Establish a maintenance plan

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

**Title:** Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure  
**US No:** 116290  
**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:

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<thead>
<tr>
<th>Title</th>
<th>ID Number</th>
<th>NQF Level</th>
<th>Credits</th>
<th>Mark</th>
</tr>
</thead>
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<td>National Certificate in Plant Production</td>
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</tbody>
</table>

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.

♦ Your facilitator should identify sources of information to complete these activities.

♦ **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.

ACTIVITY

You will be requested to complete activities, which could be group activities, or individual activities. Please remember to complete the activities, as the facilitator will assess it and these will become part of your portfolio of evidence. Activities, whether group or individual activities, will be described in this box.

Examples of certain concepts or principles to help you contextualise them easier, will be shown in this box.

How am I doing?

The following box indicates a summary of concepts that we have covered, and offers you an opportunity to ask questions to your facilitator if you are still feeling unsure of the concepts listed.

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.

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What will I be able to do?

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

♦ Design, prepare and implement basic operational procedures for the cleaning, storage and proper maintenance of equipment, implements and infrastructure.

♦ Monitor the safe use of equipment, technology, infrastructure and implements.

♦ Be fully conversant with agricultural regulations and aspects of safety as to provide the environment for the application of quality practices and thus strengthen agricultural practices in general.

♦ Develop a basic task related work program related to the scheduling and allocation of equipment and implements.

♦ Prepare and implement basic operational procedures for the cleaning, storage and proper maintenance of equipment, implements and infrastructure.

♦ Recognise, identify and solve problems related to the use of implements and equipment in an agricultural environment.

♦ Draw up plans to ensure that safety regulations are implemented as prescribed for the use of implements, agro-chemicals and equipment.

♦ Adapt equipment, implements and technology to suit different agricultural situations and processes.

Learning Outcomes

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

♦ Basic scheduling and work flow.

♦ Operational procedures.

♦ The safe handling of tools and equipment.

♦ The NOHSA Act and how it applies in the agricultural sector.

♦ The principles of safety precautions.

♦ Determining damaged and faulty equipment.

♦ The use and adaptation of tools, equipment and machinery in different combinations.

♦ Teamwork and communication.
Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure

- Work program development.
- Identification and resolving problems related to a work program.
- The benefits of a well prepared work plan.
- Personnel management.

What do I need to know?

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

- NQF 3: Apply routine maintenance and servicing plans and procedures.
- NQF 2: Define and understand production systems and production management.

My Notes ...

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Introduction

Before a farm is established, a few questions must be asked...

♦ Which activities do I engaged with?

Answering this question will decide where this farming unit will be located and the size thereof.

South Africa is a country with extreme diversities due to the difference in rainfall, climate, soil types and topography. These factors therefore determine:

■ The size of a farming unit

♦ The barren Karoo, unless irrigation facilities are possible, are normally large farming units due to the lack of sufficient and nutritious grazing. In addition to this, Groblersdal, with water available from the Loskopdam irrigation scheme has small farming units. It is therefore important that you are well familiarised with the conditions as listed above in order to establish the size of your farm.

■ The farming enterprises

♦ The Karoo, barren because of a lack of rainfall, can only manage sheep.
♦ The Bushveld is known for its beef cattle and game.
♦ The Western Cape is popular for its vineyards and wine.
♦ Mpumalanga with a relative high summer rainfall is ideal for mixed farming, such as maize, dairy and beef cattle, sheep, sunflower, potatoes, vegetables, etc.
♦ KwaZulu Natal is known for its sugarcane.
♦ Letsitele is our orange exporting country and fruit supplier.

■ A farm’s management

One person could manage a small farming unit and it is often the owner. The farmer will probably manage a medium sized farm with the assistance of a manager.

This, however, may not be the case in the event of a large estate, especially if a number of enterprises are introduced. An estate may be a family business, a consortium of farmers or could even been owned by shareholders. It would rather be difficult for these people to run an estate as they run their own businesses and probably will have no farming experience. They would therefore employ a CEO assisted by a manager form every enterprise engaged to the estate.
In this module we are going to assist a farmer to...

Establish a plan for the monitoring, safe use and maintenance of equipment, implements, technology and infrastructure.

What is...?

A plan: It’s a carefully worked out scheme of action.

Monitoring: It’s an apparatus for checking the work of other people.

Safe use: It’s the using of something without harm to your self or other.

Maintenance: It’s the prolongation and upkeep of something.

Equipment: It’s something necessary for a particular purpose.

Implements: It’s a tool or instrument to carry out a specific task.

Technology: It’s the science dealing with industrial art or methods.

Infrastructure: It’s the fixed/permanent assets of a farm.

In other words, you, the learner, must be able to work out a plan of action with which you can check the work of others and at the same time implementing occupational safety measures.

For the purpose of this Unit Standard we will use an estate as an example as it include a broad spectrum of ongoing activities on a farm.
Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure

Primary Agriculture  
NQF Level 4  
Unit Standard No: 116290

Version: 01  
Version Date: July 2006

Session 1  
A basic task related work program

After completing this session, you should be able to:

SO 1: Develop a basic task related work program related to the scheduling and allocation of equipment and implements.

In order to establish a task related work programme one needs relevant information. This information can be obtained from the different project managers as they have a complete schedule worked out for the coming season or year and know when what is needed.

1.1 Citrus production manager

The schedule described below could also apply to other orchards i.e. apple, mangos, peaches, etc. and vineyards. The dates may differ, but equipment and implements will be needed to fulfill the tasks.

Citrus production is scheduled according to a specific time factor, which is mostly, but not necessarily, determined by seasons. In contrast to a sunflower crop that is a once-off crop, the activities in a citrus orchard run from one year into the next until the trees reached an age where they are replaced with young seedlings.

Pests and deceases are monitored on a continuous basis but more so from when the buds start pushing.

A Citrus spraying programme will more or less be as follows:

♦ 7 to 15 Sept: Buds starts pushing – prevent against thrips and scale insects infestation.
♦ 25 Sept to 5 Oct: Period in which the fruit’s petals drops – prevent aphids, thrips and bollworms.
♦ 18 – 28 Nov. Fruit set stadium – protect against aphids, thrips and scale insects.
♦ 7-10 December: Root-rot treatment
♦ 10 – 15 Jan: Treatment against thrips.
♦ During Feb & March and again during Aug & Sept young trees must be treated against insects (Mites, aphids and thrips) to ensure that trees flush sufficiently enabling a maximum canopy to form.
Soil application of fertiliser takes place during September to April, (as you will notice, directly after the crop is harvested.) to ensure a good crop the following year.

Foliar spraying, for the same reason as fertiliser, but more critical, is also applied during July and again in October.

1.2 Crop (maize) manager

As in the case of orchids, crops may include Soya beans, sunflower, dried beans, groundnuts, wheat, barley etc.)

The first seasonal rain determines the planting season for crop production, as only arable soil can be cultivated. From here on forward everything happens fast.

- Ploughing starts in all earnestness.
- Preparation of seedbed.
- The planters follow this.
- Two weeks after germination the field must be cleared from weeds for the first time.
- About 6 weeks after germination nitrogenous fertiliser is administered while at the same time, the field is cleared of weeds for the second and last time.
- The next step, directly after the fertiliser application, a weed killer and pesticide is administered simultaneously.
- Harvesting normally starts 6 to 7 months after germination depending on the variety seed used, rainfall and temperature during the growing season.
- Unless the cattle are allowed to graze on the harvested field, the mealy stover should be slashed allowing it to rot (compost) and to prevent insects from hibernating in it during the winter.
- During September, just after the August winds and prior to the summer rain, limestone must be distributed.

1.3 Animal manager

Again this department may include sheep, goats, pigs and poultry.

Almost every farm in South Africa has a piece of veld unsuitable for growing trees or producing a crop due to the topography, field type (wetlands) or soil type.
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One possible way to generate money from these velds is by means of cattle grazing, either dairy cows or a beef heard. Not only has the cattle changed this veld into something useful, but they also support the estate’s monthly cash flow when the milk or male offspring are sold.

As is the case in all enterprises, this department also has its ongoing activities enhancing the manager’s responsibility. These may include:

- The dehorning of calves at the age of (but not older) 4 months is essential to prevent injuries to people as well as to other animals.
- It is accentual that provision is be made for supplementary fodder (hay/silage) during the winter to prevent the cattle from losing condition seeing that the beef cows are scheduled to give birth during Spring. (Mating season is arranged beforehand to ease the handling and weaning of calves.)
- Cattle need to be dipped during the summer to protect them from ticks and lice that may transfer diseases.
- They also need protection from internal parasites and must therefore be dosed according to a dosing program.
- Bull calves must be castrated in good time unless they are kept as future breeding stock.
- Old breeding stock (cows) is to be sold to an abattoir according to a replacement strategy in use.
- Water supply during the winter period might be necessary if the natural water supply i.e. fountains or water streams are dry.

### 1.4 General manager

The General manager is responsible for a variety of projects which may include (but can differ from farm to farm depending on job description) gardens, fencing, roads, irrigation, store room, electricity and general water supply to where it is needed and the uphold of buildings.

#### Store room

Apart from the chemicals, seed, fertiliser and pesticides in storage, one will also find tools for safekeeping. This equipment, used on a regular or daily basis, includes:

- Spades, shovels and pickaxes when digging holes, furrows etc.
- Shears and budding knives, once the propagating procedure is in process.
- Lawn mowers, edge cutters, weed eaters, garden forks, hoes and rakes for keeping the yard and garden clean.
- Wire cutters, pliers and binding wire for the upkeep and fixing of fences.
Establish a plan for the monitoring, safe use and maintenance of equipment, implements, technology and infrastructure.

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1.5 Transport manager

The transport manager will typically be in charge of the workshop, all vehicles, tractors, harvesters and implements.

This department is a farm’s heartbeat! No farm can operate without the infrastructure kept and upheld here, as the farm’s mobility depends on wheels. The vehicles and equipment should always be clean and in an excellent working condition. These may include:

- Trucks
- Bakkies (LDV’s)
- Motorbikes and Quad bikes
- Harvester
- Tractors
- Wagons/trailers
- Fertiliser spreaders
- Cultivators
- Slashing Mower
- Hoes
- Chamber Baler
- Ploughs
- Sprayers and Mist Blowers
1.6 Administration

This department looks after the general farm administration and it is the responsibility of the general-, transport-, and crop manager to order their inputs (chemicals, pesticides, cattle medicine, fuel, seed, fertiliser, etc.) through this department. This procedure will prevent that orders are not duplicated and the payment is done in time.

This department also looks after personnel issues:

♦ Employment and dismissals
♦ Leave and sick leave
♦ Salaries, overtime and bonuses
♦ Healthcare and first aid
♦ Training
1.7 Work programmes

A work programme serves as a resource mechanism enabling management to make the following decisions:

♦ To make financial provision for:
  - Monthly salary withdrawals as the quantity of workers may vary during the year i.e. the harvesting and packing of citrus need many (temporary) workers.
  - Purchasing of seed, fertilisers and pesticides when it is time to plant crops.
  - Large developments such as building a pack house or dam and installing an irrigation system.
  - Purchasing or replacement of implements, tractors or vehicles.

♦ Scheduling and allocating of implements and equipment:
  - When will the animal manager need trucks to move cattle to an auction or abattoir?
  - When will the general manager need wagons/trailers to transport irrigation pipes to be installed?
  - When will the citrus manager need workers, transport and harvesting- bins, ladders, bags and shear?
  - When will the citrus manager need the sprayer, pesticides and irrigation water?
  - When will the crop manager need tractors, ploughs, hoes, cultivators, planters, fertilisers, weed killers, seed, harvesters and (temporary) workers?

♦ To synchronise (co-ordinate) workers, vehicles, tractors, implements, equipment and activities.

♦ Monitor an activity as well as the workers attending those activities. It will be fatale to have every thing in place but the workers do not know what is expected from them. Therefore, a worker must only be allowed to do a job after obtaining an in-depth training (welders, mechanics, brick layers, etc.) where-upon his/her work quality can be measured. That allows management to take steps against lazy or incapable workers.

♦ Calculate a budget for the coming year.

In short, management is enabled to have control over what-ever-is-going-on or what-ever-will-be-going-on on the farm with an even flow of activities. Succeeding in this will prevent the possibility of too many activities scheduled for one day in relation to the quantity and availability the workers, implements or equipment.
In order to explain how a work plan is developed, and for the purpose of this example, let’s assume it rained on 25 October 2005 and maize is planted 01 Nov 2005.

(Remember seed germinate 7 to 10 days after it was planted)

Note:

This diagram is only an example/ guiding lines to compile a work plan. It does not contain all the relevant data. You, the learner must complete the diagram according to the circumstances and activities on the farm you’re working on.

Dates used will also differ from province to province and even within a province, therefore you must adapt a program according to the circumstances to fit the farm where you are doing your practical learning!

All the activities as per enterprise should be dotted in the diagram from which the work plan is scheduled.

(Most probably all this data, and even more, will be downloaded on a computer where it is refined and analysed to be used as a tool for future planning.)
Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure

Primary Agriculture
NQF Level 4
Unit Standard No: 116290

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<th>Implement</th>
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<th>Oct</th>
<th>Nov</th>
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<td></td>
</tr>
<tr>
<td>Root-rot</td>
<td>X</td>
<td>X</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Harvest</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Version: 01          Version Date: July 2006
According to the diagram (in the case of maize) the crop manager will need the following:

a. During October: tractors, ploughs and cultivators.
b. During November: tractors, planters and hoes.
c. During December: tractors, sprayer and integrate hoes.
d. During May, June, and July: harvesters, trucks, trailers and tractors.

From the information, according to your diagram (after it is completed to suit the activities on the farm where you are working) you will be able to determine when and where specific implements/equipment will be needed. This will enable you to plan, in advance, that these requirements are adhered to. You are now capable to develop a work programme suitable for the entire farm.

The successful implementation of your work plan might not always be possible.

♦ What happens if a specific day was scheduled for cattle branding and a fire breaks out on the grazing?
♦ What happens if it rained and the orchid was scheduled for spraying? In this case one must compensate or re-schedule the activity for another day.

Try to stick to the schedule but also be versatile and allow alterations.

♦ The necessary information is gathered.
♦ The work programme is scheduled.
♦ Yet...nothing is happening!
♦ A lack of workers off course!

The above-mentioned equipment and implements are non-living technology. These can only be used once workers operate it. Remember, it is technology, and in some cases advanced technology! It is therefore essential that every worker be well trained in every activity that he/she is taking part. Every worker must be acquainted with and have the knowledge and ability to fulfill a task with confidence.
Establish a plan for the monitoring, safe use and maintenance of equipment, implements, technology and infrastructure

Primary Agriculture
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Please complete Activity 1:
1. As an individual learner, obtain relevant information enabling you to establish a work programme.
2. As a group, compare these lists (it should supplement each other as it originates from different farms with different enterprises).
3. Design a wide-ranging diagram, which indicate every department’s needs.
4. Schedule and allocate equipment and implements according to diagram.
5. Discuss the importance of a work programme.

<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>The information required to develop a task-related work plan is identified and collected.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment and implements are identified and allocated efficiently.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The skill needs of the work team are identified.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A task-related work plan is developed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
After completing this session, you should be able to:
SO 2: Prepare and implement basic operational procedures for the cleaning, storage and proper maintenance of equipment, implements and infrastructure.

In this session we explore the following concepts:
- Maintenance procedures
- Major servicing of equipment
- Equipment not functioning efficiently is adapted
- Re-calibration of appropriate equipment is performed
- Safety elements

2.1 Maintenance procedures

A procedure is the manner or order of doing tasks in a correct sequence of actions.

To prolong or lengthen the performance expectancy of equipment, implements and infrastructure, definite procedures should be in place to ensure that a correct sequence of actions are taken and followed step by step. Why step by step? What do one gain from cleaning shelves from bottom to top? Only the top shelf will be clean! Therefore, you clean shelves from top to bottom. This principle also applies to farm activities.

- A procedure, implying the farm as an entity, must be in place.
- A procedure, implying the different departments, must be in place.
- A procedure, implying the different activities within a department, must be in place.
- A procedure, implying the sections within an activity, must be in place.

In short, a procedure sees to that an activity takes place in an orderly manner.
Technology is progressing, even faster in the world of computers. You buy a computer today, in 3 months time it is outdated. To stay in line with progress, a farm needs to alter in every possible way. It will therefore be necessary to make changes in procedures as well. It fits your present circumstances, but for how long?

### A completed task/job

Once a task/job is completed, the equipment or implements used should be cleaned thoroughly. A washing bay, equipped with a high pressure spraying gun and compressed air could ideally be built next to the workshop as this department will make use of it most of the time since they are responsible for the maintenance of equipment or implements.

Note that equipment or implements should only be washed after a task/job is completed.

---

**Example**

It rained and the ploughing is completed. What happens at the washing bay?

- The tractor driver will park his tractor in the parking area or pre-allocated area and report all (if any) unfamiliar noises or out of the ordinary operating difficulties at the workshop foreman.
- The foreman has a logbook and service record on every vehicle and implement where these reports are noted.
- The idea of a logbook/service record is to establish the actual costs to maintain and repair that specific vehicle or implement. There will come a time when the repairing costs may be too high or may exceed the budget per implement or vehicle and a decision will be taken to replace that specific vehicle or implement.
- After the paperwork has been done, the tractor will enter the washing bay where it is cleaned.
- The implement is unhitched at a pre-allocated area for ploughs in a shed and the tractor parked in this area.
- The foreman will inspect the plough to establish the degree of wear and tear to mould boards, shins and landsides and will decide whether it will last another season or should be replaced?
- The same procedures will be followed with the tractor except that more attention will be given to the problem areas as indicated by the driver.

---

♦ Why clean an implement?

- One must also keep in mind that soil contains acids, which will cause corrosion thus shortening the life span of an implement.

♦ Why clean a tractor?

- The workshop foreman will be able to spot fuel or oil leaks much easier, enabling him to repair faulty areas immediately.
2.2 Maintenance & servicing of major equipment

Why must implements, vehicles and equipment been kept in a shed?

Firstly, the degree of heat and ultra violet radiation of South Africa’s sun can damage a tractor’s computer, shorten the life span of tyres and causes the paint to fade. Secondly, birds and insects keep in trees. Their droppings contain acids that cause corrosion.

A few years ago a cultivator’s wheel bearings were packed with grease. With all the sand and dust penetrating the openings it did not last long and was replaced on a regular basis. Now it is fitted with sealed bearings with the result that minor maintenance to implements are minimized. It would only be replaced when it start squeaking.

Both tractors and harvesters have to be serviced more regularly based on a service record as prescribed by the manufacturer’s manual. This equipment is serviced after a certain quantity of working hours.

A new tractor i.e. is serviced at 100 hours and 500 hourly afterwards with a major service every 1500 hours. (Another reason for keeping a logbook updated as the clock’s reading has to be entered after every days work and handed in at the workshop enabling them to keep track with the servicing of equipment.)

(Note: Never fiddle with the computers. The manufacturer has specialised people to fix defaults).

- **A tractor’s maintenance (minor service) may include:**
  - Change oil & oil filter.
  - Change air filter.
  - Change fuel filter.
  - Check brake fluid level.
  - Add water coolant.

- **A major service includes:**
  - Change oil & oil filter.
  - Change air filter.
  - Change fuel filter.
  - Check brake fluid level
Check hydraulic pump pressure & oil level.

Flush radiator water, fill with clean water & add water coolant.

Check transmission oil.

Check battery.

Check brake pads.

The same rule applies to vehicles except that it is serviced on a kilometer basis. A vehicle has a minor service every 15,000 km followed by a major service every 100,000 km as prescribed in the manufacturer’s manual.

Equipment or implements leaving the shed/store could be in a good working condition as all the faults have been reported previously and rectified accordingly. In the case where it is evident that something else is faulty, it must be returned to the workshop where skilled people will repair it.

### Maintaining a Sprayer

Maintaining a Sprayer is more complicated and includes:

- Check that universals on the PTO shaft are greased.
- Grease all the nipples.
- The boom-hoses are intact.
- The nozzles are not blocked or leaking.
- The pump readings compare with handbook/manual as prescribed.
- The calibration is correct.
- The filters are clean or replaced.
- The tyre pressure is correct.
- The hydraulic hoses are intact.
- The agitation system is correct.
- The boom height is set correctly.
- The anti drip device is in order.
- The accuracy of flow sensor, single nozzle flow rate and rate control system.
- The consistency of dose rate.
- The uniformity of transverse spray liquid distribution.
Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure

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Water cart

- Tank is not leaking.
- Check mechanically actuated pump.
- Check hoses and nozzle tap.
- Check tyre pressure.
- Check PTO universals are they greased.

Trailer

- Check tyre pressure.
- Beam not bend or broken.
- Check pivot plate grease.
- Check hand brake.
- Check brake pads.

Implements

The latest models (cultivators and ploughs) available on the market (with the aid of technology) barely need any maintenance apart from replacing worn parts such as shares, mould boards and tines.

- The fertilise spreader needs minimum maintenance:
  - Check tyre pressure
  - Check conveyor belt
  - Check exit opening
  - Check vibrator device
  - Check distribution blades
  - Check transmission box oil level
  - Grease nipples

- The Chamber Baler;
  - Check for bent or broken pick-ups
  - Check for blunt and dislocated knives
  - Check cam cut-out clutch
  - Check chain tension
  - Check if automatic chain lubrication-tank is full
  - A central grease bank ease greasing
  - Check brake pads
  - Check PTO universal’s grease
  - Check hydraulic hoses and couplings
  - Do not fiddle with the electronic monitor
2.3 Re-calibration and safety elements

Hand tools are also kept clean for the same reasons as implements. Never wash electric tools with water. Compressed air is suitable for this task. Blunt tools and every other malfunctioning tool should be reported so that it can be fixed in time.

Milking equipment is washed with detergent after usage in order to keep it germ free. Milk tubes and teat cups must be checked for leaks as from the claw to the bulk tank on a regular basis.

A sprayer and fertiliser applicator has to be calibrated before administering takes place

Incorrect calibration implies a misuse of time and money.

- The over dosage of a pesticide is a misuse of money.
- The under dosage of a pesticide affects the effectiveness.
- The over dosage of a fertiliser may burn the crop resulting in a loss in yield.

- A fertilise applicator commences from the tractor via the PTO through a gearbox. It is therefore critical that the tractor should operate at the revolution and in the gear as specified in the manufacturer's working manual. A setting at the applicator's application hole will indicate the correct amount of fertiliser that must be administered per hectare.
- The calibration of a sprayer is more complicated. (Rather stay away from it if you are not thoroughly trained.) The sprayer also commences from the tractor via the PTO through a gearbox and the tractor should operate at a set revolution and gear as specified in the manufacturer's working manual.

- Pour some clean water in the tank and start up.
- Check for leaks.
- Check nozzles. Do they function correctly?
- Check pressure gauge. Set it according to figures given in the manual (to comply with your needs).
- Check bypass valve.
- Place a bucket-measure below a nozzle for 1-5 minutes. (A more accurate measurement is achieved by lengthen the minutes.) Measure the water. Follow the same routine with every nozzle and compare. A difference, worth mentioning, should be look to. Compare end result with figures as per manual.
- Empty tank
- Ready for use!

So far we looked at aspects that can influence the preparation of a procedure.
Implementing an operational procedure i.e. one concerning the workshop.

1. A project manager requests a tractor for the day.
2. The driver collects the tractor and the logbook.
3. The driver fills out a pre-check list and returns it. (off to work)
4. On return of the tractor, the driver stops at the fuel pump and refill.
5. The driver does clock reading and quantity fuel logged in the logbook.
6. The driver goes to the workshop and reports all faults.
7. Go to wash bay and clean tractor/implement (remember safety-gear).
8. Unhitch implement in shed.
9. Park tractor in shed/store.

See Learner Guide 116275 for more detail concerning maintenance and a servicing plan.

Please complete Activity 2.
1. What is a procedure?
2. Implement an operational procedure suitable for the farm where you are doing your practical training.
3. Discuss the importance of cleaning and storage of implements and equipment.
4. Discuss the importance of maintenance.
5. Explain how a sprayer is calibrated and why?

<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>Maintenance procedures are modified, prepared and implemented.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major servicing of equipment is performed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment not functioning efficiently is adapted.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-calibration of appropriate equipment is performed or requested.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety elements of equipment / tool / technology is adjusted i.e. safety shields.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Session 3

Recognise, identify and solve problems

After completing this session, you should be able to:
SO 3: Recognise, identify and solve problems related to the use of implements and equipment in an agricultural environment.

In this session we explore the following concepts:

♦ Steps to take when operational standards are below average.

♦ A fairly comprehensive maintenance plan.

It is important to concentrate on what you are doing. Not only does that prevent accidents, but also you are always aware of what is happening around you. You will thus be able to:

1. **See** that an animal’s condition is deteriorating
2. **Hear** that an engine is not running smoothly
3. **Smell** that the grass is burning
4. **Feel** that the pump is vibrating

When you observe something out of the orderly, even if it is not in your line of duty, report it to your supervisor. By solving a small problem immediately will prevent a disastrous ending later.

Problems, which cannot be identified by means of sense organs, can also be solved. This emphasizes the importance of maintenance plans, logbooks, vehicle service records and updated animal records. These resources can tell a story when all the information is analysed and monitored. As soon as the norm becomes abnormal, something must be wrong...act immediately. If the standard (work output) is dropping...take steps.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible causes</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why did this cow’s milk production drop?</td>
<td>✷ Is there something wrong with her udder (mastitis), food or health?</td>
<td>She can lose her udder or die.</td>
</tr>
<tr>
<td>Why didn’t this cow give birth this year?</td>
<td>✷ Did she abort due to Brucellosis?</td>
<td>The whole herd can be affected.</td>
</tr>
<tr>
<td>What happened to the truck’s fuel consumption?</td>
<td>✷ Is something wrong with the injectors or fuel pump or theft perhaps?</td>
<td>High running costs and a drop in power Security measures must be stepped up</td>
</tr>
<tr>
<td>Why is the repairing cost of this tractor so high?</td>
<td>✷ Is it time to replace it? ✷ Who did the repairing.... a skilled mechanic?</td>
<td>Increases the working load in workshop (man hours).</td>
</tr>
<tr>
<td>Why is the maize crops’ grading so bad?</td>
<td>✷ Were the harvester’s settings wrong? ✷ What about the administering of fertiliser and pesticides....the calibration perhaps? ✷ Was it due to poor germination or a lack of water?</td>
<td>It results in a loss in income and manpower.</td>
</tr>
<tr>
<td>Why didn’t the workers complete the task in good time?</td>
<td>✷ Were they unskilled, perhaps lazy or was the working load too much?</td>
<td>It may result in unhappy workers and strikes.</td>
</tr>
</tbody>
</table>
There is a solution to every problem. Below is an example of a fairly comprehensive maintenance plan (irrigation), which also includes essential monitoring actions:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Item</th>
<th>Task and Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Daily</strong></td>
<td>Pressures</td>
<td>Check that pump and block pressures are within prescribed limits.</td>
</tr>
<tr>
<td></td>
<td>Emitter operation</td>
<td>Check for clogged, broken or misplaced emitters. Repair, replace, unclog or reposition emitters.</td>
</tr>
<tr>
<td></td>
<td>Leaks</td>
<td>Check for water wastage and leaks in pipes and other equipment and repair immediately.</td>
</tr>
<tr>
<td></td>
<td>Primary filter</td>
<td>Flush primary filters as prescribed.</td>
</tr>
<tr>
<td></td>
<td>Fertigation application</td>
<td>Check that fertigation applications are within specifications.</td>
</tr>
<tr>
<td></td>
<td>Lateral lines</td>
<td>Flush lateral lines as prescribed.</td>
</tr>
<tr>
<td></td>
<td>Exposed joints</td>
<td>Check and repair if needed, e.g. quick coupling rubbers</td>
</tr>
<tr>
<td></td>
<td>Secondary filters</td>
<td>Flush secondary filters as prescribed</td>
</tr>
<tr>
<td></td>
<td>System pressure and flow</td>
<td>Check that system pressure and flow are as per irrigation design plan.</td>
</tr>
<tr>
<td></td>
<td>Pump operation</td>
<td>Check that pump operation is within prescribed parameters.</td>
</tr>
<tr>
<td></td>
<td>Block pressures for automated valves</td>
<td>Check that block pressures are as prescribed where automated valves are used.</td>
</tr>
<tr>
<td></td>
<td>Pump oil levels</td>
<td>Check pump oil levels as prescribed.</td>
</tr>
<tr>
<td></td>
<td>Fertigation plant</td>
<td>Inspect fertigation plant.</td>
</tr>
<tr>
<td></td>
<td>Pipes (above and below ground)</td>
<td>Check for leaks and repair</td>
</tr>
<tr>
<td><strong>Weekly</strong></td>
<td>Valves, water meters, and gauges</td>
<td>Visually check valves, water meters and gauges and look for damage and / or vandalism.</td>
</tr>
<tr>
<td></td>
<td>Filters</td>
<td>Open and inspect filters as prescribed.</td>
</tr>
<tr>
<td></td>
<td>Pump pipe work</td>
<td>Check for leaks at pump station that causes water losses and air locks.</td>
</tr>
<tr>
<td></td>
<td>Pump motor</td>
<td>Pump motor must be greased as prescribed.</td>
</tr>
<tr>
<td><strong>Monthly</strong></td>
<td>Valves</td>
<td>Service valves and physically check correct operation.</td>
</tr>
<tr>
<td></td>
<td>Filters</td>
<td>Clean filters thoroughly and replace sand in sand filters annually or biennially.</td>
</tr>
<tr>
<td><strong>Annually</strong></td>
<td>Pump</td>
<td>Change oil in pump.</td>
</tr>
<tr>
<td></td>
<td>Water sampling</td>
<td>Take a water sample at the end of lateral lines and send it in for analysis.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Frequency</th>
<th>Item</th>
<th>Task and Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Emitter delivery tests</td>
<td>Test specific emitters for discharge and pressure.</td>
</tr>
<tr>
<td></td>
<td>Sprinkler parts</td>
<td>Replace nozzles annually and other parts when needed.</td>
</tr>
<tr>
<td>2-10 years</td>
<td>Pump</td>
<td>Replace bearings and other wearing parts on pump and motor every five years.</td>
</tr>
<tr>
<td></td>
<td>Hydraulic valves</td>
<td>Replace diaphragms on hydraulic valves every three years.</td>
</tr>
<tr>
<td></td>
<td>Poly pipe and emitters</td>
<td>Replace poly pipe and emitters every seven to ten years.</td>
</tr>
</tbody>
</table>

Note: Record all the readings, replacements, maintenance done and analysis results. In short, record every activity that took place and download it on the computer. Not only will it add to the farm's history, but will also aid as a resource for future decision-making.

Please complete Activity 3:
1. Discuss the ways in which a problem can be identified?
2. Explain how unseen problems can be identified?
3. Explain the consequence if a problem is not solved immediately?
4. Explain the benefits of recording all farm activities?

<table>
<thead>
<tr>
<th>Concept (SO 3)</th>
<th>I understand this concept</th>
<th>Questions that I still would like to ask</th>
</tr>
</thead>
<tbody>
<tr>
<td>The possible causes of the problem encountered during task execution are identified.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steps to be taken to rectify problems encountered are planned and organized.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The consequences of not resolving an encountered problem are explained.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative methods and contingency plans are identified and implemented.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problems that cannot be resolved are identified and reported timeously.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure

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Session 4

Safegy regulations

After completing this session, you should be able to:

SO 4: Draw up plans to ensure that safety regulations are implemented as prescribed for the use of implements, agro-chemicals and equipment.

In this session we explore the following concepts:

♦ The necessary safety procedures in the handling of fuel, agro-chemicals, equipment and implements are identified and implemented.

♦ The procedures for the safe use and operation of implements and equipment are communicated to others.

♦ The implementation of the NOSA Act is explained.

4.1 Safety implementation

An accident is an unexpected, unfortunate happening, which is not called for, therefore:

♦ Nobody without a license must be allowed to drive any vehicle.

♦ Nobody without training must be allowed to handle any power tools, equipment or tools, not even a spade.

In order to avoid accidents, workers and assistants should:

♦ Be taught to handle every individual implement, tool etc. In the correct way and accentuate all the danger points there off. (E.g.; how to mount implements or how trailers are linked to a tractor).

♦ Never perform a task not wearing the protective clothing as prescribed per activity, which may be boots, hand gloves, eye protection, ear protection, etc.
4.2  Protective clothing

The appropriate protective clothing to use and wear includes:

♦ Protective clothing for general hand tools includes

♦ Hand tools are often used without any protective clothing.

♦ Spades and forks do not normally require protective clothing.

♦ A common exception is that rubber boots must be worn when working in muddy conditions.

♦ When picks or hammers are used on material like rock, protective eyewear it is recommended as rocks splinters can damage eyes.

♦ When working with cement or rough material like iron or barbed wire, leather gloves must be worn.

♦ When using power tools (angle grinders), an eye protection should be mandatory. Welding equipment has its specialised headgear to protect eyes from the very intense light during the operation. A leather apron must also be worn during welding.

The project manager should be aware of the safety needs of his/her workers and respond to that before it develops into a problem.

4.3  Protective equipment

Chemicals on the farm are generally dangerous and protective clothing and equipment for it is necessary according to its hazard level. Refer to the operating manual for specific and appropriate safety gear. The following should be followed in general:
Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure

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When mixing pesticides

<table>
<thead>
<tr>
<th>WEAR:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eye protection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rubber gloves</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rubber boots</td>
<td></td>
</tr>
</tbody>
</table>

When applying pesticides

<table>
<thead>
<tr>
<th>WEAR:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mouth protection</td>
<td></td>
</tr>
</tbody>
</table>

- DO NOT store food in empty pesticide containers
- DO NOT store pesticide in food containers
- RINSE empty pesticide containers and DESTROY them
Follow these steps to wash your hands after working with pesticides or any other chemical:

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet your hands thoroughly with warm water.</td>
<td>Apply antibacterial soap generously.</td>
<td>Scrub under nails with a clean nailbrush.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 4</th>
<th>Step 5</th>
<th>Step 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rub hands vigorously for at least 20 seconds.</td>
<td>Rinse hands thoroughly with warm water.</td>
<td>Dry your hands with a paper (disposable) towel.</td>
</tr>
</tbody>
</table>

Protective equipment that must be available includes:

- Overalls
- Face shields
- Rubber boots
- Rubber or leather gloves
- Goggles
Incorrect use of hand tools and equipment could lead to multiple injuries and exposure to the risk of poisoning. Incorrect storage of tools could also lead to injuries where tools may fall down for example. As was mentioned before, a tool in a bad condition may be very dangerous and may cause serious injuries.

Common sense and general care will go a long way to prevent injuries to yourself and to your fellow workers. Even death is a very real possibility when injuries with certain tools occur!

Examples of common injuries from tools include:

- Grazes
- Cuts and bruises
- Burns (heat or chemical)
- Loss of fingers and toes
- Loss of limbs
- Sustaining blindness
- Becoming deaf
- Tetanus
- Infection
- Loss of consciousness
- Death

The farm must have an up to date first aid kit/s at strategic locations and an effective system of handling injuries. This will minimize the effect of an injury. Injuries must be investigated and the causes determined as far as possible. Measures must be put in place to prevent recurring accidents.

4.4 National Occupational and Safety Act

The manager must be aware that within the health and safety Act is a section called NOSA. This stands for the National Occupational and Safety Act.

(The farm must have a copy of the Act affixed for workers to read.)

This Act governs the workplace and is graded accordingly.

- **NOSA implies the following in short:**
  - Premises and house keeping.
  - Mechanical, electrical and personal safeguarding.
Fire protection and prevention.
Accident recording and investigation.
Safety organisations.

**Draw up safety procedures**

To draw up safety procedures ensuring that safety regulations are adhered to (preventing fires, accidents, injuries and chemical spills), the abovementioned must be taken in consideration.

<table>
<thead>
<tr>
<th>STEP</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The farm workers are divided into fire teams and trained accordingly. Every team has a team leader (to whom they report in a case of emergency), a driver and water cart (which must always be full of water).</td>
</tr>
<tr>
<td>2</td>
<td>A well-trained first aid team must be available in case of an injury or accident.</td>
</tr>
</tbody>
</table>
| 3    | Communicate to workers by means of lectures concerning:  
  - Liable safety rules as prescribed by law.  
  - The advantage when obeying this law.  
  - The consequences when disobeying this law.  
  - The procedure to follow in case of an injury. |
| 4    | Affix explanatory pictures in prominent places (change rooms and toilets):  
  - Which safety clothing should be worn per specific task?  
  - Safety symbols and their degree of hazardousness.  
  - Personal hygiene. |
| 5    | A fuel pump must be located away from buildings.  
  - The operator must wear prescribed protective clothing.  
  - A prescribed fire extinguisher should be at hand.  
  - Introduce no smoking/fire signs. |
| 6    | Handling, mixing and administering of agro-chemicals should be done as prescribed.  
  - The operator must wear prescribed protective clothing.  
  - Sand or sawdust, a spade and broom must be available in case of spills. |
| 7    | When handling equipment or implements are hitched/unhitched the assistant must wear prescribed protective clothing. |
Establish a plan for the monitoring, safe use and maintenance of equipment, implements, technology and infrastructure

Primary Agriculture
NQF Level 4
Unit Standard No: 116290

<table>
<thead>
<tr>
<th>8</th>
<th>A fire-break/fire-path must be made around a crop field or grazing to prevent a run-away fire from entering it.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>A fire extinguisher must be available in buildings, 1 per prescribed quantity square metres.</td>
</tr>
<tr>
<td>10</td>
<td>Continues exercises in fire extinguishing when time permits.</td>
</tr>
<tr>
<td>11</td>
<td>Compulsory task related training.</td>
</tr>
<tr>
<td>12</td>
<td>Take severe steps against lawbreakers...it will save the farm some money.</td>
</tr>
</tbody>
</table>

Please complete Activity 4:
1. What is an accident?
2. How can an accident be avoided?
3. Name protective clothing and explain their use?
4. Explain procedures when handling, mixing and applying a pesticide?
5. Name possible injuries that may occur?
6. Discuss NOSA? (Get hold of an Act and study it in depth.)
7. Draw up operational safety procedures?

How am I doing?

<table>
<thead>
<tr>
<th>Concept (SO 4)</th>
<th>I understand this concept</th>
<th>Questions that I still would like to ask</th>
</tr>
</thead>
<tbody>
<tr>
<td>The implementation of the NOSA Act is explained.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The necessary safety procedures in the handling of fuel, agro-chemicals, equipment and implements are identified and implemented.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The procedures for the safe use and operation of implements and equipment are communicated to others.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
After completing this session, you should be able to:
SO 5: Adapt equipment, implements and technology to suit different agricultural situations and processes.

In this session we explore the following concepts:

- The correct equipment, implement or technological application that could fulfil the function is identified.
- The equipment and/or implements are adjusted or adapted to fulfil the required function.

5.1 Identify the correct equipment to fulfill a function

What have technology given us apart from changing from oxen to tractors and from horses to bakkies or motorbikes?

<table>
<thead>
<tr>
<th>Implements / Equipment</th>
<th>The usage thereof</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trucks</td>
<td>For the conveying of:</td>
</tr>
<tr>
<td></td>
<td>• Cattle to or from the auctioneer’s stockyard.</td>
</tr>
<tr>
<td></td>
<td>• Harvested crop to the silos.</td>
</tr>
<tr>
<td></td>
<td>• Picked citrus to the market.</td>
</tr>
<tr>
<td></td>
<td>• Fertilisers and other farm inputs from the suppliers.</td>
</tr>
<tr>
<td>Bakkies</td>
<td>For every day transport on the farm.</td>
</tr>
<tr>
<td>Motorbikes and Quad bikes</td>
<td>For fast mobility in orchids and between crop fields.</td>
</tr>
<tr>
<td>Harvesters</td>
<td>Harvest matured crops. By changing the header, one can harvest another crop. (From maize to wheat).</td>
</tr>
</tbody>
</table>
Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure

| Tractors | Utilised to haulage almost all the equipment used on the farm which includes:
|          | • Wagons/trailers to transport:
|          |   o Workers to and from the orchids or fields or where ever they are needed.
|          |   o Fertilisers and seed to the field.
|          |   o Picked citrus to the pack house.
|          |   o Harvested crop to the farm’s silo.
|          |   o Inputs where it is needed.

<p>| Ploughs | Are designed to turn soils over and in doing that, cover plant residues and loosening the soil at the same time enabling it to aerate. |</p>
<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stubble Cultivators</td>
<td>Are used for the mixing of plant residues and soil in a depth of 5 – 15cm. for the optimum breakdown of straw. By mounting tines it can be used as a combination-harrow.</td>
</tr>
<tr>
<td>Seedbed Cultivators</td>
<td>Is exerted to crumble and level the seedbed and to loosen soils minimizing the turnover of under soil.</td>
</tr>
<tr>
<td>Integral Cultivators</td>
<td>Are used for the clearing of weed. By fitting a Side Dress unit onto it, it is able to administer nitrogenous fertiliser at the same time.</td>
</tr>
<tr>
<td>Fertiliser spreaders</td>
<td>Are used for the spreading of lime and chicken manure on fields.</td>
</tr>
<tr>
<td>Slashing Mower</td>
<td>Is used to cut grass e.g. between orchid rows, next to roads, mealy stover and fire-paths.</td>
</tr>
<tr>
<td>Rotary Hoe</td>
<td>Is designed for clearing weed between a crop’s rows at a relative high speed.</td>
</tr>
<tr>
<td>Chamber Baler</td>
<td>Is used to bale cut grass/Lucerne in the form of a brick or roll which is then stacked, awaiting the winter when these bales are made available to the cattle.</td>
</tr>
<tr>
<td>Sprayers and Mist Blowers</td>
<td>Are used for the administering of insecticides and pesticides.</td>
</tr>
<tr>
<td>Planter</td>
<td>Is designed to insert seed into the soil at a set depth and a selected width apart. By changing the plates and sprockets the calibration can be altered for planting another commodity.</td>
</tr>
</tbody>
</table>
Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure

Primary Agriculture

NQF Level 4

Unit Standard No: 116290

Version: 01                 Version Date: July 2006

Grader
Is used for the upkeep the roads but can also aid with the outlining of contours.

Back-actor
(A device fitted at the back of a tractor)
Is used for digging furrows when i.e. installing irrigation system.

Front-end loader
(A device fitted in front of a tractor)
Is used to load sand, lime and manure onto trailers.

Mower
To cut grass and Lucerne before it is baled.

Milking machine
Requires the minimum workers and doing the job much faster than hand milking and is more hygienic.

Hand tools
The use thereof is explained in detail in Learner Guide 116167.

Please complete Activity 5:

1. Individual Project. Make a list of all the equipment, implements, technologies applications:
   • Write down their different uses
   • Write down how you could adapt / adjust these for a required task.
   • Write down the safety precautions for each of these listed.
   • Compile a servicing and maintenance plan for each of these listed.

How am I doing?

<table>
<thead>
<tr>
<th>Concept (SO 5)</th>
<th>I understand this concept</th>
<th>Questions that I still would like to ask</th>
</tr>
</thead>
<tbody>
<tr>
<td>The required task or function is identified and explained.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The correct equipment, implement or technological application that could fulfill the function is identified.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The equipment and/or implements are adjusted or adapted to fulfill the required function.</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. Develop a basic task related work programme for the scheduling and allocation of equipment and implements.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 2. Write up the following maintenance procedures and explain how you would communicate these to all the workers on the farm, including management.  
  • Maintenance and servicing of major equipment  
  • Cleaning and storage of equipment and implements  
  • Re-calibration of equipment |               |               |
| 3. Draw up a problem-solving chart for the farm where you are doing your practical learning.  
  • List the type of problems that might occur  
  • What the possible causes could be  
  • And what the effect would be if the problem remains unresolved. |               |               |
| 4. Draw up a maintenance plan for two areas (e.g. irrigation) on the farm, which will include monitoring actions. The supervisor or owner of the farm must verify your plan. |               |               |
5. Write up safety regulations / procedures for a farm unit.
   • List how you would communicate the safety regulations to the other workers.
   • Write down how a farm manager could implement the safety regulations successfully on a farm.

6. Write up a list of all the equipment, implements, and technologies applications on your farm.
   • Write down and explain their different uses.
   • Explain how you could adapt / adjust these for a required task.
   • Draw up a maintenance and servicing plan and requirements for each of these.
   • Write down the safety precautions that should be followed for each of these.
Establish a plan for the monitoring, safe use and maintenance of equipment, implements, technology and infrastructure

Primary Agriculture
NQF Level 4
Unit Standard No: 116290

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>
<td></td>
</tr>
<tr>
<td>Are you able to work well in a team?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you work in an organised and systematic way while performing all tasks and tests?</td>
<td></td>
<td></td>
</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>
<td></td>
<td></td>
</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>
<td></td>
<td></td>
</tr>
<tr>
<td>Can you base your tasks and answers on scientific knowledge that you have learnt?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are you able to show and perform the tasks required correctly?</td>
<td></td>
<td></td>
</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>
<td></td>
<td></td>
</tr>
</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 your 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><strong>Learner Information Form</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit Standard</strong></td>
</tr>
<tr>
<td><strong>Program Date(s)</strong></td>
</tr>
<tr>
<td><strong>Assessment Date(s)</strong></td>
</tr>
<tr>
<td><strong>Surname</strong></td>
</tr>
<tr>
<td><strong>First Name</strong></td>
</tr>
<tr>
<td><strong>Learner ID / SETA Registration Number</strong></td>
</tr>
<tr>
<td><strong>Job / Role Title</strong></td>
</tr>
<tr>
<td><strong>Home Language</strong></td>
</tr>
<tr>
<td><strong>Gender:</strong></td>
</tr>
<tr>
<td><strong>Race:</strong></td>
</tr>
<tr>
<td><strong>Employment:</strong></td>
</tr>
<tr>
<td><strong>Disabled</strong></td>
</tr>
<tr>
<td><strong>Date of Birth</strong></td>
</tr>
<tr>
<td><strong>ID Number</strong></td>
</tr>
<tr>
<td><strong>Contact Telephone Numbers</strong></td>
</tr>
<tr>
<td><strong>Email Address</strong></td>
</tr>
<tr>
<td><strong>Postal Address</strong></td>
</tr>
</tbody>
</table>
Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure

Bibliography

- Books:
  - Mr K van Wyk....Citrus
  - Afgri....Implements and equipment

Terms & Conditions

This material was developed with public funding and for that reason this material is available at no charge from the AgriSETA website (www.agriseta.co.za).

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No user is allowed to sell this material whatsoever.

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  - Ms A du Plessis
  - Ms N Matloa
Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure

<table>
<thead>
<tr>
<th>SAQA US ID</th>
<th>UNIT STANDARD TITLE</th>
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</thead>
<tbody>
<tr>
<td>116290</td>
<td>Establish a plan for the monitoring, safe use and maintenance of equipment implements, technology and infrastructure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SGB NAME</th>
<th>NSB</th>
<th>PROVIDER NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGB Primary Agriculture</td>
<td>NSB 01-Agriculture and Nature Conservation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FIELD</th>
<th>SUBFIELD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture and Nature Conservation</td>
<td>Primary Agriculture</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>ABET BAND</th>
<th>UNIT STANDARD TYPE</th>
<th>NQF LEVEL</th>
<th>CREDITS</th>
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<tbody>
<tr>
<td>Undefined</td>
<td>Regular</td>
<td>Level 4</td>
<td>3</td>
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</tbody>
</table>

<table>
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<tr>
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<th>REGISTRATION START DATE</th>
<th>REGISTRATION END DATE</th>
<th>SAQA DECISION NUMBER</th>
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<tbody>
<tr>
<td>Registered</td>
<td>2004-10-13</td>
<td>2007-10-13</td>
<td>SAQA 0156/04</td>
</tr>
</tbody>
</table>

**PURPOSE OF THE UNIT STANDARD**

A learner achieving this unit standard will be able to design, prepare and implement basic operational procedures for the cleaning, storage and proper maintenance of equipment, implements and infrastructure. The learner will also be able to monitor the safe use of equipment, technology, infrastructure and implements.

In addition learners will be well positioned to extend their learning and practice into other areas of agriculture, or to strive towards professional standards and practices at higher levels.

Competent learners will be fully conversant with agricultural regulations and aspects of safety as to provide the environment for the application of quality practices and thus strengthen agricultural practices in general.

**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: Apply routine maintenance and servicing plans and procedures.
- NQF 2: Define and understand production systems and production management.

**UNIT STANDARD RANGE**

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.
Specific Outcomes and Assessment Criteria:

**SPECIFIC OUTCOME 1**
Develop a basic task related work program related to the scheduling and allocation of equipment and implements.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**
The information required to develop a task-related work plan is identified and collected.

**ASSESSMENT CRITERION 2**
Equipment and implements are identified and allocated efficiently.

**ASSESSMENT CRITERION 3**
The skill needs of the work team are identified.

**ASSESSMENT CRITERION 4**
A task-related work plan is developed.

**SPECIFIC OUTCOME 2**
Prepare and implement basic operational procedures for the cleaning, storage and proper maintenance of equipment, implements and infrastructure.

**OUTCOME RANGE**
Maintenance of equipment, implements and infrastructure includes, but is not limited to the draining and replacing oil in a tractor, adjusting fan belts, checking tyre pressure of trucks, adjusting a plough angle, and adjusting the hydraulic lift on tractor.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**
Maintenance procedures are modified, prepared and implemented.

**ASSESSMENT CRITERION 2**
Major servicing of equipment is performed.

**ASSESSMENT CRITERION 3**
Equipment not functioning efficiently is adapted.

**ASSESSMENT CRITERION RANGE**
Equipment refers to any of those that are used in the agricultural sector to perform functions that include, but are not limited to, fertiliser distribution, shearing, water distribution, sprayers, vehicles, and tractors.

Fertilizer distribution faulty, mechanized shearing tool jagging, water distribution wrong, cutting / digging tools blunt, pressure drop because of blocked pipe, blocked nozzles in spraying boom, etc.
**ASSESSMENT CRITERION 4**
Re-calibration of appropriate equipment is performed or requested.

**ASSESSMENT CRITERION RANGE**
Fertilizer spreader, oil and re-adjust shearing tool, adjust water pressure / irrigation pipe distances, sharpen tools, unblock pipes, clean nozzles, etc.

**ASSESSMENT CRITERION 5**
Safety elements of equipment / tool / technology is adjusted i.e. safety shields.

**SPECIFIC OUTCOME 3**
Recognise, identify and solve problems related to the use of implements and equipment in an agricultural environment.

**OUTCOME RANGE**
Problem indicators may refer to any unusual occurrence, to possible cause of a problem and steps to resolving the problem.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**
The possible causes of the problem encountered during task execution are identified.

**ASSESSMENT CRITERION 2**
Steps to be taken to rectify problems encountered are planned and organised.

**ASSESSMENT CRITERION 3**
The consequences of not resolving an encountered problem are explained.

**ASSESSMENT CRITERION RANGE**
Consequences could be anything from "Animal could die", to "Task not completed on time", "Staff / workers endangered", or "Environmental damage could occur."

**ASSESSMENT CRITERION 4**
Alternative methods and contingency plans are identified and implemented.

**ASSESSMENT CRITERION 5**
Problems that cannot be resolved are identified and reported timeously.

**SPECIFIC OUTCOME 4**
Draw up plans to ensure that safety regulations are implemented as prescribed for the use of implements, agro-chemicals and equipment.

**OUTCOME RANGE**
The plan should be based on the accident prevention policy of the organisation, and basic safety precautions as outlined in the National Occupation Safety Act, to prevent fires, accidents, chemical spills and injury.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**
The implementation of the NOSA Act is explained.

**ASSESSMENT CRITERION 2**
The necessary safety procedures in the handling of fuel, agro-chemicals, equipment and implements are identified and implemented.

**ASSESSMENT CRITERION 3**
The procedures for the safe use and operation of implements and equipment are communicated to others.

**SPECIFIC OUTCOME 5**
Adapt equipment, implements and technology to suit different agricultural situations and processes.

**OUTCOME RANGE**
The function and use of equipment, implements and technology can be applied differently in different circumstances, depending on the context.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**
The required task or function is identified and explained.

**ASSESSMENT CRITERION 2**
The correct equipment, implement or technological application that could fulfil the function is identified.

**ASSESSMENT CRITERION 3**
The equipment and/or implements are adjusted or adapted to fulfil the required function.

**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:

- Basic scheduling and work flow.
- Operational procedures.
- The safe handling of tools and equipment.
- The NOHSA Act and how it applies in the agricultural sector.
- The principles of safety precautions.
- Determining damaged and faulty equipment.
- The use and adaptation of tools, equipment and machinery in different combinations.
- Teamwork and communication.
- Work program development.
- Identification and resolving problems related to a work program.
- The benefits of a well prepared work plan.
- Personnel management.

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-organisation and management relates to specific outcomes:
- Develop a task related work program related to the scheduling and allocation of equipment and implements.
- Recognise, identify and solve problems related to the use of implements and equipment in an agricultural environment.
- Draw up plans to ensure that safety regulations are implemented as prescribed for the use of implements, agro-chemicals and equipment.
- Adapt equipment, implements and technology to suit different agricultural situations and processes.

UNIT STANDARD CCFO COLLECTING
Information evaluation relates to specific outcomes:
- Develop a task related work program related to the scheduling and allocation of equipment and implements.
implements.
• Prepare and implement basic operational procedures for the cleaning, storage and proper maintenance of equipment, implements and infrastructure.
• Draw up plans to ensure that safety regulations are implemented as prescribed for the use of implements, agro-chemicals and equipment.
• Adapt equipment, implements and technology to suit different agricultural situations and processes.

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 specific outcomes:
• Develop a task related work program related to the scheduling and allocation of equipment and implements.
• Recognise, identify and solve problems related to the use of implements and equipment in an agricultural environment.
• Draw up plans to ensure that safety regulations are implemented as prescribed for the use of implements, agro-chemicals and equipment.
• Adapt equipment, implements and technology to suit different agricultural situations and processes.

UNIT STANDARD CCFO CONTRIBUTING
Self-development relates to specific outcomes:
• Develop a task related work program related to the scheduling and allocation of equipment and implements.
• Draw up plans to ensure that safety regulations are implemented as prescribed for the use of implements, agro-chemicals and equipment.
• Adapt equipment, implements and technology to suit different agricultural situations and processes.

UNIT STANDARD ASSESSOR CRITERIA
N/A

UNIT STANDARD NOTES
N/A

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