



NQF Level: 3

US No: 116267

# Facilitator Guide

## Primary Agriculture

# Manage Soil Fertility and Plant Nutrition



Facilitator: .....

Company: .....

Commodity: ..... Date: .....

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agriculture

Department:  
Agriculture  
REPUBLIC OF SOUTH AFRICA



# Before you get started...

Dear Facilitator,

This Facilitator Guide (together with the relevant Learner Guide) is aimed at facilitators who will be assisting learners wishing to complete the following unit standard:

<b>Title:</b> Manage soil fertility and plant nutrition
<b>US No:</b> 116267 <b>NQF Level:</b> 3 <b>Credits:</b> 5

This guide contains all necessary facilitation instructions to ensure that learners will attain the expected competencies required by the above-mentioned unit standard. This guide is designed to be used during the presentation of a learning session based on this unit standard. The full unit standard is attached at the end of the relevant Learner Guide. Learners are advised to read the unit standard at their time. Please discuss the unit standard with the learners to ensure that they understand what is expected from them to achieve the outcomes of the unit standard.

This unit standard is one of the building blocks in the qualifications listed below. Please mark the qualification you are currently facilitating, because that will be determined by the context of application:

Title	ID Number	NQF Level	Credits	Mark
National Certificate in Animal Production	49048	3	120	<input type="checkbox"/>
National Certificate in Plant Production	49052	3	120	<input type="checkbox"/>

Please mark the learning program the learners are enrolled in:

Are you enrolled in a:	Y	N
Learnership?	<input type="checkbox"/>	<input type="checkbox"/>
Skills Program?	<input type="checkbox"/>	<input type="checkbox"/>
Short Course?	<input type="checkbox"/>	<input type="checkbox"/>

**Note to Facilitator:**  
If you are presenting this module as part of a full qualification or learnership, please ensure that you have familiarised yourself with the content of the qualification.

Please explain the above concepts to the learner.

There are three guides, namely the Learner Guide (with activities), Assessor Guide and the Facilitator Guide.

These guides have been developed to address specific aspects of the learning experience. You therefore need to use these guides complementally to one another.

**Make this an enjoyable learning experience!**

# Context of Application ...

Primary Agriculture is a diverse sector and a wide range of commodities is being produced for both national and international market. Each commodity has its own production requirements and practices. You will be facilitating the learning process within a specific context where a specific agricultural commodity is being produced. The learning material has been written in a **generic** manner, as it is aimed to be available on national level and should be relevant to be applied within a variety of commodities. It is therefore inclusive of all agricultural commodities and crop in this field. Therefore, the examples that are being used in the materials may not always be applicable to your specific community, commodity, environment or region.

This presents you, the facilitator, with the challenge to **contextualise** the learning material. It is imperative that you, the Facilitator and Assessor interpret and present activities, case studies and projects related to the material in such a way that learners can easily identify and apply their knowledge within their own context. This will require from you to add examples of crop, which are applicable to the community or farm. Learners must be guided with examples from their own communities, commodities, environment or regions. This should be done by complementing the learning material with:

- Examples relevant to the commodity,
- Including commodity specific requirements,
- Including operating procedures of the farm,
- Including agricultural practice specific requirements,
- Agricultural markets,
- Guiding learners to write these specifics down in the learning guide, etc.

**The contextualisation of the learning material is a very important step in preparing for and facilitating the learning experience and enough time and effort should be put into this exercise.**

According to the qualifications mentioned on page 2, this module could be contextualised to fit the following groups of commodities:

Plant Production	Animal Production	
<ul style="list-style-type: none"> <li>• Organic production,</li> <li>• Hydroponic production,</li> <li>• Perma-culture production,</li> <li>• Agronomy,</li> <li>• Horticulture,</li> <li>• Natural resources harvesting.</li> </ul>	<ul style="list-style-type: none"> <li>• Small stock production,</li> <li>• Large stock production,</li> <li>• Dairy production,</li> <li>• Pig production,</li> <li>• Poultry production,</li> <li>• Game,</li> <li>• Aqua / mari culture,</li> <li>• Commercial insects</li> <li>• Animal fibres harvesting,</li> <li>• Bee keeping,</li> </ul>	<ul style="list-style-type: none"> <li>• Natural resources harvesting,</li> <li>• Organic production,</li> <li>• Perma-culture production,</li> <li>• Eco/Agri Tourism,</li> <li>• Agro Chemicals,</li> <li>• Horse Breeding,</li> <li>• Etc.</li> </ul>

# How to use this guide ...

Throughout the guide information is given specifically aimed at you, the facilitator, to **assist** in the actual presentation of the learning material and/or facilitation of the learning process. Although this guide contains all the information required for attaining competency in this unit standard, references to additional resources, both printed and electronic, are provided for additional reference by the facilitator and further study by the learner.

Please note that the purpose of this information is merely to **guide** you, the facilitator, and is provided as a suggestion of possibilities. It remains the responsibility of every facilitator to re-assess the learner/s in each learning situation throughout the learning process in order to stay in touch with their specific learning needs. This should be the determining factor in the choice of the learning approach to follow.

Use the different boxes listed below for identification purposes:



Instructions regarding **activities**, whether group or individual activities will be described in this box.



Facilitators' Tip ...

**My Notes ...**  
You can use this box for your own notes/comments.

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# What & How will you be Facilitating?

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## The Learning Experience...

### On completion of this module, the learners will be able to:

- ◆ Supervise application of soil nutrient preparations in a safe, effective and responsible manner for the benefit of plant/crop growth with consideration to the environment.
- ◆ Gain specific knowledge and skills in soil and plant nutrition.
- ◆ Operate in a plant production environment implementing sustainable and economically viable production principles.

### Learners will specifically be able to:

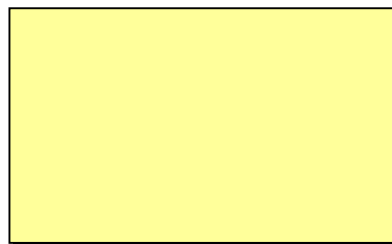
- ◆ Prepare for soil nutrient applications using specialized equipment.
- ◆ Supervise the collection of samples, storage and dispatch of samples to appropriate service provider.
- ◆ Demonstrate an understanding of the properties of soil and how these impact on plant nutrition and soil preparation.
- ◆ Identify and interpret symptoms of nutritional deficiencies in different crops and make basic recommendations.
- ◆ Supervise and implement soil preparation and remediation.

### Learners will also gain basic knowledge of:

- ◆ Sampling procedures.
- ◆ Chemical, properties of soil - pH, Nutrient status.
- ◆ Physical properties of soil - Texture, structure, soil profiles.
- ◆ Biological properties of soil.
- ◆ Soil ecology e.g. soil organisms, food webs, role of water and oxygen in soil.
- ◆ Soil health and conservation.
- ◆ Role of living organisms.
- ◆ Conservation practices - Runoff control, contours.
- ◆ Tillage operations - mechanical, non mechanical, organic, Minimum and zero Tillage and application of nutrients (liquid and solid).
- ◆ Primary and secondary soil preparation methods.
- ◆ Soil preparation and Fertilizer application equipment.
- ◆ Nutrients - Mixtures, limes, calcite and dolomite lime, single nutrients and compost, liquids, etc.
- ◆ Calibration of equipment.

### Learning Assumed to be in Place:

- ◆ NQF2, Literacy and Numeracy
- ◆ NQF2, 116053, Understand basic soil fertility and plant nutrition
- ◆ NQF 3, 116269, Supervise the collection of agricultural data
- ◆ NQF 3 (F), 116269





# Learning Program Time Frames

	Total time allocated (hours)	Theoretical learning time allocated (hours)	Practical learning time allocated (hours)	Activities to be completed
<b>Complete Program (including summative assessment)</b>	50 hours	28 hours 30 minutes	21 hours 30 minutes	11
Learner Orientation and "Ice Breaker"	1 hour	30 min	30min	n/a
Purpose, Introduction and Learner Directions	1 hour	30 min	30 min	n/a
Session 1	10 hours	6.5 hours	3.5 hours	1-3
Session 2	7.5 hours	5 hours	2.5 hours	4-5
Session 3	4.5 hours	3.5 hours	1 hour	6
Session 4	10.5 hours	7 hours	3.5 hours	7-9
Session 5	13 hours	3.5 hours	9.5 hours	10-11
<b>Preparation for Assessment &amp; revision</b>	2.5 hours	2 hours	30 minutes	n/a

## Tips for level of learning



Remember the following before you get started:

**Typically, a learning programme leading to the award of a qualification or unit standards at level 3 should develop learners who demonstrate an ability to:-**

- Operate within clearly defined contexts.
- Work and learn within a managed environment.
- Actively contribute to team effectiveness.
- Take position on available information, discuss the issues and reach a resolution; produce a coherent presentation and report, providing explanations for positions taken.
- Summarise and interpret information relevant to the context from a range of sources.
- Use their knowledge to select appropriate procedures to solve problems within given parameters.
- Apply skills in measuring the environment using key instruments and equipment operational literacy and numeracy skills; use basic procedures and operations to complete complex tasks.
- Understand the organisational and operating environment as a system.
- Understand one or more fields or discipline's key concepts and knowledge, in addition to the fundamental areas of study.

## Tips for the Facilitator



- It is important to ensure that the learners who are undertaking this learning program has already completed the correct prior learning modules, to ensure that they are not unfairly disadvantaged by the learning process, and can be supported accordingly.
- Fertilization procedures may differ between different crop types as well as between farms growing the same crop. Ensure that in all cases the site specific methodology, procedures and industry specifications are incorporated into the learning experience. These should also be considered during assessment.
- Spend additional time ensuring all relevant concepts are discussed and properly understood. If at all possible, show instruments used to measure these values and give examples of actual values obtained with samples and actual measurement.

## Facilitator's Checklist & Training Aids

### Learner support strategies:

Learners are supplied with all resources and aids as required by the programme – including:

- Objects & devices such as equipment, protective clothing, safety gear, etc.
- Learner Guides and Learner Workbook
- Visual aids, etc.

Use this checklist below during your preparation to ensure that you have all the equipment, documents and training aids for a successful session.

Preparation:	Yes	No
<b>Qualification Knowledge</b> – I have familiarised myself with the content of the applicable qualification		
<b>Unit Standard Knowledge</b> – I have familiarised myself with the content of all aspects of the applicable unit standard		
<b>Content Knowledge</b> – I have sufficient knowledge of the content to enable me to facilitate with ease		
<b>Application knowledge</b> – I understand the programme matrix & have prepared for programme delivery accordingly		
<b>Contextualisation</b> – I have included information which is specific to the commodity and practices related to the commodity		
<b>Ability to respond to learners background &amp; experience</b> – I have studied the learner demographics, age group, experience & circumstances & prepared for programme delivery accordingly		
<b>Enthusiasm &amp; Commitment</b> – I am passionate about my subject & have prepared my programme delivery to create a motivating environment with real commitment to success		
<b>Enterprise knowledge</b> – I know & understand the values, ethics, vision & mission of the workplace & have prepared my programme		



delivery, reporting & administrative tasks accordingly.		
<b>Equipment check:</b>		
Learner guides x 1 per learner		
Assessment guides x 1 per learner		
Writing materials & stationary (facilitator & learner)		
White board & pens		
Flip chart paper		
Proxima projector & screen		
Laptop & programme disk		
Sample Hand-outs and examples of laws and other relevant documents		
Safety gear as prescribed by unit standard and applicable legislation		
<b>Documentation checklist:</b>		
Attendance Register		
Course Evaluation		
Learner Course Evaluation		
Portfolios of evidence		

## Contextualization of Content!

Go through this module and indicate what specific **information / activities / examples** should be included in this module?

Contextualisation	
<ul style="list-style-type: none"> <li>Commodity specific?</li> </ul>	
<ul style="list-style-type: none"> <li>Operating procedures of the farm?</li> </ul>	
<ul style="list-style-type: none"> <li>Agricultural practices?</li> </ul>	
<ul style="list-style-type: none"> <li>Agricultural markets?</li> </ul>	

Session

1

# Prepare for soil and foliar nutrient applications using specialized equipment

Learner Guide:  
Page 11

After completing this session, the learner should be able to:

**SO 1: Prepare for soil nutrient applications using specialized equipment.**

Concept (SO 1)	Time frame	Activities related to the concept
The ability to use specialized equipment is demonstrated.	<b>10 hours</b>	<b>Activity 1-3</b>
The ability to calibrate specialized equipment is demonstrated.		
The ability to select the appropriate nutrients for application from storage facilities is demonstrated.		

## Tips for the Facilitator



- ◆ Learners should be familiar with the application of fertilizers in various forms and using various methods. Place emphasize on the completeness of the procedure to be followed and on the manner in which fertilizer applications should be supervised.
- ◆ Substitute the example provided in the learner guide example with one from a farm where the learners work if required. Discuss in detail how the program is set up and what each instruction or value means.
- ◆ If learners do not have previous experience of fertigation, arrange for a site visit to a farm where fertigation is used.
- ◆ Discuss the reasons for foliar applications and ensure that learners are made aware of the fact that all fertilizers are not suitable for foliar applications.
- ◆ If possible, have the fertigation / fertilization manager explain to learners how the system is implemented in practice. Also ensure that the guidelines and principles are explained to the learners.
- ◆ Allow time for the learners to read through the summary and to gauge their own progress. Make sure that each and every learner gets and opportunity to ask questions.



**Please allow learners to complete Activity 1, 2 & 3 in their Learner Guides**

Type of activity	Resources
1. Group Activity	Learner Guide
<b>Instructions to give to the learners</b>	
Explain the methodology of drawing a flow diagram and concluding information from it. Then allow groups to break away and draw their flow diagrams and answer the questions. Allow time for learners to give feedback and comment on each other's flow diagram.	
Type of activity	Resources
2. Case Study	Learner Guide
<b>Instructions to give to the learners</b>	
Present the case study to the learners, hold a class discussion about it and allow time for learners to answer the questions.	
Type of activity	Resources
3. Worksheet	Learner Guide
<b>Instructions to give to the learners</b>	
Encourage learners to answer this worksheet on their own, as per the understanding they have of the concepts asked and in their own words.	

**My Notes ...**

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Session

# 2 Collection, storage and dispatch of samples for nutrient analyses

**Learner  
Guide:  
Page 21**

*After completing this session, the learner should be able to:*

**SO 2: Supervise the collection of samples, and the storage and dispatch of samples to appropriate service providers.**

Concept (SO 2)	Time frame	Activities related to the concept
The ability to take and handle leaf, soil and fruit samples according to prescribed procedures are demonstrated.	<b>7.5 hours</b>	<b>Activity 4-5</b>
The process of recording and dispatching the samples to the appropriate service provider is explained.		

## Tips for the Facilitator



- ◆ Revise the sampling procedures discussed in level 2 briefly by having a class discussion where learners share their knowledge and understanding of the subject.
- ◆ Hold a class discussion during which learners are allowed to discuss what they have seen go wrong and what they think can go wrong in sampling
- ◆ Use an example from the learners' own workplace if possible, and ensure that they understand the information that must be contained in a consignment note.
- ◆ The summary is an opportunity to check the progress that learners have made.
- ◆ Allow time for the learners to read through the summary and to gauge their own progress. Make sure that each and every learner gets and opportunity to ask questions.



# 3 Nutritional deficiencies in crops

Session

**Learner  
Guide:  
Page 28**

*After completing this session, the learner should be able to:*  
**SO 4: Identify and interpret symptoms of nutritional deficiencies in various crops and make basic recommendations.**

Concept (SO 4)	Time frame	Activities related to the concept
The relationship between plant abnormalities and deficiencies of specific macro- and micro- nutrients is explained.	<b>4.5 hours</b>	<b>Activity 6</b>
Basic recommendations for improving soil fertility are made.		

## Tips for the Facilitator



- ◆ Work through a brief summary of the role of the different elements in the specific crop.
- ◆ Then discuss the elements in more detail. Remember to also discuss the symptoms of nutrient deficiencies and nutrient toxicities.
- ◆ The summary is an opportunity to check the progress that learners have made.
- ◆ Allow time for the learners to read through the summary and to gauge their own progress.
- ◆ Make sure that each and every learner gets an opportunity to ask questions.



**Please allow learners to complete Activity 6 in their Learner Guides**

Type of activity	Resources
6. Worksheet	Learner Guide

**Instructions to give to the learners**

Encourage learners to answer the worksheet as a progress check, as per their own understanding and in their own words.



# 4 Plant Nutrition and Soil Preparation

Session

**Learner  
Guide:  
Page 40**

*After completing this session, the learner should be able to:*

**SO 3 : Demonstrate an understanding of the properties of soil and how these impact on plant nutrition and soil preparation.**

Concept (SO 3)	Time frame	Activities related to the concept
The impact of soil properties on plant nutrition is explained.	<b>10.5 hours</b>	<b>Activity 7-9</b>
The impact of soil properties on soil preparation is explained.		

## Tips for the Facilitator



- ◆ Discuss each physical soil property in terms of the impact it has on the availability of nutrients, and on the growth of the plant.
- ◆ Learners should be familiar with plant respiration. Be alert to learners that do not understand the concept.
- ◆ Discuss what each chemical soil property entails and how it influences the plant. Also discuss how the chemical soil properties might influence the accessibility of nutrients and the growth of the plant.
- ◆ Place emphasize on the salt indexes of fertilizers that learners may be familiar with. Discuss how this plays a role in the manner in which fertilizer is applied.
- ◆ Ensure that learners understand the concept of homogeneity. If possible, provide examples or pictures of homogenous soil.
- ◆ It is recommended that an SME hold a brief discussion about soil surveying with the learners if possible and that learners are allowed to ask questions during this discussion.
- ◆ The summary is an opportunity to check the progress that learners have made.
- ◆ Allow time for the learners to read through the summary and to gauge their own progress. Make sure that each and every learner gets and opportunity to ask questions.



**Session**

# 5 Supervise and implement Soil Preparation and Remediation

**Learner  
Guide:  
Page 50**

*After completing this session, the learner should be able to:*  
**SO 5 Supervise and implement soil preparation and remediation**

Concept (SO 5)	Time frame	Activities related to the concept
An understanding of the special cultivation needs of various soils is demonstrated.	<b>13 hours</b>	<b>Activity 10-11</b>
Appropriate implements and/or methods for soil preparation is selected.		

## Tips for the Facilitator



- ◆ It is important to remind learners that they have to arrange for practical work on the farm in the soil preparation and fertigation department after the theoretical module has been completed. It is recommended that they hand in signed-off job cards to indicate that they spent time in these departments and show what tasks they completed.
- ◆ Ask the questions why is soil preparation done, what happens if soil preparation is not done, are there different in soil preparation techniques, and is all soil preparation equally effective?
- ◆ If possible, show in practice how a soil probe is used, or show footage on the subject. Ensure that learners understand how it is used.
- ◆ Discuss these methods in detail and ensure learners understand the difference between them and the reasons for choosing one or the other.
- ◆ The summary is an opportunity to check the progress that learners have made.
- ◆ Allow time for the learners to read through the summary and to gauge their own progress. Make sure that each and every learner gets an opportunity to ask questions.



**Please allow learners to complete Activity 10 & 11 in their Learner Guides**

Type of activity	Resources
10. Group Activity	Learner Guide

**Instructions to give to the learners**

Explain the concept of a mind map and then allow time for groups to draw their mind maps, answer the questions and give feedback to the class.

Type of activity	Resources
11. Worksheet	Learner Guide

**Instructions to give to the learners**

Encourage learners to answer the worksheet as per their understanding, in their own words and as a check to their own progress and ensure that they have gained the necessary knowledge.

**My Notes ...**

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# What will I do differently next time?

Take some time to **reflect** on your own activities as facilitator of this Unit Standard.

Then write down five of the most important lessons you have learnt and include a motivation:

What will I do differently next time?	Motivate how or why (Give examples, reasons, etc.)
1.	
2.	
3.	
4.	
5.	

As facilitator, you have hands on experience in the application of the unit standard.

And you might experience difficulties with the unit standard that the developers did not anticipate. Also, the unit standard will be revised at the end of the registration period. Your comments below can be an important contribution in the revision process and should be brought to the attention of either the AgriSETA ETQA manager or the SGB chairperson.

Please take some time to reflect on your experience and list a few of the difficulties you had to address.

Difficulties I had with the Unit Standard	Recommended Changes to Address the Difficulty
6.	
7.	
8.	
9.	
10.	