes every thing that is needed from the moment harvesting have started until it reached the point of sale. These may include; shears, ladders, containers, bins, transport, storage and pack-house facilities.

- **Safe use of tools and equipment.**

  The tools and equipment used during harvest range from simple hand picking tools to specialised high-tech combine harvesters. Supervisors must see that basic safety procedures are followed at all times when harvesting tools are used by TRAINED workers.

  Keep in mind:

  - Tools are usually sharp.
  - Ensure that fingers and other body parts are out of the way during cutting (knife and pruning shear) or lifting (forks).
  - Close pruning shears and secure knifes when not in use
  - Always wear protective clothing prescribed for the tools
  - Always follow the methodology an instructions as set out by the manufacturer
  - Be aware of moving parts when machinery is in use; ensure that clothing do not become entangled
  - Never use a tool or equipment other than what it was designed for.

- **Cleaning Harvesting Tools**

  All equipment must be cleaned and stored in designated storage facilities. The equipment must be kept dry; therefore not on a dirt floor. Harvesting equipment should be stored away from pesticides, pesticide application equipment or fertilisers as it could become contaminated. Tools are cleaned to ensure that post-harvest decay organisms do not come into contact with harvested produce and to increase the life-span of tools and equipment.

  When cleaning harvesting tools the following should be considered:

  - The removal of dirt and plant material adhered to the tools
  - The removal of microscopic particles and disease organisms
  - Sterilization is the elimination of all transmissible agents (such as bacteria, fungi and viruses) from a piece of equipment

- **Report faulty equipment**

  Every farming enterprise develops specific guidelines as how to report and record faulty equipment which occurred during harvesting. It is important to record every aspect of a problem, especially when it can lead to serious losses. It is important that one always follow the required occupational health and safety rules as set out in the OHS act as well as all company or industry specific guidelines and procedures.
1.2 Produce maturity

■ Maturity indexes

Before a crop is harvested, one must determine whether the crop is matured (ready to be harvested) by means of maturity indexing. Maturity indexing is the process of monitoring the physiological development of the crop as it ripens. The basic parameters that are assessed and monitored during maturity indexing are parameters such as internal quality parameters, fruit colour, water content etc... Various industries have their own specific guidelines and procedures for determining maturity. These are available from growers' associations, retailers and exporters, and should be available on farm for use by harvest personnel.

■ Sampling for maturity indexing

Sampling is a process of gathering individual fruit from randomly selected trees in an orchard or from a number of plants within a field. In some cases a visual assessment of maturity is done without having to sample the produce. The idea is that the condition of the sampled fruit is representative of the field or orchards as a whole. The sampling procedure is designed to ensure that samples are in fact statistically representative of the field. Even if fruit is not used, it must still represent the field as a whole.

Harvest readiness does not necessarily mean that the fruit is mature or ripe. Different crops are harvested at different stages of development. Baby vegetables, for example, are harvested at a young stage, mostly before the crop is mature. Vegetables (carrots, beetroot and lettuce) are harvested when it reached a specific size as required by the market or consumer.

The sampling approach is similar to the sampling for nutrient analyses or for pest and disease management. Although the procedures are crop or even site specific, the general rule should be; the initial selection of produce and sampled plants must represent the field/orchard as a whole.
Please complete Activity 1: **Review the harvesting techniques and equipment.**

In this section you will review the harvesting techniques used for the crop farmed at your place of work.

1. Using all sources of information available to you, determine all the techniques and equipment used in harvesting the crop produced at your place of work.
   - Learners are to search for all potential techniques that can be used for their specific crop, including those not used on the farm.
   - Need to determine the potential effects that the harvest technique may have on the quality of crop.
   - Compare aspects such as time of harvesting and its relation to harvest techniques in use. (Some techniques only allow harvest at a certain degree of ripeness.)

2. Now determine the specific techniques used on farm and motivate why these are used rather than other alternatives generally used for the specific crop.
   - Learners are to determine and motivate the techniques used at their place of work.
   - Look at aspects such as volume delivery, quality considerations and on farm logistics.

3. Determine the market requirements of the harvested crop
   - Learners are to determine the on farm market requirements.
   - Learners are to determine the main quality groups of their crop should there be more than one major client.
   - Identify at least 2 groups and identify their target clients. (Learners must include the export produce as one of the main clients.)
   - Learners must determine the clients that receive the harvested produce
   - Learners must determine the different product requirements and volumes of the crops that are delivered to the various clients.

4. Determine the specific procedures followed to facilitate the harvested produce to reach the client in the condition they required.
   - Learners are to determine the specific procedures for each of the main quality requirements
   - Learners are to trace the process from the point of picking/cutting/ etc, up to the point of delivery to the client
   - Learners are to identify the various locations that the harvested crop is transported to
   - Learners are to determine the harvest volumes as required for each of the main quality groups
   - Learners are to determine the optimal volumes that should be delivered to the pack-houses

5. Determine the volume a picker / harvester can harvest per time interval (this is usually a volume per day).
   - Learners are to approach this for both major quality groups (export and local market quality)
   - Identify whether there is a significant difference in harvested volumes between the two main quality groups. In some cases the higher quality crop will require more time, thus influencing the volume per harvester which will be lower for the higher quality crop.

6. Determine the number of labour units required to reach the target volumes.
   - Learners are to calculate the number of harvesters required to reach the target volumes for each of the harvest groups. This calculation is normally done on a per day basis.
• It is also important to calculate the labour units over the harvest period as a whole as this will differ from crop to crop. For some crops this may be a short period; a few days or weeks. (e.g. Tomatoes with a determinately growing season; this will be a two week period at the end of the growth period and the entire crop will be harvested at once. Tomatoes with an indeterminately growing season; this will be a longer, almost indefinite period and will therefore be easier to work on the volumes per day.)

7. Determine the equipment quantity required for the harvest.
• The quantity of each tool or pieces of equipment is identified and calculated, using data gained from step 6 to do this calculation.

8. Determine the ideal harvesting time to ensure that both quality and volume requirements are met. (Learners must record all the information gathered as it necessary to allow completion of the next activities.)

<table>
<thead>
<tr>
<th>Concept (SO 1)</th>
<th>I understand this concept</th>
<th>Questions that I still would like to ask</th>
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My Notes ...

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Session 2

Developing a harvest plan and its components

After completing this session, you should be able to:

SO 1: Identify, plan and obtain tools / equipment for the harvesting of the crop of the agricultural enterprise.

SO 2: Develop a maturity-indexing plan and interpret the data.

SO 3: Develop the harvesting plan for the crops according to the maturity indexing data.

SO 4: Develop health, hygiene and safety plans, for the harvesting operation and moving the product to the processing point.

SO 5: Develop the plan for the disposal of waste as prescribed by the different rules and regulations and adhering to company policy.

SO 6: Develop a plan for the proper care and maintenance of the equipment used.

In this session we explore the following concepts:

- The equipment plan
- Labour plan
- Maturity indexing plan
- Health and safety plan
- Waste management plan

2.1 Introduction

To compile a harvest plan, the editor must be acquainted with the harvest techniques and must have the knowledge regarding the different phases during the harvest process. These phases will either become a component of the plan, or it will be integrated into a component of the plan. It is therefore critical that the relevant information gathered is accurate and correct.
The harvesting process is summarised in the diagram below.

The preparation phase includes: deciding on the harvest technique; which tools are required; the sourcing and checking of equipment; sourcing and training of labourers; etc...

The harvest phase is now implemented and which involve the picking of fruit, the cutting of cabbages etc... The produce is placed into intermediate storage, transported to a pack-house where it is processed and packed for final shipment.

The extent of processing and treatment that take place in the pack-house dependents on the crop and the market it is destined for. This could also differ from one site to the other.

The harvest plan should take all these aspects into account as well as timing related issues. It is important that the harvest plan is developed and ready for implementation well in advance of the actual harvest commencing.
# 2.2 The equipment plan

The equipment plan is the most crucial component of a harvest plan as it controls and schedules the use of equipment as well as the training of personnel in the use and maintenance thereof.

The required process is set out in the diagram below.

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<thead>
<tr>
<th>Determine Market Requirement</th>
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<tr>
<td>Determine Suitable Equipment Type</td>
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<td>Determine Numbers Required</td>
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<td>Determine Locations where Equipment is required</td>
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<tr>
<td>Implementation Plan</td>
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<tr>
<td>Procure Equipment</td>
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<tr>
<td>Determine Equipment Effectiveness</td>
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<tr>
<td>Training</td>
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<tr>
<td>Harvest</td>
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Compiling an equipment plan involves the gathering of relevant information on the expected harvest. Remember to include the relevant safety issues and precautionary safety measures.

- **Determining Equipment needed**

  The method of harvesting will determine the equipment and tools required as the quality of end product is influenced by the way in which a product is harvested. Only now an equipment plan can be compiled. The quality requirements can also determine how long the harvested crop can be kept in the field and the type of equipment that the crop can be stored in.

- **Determine the equipment quantity required**

  The quantity of tools or pieces of equipment needed depends on the number of harvesters that are required. The number of harvesters is determined by: The volume of a product required by your client and the volume that a single harvester
can harvest per day (using the tools and techniques you have selected for harvesting).

- Determine the locations where tools and equipment is required

After you have decided on the harvesting technique and determined the quantity tools and equipment required, you need to establish the logistics regarding the locations.

*Fields and personnel* - You need to know where the fields are located in relation to the housing of the harvesters. This will enable you to determine the transport you require to move the personnel and their equipment to the fields.

*Fields to pack-houses* - the distance and condition of the roads from the field to the pack-houses will indicate: the number of trips - thus quantity vehicles needed; the speed at which the crop can physically be transported; the volume of produce that can be loaded at one time; the type of containers that can be used.

- Compiling an implementation plan

Compiling an implementation plan involves the supplying of tools, equipment and labourers at the different sites as well as the time factor - when are these needed - and of course the transport.

- Planning procurement

If it is necessary to replenish tools or equipment, place your order in good time to ensure that delivery will be in time before harvesting commences. You will have to take into account the elapse of time between equipment being ordered and it being delivered.

- Equipment check and maintenance

All (old and new) the tools and equipment required for harvesting must be checked in advance, allowing time to repair faults.
Please complete Activity 2.

**Group Activity** - Groups not exceeding 3 learners

Using the information gathered during activity 1, develop a harvest equipment plan for the major crop grown at your place of work. The plan should be aimed at fulfilling the requirements of the major clients.

Ensure that you address the following when developing the plan:

- Market requirements relevant to the main target market.
- The equipment selection that will allow harvested crop to meet these requirements.
- Identification of all the equipment needed; the specific locations where it is required; the physical positioning of every site; and the ideal placement of equipment at each site.
- The quantity of equipment required, taking into account the volumes to be delivered and the numbers of labourers required.
- An implementation plan is designed that provides time lines on how and when the harvest plan is to be implemented.
- Details on when, how and from what sources equipment is procured.
- Which equipment checks are to be performed and the procedures in case equipment do not meet requirements.

**Assessment:**

Learners are to construct a harvest equipment plan, using the relevant information gathered for the major crop that is harvested at their place of work.

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**My Notes ...**
### 2.3 Labour plan

In order to compile a labour plan, you need to know where, for how long and when these labourers will be needed. The diagram below provides a simplified version of the process required.

1. **Determine Major Tasks**
2. **Determine Harvest Volumes**
3. **Determine Numbers of Personnel per Task required**
4. **Determine Locations where Personnel are Required**
5. **Procure**
6. **Training and Testing**
7. **Harvest**

You also need to plan for unforeseen events, accidents or risks such as:

- What happens if the harvest is early or if it has to be postponed?
- What happens if the harvest carries on for longer than planned?
- Are the personnel to be paid per day or per volume of actual harvested produce and how could this influence your plans?
- What happens if personnel are hurt or become ill?
- What happens if for some reason harvesting cannot continue for a specific period of time? Do you use the labour for other tasks?
- Can temporary contract labourers perform similar activities at other locations?
- Can temporary contract labourers be used to perform other activities?
- If you use on-site personnel, what other tasks do they have to perform and how could this influence your harvest plan?

These possibilities will influence your former planning and therefore you need to make provision for alternatives.
**Personnel recruitment plan**

As part of the equipment plan, you needed to identify all the phases and major tasks that are to be performed during harvest. You also determined the number of labour units required which was influenced by the volume of the harvest.

Keep in mind that some personnel can perform shared tasks. These tasks are not performed at the same time, but at the same location. For example, a harvester can empty his own picking basket into the transport trailer in stead of appointing a labourer to do it. On the other hand, a tractor driver should not perform shared tasks.

**Personnel Training Plan**

Once you determined the number of labourers needed for each phase during the harvest process at each location and the job they are to perform, you need to procure the personnel. There should be records of previous personnel procurement conducted on the farm. Use these to identify relevant labour for the different jobs. In this way you could procure individuals experienced in a specific field. These are especially important for specialised jobs such as tractor drivers and combine operators.

You will have to plan for sufficient time to ensure that the labourers are well trained. Also allow extra time to put these labourers through a test to see if they are capable to perform the jobs they are trained for – can they manage the identification of the crop quality requirements, application harvest procedures correctly, apply hygiene and health measures, what about safety measures etc.

Your plan should allow for time to train, evaluate and retrain them if necessary. You should, where possible, employ people with previous experience for specific tasks in which they gained confidence as they will need minimal training.

Keep in mind that not all personnel require to be trained fully in all aspects of harvesting. The tractor driver for example does not have to know the quality criteria of the crop, but he must be able to drive a tractor, operate the trailer and he must be aware of the driving conditions he should adhere to. He must also be concerned of the areas where he is allowed to park the trailers in the field and the off-loading areas at the pack-house. The tractor driver should also be aware of the rules regarding produce handling in the pack-house.

An important part of your plan is to keep record of the process and steps taken. Implement a record keeping process which includes the wages negotiated, tasks delegated, training provided and all evaluation information.

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Please complete **Activity 3**.

**Group Activity** - Groups not exceeding 3 learners

Develop a Labour plan for harvesting the major crop grown at your place of work. The plan should be aimed at fulfilling the requirements of the major clients.

Pay special attention to risk and risk management surrounding the labour issues, procurement and training.

**Assessment:**

Learners are to develop a labour plan for harvesting of the major crop grown at their place of work.
2.4 Maturity indexing plan

Maturity index for local markets will differ from produce destined for overseas markets.

The steps involved in maturity indexing are shown in the diagram:

By the time you reached this stage, you will be acquainted with the quality requirements for your crop. You will also have an indication of when the harvest is most likely to start. You now have to plan the timing and logistics for maturity indexing.

To compile a maturity indexing plan, you need to decide:

- Who will conduct the maturity indexing?
- How often should this happen?
- How many indexing people will be needed?
- Are they fully trained in indexing?

In most cases the personnel involved in indexing tend to be permanent employees and maturity indexing is part of their job description. It is important that you plan to involve these people in the training of harvesters as they will be able to demonstrate the maturity criteria to inexperienced harvesters.

Please complete Activity 4.

**Group Activity** - Groups not exceeding 3 learners

Develop a Maturity Indexing Plan to determine when the crop at your place of work is ready for harvest.

Take into account:

- Quality requirements for the major client (target market)
- Timing requirements and volumes required by the main client (target market)
- Identification of specific individuals to conduct the indexing
- Time lines and locations of all relevant fields or orchards
- Risk management plan that takes all relevant risks into account
2.5 Health and safety plan

A Health and Safety plan is developed to ensure the health, welfare and safety of all personnel working on a farm. Hygiene procedures required during harvest is integrated into the H & S plan. This plan will normally also provide for the health and safety of the consumer of the harvested product.

The issues that have to be considered include:

♦ Planning for safety: personnel should be trained in the correct use of personal protective wear, equipment and procedures within facilities.

♦ Accident handling: This is an emergency plan which prescribes the procedures to follow when a minor accident or injury occurs and how these should be handled. An evacuation and/or emergency plan needs to be developed for any injury that cannot be handled on site. The plan should clearly define the circumstances under which evacuation may be required. It should also define the situations which can be handled on site.

♦ Hygiene. Hygiene instructions and procedures not only protect the consumer but also include post harvest treatments and define personal hygiene. As an integral part of this plan aspects such as the number and location of toilets and basins required in the field are prescribed. This plan also prescribes the volumes of detergent, soap and disposable gloves.

♦ Labour training. The H & S plan should detail the training schedule to all personnel prior to the commencing of harvest.

Please complete Activity 5.

**Group Activity** - Groups not exceeding 3 learners

Develop a Health, safety and hygiene plan for the major crop produced at your place of work. Use the harvest specification and requirements for the crop and client used in Activity 3.

Ensure that you take into account:

- On farm health and safety procedures and plans
- Accident and emergency procedures
- Procedures that could be put in place to avoid accidents
- Hygiene logistics requirements – i.e. when, where and how many facilities and equipment required.
- Suitable safety wear and equipment is sourced and identified.
- The labour training schedule fits into existing training plans.
2.6 Waste management plan

A waste management plan is compiled which enables all personnel to identify the different types of waste, what to do with the different types of waste and where, when and how it should be disposed of.

The waste plan should take into account:

- The type of waste expected
- How the waste can be segregated
- Where the waste can be expected
- When is it expected
- The volume that should be expected
- The procedures in handling the waste; what should be done with the different streams of waste, where is it to be taken to, how it should be transported, is intermediate storage required and the rate at which the waste is generated.
- The plan must identify the personnel responsible for waste management and identify the tasks and responsibilities of individual team members.
- Any training that may be required must also be planned.

Please complete Activity 6.

**Group Activity** - Groups not exceeding 3 learners
Develop a waste management plan for use on the crop identified in Activity 2.
Ensure that you take into account:

- The type of waste expected
- Waste segregation
- Site of waste build up
- Timing and volume of waste expected
- Responsibilities, procedures and logistics for personnel handling waste.
- Any training that may be required must also be planned.
Please complete Activity 7.

**Group Activity** - Groups no larger than 3 learners

By using the information and plans developed in activity 1 - 6; compile a harvest plan that will enable the farm to meet the criteria set out below:

- Crop Quality to meet with that of the major markets
- Produce delivery within specified market requirement
- Overall harvest period available is known
- Labour training requirement can be met
- Risks are identified and a management plan is in place
- Record keeping in planned - relevant forms is designed and responsibilities are assigned.
- Harvest logistics are planned
- Harvest techniques are identified
- Storage identified and planned
- Equipment and labour plan is in place
- Labour training is in place.
- Health and Safety plan is in place
- Procedures are in place for handling minor and major accidents
- The required hygiene practices
- Maturity indexing plan in place
- Waste management plan in place
- Training requirement are in place.
### Developing a harvesting plan for the specific agricultural crop

#### Primary Agriculture

**NQF Level 4**

**Unit Standard No:** 116297

**Version:** 01  **Version Date:** July 2006

<table>
<thead>
<tr>
<th>Concept (SO 1)</th>
<th>I understand this concept</th>
<th>Questions that I still would like to ask</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plans are developed for the use of harvesting equipment to ensure a smooth and problem free harvesting period.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment is obtained timely and checked to ensure that it is in good working order.</td>
<td></td>
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<tr>
<td>The use of the equipment is demonstrated to ensure that all safety precautions are implemented.</td>
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</tr>
<tr>
<td>All the factors and processes that need to be considered when developing a plan for the use of specific equipment are explained.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Such a plan is illustrated and what record keeping is involved is explained.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Concept (SO 2)</th>
<th>I understand this concept</th>
<th>Questions that I still would like to ask</th>
</tr>
</thead>
<tbody>
<tr>
<td>The importance of a maturity-indexing plan is explained.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The factors that would have an influence on the maturity of the crop of the specific agricultural enterprise are identified and discussed.</td>
<td></td>
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</tr>
<tr>
<td>The influence of these factors on the maturity of the crop is explained.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The maturity indexing plan and how the data influences the harvesting plan is illustrated and described.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Samples are taken and processed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The maturity indexing plan information is recorded and how this could fit in with tracing and tracking of certain post-harvest problems maturity.</td>
<td></td>
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</tr>
</tbody>
</table>
### Concept (SO 3)

<table>
<thead>
<tr>
<th>Explain the different factors that need to be considered when developing a harvesting plan.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The influence of the type of market on the harvesting plan is described.</td>
</tr>
<tr>
<td>The visual maturity aspects of the harvesting plan are conveyed to the workers to ensure that the crop is harvested according to the information.</td>
</tr>
<tr>
<td>A harvesting plan with the different aspects fit into each other, is developed.</td>
</tr>
<tr>
<td>The process (harvesting plan) is managed and records are kept and processed.</td>
</tr>
<tr>
<td>The harvesting plan incorporates the principles of good agricultural practices (GAP).</td>
</tr>
</tbody>
</table>

### Concept (SO 4)

<table>
<thead>
<tr>
<th>The health, hygiene and safety plan and the regulations of the company and how this relates to the different rules and regulations of the market are described.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The plan is implemented to the benefit of the worker and the company.</td>
</tr>
<tr>
<td>Health, hygiene and safety checks are included in the plan to ensure that both the worker and product is protected.</td>
</tr>
<tr>
<td>Access to facilities such as toilets, wash basins etc are included in the plan.</td>
</tr>
<tr>
<td>The plan and supporting record keeping processes are implemented.</td>
</tr>
<tr>
<td>Concept (SO 5)</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>A waste audit is performed to identify all the possible waste produced by the harvesting process.</td>
</tr>
<tr>
<td>Waste is classified and collected accordingly.</td>
</tr>
<tr>
<td>The plan includes the re-cycling of most of the waste.</td>
</tr>
<tr>
<td>Waste is disposed of to adhere to the requirements of the different regulations, such as EUREPGAP and GAP.</td>
</tr>
<tr>
<td>Records are kept and what information is recorded and why.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concept (SO 6)</th>
<th>I understand this concept</th>
<th>Questions that I still would like to ask</th>
</tr>
</thead>
<tbody>
<tr>
<td>The elements the plan needs to consider are described.</td>
<td></td>
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</tr>
<tr>
<td>The different procedures that need to be implemented to comply with GAP is explained.</td>
<td></td>
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</tr>
<tr>
<td>The maintenance plan for all equipment used as a basic component of the care and maintenance plan is developed.</td>
<td></td>
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<tr>
<td>The plan is managed and supporting procedures are implemented to the maintenance plan.</td>
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<td></td>
</tr>
<tr>
<td>Irregularities are dealt with and recorded.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Am I ready for my test?

- Check your plan carefully to make sure that you **prepare in good time**.
- You have to be found **competent** by a qualified **assessor** to be declared competent.
- Inform the assessor if you have any **special needs** or requirements **before** the agreed date for the test to be completed. You might, for example, require an interpreter to translate the questions to your mother tongue, or you might need to take this test orally.
- Use this worksheet to help you prepare for the test. These are **examples** of **possible questions** that might appear in the test. All the information you need was taught in the classroom and can be found in the learner guide that you received.

1. **I am sure** of this and understand it well
2. **I am unsure** of this and need to ask the Facilitator or Assessor to explain what it means

<table>
<thead>
<tr>
<th>Questions</th>
<th>1. I am sure</th>
<th>2. I am unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What are the market quality requirements for the main crop grown at your place of work?</td>
<td></td>
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</tr>
<tr>
<td>2. What is major market for the crops grown at your place of work?</td>
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<tr>
<td>3. Describe the harvest techniques required to fulfil market requirement?</td>
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<tr>
<td>4. What volume or mass of crop can be harvested safely within a day?</td>
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<tr>
<td>5. What tools are typically used during harvest? Describe their use.</td>
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<tr>
<td>6. Describe the harvest process followed at your place of work?</td>
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<tr>
<td>7. What are the major risks associated with the harvest?</td>
<td></td>
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</tr>
<tr>
<td>8. Describe the maturity indexing systems used on farm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. What are the quality criteria measured by the maturity index and why should this be determined?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. How is the maturity of the crop influenced by environmental effects?</td>
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</tr>
</tbody>
</table>
### 11. Explain the different factors that need to be considered when developing a harvesting plan.

### 12. Discuss the GAP for the crop produced at your place of work.

### 13. Discuss the health, hygiene and safety plan for the farm in relation to harvest.

### 14. Discuss the waste handling plan for the farm in relation to harvest.

---

### My Notes ...

...
Checklist for practical assessment ...

Use the checklist below to help you prepare for the part of the practical assessment when you are observed on the attitudes and attributes that you need to have to be found competent for this learning module.

<table>
<thead>
<tr>
<th>Observations</th>
<th>Answer Yes or No</th>
<th>Motivate your Answer (Give examples, reasons, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can you identify problems and deficiencies correctly?</td>
<td></td>
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</tr>
<tr>
<td>Are you able to work well in a team?</td>
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<tr>
<td>Do you work in an organised and systematic way while performing all tasks and tests?</td>
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</tr>
<tr>
<td>Are you able to collect the correct and appropriate information and / or samples as per the instructions and procedures that you were taught?</td>
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</tr>
<tr>
<td>Are you able to communicate your knowledge orally and in writing, in such a way that you show what knowledge you have gained?</td>
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</tr>
<tr>
<td>Can you base your tasks and answers on scientific knowledge that you have learnt?</td>
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</tr>
<tr>
<td>Are you able to show and perform the tasks required correctly?</td>
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</tr>
<tr>
<td>Are you able to link the knowledge, skills and attitudes that you have learnt in this module of learning to specific duties in your job or in the community where you live?</td>
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</tbody>
</table>

- The assessor will complete a checklist that gives details of the points that are checked and assessed by the assessor.
- The assessor will write commentary and feedback on that checklist. They will discuss all commentary and feedback with you.
- You will be asked to give your own feedback and to sign this document.
- It will be placed together with this completed guide in a file as part of you portfolio of evidence.
- The assessor will give you feedback on the test and guide you if there are areas in which you still need further development.
Paperwork to be done …
Please assist the assessor by filling in this form and then sign as instructed.

<table>
<thead>
<tr>
<th>Learner Information Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Standard</td>
</tr>
<tr>
<td>Program Date(s)</td>
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<td>Assessment Date(s)</td>
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<tr>
<td>Surname</td>
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<tr>
<td>First Name</td>
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<tr>
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<td>Job / Role Title</td>
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<td>Home Language</td>
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<tr>
<td>Contact Telephone Numbers</td>
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<tr>
<td>Email Address</td>
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<tr>
<td>Postal Address</td>
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</tbody>
</table>
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- **Design:**
  Didacsa Design SA (Pty) Ltd

- **Layout:**
  Ms A du Plessis
Develop a harvesting plan for the specific agricultural crop

SAQA US ID  | UNIT STANDARD TITLE
116297     | Develop a harvesting plan for the specific agricultural crop

SGB NAME   | NSB NAME
SGB Primary Agriculture | NSB 01-Agriculture and Nature Conservation

FIELD      | SUBFIELD
Agriculture and Nature Conservation | Primary Agriculture

ABET BAND  | UNIT STANDARD TYPE | NQF LEVEL | CREDITS
Undefined   | Regular             | Level 4   | 3

REGISTRATION STATUS | REGISTRATION START DATE | REGISTRATION END DATE | SAQA DECISION NUMBER
Registered     | 2004-10-13            | 2007-10-13            | SAQA 0156/04

PURPOSE OF THE UNIT STANDARD

A learner achieving this unit standard will be able to develop, implement and supervise different plans impacting on the harvesting of crops according to the necessary procedures making use of harvesting tools as described in the harvest plan.

Learners will gain specific knowledge and skills in harvesting processes and will be able to operate in a plant production environment implementing sustainable and economically viable production principles.

They will be capacitated to gain access to the mainstream agricultural sector, in plant production, impacting directly on the sustainability of the sub-sector. The improvement in production technology will also have a direct impact on the improvement of agricultural productivity of the sector.

LEARNING ASSUMED TO BE IN PLACE AND RECOGNITION OF PRIOR LEARNING

It is assumed that a learner attempting this unit standard will show competence against the following unit standards or equivalent:

- NQF 3: Monitor and co-ordinate the harvesting of agricultural crops.
- NQF 3: Supervise the collection of agricultural data.
- NQF 3: Explain the planning and scheduling of tasks in a production environment.
- NQF 4: Implement a food safety and quality management system in the agricultural supply chain.

UNIT STANDARD RANGE

Whilst range statements have been defined generically to include as wide a set of alternatives as possible, all range statements should be interpreted within the specific context of application.

Range statements are neither comprehensive nor necessarily appropriate to all contexts. Alternatives must
however be comparable in scope and complexity. These are only as a general guide to scope and complexity of what is required.

**UNIT STANDARD OUTCOME HEADER**

**N/A**

**Specific Outcomes and Assessment Criteria:**

**SPECIFIC OUTCOME 1**

*Identify, plan and obtain tools / equipment for the harvesting of the crop of the agricultural enterprise.*

**OUTCOME RANGE**

Harvesting methods according to specific production context include, but are not limited to harvesting by hand, machine harvesting, etc. Planning and obtaining the tools include but are not limited to hiring of and collecting large harvesting equipment where appropriate.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**

Plans are developed for the use of harvesting equipment to ensure a smooth and problem free harvesting period.

**ASSESSMENT CRITERION RANGE**

Tools, according to specific production context include, but are not limited to hands, trays, crates, picking bags, shears, ladders, etc.

**ASSESSMENT CRITERION 2**

Equipment is obtained timely and checked to ensure that it is in good working order.

**ASSESSMENT CRITERION 3**

The use of the equipment is demonstrated to ensure that all safety precautions are implemented.

**ASSESSMENT CRITERION 4**

All the factors and processes that need to be considered when developing a plan for the use of specific equipment are explained.

**ASSESSMENT CRITERION 5**

Such a plan is illustrated and what record keeping is involved is explained.

**SPECIFIC OUTCOME 2**

*Develop a maturity-indexing plan and interpret the data.*

**OUTCOME RANGE**

Maturity indexing may include, but is not limited to, withholding period, stage of growth of crop, sugar levels, size, color, texture, ratios of one chemical versus another, level of ethylene production, etc.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**

The importance of a maturity-indexing plan is explained.

**ASSESSMENT CRITERION 2**

The factors that would have an influence on the maturity of the crop of the specific agricultural enterprise are identified and discussed.
**ASSESSMENT CRITERION 3**
The influence of these factors on the maturity of the crop is explained.

**ASSESSMENT CRITERION 4**
The maturity indexing plan and how the data influences the harvesting plan is illustrated and described.

**ASSESSMENT CRITERION 5**
Samples are taken and processed.

**ASSESSMENT CRITERION 6**
The maturity indexing plan information is recorded and how this could fit in with tracing and tracking of certain post-harvest problems maturity.

**SPECIFIC OUTCOME 3**
Develop the harvesting plan for the crops according to the maturity indexing data.

**OUTCOME RANGE**
Harvesting plan could include but is not limited to harvesting method, time of day to harvest, date for harvesting to start, which area to start with, sugar levels, starch levels, colour etc.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**
Explain the different factors that need to be considered when developing a harvesting plan.

**ASSESSMENT CRITERION RANGE**
Factors include but are not limited to weather, withholding periods, sugar levels, number of people needed etc.

**ASSESSMENT CRITERION 2**
The influence of the type of market on the harvesting plan is described.

**ASSESSMENT CRITERION 3**
The visual maturity aspects of the harvesting plan are conveyed to the workers to ensure that the crop is harvested according to the information.

**ASSESSMENT CRITERION 4**
A harvesting plan with the different aspects fit into each other, is developed.

**ASSESSMENT CRITERION 5**
The process (harvesting plan) is managed and records are kept and processed.

**ASSESSMENT CRITERION 6**
The harvesting plan incorporates the principles of good agricultural practices (GAP).

**SPECIFIC OUTCOME 4**
Develop health, hygiene and safety plans, for the harvesting operation and moving the product to the processing point.

**OUTCOME RANGE**
Health hygiene and safety plan includes but is not limited to ensuring that specific health, hygiene and safety procedures are complied with as stipulated by the OHSA, GAP and others.
ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1
The health, hygiene and safety plan and the regulations of the company and how this relates to the different rules and regulations of the market are described.

ASSESSMENT CRITERION 2
The plan is implemented to the benefit of the worker and the company.

ASSESSMENT CRITERION 3
Health, hygiene and safety checks are included in the plan to ensure that both the worker and product is protected.

ASSESSMENT CRITERION 4
Access to facilities such as toilets, wash basins etc are included in the plan.

ASSESSMENT CRITERION 5
The plan and supporting record keeping processes are implemented.

SPECIFIC OUTCOME 5
Develop the plan for the disposal of waste as prescribed by the different rules and regulations and adhering to company policy.

OUTCOME RANGE
Waste includes but is not limited to bio-degradable materials (including parts of plants, fruit, flowers, etc.) and non bio-degradable materials (plastics, glass, metals, etc.) A waste collection and disposal plan could include but is not limited to evaluating what can be recycled, how and where and what must be dumped, where and how.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1
A waste audit is performed to identify all the possible waste produced by the harvesting process.

ASSESSMENT CRITERION 2
Waste is classified and collected accordingly.

ASSESSMENT CRITERION 3
The plan includes the re-cycling of most of the waste.

ASSESSMENT CRITERION 4
Waste is disposed of to adhere to the requirements of the different regulations, such as EUREPGAP and GAP.

ASSESSMENT CRITERION 5
Records are kept and what information is recorded and why.

SPECIFIC OUTCOME 6
Develop a plan for the proper care and maintenance of the equipment used.

OUTCOME RANGE
Care and maintenance include but are not limited to the cleaning, repairing sanitizing and storage of the equipment etc according to GAP.
**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**
The elements the plan needs to consider are described.

**ASSESSMENT CRITERION 2**
The different procedures that need to be implemented to comply with GAP is explained.

**ASSESSMENT CRITERION 3**
The maintenance plan for all equipment used as a basic component of the care and maintenance plan is developed.

**ASSESSMENT CRITERION 4**
The plan is managed and supporting procedures are implemented to the maintenance plan.

**ASSESSMENT CRITERION 5**
Irregularities are dealt with and recorded.

**UNIT STANDARD ACCREDITATION AND MODERATION OPTIONS**
The assessment of qualifying learners against this standard should meet the requirements of established assessment principles.

It will be necessary to develop assessment activities and tools, which are appropriate to the contexts in which the qualifying learners are working. These activities and tools may include an appropriate combination of self-assessment and peer assessment, formative and summative assessment, portfolios and observations etc.

The assessment should ensure that all the specific outcomes; critical cross-field outcomes and essential embedded knowledge are assessed.

The specific outcomes must be assessed through observation of performance. Supporting evidence should be used to prove competence of specific outcomes only when they are not clearly seen in the actual performance.

Essential embedded knowledge must be assessed in its own right, through oral or written evidence and cannot be assessed only by being observed.

The specific outcomes and essential embedded knowledge must be assessed in relation to each other. If a qualifying learner is able to explain the essential embedded knowledge but is unable to perform the specific outcomes, they should not be assessed as competent. Similarly, if a qualifying learner is able to perform the specific outcomes but is unable to explain or justify their performance in terms of the essential embedded knowledge, then they should not be assessed as competent.

Evidence of the specified critical cross-field outcomes should be found both in performance and in the essential embedded knowledge.

Performance of specific outcomes must actively affirm target groups of qualifying learners, not unfairly discriminate against them. Qualifying learners should be able to justify their performance in terms of these values.

- Anyone assessing a learner against this unit standard must be registered as an assessor with the relevant ETQA.
- Any institution offering learning that will enable achievement of this unit standard or assessing this unit standard must be accredited as a provider with the relevant ETQA.
- Moderation of assessment will be overseen by the relevant ETQA according to the moderation guidelines in the relevant qualification and the agreed ETQA procedures.
UNIT STANDARD ESSENTIAL EMBEDDED KNOWLEDGE

The person is able to demonstrate a basic knowledge of:

- Principles of harvesting a crop are understood.
- Names and functions of tools and materials.
- Safe handling procedures of tools and materials.
- Different harvesting methods are understood.
- Elements of maturity indexing are understood.
- Plant physiology and anatomy.
- Management of waste and pollution.
- The occupational health and safety act is understood and can be implemented.
- Regulatory procedures of the market are understood and can be managed.

UNIT STANDARD DEVELOPMENTAL OUTCOME

N/A

UNIT STANDARD LINKAGES

N/A

Critical Cross-field Outcomes (CCFO):

UNIT STANDARD CCFO IDENTIFYING

Problem Solving: Relates to all specific outcomes.

UNIT STANDARD CCFO WORKING

Teamwork: Relates to all specific outcomes.

UNIT STANDARD CCFO ORGANIZING

Self Management: Relates to all specific outcomes.

UNIT STANDARD CCFO COLLECTING

Information interpretation: Relates to all specific outcomes.

UNIT STANDARD CCFO COMMUNICATING

Communication: Relates to all specific outcomes.

UNIT STANDARD CCFO SCIENCE

Use science and technology: Relates to all specific outcomes.

UNIT STANDARD CCFO DEMONSTRATING

Inter-relatedness of Systems: Relates to all specific outcomes.

UNIT STANDARD CCFO CONTRIBUTING

Self-development: Relates to all specific outcomes.

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