



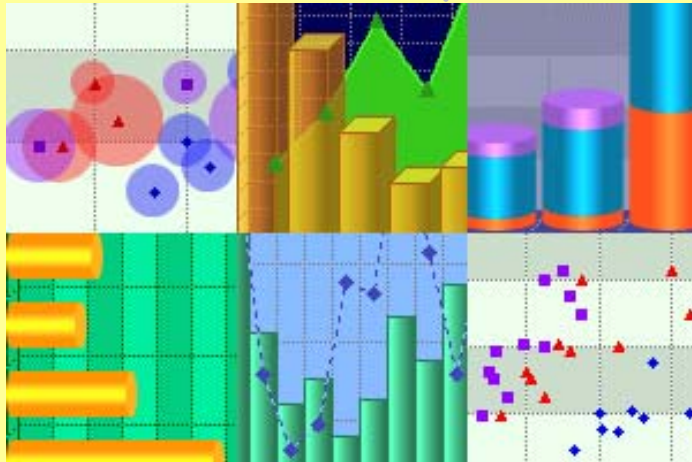
NOF Level: 4

US No: 116312

# Learner Guide

## Primary Agriculture

### *Implement a data collection 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.



## Before we start...

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

<b>Title: Implement a data collection plan</b>		
<b>US No: 116312</b>	<b>NQF Level: 4</b>	<b>Credits: 4</b>

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:

Title	ID Number	NQF Level	Credits	Mark
National Certificate in Animal Production	49009	4	120	ρ
National Certificate in Plant Production	48979	4	120	ρ

Please mark the learning program you are enrolled in:

Your facilitator should explain the above concepts to you.

Are you enrolled in a:	Y	N
Learnership?	ρ	ρ
Skills Program?	ρ	ρ
Short Course?	ρ	ρ

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.

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.

## How to use the activity sheets...

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 and worksheets, 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 roll in reaching competence.
- ♥ When you have completed all the activities and worksheets, hand this workbook in to the assessor who will mark it and guide you in areas where additional learning might be required.
- ♥ You should not move on to the next step in the assessment process until this step is completed, marked and you have received feedback from the assessor.
- ♥ Sources of information to complete these activities should be identified by your facilitator.
- ♥ **Please note** that all completed activities, tasks and other items on which you were assessed must be kept in good order as it becomes part of your **Portfolio of Evidence** for final assessment.

*Enjoy this learning experience!*

## How to use this guide ...

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



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



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.



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.

.....

.....

.....

.....

.....

.....

## *What are we going to learn?*

What will I be able to do? .....	6
What do I need to know? .....	6
Learning Outcomes .....	6
Introduction.....	7
Session 1: Interpret a data collection plan .....	8
Session 2: Implement a data collection plan .....	17
Session 3: Interpret and analyze the collected data .....	25
Session 4: Present collated data coherently.....	28
Am I ready for my test? .....	33
Checklist for Practical assessment .....	34
Paperwork to be done .....	35
Bibliography .....	36
Terms and Conditions .....	36
Acknowledgements .....	37
SAQA Unit Standard	

## What will I be able to do?

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

- ◆ Implement a data collection plan in the agricultural sector;
- ◆ Effectively analyse, interpret and evaluate agricultural data;
- ◆ Communicate findings accurately;
- ◆ Recognize, interpret and report on a range of deviations in data collection processes;
- ◆ Extend their learning and practice into other areas of information management and dissemination in the agricultural sector;
- ◆ Understand the value of accurate data collection to the agricultural sector;
- ◆ Implement best practices in the area of information gathering;
- ◆ Understand the importance of the application of business principles in agricultural production with specific reference to information systems and technology;

## 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: Supervise the collection of agricultural data.

## Learning Outcomes

**At the end of this learning module, you must be able to demonstrate an advanced knowledge and understanding of:**

- ◆ Different methods of data collection.
- ◆ Selection and application of data collecting methods.
- ◆ Analysing and evaluating of collected data for problem identification and decision-making.
- ◆ Methods of analysing and interpreting data.
- ◆ Report writing.



## Introduction

### v What is Agricultural Data?



#### **Agricultural Data Collection**

The process of gathering information, such as profit margins per cultivar, pest and disease infestations, weather and climatic information, rainfall, costs, economic conditions – and analysing it to be able to find patterns that will help us work more efficiently, sustainably and profitably on a farm.

### v **Agricultural data could be any of these items listed below:**

- ◆ Occurrence of pest and disease infestations.
- ◆ Weather and climatic information – year on year.
- ◆ Rainfall & Soil sample data
- ◆ Costs of agricultural inputs
- ◆ Yield data
- ◆ Prevailing economic conditions in the sector, country and internationally.
- ◆ Production costs per crop.
- ◆ Soil and fertilisation costs and applications.
- ◆ Pest and Weed Control application programs and statistics
- ◆ Non-target species data
- ◆ Crop quality margins
- ◆ Agronomic data
- ◆ Profit margins per cultivar / per crop / per block / per orchard / per Hectare
- ◆ Agricultural photographic data

### v **The reasons why we would see to the accurate collection of Agricultural Data and report on it**

Patterns of the environment include rainfall, climate, dry cycles, original vegetation, seasons, movement patterns of animals, etc. Processes of the biophysical environment include the interaction and the relationship between food webs, human activities, soil, climate, water, plants, animals and solar energy.

It is always useful to have detailed records and data in order to ensure that we make optimum decisions in order to maximise profits, production and quality, whilst keeping risks and problems to a minimum. Detailed records of data need to be integrated, compared and correctly and accurately reported on, in order to make data useful and applicable in an agricultural setup.

Session



# Interpret a data collection plan

After completing this session, you should be able to:  
**SO 1: Interpret a data collection plan**

In this session we explore the following concepts:

- ◆ Explain a range of data outlined in the data collection plan.
- ◆ Create a schedule for data collection
- ◆ Identify the appropriate methods for collection
- ◆ Perform data scheduling and see that the schedule takes the activity plan of the enterprise into account
- ◆ Identify possible dates that clash with other scheduled events and make alternative plans.

## 1.1 Elements of data collection

Let's make sure that you know what the elements of data collection are before we work on the data collection plan:

### v Collecting Samples

There are various well-known and tried and trusted methods of sampling. Before we explore these different methods, let us first decide what types of things we could possibly sample and what those samples could tell us.



#### **Agricultural Sampling:**

Removing and/or examining a portion of an entire set (i.e., examining three leaves per plant on 20 plants in a 11 ha field).



## v Measuring

(It is expected that person doing this unit standard is competent in the units of measuring, and can assure to the performance of measurement under instruction and by delegation of such tasks.

### There are seven SI base units:

- ◆ the **meter** for distance,
- ◆ the **kilogram** for mass,
- ◆ the **second** for time,
- ◆ the **ampere** for electric current,
- ◆ the **Kelvin** for temperature,
- ◆ the **mole** for amount of substance, and
- ◆ the **candela** for intensity of light.

There are also other units of measure derived from SI – some of these that you might encounter include:

- ◆ the **Newton** for force and the **Pascal** for pressure;
- ◆ the **joule** for energy and the **watt** for power;
- ◆ the **degree Celsius** for everyday measurement of temperature;
- ◆ the traditional mathematical units for measuring **angles** (degree)
- ◆ the traditional units of civil **time** (minute, hour, day, and year);
- ◆ two **metric** units commonly used in ordinary life: the liter for volume and the ton (metric ton) for large masses;
- ◆ **knot**, units traditionally used in meteorology;
- ◆ the **hectare**
- ◆ the **bar**, a pressure unit

## v Weighing

(It is expected that a person doing this unit standard is competent in the units of weighing, and can assure to the performance of measurement under instruction and by delegation of tasks).

### ***The International System of Units (SI)***

All systems of weights and measures, metric and non metric are linked through a network of international agreements supporting the **International System of Units**. The International System is called the **SI**, using the first two initials of its French name *Système International d'Unités*.

## v Counting, Observing, Recording

### ◆ Observing

**How and what to observe?** Observation is one of the most important aspects of collecting Agricultural Data. It is a skill developed through dedicated action and meticulous methodology. A person doing this unit standard should be able to realize the importance of observation while collecting samples.



#### **Observing:**

Observation basically means watching something and taking note of anything it does. For instance, you might observe a bird flying by watching it closely. The sciences of biology and astronomy have their historical basis in observations by amateurs, therefore Agricultural data is often much enhanced by focused observation.

### ◆ Counting

Counting plays a very big role in collecting Agri-data. A farmer may decide to count the number of weeds or pests in a specific area, in order to determine whether or not chemical pest control is necessary.

- We also count the amount of fertilizer, and the number of plants or trees in any given area, in order to determine:
- “How much” fertilizer we should give.
- “How many” fruit it delivered.
- “How much” money we spent to fertilize, pest control, etc. each and every plants.

### ◆ Recording

Recording may take place in various forms, namely: in written form, in oral form, electronically, digitally, photographically, on tape or cassette. The most important point to remember about the recording of data, is that it should be

- Accurate, and
- Current (meaning up to date).

When this is the case, the integrity of the data is sound. If not, the integrity of the data is compromised and not reliable and might lead to incorrect interpretation and findings, as well as incorrect decisions.

v **Scouting**

Scouting, or monitoring pest populations, is part of an Integrated Pest Management (IPM) system. IPM prescribes treating the portions of a farm or field that have identified higher than threshold levels of pests, rather than treating the whole field, resulting in using less applied farm chemicals. *The person doing this unit standard should acquaint him/herself with the methods of scouting on different crops, by sourcing training manuals or production manuals of each crop.*



**Agricultural Scouting:**

Systematic, regular monitoring of a crop or ornamental planting or landscape.

v **Monitoring**

Monitoring would imply to count and observe a certain data package or the collection of data over a certain time period.



Concept	I understand this concept	Questions that I still would like to ask
The different elementary methods of data collection in Agriculture.		
Interpreting a gauge.		
Measuring.		
Observing.		
Collecting samples (sweeping, trapping)		
Counting.		
Scouting.		
Monitoring		
The advantages and disadvantages of different methods of data collection.		

## 1.2 Data collection Plan

The data collection plan would depend on the type of data you would wish to collect. The type of data could be any aspect of agriculture like, pest numbers, plant numbers, soil analyses data, weather data, poultry data, control of stock etc.

Steps to compile a data collection plan:

Step	Action	Example
Step 1	Identify the data set	Poultry data – broilers
Step 2	Set the period for data collecting (over a month, a year etc.)	For broilers 1 year
Step 3	The method of collecting (weighing, counting (trapping, sweeping, catching etc), measuring etc.)	Counting eggs
Step 4	Determine the schedule of collecting, implying when during this set period will I see to it that the necessary data is gathered by the ascribed means	Weekly counting eggs from broilers
Step 5	Make a “plan b”, meaning an alternative option for when your activities of collecting may coincide with other activities on the farm	Assign a different person to collect the eggs, if your main “collector” of this egg data, is needed to do something else, e.g. drive the tractor, or collect eggs on the following day

Requirement:	The data collection plan should be in writing and visually presented in order for it to be easily understandable and accessible for the person who are responsible for the collection of data, and for the person who are conducting the planning to be at hand for revising and implementation ( <i>see example below</i> )
--------------	--

A typical data collection plan would include what is explained in the example below.



**Budget for record keeping of three-week old broilers on a farm.** In order to keep three-week old broilers, the farmers should know that he or she needs a grower house to keep chicken, a feed storeroom, enough water, and the knowledge and skills to look after the birds, how to feed them, how to recognize and guard against disease, and then for the purpose of this example, how to keep record of them and how to market them. The first step would be to plan the range of data needed to keep the broilers. Thus the budget for home egg production by the broilers. This type of data or budget would perhaps look like this:

Data Collection Plan		
Complete a budget for a home egg production for one year:		
<b>Expenses:</b>		
<b>Fixed costs:</b>		
Cage:		
12 POL pullets	@ R_____ /pullet (chicken)	R_____
<b>Running Costs:</b>		
Feed: _____ bags layer mash	@ R_____ /bag	R_____
<b>Other Expenses</b>		R_____
		Sub-Total: R_____
<b>Income:</b>		
Eggs eaten by your household	(_____ doz x R_____ /doz)	R_____
Sales of eggs	(_____ doz x R_____ /doz)	R_____
Sale of old hens	(_____ hens x R_____ /hen)	R_____
		Sub-Total: R_____
<b>Surplus = Income – Expenses</b>		R_____

**BROILER RECORD SHEET**

BATCH NO: \_\_\_\_\_ Shed no.: \_\_\_\_\_ Breed: \_\_\_\_\_

Hatch Date: \_\_\_\_\_ Starting no.: \_\_\_\_\_

Feed given (bags)								
Day	1	2	3	4	5	6	7	Total
Week 1								
Week 2								
Week 3								
Week 4								
Week 5								
Week 6								
Week 7								
Week 7								
Week 8								
Total								

Deaths and culls								
Day	1	2	3	4	5	6	7	Total
Week 1								
Week 2								
Week 3								
Week 4								
Week 5								
Week 6								
Week 7								
Week 7								
Week 8								
Total								

Live body weight at 42 days:

No. of birds weighed \_\_\_\_\_

Total feed intake \_\_\_\_\_ kg/bird

Total weight of birds \_\_\_\_\_ kg

Mortality \_\_\_\_\_ %

Average weight of one bird \_\_\_\_\_ kg

FCR (food conversion rate ) \_\_\_\_\_

Remarks Mr. Gumede is responsible for collection of feeding data for weeks 7 & 8, since Mr. Poto would be on leave for this period.

\_\_\_\_\_

\_\_\_\_\_

**LAYER RECORD SHEET**

BATCH NO: \_\_\_\_\_ Shed no.: \_\_\_\_\_ Breed: \_\_\_\_\_

Hatch Date: \_\_\_\_\_ Starting no at POL.: \_\_\_\_\_ Age at beginning of period \_\_\_\_

Feed given (bags)								
Day	1	2	3	4	5	6	7	Total
Week 1								
Week 2								
Week 3								
Week 4								
Week 5								
Week 6								
Week 7								
Week 7								
Week 8								
Total								

Deaths and culls								
Day	1	2	3	4	5	6	7	Total
Week 1								
Week 2								
Week 3								
Week 4								
Week 5								
Week 6								
Week 7								
Week 7								
Week 8								
Total								

Eggs laid (Saleable = G and Non Saleable = B)								
Day	1	2	3	4	5	6	7	Total
Week 1								
Week 2								
Week 3								
Week 4								
Week 5								
Week 6								
Week 7								
Week 8								
Total								



Eggs laid (Saleable = G and Non Saleable = B)															
Day	1G	1B	2G	2B	3G	3B	4G	4B	5G	5B	6G	6B	7G	7B	Total
Week 1															
Week 2															
Week 3															
Week 4															
Week 5															
Week 6															
Week 7															
Week 8															
Total															

Feed intake \_\_\_\_\_g/hen/day

Mortality \_\_\_\_\_ %

RDL

Remains



Please complete **Activity 1**:

**Group & individual activity:** Brainstorm the example above in your small group. Create a data collection plan for your own context by following the steps mentioned above.



Concept (SO 1, AC 1-5)	I understand this concept	Questions that I still would like to ask
The range of data outlined in the data collection plan is explained.		
A schedule for data collection is created.		
The appropriate methods for collection are identified.		
Data scheduling takes the scheduled activities of the enterprise into account.		
Possible dates that clash with other scheduled events are identified and alternative plans made.		

Session

# 2 Implement a data collection plan

After completing this session, you should be able to:  
**SO 2: Implement a data collection plan.**

In this session we explore the following concepts:

- ◆ See to it that data collection is done at the scheduled times
- ◆ Supervise the collation of data promptly, according do the data collection plan
- ◆ Identify and report on gaps and/or irregularities in the data collection methods.

## 2.1 Schedule the time of collection of the data

The time of collection of the data should be scheduled to suit the specific type of data which is collected. For insects, the time of collection by means of sweeping would for example be early morning before the insects are agile and fly around, and it should be scheduled on a constant basis, e.g. sweeping early mornings, once a week for 6 weeks.

A person doing this unit standard should be able to supervise the collection of the data and see that it is done at specific times. Depending on the site or set-up where data is collected, a mechanism can be put in place to check of data is collected according to the scheduled times. A logbook can be completed, a check-in –check-out system can be installed, or the person collecting the date can be merely trusted and asked to deliver the data sheet on time, or it can be checked on completion at the appropriate time.



In the example of broilers used above, a broiler recording sheet is designed to:

- ◆ Mark the date each time you start a new bag of feed
- ◆ Mark every time a bird dies or is culled (removed due to sickness)
- ◆ Complete the recording sheet every day and deliver to the supervisor.

## 2.2 *Supervise the collection of the data according to plan*

A person doing this unit standard should be able to instruct and advise on the collation of a data sheet, in order to deliver the most relevant data. The person completing this Specific Outcome should be able to instruct and advice on the collation of data for a specific purpose, and the explanation should be given clearly.



In the above broiler example discussed in Session 1 of this Learner Guide, the farmers have to determine the % mortality as part of his data set to determine his annual income. He calculates the mortality by not only recording each day's death or sickness, but also combining these numbers to do a calculation. He was advised to calculate the mortality by dividing the total number of broilers at the start of the programme. Then he should divide the number of deaths over the period by the number of boilers at the start. (For 200 broilers, 24 deaths / 200 broilers = 0.12). Mortality is expressed as a %, so he multiplies this figure by 100. ( $0.12 \times 100 = 12\%$ ). He then reports on the percentage mortality.

## 2.3 *Identify gaps and irregularities in data collection*

Data may often be suggestive and not provide the information which was required, if not all factors that can have an influence on the issue are taken into account. The data set obtained should provide sensible logical information within the context it was gathered or collected. The data should be gathered while taking note of the specific environmental conditions, functioning state of the apparatus used, time-frame given, and the socio-economic context of the people involved.



A survey done on whether households do have vegetable gardens or not. The survey was done on a number of households within two specific areas. The data was collated and tabled in order to submit a report to an agricultural investor. The aim of the investor was to determine the focus of future skills training and farming initiatives in the area.

Reasons	Area 1	Area 2	Total
Respondents no. (out of 30)	14	10	24
Poor access to resources	12	5	17
Lack of fences	4	10	14
Insufficient labor	14	5	19
Seedlings not available	14	1	15
Other means of income	4	8	12
Lack of knowledge	14	10	24
Household plot too small	5	8	10
Soil problems	2	3	5

(adapted from Land Development Unit, 1994-5,)

#### v Interpretation of the data:

For the 1<sup>st</sup> area, the lack of vegetable gardens was described as a result of:

- ◆ Lack of fences in the area,
- ◆ Poor access to resources, and
- ◆ Insufficient labor.

For the 2<sup>nd</sup> area, the lack of vegetable gardens was described as a result of:

- ◆ The unavailability of seed was a problem;
- ◆ Small plots, and
- ◆ The fact that most families had other income.

#### v Gaps and irregularities in the data

A person within this context should be able to advise and fill the gap of the few respondents who answered the questionnaire out of 30 people in each case. In addition, no mention was made concerning the availability of water and compost for gardening purposes, or how the households would require the skills to provide water for gardening.

The low number of people responding to the questionnaire, should also be correlated with their socio-economic status, since in both of these areas, a very high

number of people is HIV positive and not physically strong to do the labor, which is probably reflected in the data of the people from area 1.

v **Let's look at problems that can occur by:**



Please complete **Activity 2**:

**Individual activity:** Complete the table below by describing the problems that could arise with different collection methods. **(Refer to SO 2 AC 1-3)**

Type of data:	Pests data
Correct Method of collection:	<p>Sampling within individual fields is also done objectively. Surveyors strive to enter a given field without letting field conditions influence their choice of entrance location. Once in a field, a pest is sampled repeatedly along a transect with fixed spacing so as to try to achieve an accurate estimate of the pest conditions in that portion of the field.</p> <p>Sampling is done by sweep netting, trapping, which can include but is not limited to sticky traps, light traps, pheromone traps, trap crops etc., inspecting individual plants, inspecting a certain unit of the ground, or by other means depending on the crop and the target pest.</p> <p>Typically a surveyor will employ multiple sampling methods in an individual field and will be estimating numbers of multiple insect species as well as the presence of disease or weeds.</p>
Problems that can arise with a specific kind of data:	(mention 5)
Questions I would like to ask:	

Type of data:	Economic indicator data
Correct Method of collection:	These include indications of items such as the Rand vs Dollar exchange rate, the price of oil, the price of gold and many more.
Problems that can arise with a specific kind of data:	(mention 2)
Questions I would like to ask:	

Type of data:	Diseases data
Correct Method of collection:	<p><b>The type of Crop</b></p> <p>There are specific crops with very specific disease vulnerabilities. Accordingly, we will try to determine whether our farm's crops are more or less affected than average.</p> <p><b>The type of Disease</b></p> <p>Only diseases that can cause us to lose our crop of that can have a financial impact on our crop are reported on.</p> <p><b>Pathogen</b></p> <p>This is the scientific name of the organism that causes the disease in the first place.</p> <p><b>Weather station and sensor location</b></p> <p>The location of weather monitoring equipment relative to the crop canopy. The sensors that monitor the environmental variables are important, and they should be located within the crop canopy in order to give accurate information.</p> <p>Variables typically monitored include temperature, precipitation, relative humidity, and leaf wetness, wind.</p>
Problems that can arise with a specific kind of data:	(mention 2)
Questions I would like to ask:	

Type of data:	Agro-chemicals data
Correct Method of collection:	<p>This type of data report should include information such as wind speed, humidity and temperature, every fifteen minutes, types of chemicals applied.</p> <p>Reasons for the application, results of the application.</p> <p>It is important to compare year on year information and statistics.</p> <p>It is also important to have regular stockholding and stock rotation reports, as agrochemicals do not have unlimited shelf life.</p>
Problems that can arise with a specific kind of data:	(mention 2)
Questions I would like to ask:	

Type of data:	Crop data
Correct Method of collection:	<p>This type of data report normally includes a list of the following:</p> <ul style="list-style-type: none"> <li>• The type of crop and cultivar.</li> <li>• Type of topography and soil the crop is planted on.</li> <li>• The soil preparation and fertilisation actions that was affected.</li> <li>• The spray program and quantities of agrochemicals, herbicides, pesticides and fertilisers applied.</li> <li>• Plant manipulation actions taken.</li> <li>• The grade and quality of the crop yielded.</li> <li>• The tonnage of the crop yielded.</li> <li>• The price per ton income for the crop.</li> <li>• The profitability of the crop.</li> <li>• Notes on Economic and External factors that might contribute to the overall crop yield, quality and profitability.</li> </ul> <p>This data report should be compared season on season and year on year.</p>
Problems that can arise with a specific kind of data:	(mention 5)
Questions I would like to ask:	

Type of data:	Stock control data
Correct Method of collection:	<p>It is important to have regular stockholding and stock rotation reports, as agrochemicals do not have unlimited shelf life, and some chemicals can be de-registered in time, due to a proven negative effect on the environment, e.g. monocrotophos. (De-registered in SA in 2005).</p>
Problems that can arise with a specific kind of data:	(mention 2)
Questions I would like to ask:	



Type of data:	Maintenance information
Correct Method of collection:	<p>Service technicians perform routine maintenance checks on diesel engines and on fuel, brake, and transmission systems to ensure peak performance, safety, and longevity of the equipment.</p> <p>Maintenance checks and comments from equipment operators usually alert technicians to specific problems.</p> <p>With many types of modern heavy and mobile equipment, technicians can plug diagnostic computers into onboard computers to diagnose a component needing adjustment or repair.</p> <p>After locating the problem, these technicians rely on their training and experience to use the best possible technique to solve the problem.</p> <p>If necessary, they may partially dismantle the component to examine parts for damage or excessive wear. Then, using hand-held tools, they repair, replace, clean, and lubricate parts as necessary.</p> <p>In some cases, technicians calibrate systems by typing codes into the onboard computer. After reassembling the component and testing it for safety, they put it back into the equipment and return the equipment to the field.</p> <p>Many types of heavy and mobile equipment use hydraulics, to raise and lower movable parts. When hydraulic components malfunction, technicians examine them for fluid leaks, ruptured hoses, or worn gaskets on fluid reservoirs.</p> <p>Occasionally, the equipment requires extensive repairs, as when a defective hydraulic pump needs replacing.</p> <p>In addition to conducting routine maintenance checks, service technicians perform a variety of other repairs.</p> <ul style="list-style-type: none"> <li>• They diagnose electrical problems and adjust or replace defective components.</li> <li>• They also disassemble and repair undercarriages and track assemblies.</li> <li>• They weld broken equipment frames and structural parts, using electric or gas welders.</li> </ul>
Problems that can arise with a specific kind of data:	(mention 3)
Questions I would like to ask:	



Session

3

*Interpret and analyze collected data*

After completing this session, you should be able to:  
**SO 3: Interpret and analyze collected data.**

**In this session we explore the following concepts:**

- ◆ Explain methods of analyzing and interpreting data
- ◆ Interpret and analyze data
- ◆ Check data for accuracy and rectify problems.

It is important that the learner should be able to identify the data relevant to satisfy his/her objective. By identifying the relevant data the method of explaining and analyzing the data is made easier. By this time, the data collected should be collated – grouped and interpreted and the relevant numbers should be compiled in the form of a report or in some other format and be ready for interpretation and analysis of the data. The learner doing this specific outcome should be able to explain the methods for analyzing and interpreting the data, but also be able to interpret initially, or further interpret the data sheet.



Recorded collated data formats (adjust to suit your context where you work in)

1. Written format: Graphical presentation; recording sheets or logbooks; tabulate)
2. Electronic format on a computer system
3. As an oral presentation
4. Visual presentation

Is the reporting format selected in a usable format for others?

Can data that is reported on be referred to at a later stage without doubt?

Data reported on should include additional comments or an opportunity to identify inconsistencies in the data sheet or alternative results that occurred as expected.

Tools used in the data collection process should be identified as being impaired or non-functional (electronic tools) and reported on as such.

If we consider an example it becomes more obvious what kind of methods of analyses we are referring to. It depends of the report format of the data set.

American bollworm moths: Light trap data													TOT AL
	2- Jan -02	22- Jan -02	11- Feb -02	4- Mar -02	25- Mar -02	15- Apr -02	6- May -02	27- May - 02	18- Jun -02	8- Jul- 02	29- Jul- 02	19- Aug -02	
L7 - Bt cotton	5	15	34	2	3	15	0	0	*	*			74
L7 - weeds	1	0	1	0	0	4	0	2	0	1			9
L12 - Bt cotton	1	24	30	0	0	18	1	*	*	*			74
L12 - Non- transgeni c cotton	*	*	49	2	3	35	0	*	*	*			89
L12 - weeds	9	17	10	0	0	1	1	*	*	*			38
Totals	16	56	12 4	4	6	73	2	2	0	1	0	0	284

This example represents American bollworm moth catches in a light trap for a number of dates during 2002. The most preferred method of analyses would probably be graphically. It is always good to represent a tendency over time graphically. The learner should adapt his or her method of analyses to suit the data set.

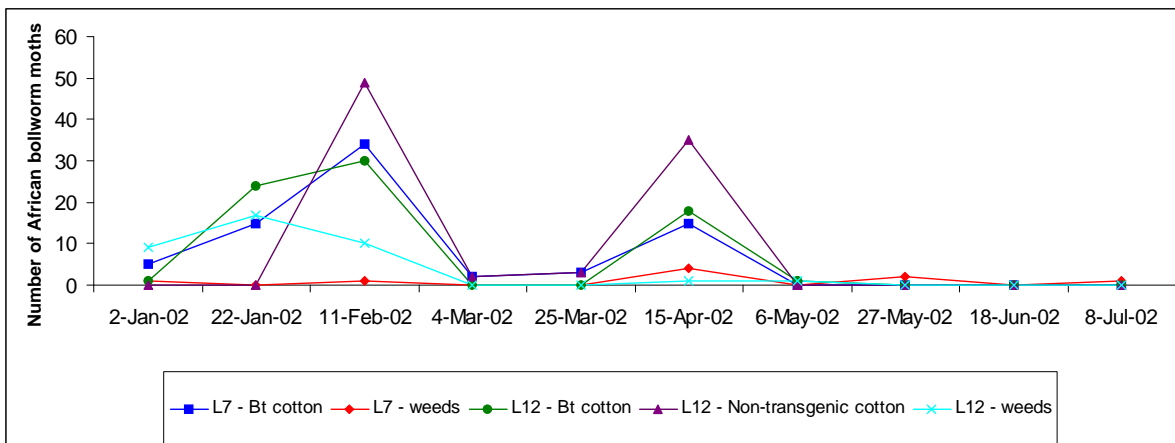


Figure: The number of African bollworm moths caught in the light trap from January to July 2002. (data adapted from Agri-Biotech Research Consultancies cc.)

In this example the data is analysed by presenting it graphically. It is interpreted by observation and studying the data set. In the above example the tendency for bollworms moths on all the cotton types could be observed and was highest on the non-transgenic cotton on two occasions. AC. 3.2.

A check for accuracy would reveal that the y-axis heading of the data set is incorrect and should not read "African bollworm" but " American bollworm" This could lead to confusion and should be corrected and reported on. It should also be explained in the table why some of the values were missing and not necessary zero values. In this case, the light trap batteries were stolen at the various localities. The learner should be able to advise on the problem and rectify the matter, by making a plan with the batteries and repeat the data set. AC 3.3.



Please complete **Activity 3**:

**Brainstorm in your group:** Obtain an example of a data sheet and discuss and decide on a method how to present it in your own context. Explain what measures you would put into place to ensure accuracy of the data and the importance of accurate data. Use the flipcharts to present it to the class. **(SO 3, AC 3.1-3.3)**



Concept (SO 1)	I understand this concept	Questions that I still would like to ask
Methods of analysing and interpreting data are explained.		
Data is analysed and interpreted.		
Data is checked for accuracy and problems rectified.		

*My Notes ...*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Session

# 4 Present collated data coherently

After completing this session, you should be able to:  
**SO 4: Present collated data coherently.**

**In this session we explore the following concepts:**

- ◆ Explain various methods of data presentation
- ◆ Select the most appropriate methods of data presentation
- ◆ Present data accurately
- ◆ State the findings of a report clearly.

When compiling agricultural data and collecting the information that is required, it is important to remember that it is important to choose the methods of data collection carefully in order to make reporting on the data easily understandable and applicable to the objective of data collection. In order to integrate different concepts and conclusions made based on the data set, it is necessary to present the collated data packages together. If it were a series of data gathered at different intervals, the presentation of the data sets in a consistent fashion would demonstrate the tendency in the data series.

## 4.1 Different methods of data presentation and the selection of the most appropriate method

Different methods of presentation are available depending on the data gathered. Most data sets in agriculture is aimed to be presented at decision makers, be it farmers, researchers, supervisors, politicians, trainers, extension officers etc.

At the farming level, the presentation of a set of data would probably be in a simple manner, and would be in line with the competency of the skills of the person presenting the data set. The presentation of the data is also determined by the extent of detail that is presented in the report, or by the person who are being supervised. Often, it may be that the person presenting the report would also gather the data , write the report and also present the results to his/her supervisor or to the interested parties.

## v Presenting Data

### ◆ Simple Ways of presenting data:

Transferred **verbally** with the aid of

- Flip charts
- Written reports
- Reported with drawings on paper, on blackboards, on pin-up boards.

Data report transferred in **writing**

- In tabular format,
- As a summary

### ◆ Advanced Ways of Presenting Data:

- Computer print outs e.g. Weather reports, statistical analyses, data logger reports, report of an instrument that measured a specific parameter, scanning reports etc.
- Computer print outs from data that was typed into the computer system and saved to a file for future reference, e.g. Excell spread sheets.
- Digital presentation by making use of a visual computer programme, such as Power point presentation (Windows Office software).
- DVD or video presentation of a series of data.
- Presentation by electronic media such as email.

Whichever method of presentation is selected, the importance issue is communication, be it verbally or in writing.

## 4.2 *The importance of presenting results accurately and state findings clearly*

Results or data should be presented accurately and the findings of the report should be stated clearly.

A person completing this learning outcome should be able to have a good comprehension of how important it is to present data packages accurately. The incorrect presentation of data could lead to incorrect and irrelevant findings made and further be presented as recommendations. The "accuracy" of the data should be correlated with the necessary skill required to provide the data information and to gather the data. Accurate data helps us to make meaningful decisions and to plan effectively in order to maximise our crop yield and crop quality, for maximum profitability and sustainability (i.e. without damaging our environment).



**In order for us to report and present data accurately it is important to remember the following points:**

<i>Step</i>	<i>Action Completed</i>	<i>Yes</i>	<i>No</i>
<i>Step 1</i>	Draft specific formats of sample-information collecting forms & reports.		
<i>Step 2</i>	Educate ALL staff that are involved in the data collection process, and be able to trace any missing values to a specific person who was responsible for collection of the data.		
<i>Step 3</i>	Maintain all equipment used for data collection correctly and properly (as to remain in excellent, calibrated working order).		
<i>Step 4</i>	Check and analyse reports and data critically on a regular periodic basis.		
<i>Step 5</i>	Link your presentation to the data sheet. E.g. a graphical presentation displayed as a power point presentation, should be able to link to the excel data sheet where the series presented contains the numbers.		
<i>Step 6</i>	You should be able to repeat the method of data collection and the subsequent presentation, but the results may vary depending on the context.		
<i>Step 7</i>	Draw sensible conclusions from your collated data in your presentation.		



In a questionnaire to two groups of inhabitants on gardening problems the following answers were given with regards to the pests attacking garden vegetables:

**Table: Indicating percentage of vegetable growers reporting on pests present in their gardens.**

Practice	Group 1	Group 2
Respondents no.	14	10
Snails	64	100
Leaf and stem-eating worms	21	30
Diseas	21	10
Aphids	14	20
Dogs	14	10
Moles	*	50
Birds	14	*
Other insects	14	*

Written report presented by e.g. extension officer:

All but two respondents reported specific pest problems. The results from the table above shows that snails were the principal pest, followed by leaf-end stem-eating worms (possibly cutwors). A variety of plant diseases included "rotting" while aphids and stray dogs, which trample gardens and dig out plants In the absence of fencing were troublesome. Strangely enough the second group did not report on moles, which are often a problem in this area. Lastly came the birds (not chickens) and other insects including ants and thrips.

In the above example, the deductions made in the written presentation, are good, but do not provide reasons for the accuracy in the data sheet. An important recommendation or not that should have been reported on could be in this case that the lack of insects to be reported on in the questionnaire as pests, is probably due to the persons answering the questionnaire being unskilled in the identification of insect pests. This would not provide accurate data, though it was correctly reported on as findings, but not explained fully. This example demonstrates that the findings and presentation of data should be explained and be brought into context when,

how and by whom the data was gathered. In this case human "error" could have a large implications in important decisions made if these groups of people need chemicals for pest control or not so. Collection of data packages should also be able to be repeated, though the results in some instances like weather reports may vary, as well as scouting of insects. Within a specific time frame, similar results may be obtained.



Please complete **Activity 4**:

**Brainstorm in your group:** Describe in a group in a number of points, what aspects you would consider when presenting a data sheet to ensure accuracy of the data and a statement of correct findings. The group leader should orally present his/her presentation. **(SO 4, AC 4.3-4.4)**



Concept (SO 4)	I understand this concept	Questions that I still would like to ask
Various methods of data presentation are explained.		
The most appropriate methods of data presentation are selected.		
Data is presented accurately.		
The findings of the report are clearly stated.		

## *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

Questions	1. I am sure	2. I am unsure
1. Explain verbally (individually or in groups) what steps you would take to interpret the collection plan received from a supervisor		
2. Explain within groups how you would see to the promptly implementation of a plan?		
3. Explain the methods you will use to analyse the collection plan.		
4. Discuss the method you would choose to present a set of collated data within his/her own context.		

*My Notes ...*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

## Checklist for practical assessment ...

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

Observations	Answer Yes or No	Motivate your Answer (Give examples, reasons, etc.)
Can you identify problems and deficiencies correctly?		
Are you able to work well in a team?		
Do you work in an organised and systematic way while performing all tasks and tests?		
Are you able to collect the correct and appropriate information and / or samples as per the instructions and procedures that you were taught?		
Are you able to communicate your knowledge orally and in writing, in such a way that you show what knowledge you have gained?		
Can you base your tasks and answers on scientific knowledge that you have learnt?		
Are you able to show and perform the tasks required correctly?		
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?		

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

## Paperwork to be done ...

Please assist the assessor by filling in this form and then sign as instructed.

Learner Information Form				
Unit Standard	116312			
Program Date(s)				
Assessment Date(s)				
Surname				
First Name				
Learner ID / SETA Registration Number				
Job / Role Title				
Home Language				
Gender:	Male:		Female:	
Race:	African:	Coloured:	Indian/Asian:	White:
Employment:	Permanent:		Non-permanent:	
Disabled	Yes:		No:	
Date of Birth				
ID Number				
Contact Telephone Numbers				
Email Address				
Postal Address				Signature:

## Bibliography

### v **Books:**

Encyclopedia Britannica – South African Version

People Farming Workbook – Environmental and Development Agency Trust

Cotton Management Guide (revised 2006); Institute for Industrial Crops – Agricultural Research Council (ARC).printed – Pro-Spec Media.

Magabolo V, M. Malaoa & D. Catling, Survey of Vegetable Gardens in Lower Crossroads and Langa Townships in 1994-5. Unpublished document March 1999, land Development Unit

Wethli, E. 1999. The Southern African Chicken Book. How to start a small business keeping chickens. Juta & Co Ltd, Kenwyn.

### v **World Wide Web:**

wordnet.princeton.edu/perl/webwn

www.tiaa-crefbrokerage.com/invest\_glosry\_PrPt.htm

www.en.wikipedia.org/wiki

www.indiaonline.com/bisc/accc.html

http://www.tshwane.gov.za/weeds.cfm

http://www.southafrica.info/ess\_info/sa\_glance/geography/biodiversity.htm

## 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](http://www.agriseta.co.za)).

**Users are free to produce and adapt this material to the maximum benefit of the learner.**

**No user is allowed to sell this material whatsoever.**



## Acknowledgements

v **Project Management:**

M H Chalken Consulting  
IMPETUS Consulting and Skills Development



v **Developer:**

Agri-Biotech Research Consultancies cc



v **Authenticator:**

Rural Integrated Engineering



v **OBE Formatting:**

Ms B Enslin

v **Design:**

Didactical Design SA (Pty) Ltd



v **Layout:**

Ms N Matloa



All qualifications and unit standards registered on the National Qualifications Framework are public property. Thus the only payment that can be made for them is for service and reproduction. It is illegal to sell this material for profit. If the material is reproduced or quoted, the South African Qualifications Authority (SAQA) should be acknowledged as the source.

**SOUTH AFRICAN QUALIFICATIONS AUTHORITY  
REGISTERED UNIT STANDARD:**

**Implement a data collection plan**

SAQA US ID	UNIT STANDARD TITLE		
116312	Implement a data collection plan		
SGB NAME	NSB	PROVIDER NAME	
SGB Primary Agriculture	NSB 01-Agriculture and Nature Conservation		
FIELD		SUBFIELD	
Agriculture and Nature Conservation		Primary Agriculture	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	4
REGISTRATION STATUS	REGISTRATION START DATE	REGISTRATION END DATE	SAQA DECISION NUMBER
Registered	2004-10-13	2007-10-13	SAQA 0156/04

**PURPOSE OF THE UNIT STANDARD**

The learner achieving this unit standard will be able to implement a data collection plan in the agricultural sector. S/he will be able to effectively analyse, interpret and evaluate agricultural data and be able to communicate findings accurately. In addition to this, the learner will be able to recognise, interpret and report on a range of deviations in data collection processes.

Learners will be well positioned to extend their learning and practice into other areas of information management and dissemination in the agricultural sector. Competent learners will understand the value of accurate data collection to the agricultural sector and be able to implement best practices in the area of information gathering.

Learners will understand the importance of the application of business principles in agricultural production with specific reference to information systems and technology.

They will be able to operate farming practices as businesses and will gain the knowledge and skills to move from a subsistence orientation to an economic orientation in agriculture. Farmers will gain the knowledge and skills to access mainstream agriculture through a business-oriented approach to agriculture.

**LEARNING ASSUMED TO BE IN PLACE AND RECOGNITION OF PRIOR LEARNING**

It is assumed that a learner attempting this unit standard will demonstrate competence against unit standard

- NQF 3: Supervise the Collection of Agricultural Data.

**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.

**UNIT STANDARD OUTCOME HEADER**

N/A

**Specific Outcomes and Assessment Criteria:**

**SPECIFIC OUTCOME 1**

Interpret a data collection plan.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**

The range of data outlined in the data collection plan is explained.

**ASSESSMENT CRITERION 2**

A schedule for data collection is created.

**ASSESSMENT CRITERION 3**

The appropriate methods for collection are identified.

**ASSESSMENT CRITERION 4**

Data scheduling takes the scheduled activities of the enterprise into account.

**ASSESSMENT CRITERION 5**

Possible dates that clash with other scheduled events are identified and alternative plans made.

**SPECIFIC OUTCOME 2**

Implement a data collection plan.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**

Data collection is done at the scheduled times.

**ASSESSMENT CRITERION 2**

Data is collated promptly according to the data collection plan.

**ASSESSMENT CRITERION 3**

Gaps and/or irregularities in data collection methods are identified and reported.

**SPECIFIC OUTCOME 3**

Interpret and analyse collected data.

**OUTCOME RANGE**

All relevant data related to agriculture and agricultural experiments and/or research.

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**

Methods of analysing and interpreting data are explained.

**ASSESSMENT CRITERION 2**

Data is analysed and interpreted.

### **ASSESSMENT CRITERION 3**

Data is checked for accuracy and problems rectified.

### **SPECIFIC OUTCOME 4**

Present collated data coherently.

## **ASSESSMENT CRITERIA**

### **ASSESSMENT CRITERION 1**

Various methods of data presentation are explained.

### **ASSESSMENT CRITERION 2**

The most appropriate methods of data presentation are selected.

### **ASSESSMENT CRITERION 3**

Data is presented accurately.

### **ASSESSMENT CRITERION 4**

The findings of the report are clearly stated.

## **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 an advanced knowledge of:

- Different methods of data collection.
- Selection and application of data collecting methods.
- Analysing and evaluating of collected data for problem identification and decision-making.
- Methods of analysing and interpreting data.
- Report writing.

#### **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 all specific outcomes.

#### **UNIT STANDARD CCFO COLLECTING**

Information evaluation relates to all specific outcomes.

#### **UNIT STANDARD CCFO COMMUNICATING**

Communication relates to all specific outcomes.

#### **UNIT STANDARD CCFO SCIENCE**

Use science and technology relates to all specific outcomes.

#### **UNIT STANDARD CCFO DEMONSTRATING**

Inter-relatedness of systems relates to all specific outcomes.

#### **UNIT STANDARD CCFO CONTRIBUTING**

Self-development relates to all specific outcomes.

#### **UNIT STANDARD ASSESSOR CRITERIA**

N/A

#### **UNIT STANDARD NOTES**

N/A

---

*All qualifications and unit standards registered on the National Qualifications Framework are public property. Thus the only payment that can be made for them is for service and reproduction. It is illegal to sell this material for profit. If the material is reproduced or quoted, the South African Qualifications Authority (SAQA) should be acknowledged as the source.*