Learner Guide
Primary Agriculture

Operate and Support a Food Safety and Quality Management System in the Agricultural Supply Chain

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

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

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

| Title: Operate and support a food safety and quality management system in the agricultural supply chain |
| US No: 116070 | NQF Level: 2 | Credits: 2 |

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

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

<table>
<thead>
<tr>
<th>Title</th>
<th>ID Number</th>
<th>NQF Level</th>
<th>Credits</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Certificate in Plant Production</td>
<td>48975</td>
<td>2</td>
<td>120</td>
<td>□</td>
</tr>
<tr>
<td>National Certificate in Animal Production</td>
<td>48976</td>
<td>2</td>
<td>120</td>
<td>□</td>
</tr>
<tr>
<td>National Certificate in Mixed Farming Systems</td>
<td>48977</td>
<td>2</td>
<td>120</td>
<td>□</td>
</tr>
</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.

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.
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 role 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.

**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.
What are we going to learn?

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SAQA Unit Standards
What will I be able to do?

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

- Monitor and support the implementation of food safety and quality, production, environmental and social practices and awareness within the agricultural supply chain.
- Gain an understanding of sustainable agricultural practices as applied in the animal-, plant and mixed farming sub fields. The application of food safety in primary agriculture is focussed on.
- Participate in, undertake and plan farming practices with knowledge of their environment. A culture of maintenance and care will be instilled for both the environment as well as towards farming infrastructure and operations.
- Illustrate basic knowledge to distinguish and report non-conformances and deviations in food safety, quality and the environment with reference to the agricultural enterprise.
- Understanding basic health and social issues in the agricultural environment.
- Demonstrate an understanding of risk factors in food safety and quality related to the agricultural supply chain.
- Illustrate basic knowledge to distinguish and report non-conformances and deviations in food safety, quality and the environment with reference to the agricultural enterprise.

Learning Outcomes

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

- Basic principles of different regulations, requirements and regulatory aspects with reference to the agricultural enterprise are understood.
- Good agricultural / manufacturing / processing/health practices.
- Standard operation procedures on the farm.
- Food borne illnesses.
- Impact of food safety and quality in trade.
- Contamination risks.
- Contamination preventative measures.
- Risk factors related to food safety.
- Principles of food safety and quality.
- Basic principles of environmental and conservation management.
- Basic principles of waste and pollution management.
- Understanding basic health and social issues in the agricultural environment.
- Demonstrate an understanding of risk factors in food safety and quality related to the agricultural supply chain.
- Demonstrate basic understanding of record keeping activities on the farm.
Learning Assumed to be in Place

It is expected of the learner attempting this unit standard to demonstrate competence against the following unit standard(s):

- NQF 1, 116204, Recognise pests and diseases and weeds on crops.
- NQF 1, 116166, Apply basic food safety practices.

Food Safety and Quality Management – an Introduction

Background

Any farm that is going to be producing a crop that will be utilised in big food chains in South Africa or exported needs to have all of its staff trained and able to help in the process of food safety. To control and monitor a food safety process is beyond the ability of management alone. In this process, management will need the assistances of the staff at every level of the operation.

This will entail the following:

- High standard of training for staff in the importance of traceability.
- Full training in all the technical aspects carried out by the person.
- Full understanding of the OHSA.
- Personnel hygiene.
- Social issues.

To get a product to an overseas market usually requires many steps. At each step there will be an assessment and sampling of quality and food safety. Before your product will be accepted by an export agent there will be an audit conducted to establish compliance to Good Agricultural Practices. The overseas standards are important because if you want to export you will have to meet these standards. As the overseas standards raise so the South African standards have to change to meet these standards.
Session 1

Apply basic food safety practices

After completing this session, you should be able to:
SO 1: Apply basic food safety practices.

1.1 Let's define and understand the concepts of food safety

Food safety: To produce, store and handle food in such a way that it is not hazardous to humans, animals and the environment

Chemical hazards: Chemical hazards include substances such as cleaning solutions and sanitizers.

Physical hazards: Physical hazards are foreign particles, like glass or metal.

Biological hazards: Biological hazards come mainly from micro-organisms.

How does food become hazardous?

Food becomes hazardous by contamination. Contamination is the unintended presence of harmful substances or micro-organisms in food. Food can become contaminated from chemical, physical or biological sources.

Why are micro-organisms important?

Micro-organisms are everywhere. You may not see, taste, or smell them, but they hide on your body, in the air, on kitchen counters and utensils, and in food. The main micro-organisms are:

1. Viruses
2. Parasites
3. Fungi
4. Bacteria.
Viruses are the tiniest, and probably the simplest, form of life. They are not able to reproduce outside a living cell. Once they enter a cell, they force it to make more viruses.

Some viruses are extremely resistant to heat and cold. They don't need potentially hazardous food to survive, and once in the food, they don't multiply. The food is mainly a transportation device to get from one host to another.

Once in the human, viruses reproduce quickly and may cause disease.

Parasites need to live on or in a host to survive. Examples of parasites that may contaminate food are Trichinella spiralis (trichinosis) that affects pork, and Anisakis roundworm, that affects fish.

Fungi can be microscopic or as big as a giant mushroom. Fungi are found in the air, soil, plants, animals, water, and some food. Moulds and yeast are fungi.

Bacteria can cause food borne illness in the food people eats such as diarrhoea, vomiting, an upset stomach, fever, or cramps.

The market needs and demands for food safety

Food safety has always been important to consumers, but recent high-profile events around the world, including outbreaks of mad cow disease in Europe, and concerns about bio-terrorism have raised their awareness and expectations. In addition, in areas other than safety, consumers are increasingly knowledgeable and discerning in their food purchases and are demanding greater choice.

To maintain their markets, suppliers of food and agricultural products are developing and implementing systems that demonstrate to both existing and potential consumers that they can deliver products within the demanded safety and quality specifications. At the same time, suppliers are taking advantage of these changing consumer dynamics to gain new markets and develop niche markets with potential price premiums.

The advantages of applying good food safety practices and principles

Please complete Activity 1 at the end of the section

My Notes ...
Food safety practices and personal hygiene

Many fresh fruits and vegetables are eaten with little or no cooking - they are "ready to eat". Because they are not cooked, raw fruits and vegetables can be a source of disease-causing bacteria, viruses or parasites (pathogens). Grains and lupines are cooked, which has a sterilising effect.

Humans and animals are the major source of pathogens in our food supply.

Harvesting can be a labour-intensive operation involving direct human contact with fresh produce.

"Personal hygiene" includes practices that promote health and cleanliness.

Good worker hygiene practices during production and harvest can help to minimize microbial contamination.

Therefore, it is important to make worker health and hygiene a priority:

♦ Frequent and effective hand washing is important.
♦ To make this possible, toilet facilities must be available, clean, and well maintained.
♦ If you or any of the other workers are ill, then report it immediately and your supervisor or team leader should address it without delay.
♦ Infected employees – those with infectious diseases or open lesions/wounds - could increase the risk of transmitting food borne illnesses. All open wounds and infected areas should be covered hygienically with dressings and with additional pairs of gloves. If there is any risk of contamination, then the worker CANNOT continue working.
♦ Workers with symptoms of nausea, vomiting or diarrhoea should not handle the fruits or vegetables.
♦ Prevention practices and knowledge is the key to the safety of the fruits and vegetables that you harvest.

Please complete Activity 2 at the end of the session

My Notes …
Food safety and conservation

Why would conservation be important for Food Safety?

Conservation: Refers to the protection, restoration or sustainability of natural resources.

When toxic contaminants - such as pesticides, mercury pollution and diesel exhaust - are released into the environment, their effect on human health can be profound.

It has been found that if ecological habitats and food chains are not conserved then some of the organisms and life forms might become extinct. As soon as one organism becomes extinct, another might become over-active and multiply to such an extent that it causes the plants and food produce in that ecosystem to become toxic or poisonous for human consumption.

Food safety and waste

Waste: Refers to the “left-overs” or unwanted products from industry and human activities.

Pollution: Is the unwelcome concentration of substances that are beyond the environment’s capacity to handle. These substances are detrimental to people and other living things.

Farm activities will always result in a certain amount of waste. Farm management must control and limit the amount of waste but workers must be able to identify waste and control it before it pollutes the environment.

Acid Rain: The main gasses responsible for acid rain are Sulphur and Nitrogen. Acid rain would occur naturally where active volcanoes erupt, where there is lightning or if there is bacterial action in the soil. However, acid rain has become problematic due to increased human activity that produces Sulphur Dioxide and Nitrous Oxides. Common human actions contributing to this is the burning of fossil fuels, for example power stations, factories and petroleum based vehicles. When water combines with the gasses, acids form in the rainwater. These acids can burn holes into various materials.

Global warming: It is the increase in the average temperature of the earth’s lower atmosphere as a result of an increase in greenhouse gasses (water vapour, Carbon Dioxide, Methane, Nitrous Oxide and Ozone) since the industrial revolution. The sustained increase of temperature could cause climatic change.
Food Safety and pollutants

The use of pesticides in food production results in residues on foods. Research has examined the Rand value consumers might place on reducing the human health risks induced by dietary intake of pesticides.

Some consumers have tried to reduce dietary intake of pesticides by purchasing organic food. Together, the premium for organic food and consumers' willingness to pay to reduce well-known risks suggest that most consumers are willing to buy organic food for health benefits alone.

♦ Pollutants: Air —

<table>
<thead>
<tr>
<th>Burning coal for energy</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and environmental effects:</td>
<td></td>
</tr>
<tr>
<td>1. Acid rain.</td>
<td>Acid rain and Global warming are earth threatening environmental pollutants.</td>
</tr>
<tr>
<td>2. Respiratory problems.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fumes from vehicles</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and environmental effects:</td>
<td></td>
</tr>
<tr>
<td>2. Respiratory problems.</td>
<td></td>
</tr>
<tr>
<td>3. Restricts breathing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Land clearing</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and environmental effects:</td>
<td></td>
</tr>
<tr>
<td>1. Smoke affects the air, be sure to control fires when burning firebreaks.</td>
<td>Particulates from vehicles aid in the effect of global warming.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Land clearing</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and environmental effects:</td>
<td></td>
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<tr>
<td>1. Smoke affects the air, be sure to control fires when burning firebreaks.</td>
<td>Particulates from vehicles aid in the effect of global warming.</td>
</tr>
</tbody>
</table>
Organise and support a food safety and quality management system in the agricultural supply chain

Primary Agriculture  NQF Level 2  |  Unit Standard No: 116070

Pollutants: Noise –

<table>
<thead>
<tr>
<th>Traffic</th>
<th>Health and environmental effects:</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1. Affects hearing.</td>
</tr>
</tbody>
</table>

Pollutants: Water –

<table>
<thead>
<tr>
<th>Sewage – inadequate sanitation</th>
<th>Health and environmental effects:</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Pathogens cause many diseases and illness in humans.</td>
<td>If man does not use toilets with a suitable sewage system, the effluent can pollute the environment and cause people to become ill.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Build up of silt in dams</th>
<th>Health and environmental effects:</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Kills aquatic life.</td>
<td>Soil maintenance and prevention of erosion must be practiced in daily farm activities.</td>
</tr>
<tr>
<td></td>
<td>2. Destroys the food chain.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agrochemicals</th>
<th>Health and environmental effects:</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Toxic.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Interferes with breeding of animals.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Destroys the food chain.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Man can become ill if he drinks the water.</td>
<td></td>
</tr>
</tbody>
</table>

My Notes ...

..........................................................
1.2 How we can apply good personal hygiene practices

Let’s take it step by step:
Follow these steps to promote food safety in the workplace:

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Uniforms should be worn as per farm and pack house regulations, and should be clean and tidy at all times.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Wear only closed protective shoes or boots.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Hair must be neat and trim, or pulled back to avoid falling onto face. Facial hair is not recommended, although it should be kept neat and tidy if it is allowed within your place of work. It should be covered at all times in the food prep areas.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Nail polish is not allowed. Nails should be short and clean.</td>
</tr>
<tr>
<td>Step 5</td>
<td>If you have body piercing, you are not allowed to wear the studs that are associated with it in your place of work.</td>
</tr>
<tr>
<td>Step 6</td>
<td>Staff is not allowed to wear lots of jewellery. Rings, except wedding bands, are unacceptable.</td>
</tr>
<tr>
<td>Step 7</td>
<td>Staff must wash their hands after touching their face and hair.</td>
</tr>
<tr>
<td>Step 8</td>
<td>Staff should wash their hands thoroughly with a sanitizer after visiting the toilet.</td>
</tr>
<tr>
<td>Step 9</td>
<td>Staff should wash their hands regularly with soap and warm water</td>
</tr>
<tr>
<td>Step 10</td>
<td>Staff should shower, use deodorant and change underwear everyday</td>
</tr>
<tr>
<td>Step 11</td>
<td>Wear a clean work uniform everyday</td>
</tr>
<tr>
<td>Step 12</td>
<td>Clean teeth everyday</td>
</tr>
<tr>
<td>Step 13</td>
<td>Have neat and clean fingernails</td>
</tr>
<tr>
<td>Step 14</td>
<td>Wash hair regularly</td>
</tr>
</tbody>
</table>
How to wash your hands correctly:

Your hands can be the most potentially dangerous serving equipment you use. Scratching your scalp, running your fingers through your hair, or touching a pimple can cause the transmission of pathogenic micro-organisms in a food service setting.

Follow these steps to wash your hands:

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet hands thoroughly with warm water.</td>
<td>Apply antibacterial soap generously.</td>
<td>Scrub under nails with a clean nail brush.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Step 5</td>
<td>Step 6</td>
</tr>
<tr>
<td>Rub hands vigorously for at least 20 seconds.</td>
<td>Rinse hands thoroughly with warm water.</td>
<td>Dry hands using a single-use towel.</td>
</tr>
</tbody>
</table>

Version: 01  Version Date: July 2006
1.3 Preventative measures against food contamination

Many people get sick each year from the food they eat. They may have diarrhoea, vomiting, an upset stomach, fever, or cramps. They often think they have the flu, but the real problem is food borne illness caused by bacteria in the food they ate a few hours or several days ago.

- **Bacteria is the greatest threat to food safety**

Of all the micro-organisms, bacteria are the greatest threat to food safety. Bacteria are single-celled, living organisms that can grow quickly at favourable temperatures. Some bacteria are useful. We use them to make foods like cheese, buttermilk, sauerkraut, pickles, and yoghurt. Other bacteria are infectious disease-causing agents called pathogens that use the nutrients found in potentially hazardous foods to multiply.

Some bacteria are not infectious on their own, but when they multiply in potentially hazardous food, they eject toxins that poison humans when the food is eaten.

Food handling practices are risky when they allow harmful bacteria to contaminate and grow in food. If you touch a potentially hazardous food during preparation, you may transfer several thousand bacteria to its surface.

Under the right conditions, bacteria can double every 10 to 30 minutes. A single bacterium will double with each division - two become four, four become eight, and so on. A single cell can become billions in 10 to 12 hours.

- **We need to understand FAT TOM!**

What can we do to ensure that the environment in which our produce grows, is packed and handled, has optimum food safety standards?
Who is FAT TOM?

F - is for Food

Nutrients available in food often determine which microorganisms will grow in it. While some microorganisms have simple nutrient requirements, some pathogens require a complex diet, including vitamins and minerals found in the foods we eat.

Moist protein-rich foods, such as meat, milk, eggs and fish, are potentially hazardous. That is, they are most likely to cause food borne illness because they are vehicles of transmission of pathogenic bacteria and can support growth of these bacteria.

A – is for Acidity

pH is the symbol for the degree of acidity or alkalinity (base) of a substance. Bacteria grow best in an environment that is neutral or slightly acidic. Most bacterial growth is inhibited in very acidic conditions. That is why acidic foods, like vinegar and fresh fruits, seldom provide a favourable climate for pathogenic bacteria.

pH is measured on a scale from 0 to 14. An environment with a pH of 7.0 is exactly neutral—neither acid nor alkaline. Pure water has a pH of 7. Foods with a pH below 7.0 are acidic; pH above 7.0 is alkaline. The lower the pH, the higher the acidity; the higher the pH, the lower the acidity. Most bacteria will not grow at pH levels below 4.6. Micro-organisms thrive in a pH range between 6.6 and 7.5.
Pathogenic micro-organisms reproduce by cell division. One becomes two. Two become four. When small numbers of pathogens are present in food, they pose a very low risk to consumers. However, when low acid food (food with a neutral or alkaline pH) is abused by placing it in the DANGER ZONE (40°C to 140°F or 5°C to 60°C) longer than two hours, pathogens multiply rapidly. Restricting the time that low acid foods stay in the DANGER ZONE to two hours or less prevents growth of large numbers of pathogens.

Micro organisms grow fast between the temperatures of (5°C to 60°C). During the two-hour period in the DANGER ZONE, only minimal growth and reproduction can occur.

One important rule of food safety is to stay out of the DANGER ZONE, where potentially hazardous foods support the growth of pathogenic micro organisms. In general it is advisable to cool fruit as soon as possible after harvesting.
Some micro organisms need oxygen (air) to grow, that is, they are aerobic. When foods such as meat, fruit or vegetables are canned, oxygen is excluded from the environment. Therefore, growth of aerobic organisms is controlled and the food is preserved. Such foods are shelf stable and do not require refrigeration.

Some micro-organisms will grow only in anaerobic conditions (in the absence of oxygen). Botulism, a rare type of food borne illness, is caused by a specific type of organism that grows only in anaerobic conditions (in the absence of oxygen). Improperly preserved home canned foods are usually the source of botulism.

Consequently, perishability of a food is related not only to moisture content, but also to water activity.

Moisture content is the amount of water in food and is expressed as a percentage. Water activity (a_w) is the amount of water available for deterioration reactions and is measured on a scale of 0 to 1.0. Bacteria, yeast, and mould multiply rapidly at a high water activity—above 0.86. Meat, produce and soft cheeses have a_w in this range (between 0.86 and 1.0).

Pathogenic bacteria have difficulty growing in foods such as jams and jellies, dry noodles, flours, candies and crackers, where a_w is below 0.85. Foods preserved with salt or sugar, such as jams have a lower a_w because salt and sugar deprive micro organisms of water and inhibit their reproduction. These products are shelf-stable (i.e. they do not need refrigeration).
1.4 Warning signs

**What types of warning signs we can find and what does each one mean?**

There are four basic categories of safety sign. The categories, their usage, colour and shape are as shown:

<table>
<thead>
<tr>
<th>Sign</th>
<th>What it means</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFE CONDITION</td>
<td>COLOUR AND SHAPE: green background, white symbol, square or oblong. USE: provides information about safe conditions. EXAMPLE: First Aid Equipment.</td>
</tr>
<tr>
<td>WARNING</td>
<td>COLOUR AND SHAPE: yellow triangle with a black border. USE: gives a warning of risk of danger. EXAMPLE: Dangerous Substance.</td>
</tr>
<tr>
<td>PROHIBITION</td>
<td>COLOUR AND SHAPE: white, circular sign, red border and a red crossbar running from top left to bottom right. USE: states that you can't do something EXAMPLE: No Smoking</td>
</tr>
<tr>
<td>MANDATORY</td>
<td>COLOUR AND SHAPE: blue background, white symbol, circular. USE: states that you must do something EXAMPLE: Wear Ear Protection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sign</th>
<th>What it means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosive</td>
<td>The chemical or substance could cause injury to the person handling it and / or may cause damage to the packaging material surrounding the chemicals, fertiliser or fruit product, rendering it unsafe.</td>
</tr>
<tr>
<td>Dangerous to the environment</td>
<td>The disposal of certain agro-chemicals, fertilisers, herbicides, pesticides and materials could be harmful for the ecological system and environment, causing the fruit produced to be rendered unsafe.</td>
</tr>
<tr>
<td>Chemicals that will contaminate food stuffs</td>
<td>If certain materials, substances and agro-chemicals come into contact with a crop due for human consumption, the food safety will become compromised and thus poisonous.</td>
</tr>
<tr>
<td>Sign</td>
<td>What it means</td>
</tr>
<tr>
<td>------</td>
<td>---------------</td>
</tr>
</tbody>
</table>
| ![Poisonous Sign](image) | **Poisonous**  
Any poisonous substances would automatically render crops unsafe for consumption (Remember about harvest intervals!) |
| ![Poisonous Gas Sign](image) | **Poisonous Gas**  
Any poisonous substances would automatically render crops unsafe for consumption (Remember about harvest intervals!) |
| ![Biological Hazard Sign](image) | **Biological Hazard**  
The material might cause microbial or organic changes in the food crop causing food safety to be unsafe. |
| ![Radioactive Sign](image) | **Radioactive**  
No food crop that has been in contact with radioactive material would be considered safe. |
| ![Dangerous when wet Sign](image) | **Dangerous when wet**  
Some substances react badly to contact with water and can cause fires or explosions, or poisonous materials to be released. Any food crop that has come into contact with such a substance would immediately be considered unsafe. |
| ![Flammable Sign](image) | **Flammable**  
Any food crop that comes into contact with flammable liquid or materials would automatically be rendered unsafe. |
| ![Irritant or Harmful substance Sign](image) | **Irritant or Harmful substance**  
Any food crop that comes into contact with chemicals or fertilisers that are irritants or harmful to human or animal consumption would immediately be rendered unsafe. |
Why we should adhere to warning signs?

Find the answer to the above question in your working environment.

Please complete Activity 4 here below

My Notes ...

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Let’s define and understand the concepts of food safety:

- A Definition of “Food Safety”.
- The market needs and demands for food safety.
- The advantages of applying good food safety practices and principles.
- Food safety practices and personal hygiene.
- Food safety and conservation.
- Food safety and waste.
- Food safety and pollutants.

How we can apply good personal hygiene practices:

- Preventative measures against food contamination.
- Warning signs.
- What types of warning signs we can find and what each one means.
- Why we should adhere to warning signs.
- What the consequences could be if we did not adhere to warning signs.
Hold a brainstorming session and write down what you think the advantages for a crop farmer might be, in terms of applying good food safety practices and principles on their farm and in their pack house.

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In groups of four, play the roles of 4 different types of farm workers and explain to each other how your “type” of personal hygiene personality, might compromise food safety. Write down keynotes for yourself.

**Type 1 – A farm worker with an old, dirty uniform.**

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**Type 2 – A farm worker with dirty hair and has a runny nose.**

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**Type 3 – A farm worker who has not had a bath for the past 2 weeks.**

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**Type 4 – A farm worker who does not wash his/her hands after going to the toilet.**

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**Facilitator comments:**

**Assessment:**
Walk around on the farm and make a list of at least 10 different types of waste that might potentially cause food safety to become compromised. Explain why, for each item on the list.

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1. What is the use of placing warning signs around the farm?

2. What types of warning signs are most important and what do they mean?

3. Why is it important for workers to adhere to safety and warning signs?

Facilitator comments:

Assessment:
**Concept (SO 1)** | **I understand this concept** | **Questions that I still would like to ask**
--- | --- | ---
Good personal hygiene practices are applied. |  |  
Preventative measures against food contamination are applied. |  |  
Warning signs regarding product safety are adhered to. |  |  

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**My Notes ...**

...
2 Non-conformances and deviations in food safety

After completing this session, you should be able to:

SO 2: Illustrate basic knowledge to distinguish and report non-conformances and deviations in food safety, quality and the environment with reference to the agricultural enterprise.

2.1 Defining the concepts

**Deviations:** Describe the difference between an observed value and the expected value.

**Non-conformance:** Include failures, deficiencies, defects and malfunctions in a product or behaviour that causes the deviation.

The grower, packer, shipper, and handler of fresh consumed horticultural products are often faced with a hundred different decisions and responses to weather, pests, market value and trends, labour, and customer requests. Each decision may alter microbial food safety risks. The potential risk may be reduced or increased by seemingly minor deviations in timing, source of production input, degree of handling, method of cooling, or any dozens of different interacting factors.
2.2 The types of problems the enterprise can have if plans to deal with deviations are not in place

Animal manure is often contaminated with human pathogens. This waste management issue is believed to be a key contributor to an intimately related potential source of produce contamination, water. It has long been known that the improper use of manure can transfer pathogens onto crops, resulting in human disease. Raw manure should not be applied to crops. In addition to the hazard of pathogen transmission, it is well recognized that salt injury to sensitive vegetable crops and transfer of viable weed seed may result unless the manure is subjected, at least, to a period of unmanaged (no thorough mixing or pile inversion) composting.

The following inputs to the enterprise will become contaminated:

- **Water** – quality might become poor, with high salinity or toxicity for the crop produced, causing the crop to fail or become unsafe for human consumption.
- **Soil** – soil might become ineffective, with unbalanced nutrient profiles, causing the crop to fail or the crop to become unsafe for human consumption.
- **The actual crop prior to harvesting** – the crop might become poisoned or toxic or generally unsafe for human consumption, due to exposure from microbial, physical, chemical, viral hazards.

My Notes ...

Please complete Activity 5 at the end of the session

My Notes ...

Version: 01  Version Date: July 2006
Why it is necessary for workers to be trained with regards to detecting problems in the system and being able to trace it to the source

If the workers are trained in, and really understand the principles of food safety, then they will:

- Contribute to the supply of a healthy and safe crop.
- Automatically report any deviations and problems that might lead to compromised food safety.
- Become the custodians of a Good Agricultural Food Safety Monitoring system such as HACCP.

Here is a visual representation of:

- Examples of deviations from pre-harvest norms and Critical control points for monitoring and detection.
- The way non-conformances and deviations in the food safety and quality will be detected
- The way this problem will be traced to a pre-harvest environment.
Let’s define the concepts of “Non-conformance” and “deviations” in food safety:

Examples of deviations from pre-harvest norms:

- Fertilizers.
- Agrochemical application.
- Agrochemical handling.
- The way non-conformances and deviations in the food safety and quality will be detected.
- The way this problem will be traced to a pre-harvest environment.
- The types of problems the enterprise can have on the environment if plans to deal with deviations are not in place.
### 5. SO 2 AC 1

#### Walk around on the farm and discover:

Make a list of at least 10 possible points where the Occupational Health and Safety and/or Food Safety policy of the farm is being deviated from or is not complied with. For each one write next to it, why you think the deviation took place and what can be done to rectify the problem.

<table>
<thead>
<tr>
<th>Deviation / Non-compliance:</th>
<th>Reasons for it:</th>
<th>What can be done to remedy this:</th>
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**Facilitator comments:**

**Assessment:**
### Concept (SO 2)

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<th>Concept (SO 2)</th>
<th>I understand this concept</th>
<th>Questions that I still would like to ask</th>
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<tr>
<td>The way non-conformances and deviations in the food safety and quality will be detected is described.</td>
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<td>The way this problem will be traced to a pre-harvest environment is explained.</td>
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<tr>
<td>The types of problems the enterprise can have on the environment if plans to deal with deviations are not in place are explained.</td>
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<tr>
<td>The need for worker training with regards to detecting problems in the system and being able to trace it to the source is discussed.</td>
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### My Notes ...

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Session 3 Basic health and social issues

After completing this session, you should be able to:
SO 3: Understanding basic health and social issues in the agricultural environment.

3.1 Let’s discuss and define what basic health and social issues include

| Social Issues: | Are questions concerning how events may affect society as a whole and individuals in society. |
| Health Issues: | Is the absence of disease or injury along with physical, mental, and social well-being. Health also implies good prospects for continued survival. |

3.2 The Occupational Health and Safety Act (OHSA)

What does the South African law say in the Occupational Health and Safety Act (OHSA) in terms of the worker and the working environment? The act establishes five key action areas for health promotion practice. These are:

♦ To promote safe environments for people to live and work in. Many of the health problems facing South African communities are caused or made worse by living and working in poor conditions. For example, having poor water and sanitation facilities or working in dangerous conditions without any safety measures.

♦ To develop healthy public policy. This is legislation and policy that protects health. For example, this can range from tobacco control legislation through to ensuring that housing policy protects the health of people by ensuring that, for example, it provides for adequate ventilation or sanitation facilities.
Operate and support a food safety and quality management system in the agricultural supply chain

Primary Agriculture
NQF Level 2
Unit Standard No: 116070

To promote community action. Health problems are often best tackled through community action. This could include community clean-up campaigns or setting up an HIV/AIDS support group in a community.

Develop personal skills. It is essential that each person is equipped with the information and skills to promote their health. For example in South Africa everyone needs to know about AIDS, and young people need to learn how to negotiate safe sex or how to say no to sex.

Re-orient the health service. Often the health service does not act in the best interest of people’s health. Clinics are often not open in the early evening when it may be easier for working people to get to them and environmental health officers may over emphasize the role of inspections and law enforcement rather than education for food traders.

Information
There are various guides to “Best Practice” implementation of the OHASA. They can be found from the Department of Labour Offices, the CCMA or on the following website: http://www.ccma.org.za

Please complete Activity 6 at the end of the session

My Notes ...

My Notes ...
3.3 The importance of good health care practices as related to food safety

**HIV / AIDS**

Persons with Acquired Immunodeficiency Syndrome (AIDS) are susceptible to many types of infection including illness from food borne pathogens. They are at higher risk than are otherwise healthy individuals for severe illness or death. Affected persons must be especially vigilant when handling and cooking foods. The recommendations provided here are designed to help prevent bacterial food borne illness.

♦ **Why do bacteria endanger people with AIDS?**

When the AIDS virus damages or destroys the body's immune system, the person becomes more vulnerable to infection by food borne bacteria and other pathogens. For example, the common pneumonia, which is caused by a bacterial infection of the lungs, can occur in any individual but occurs much more frequently in persons with AIDS. In addition, when pneumonia strikes a person with AIDS, it causes a more severe illness and is thus more dangerous.

♦ **How can persons with AIDS prevent food borne illness?**

Food must be handled safely at every stage from purchase through consumption. Critical points are transporting perishable foods home from the store immediately; prompt, safe storage; thorough cooking to destroy bacteria and other pathogens; and prompt refrigeration of leftovers.

♦ **Can people who are infected with HIV and AIDS cause fresh food products to become unsafe for consumption?**

Essentially the answer is "NO", unless the person's body fluids are somehow injected into the fresh food product. Even then the likeliness of the HIV virus surviving long enough to be ingested and cause HIV infection is nearly impossible. Luckily the HIV virus is very weak and cannot survive in the face of Acidic conditions or exposure to air.

It is still a good idea for any people who work with fresh fruit products to take extra care with handling according to the following guidelines (for their own sake of not becoming infected as well as for the peace of mind of others.):

- **Clean** -- Wash hands and surfaces often.
- **Separate** -- Don't cross-contaminate.
- **Cook** -- Cook to proper temperatures.
- **Chill** -- Refrigerate promptly.
Communicable diseases

Food borne illness often presents itself as flu-like symptoms such as nausea, vomiting, diarrhoea, or fever, so many people may not recognize the illness is caused by bacteria or other pathogens in food. Thousands of types of bacteria are naturally present in our environment. Not all bacteria cause disease in humans. For example, some bacteria are used beneficially in making cheese and yoghurt.

Bacteria that cause disease are called pathogens. When certain pathogens enter the food supply, they can cause food borne illness. Millions of cases of food borne illness occur each year. Most cases of food borne illness can be prevented. Proper cooking or processing of food destroys bacteria.

Age and physical condition place some persons at higher risk than others, no matter what type of bacteria is implicated. Very young children, pregnant women, the elderly and people with compromised immune systems are at greatest risk from any pathogen. Some persons may become ill after ingesting only a few harmful bacteria; others may remain symptom free after ingesting thousands.

How bacteria get in food: Bacteria may be present on products when you purchase them. Plastic-wrapped boneless chicken breasts and ground meat, for example, were once part of live chickens or cattle. Raw meat, poultry, seafood, and eggs are not sterile. Neither is fresh produce such as lettuce, tomatoes, sprouts, and melons.

How are communicable diseases and food borne illnesses linked?

Before we examine this point, we need to define what Communicable Disease might include:

**Communicable disease:** Any disease that is easily spread through direct/indirect contact. An infectious disease that can be spread from person to person or animals to humans.

The only communicable diseases that can really have an influence on the food safety of fresh product, such as fruit, is bird flu and mad cow disease. These are passed on indirectly through fertilisation, and the impact is as yet, unknown. **Food borne illnesses** - the incidence of food borne **diseases** is minor compared to the more serious **diseases** related to environmental health. We can therefore conclude that
communicable diseases are only dangerous in pre-harvest crops in as far it concerns worker health and safety and fertilisation or water sources.

Let’s discuss and define what basic health and social issues include:
♦ What South African law says in the occupational health and safety act (OHSA) with reference to the workers and working environment.
♦ A brief description of the OHSA.
♦ The importance of good health care practices as related to food safety as related to HIV and AIDS, communicable diseases, good nutrition and alcohol and drug abuse and dependency.
♦ The rights of the workers are described with regard to the OHSA, as related to good health care practices.
♦ Basic record keeping and training of the workers with regard to the OHSA and social issues.
1. Give a brief overview of the objectives of the Occupational Health and Safety Act of South Africa?

2. Explain the main duties and functions of members of the Health and Safety Committee on the farm:

Facilitator comments:

Assessment:
1. What do you think the consequences for someone who has HIV / AIDS might be in relation to food safety?

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2. What do you think the consequences for food safety might be, if the produce is handled by someone who has HIV / AIDS?

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Explain in your own words

Facilitator comments:

Assessment:
In pairs, role-play and explain the reasons why...

1. Pick a type of Communicable disease from the list below.

Then practice informing the team leader / supervisor that you have contracted this disease.

The other party will be the team leader / supervisor and will have to make the appropriate decision of what action the worker should take. This person will also explain to the worker why the decision is important for the security of food safety. Make keynotes for yourself.

♦ Measles  ♦ TB
♦ Chicken pox  ♦ Rabies
♦ German measles  ♦ Avian Flu
♦ Influenza  ♦ Diarrhoea

<table>
<thead>
<tr>
<th>Informing the team leader</th>
<th>Appropriate decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>........................................</td>
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<td>........................................</td>
<td></td>
</tr>
</tbody>
</table>

Facilitator comments:

Assessment:
<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 importance of good health care practices is explained.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A brief description of the OHSA and how it relates to the specific agricultural enterprise is given.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The rights of the workers are described with regard to the OHSA and the specific agricultural enterprise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic record keeping and training of the workers are discussed with regard to the OHSA and social issues</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
After completing this session, you should be able to:
SO 4: Demonstrate an understanding of risk factors in food safety and quality related to the agricultural supply chain.

**Food Safety and Quality:** With reference to agricultural enterprise refers to protecting the food supply from microbial, chemical (i.e. rancidity, browning) and physical (i.e. drying out, infestation) hazards or contamination that may occur during all stages of food production and handling-growing, harvesting, processing, transporting, preparing, distributing and storing. The goal of food safety monitoring is to keep food wholesome.

### 4.1 Let’s look at different types of risk factors in food safety

**Chemical hazards**

- Pesticide Residues
- Veterinary Residues
- Non permissible Additives
- Excess of Permissible additives
- Oil & Grease
- Cleaning Chemicals
Residue monitoring and evaluation programs identify animals containing harmful residues and remove them from the food chain. These residues include toxins from natural sources, from pesticides, from feeds, or from antibiotics administered to animals too soon before slaughter.

Number of agricultural chemicals (pesticides, herbicides, and fertilizers) may leave potentially hazardous residues in foods, and chemical contamination during manufacture is also possible. Where compounds that might enter the food chain are known or believed to be hazardous, there are limits on the maximum amount that may be present in foods. This acceptable daily intake is set by determining the highest lifetime level of intake that causes no detectable effect, and dividing it by a safety factor of 100.

♦ **Pesticides**

- All crop protection products must be approved for their intended use. They should only be used in accordance with the manufacturer’s instructions and any relevant codes of good practice should be observed. Compliance with ‘harvest intervals’ should be ensured.

- Pesticides (including herbicides, fungicides and wood preservatives) should be stored in an appropriate well ventilated and secure area. This area should be constructed in such a manner as to contain spillages in the case of accidents. They should be kept in the original container and not transferred to e.g. unmarked containers such as drink bottles.

- Appropriate protective clothing and masks should be worn when handling, mixing or using these products, as indicated on the label of the product.

♦ **Other Farm Chemicals**

- These include detergents, sterilisers/cleaning agents, disinfectants, feed additives, fertilisers, fuel oils, lubricants etc.

- As with pesticides, all other chemicals must be handled, stored, used and disposed of in a manner that minimises the risk of contamination of primary food produce or animal feed as well as the risk of accidental ingestion/uptake by animals/crops.
### Physical hazards

Apart from the physical hazards given above, dust must also be considered. After packing and during transporting dust must be prevented to contaminate food products.

### Micro-biological hazards
Bacteria and fungi (yeasts and moulds) are the principal types of micro-organisms that cause food spoilage and food-borne illnesses. Foods may be contaminated by microorganisms at any time during harvest, storage, processing, distribution, handling, or preparation. The primary sources of microbial contamination are soil, air, animal feed, animal hides and intestines, plant surfaces, sewage, and food processing machinery or utensils.
For each of the following category of hazards – brainstorm as many examples on the farm as you can come up with:

1. **Physical Hazard**

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2. **Chemical Hazard**

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3. **Microbiological Hazard**

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   ..................................................................................................................
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   ..................................................................................................................

**Facilitator comments:**

**Assessment:**
4.3 How we can monitor the risks and avoid contamination

There are various internationally recognised monitoring systems available to help farmers to monitor any and all risk areas related to food safety.

The most well known of these systems is called:

HACCP

What does HACCP stand for?

Food Safety and Quality Hazard Analysis Critical Control Point:
An internationally recognized and recommended approach to food safety that anticipates and prevents hazards associated with ingredients.

My Notes ...

Please complete Activity 10 at the end of the session

My Notes ...

The principles of HACCP:

HACCP offers continuous and systematic approaches to assure food safety.

<table>
<thead>
<tr>
<th>Principle</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Hazard Analysis:</strong> Hazards (biological, chemical, and physical) are conditions, which may pose an unacceptable health risk to the consumer. A flow diagram of the complete process is important in conducting the hazard analysis. The significant hazards associated with each specific step of the manufacturing process are listed. Preventive measures (temperature, pH, moisture level, etc.) to control the hazards are also listed.</td>
</tr>
<tr>
<td>2</td>
<td><strong>Identify Critical Control Points:</strong> Critical Control Points (CCP) are steps at which control can be applied and a food safety hazard can be prevented, eliminated or reduced to acceptable levels.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Establish Critical Limits:</strong> All CCP's must have preventive measures, which are measurable! Critical limits are the operational boundaries of the CCPs which control the food safety hazard(s). The criteria for the critical limits are determined ahead of time in consultation with competent authorities. If the critical limit criteria are not met, the process is &quot;out of control&quot;, thus the food safety hazard(s) are not being prevented, eliminated, or reduced to acceptable levels.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Monitor the CCP's:</strong> Monitoring is a planned sequence of measurements or observations to ensure the product or process is in control (critical limits are being met). It allows processors to assess trends before a loss of control occurs. Adjustments can be made while continuing the process. The monitoring interval must be adequate to ensure reliable control of the process.</td>
</tr>
<tr>
<td>5</td>
<td><strong>Establish Corrective Action:</strong> HACCP is intended to prevent product or process deviations. However, should loss of control occur, there must be definite steps in place for disposition of the product and for correction of the process. These must be pre-planned and written.</td>
</tr>
<tr>
<td>6</td>
<td><strong>Record keeping:</strong> The HACCP system requires the preparation and maintenance of a written HACCP plan together with other documentation. This must include all records generated during the monitoring of each CCP and notations of corrective actions taken. Usually, the simplest record keeping system possible to ensure effectiveness is the most desirable.</td>
</tr>
<tr>
<td>7</td>
<td><strong>Verification:</strong> Has several steps. The scientific or technical validity of the hazard analysis and the adequacy of the CCP's should be documented. Verification of the effectiveness of the HACCP plan is also necessary. The system should be subject to periodic revalidation using independent audits or other verification procedures.</td>
</tr>
</tbody>
</table>
4.4 The role of worker health and welfare on food safety and quality

If the workers are trained in, and really understand the principles of food safety, then they will:

- Contribute to the supply of a healthy and safe crop.
- Automatically report any deviations and problems that might lead to compromised food safety.
- Become the custodians of a Good Agricultural Food Safety Monitoring system such as HACCP.

Let’s decide what is understood by food safety and quality is explained with reference to the agricultural enterprise.

Let’s define risk factors and different elements in food safety and quality.

Let’s look at different types of risk factors in food safety:

- Chemical hazards.
- Physical hazards.
- Biological hazards.
- How we can monitor the risks and avoid contamination.
- The role of worker health and welfare on food safety and quality.
As a group make a 10-minute presentation to the rest of the class explaining the following.

1. What HACCP stands for and what it means?
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   ..................................................................................................................
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2. Why a HACCP system might be implemented?
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3. What the 7 principles of HACCP are?
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   2. ...............................................................................................................
   3. ...............................................................................................................
   4. ...............................................................................................................
   5. ...............................................................................................................
   6. ...............................................................................................................
   7. ...............................................................................................................

Facilitator comments:
### Concept (SO 4)

<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>What is understood by food safety and quality is explained with reference to the agricultural enterprise.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The different elements that can affect food safety and quality are described.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The role of worker health and welfare on food safety and quality is discussed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The different records required to assist the operation is described.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate basic understanding of record keeping activities on the farm.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### My Notes...

...
5 Record keeping activities on the farm

After completing this session, you should be able to:
SO 5: Demonstrate basic understanding of record keeping activities on the farm.

5.1 The different records required to assist the operation in ensuring optimum food, safety and quality

Management of health and safety can make a significant contribution to the performance of the crop and for enhancing food safety by reducing injuries and ill health and helping minimize losses and liabilities.

It is however very important to ensure that records of all actions are kept. The main reason for these records is “traceability”.

Traceability: Refers to the completeness of the information about every step in a process chain.

Safety records are the responsibility of dedicated team leaders, foremen, the health and safety committee, and specific individuals such a spray pump operators. It is important to keep the records in an organised and centralised point, under control of one person who will be able to access the information at a moment’s notice.
Types of records

The following types of Health and safety records are important for tracebility in terms of food safety:

- Employee health records I.e. Food handler tests, sick notes, sick leave records, etc.
- Incident and Accident Reports.
- Agro-chemical application details.
- Agro-chemical annual programmes.
- Agro-chemical stock control and consumption records.
- Training records of staff for health and safety.
- Environmental control records.

The handling of agrochemicals is covered in detail in the Soil and Fertilisation module of this program, but it is important to remember that good pesticide record keeping is not only essential, but in some cases is required by law.

Below is an example of what such a record form would look like:

### PESTICIDE FIELD RECORD

<table>
<thead>
<tr>
<th>ASCS Farm/Field #:</th>
<th>Acres:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location/Legal Description:</td>
<td></td>
</tr>
<tr>
<td>Crop:</td>
<td>Planting Date:</td>
</tr>
<tr>
<td>Soil Test Information</td>
<td>N: kg</td>
</tr>
<tr>
<td>P2O5: kg</td>
<td>OM:</td>
</tr>
<tr>
<td>K2O: kg</td>
<td></td>
</tr>
<tr>
<td>Fertilizer Applied:</td>
<td>Method:</td>
</tr>
</tbody>
</table>

### PESTICIDE INVENTORY

<table>
<thead>
<tr>
<th>CHEMICAL</th>
<th>ACTIVE INGREDIENTS</th>
<th>EPA REG. #</th>
<th>REI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PESTICIDE INFORMATION

- Application Date/Time
- Restricted Entry Interval
- Product Name & EPA Reg. No.
- Target Pest
- Active Ingredients
- Rate of Formulation/Acre
- Method/Equipment
- Total Amount Applied
- Applicator's Cert. no.
- Applicator's Initials

My Notes ...

Please complete Activity 11 at the end of the session

My Notes ...

 Version: 01 Version Date: July 2006
The different records required to assist the operation in ensuring optimum food safety and quality.

Record keeping:
Your understanding of record keeping:
The importance of a systematic filing Systematic filing of documents of the farming operations in accordance with GAP (good agricultural practices) and GMP (good manufacturing practices) principles.

How and where certain files will be found:
- Regarding chemical usage.
- Regarding training.
- Regarding environmental issues.
- Systematic filing of personnel records.
- Electronic filing.

The process that will be followed to find or identify where a problem in the operation occurred.

My Notes ...

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1. Go to the farm and find out "How and where certain files will be found":

<table>
<thead>
<tr>
<th>Regarding chemical usage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Regarding training</td>
<td></td>
</tr>
<tr>
<td>Regarding environmental issues</td>
<td></td>
</tr>
<tr>
<td>Systematic filing of personnel records</td>
<td></td>
</tr>
<tr>
<td>Manual filing</td>
<td></td>
</tr>
<tr>
<td>Electronic filing</td>
<td></td>
</tr>
</tbody>
</table>

2. Now explain the process that will be followed to find or identify where a problem in the operation occurred.

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..................................................................................................................
### Concept (SO 5) | I understand this concept | Questions that I still would like to ask
--- | --- | ---
Your understanding of record keeping is explained. |  |  
The importance of a systematic filing system for records in accordance with GAP (good agricultural practices) and GMP (good manufacturing practices) principles is discussed |  |  
How and where certain files will be found is demonstrated e.g. regarding chemical usage, training or environmental issues etc. |  |  
The process that will be followed to find or identify where a problem in the operation occurred is explained. |  |  

---

**My Notes ...**

...
Am I ready for my test?

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

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

<table>
<thead>
<tr>
<th>Questions</th>
<th>1. I am sure</th>
<th>2. I am unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What products does the farm produce that might be affected by food safety practices?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. What are the rules regarding worker personal hygiene who handles this product?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. What are the rules regarding the wearing of uniforms by workers handling this product?</td>
<td></td>
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</tr>
<tr>
<td>4. What are the rules regarding contagious diseases contracted by workers handling this product?</td>
<td></td>
<td></td>
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<tr>
<td>5. What rules are there regarding the storage of things on the farm to ensure food safety?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. What can go wrong in terms of food safety for this product?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. What will happen if the food safety of this product was compromised?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. How will the farm react if a product from the farm caused food poisoning?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Operate and support a food safety and quality management system in the agricultural supply chain

Primary Agriculture
NQF Level 2
Unit Standard No: 116070

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>Learner Information Form</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>
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<tr>
<td><strong>Employment:</strong></td>
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<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>
Bibliography

Books:

- Encyclopaedia Britannica – South African Version
- Wikepedia – International Version
- Advances in Microbial Foods Safety by Vijay Juneja, John P. Cherry, and Michael H. Tunick
- Salmonella Infections: Clinical, Immunological and Molecular Aspects (Advances in Molecular and Cellular Microbiology) by Pietro Mastroeni
- Food Safety Control in the Poultry Industry by G. Mead
- Aflatoxin and Food Safety by Hamed K. Abbas Marcel Dekker
- Practical Guide To Food Safety Regulation H.L. Goodwin
- Training and Education for Food Safety S. Mortimore, C. A. Wallace, and R. Smith

World Wide Web:

- wordnet.princeton.edu/perl/webwn
- www.en.wikipedia.org/wiki
- http://www.extension.iastate.edu/foodsafety
- http://ppceb.co.za

Subject Matter Experts:

- B Harington (B.Sc. Agric Viticulture & Oenology)
- C Harington (OBET)

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No user is allowed to sell this material whatsoever.
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Operate and support a food safety and quality management system in the agricultural supply chain

SAQA US ID | UNIT STANDARD TITLE
--- | ---
116070 | Operate and support a food safety and quality management system in the agricultural supply chain

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 2 | 2

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

PURPOSE OF THE UNIT STANDARD

A learner achieving this unit standard will be able to monitor and support the implementation of food safety and quality, production, environmental and social practices and awareness within the agricultural supply chain.

Learners will gain an understanding of sustainable agricultural practices as applied in the animal-, plant and mixed farming sub fields. The application of food safety in primary agriculture is focussed on in this unit standard.

They will be able to participate in, undertake and plan farming practices with knowledge of their environment. A culture of maintenance and care will be instilled for both the environment as well as towards farming infrastructure and operations.

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 1: Recognise pests and diseases and weeds on crops.
- NQF 1: Apply basic food safety practices.

UNIT STANDARD RANGE

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

Range statements are neither comprehensive nor necessarily appropriate to all contexts. Alternatives must however be comparable in scope and complexity. These are only as a general guide to scope and
Specific Outcomes and Assessment Criteria:

SPECIFIC OUTCOME 1
Apply basic food safety practices.

OUTCOME RANGE
Food safety practices include but are not limited to hygiene, conservation, waste and pollutants, etc.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1
Good personal hygiene practices are applied.

ASSESSMENT CRITERION 2
Preventative measures against food contamination are applied.

ASSESSMENT CRITERION 3
Warning signs regarding product safety are adhered to.

SPECIFIC OUTCOME 2
Illustrate basic knowledge to distinguish and report non-conformances and deviations in food safety, quality and the environment with reference to the agricultural enterprise.

OUTCOME RANGE
Non-conformances and deviations in food safety include but are not limited to deviations from pre-harvest norms such as with fertilizers, agrochemical application, handling etc.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1
The way non-conformances and deviations in the food safety and quality will be detected is described.

ASSESSMENT CRITERION 2
The way this problem will be traced to a pre-harvest environment is explained.

ASSESSMENT CRITERION 3
The types of problems the enterprise can have on the environment if plans to deal with deviations are not in place are explained.

ASSESSMENT CRITERION 4
The need for worker training with regards to detecting problems in the system and being able to trace it to the source is discussed.

SPECIFIC OUTCOME 3
Understanding basic health and social issues in the agricultural environment.

OUTCOME RANGE
Basic health and social issues include but are not limited to a basic understanding of the occupational
health and safety act (OHSA) with reference to the workers and working environment.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1
The importance of good health care practices is explained.

ASSESSMENT CRITERION RANGE
Good health care practices include but are not limited to HIV/AIDS, communicable diseases, good nutrition, drug abuse and dependency.

ASSESSMENT CRITERION 2
A brief description of the OHSA and how it relates to the specific agricultural enterprise is given.

ASSESSMENT CRITERION 3
The rights of the workers are described with regard to the OHSA and the specific agricultural enterprise.

ASSESSMENT CRITERION 4
Basic record keeping and training of the workers are discussed with regard to the OHSA and social issues.

SPECIFIC OUTCOME 4
Demonstrate an understanding of risk factors in food safety and quality related to the agricultural supply chain.

OUTCOME RANGE
Risk factors in food safety and quality include but are not limited to chemical, physical and biological factors.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1
What is understood by food safety and quality is explained with reference to the agricultural enterprise.

ASSESSMENT CRITERION 2
The different elements that can affect food safety and quality are described.

ASSESSMENT CRITERION 3
The role of worker health and welfare on food safety and quality is discussed.

ASSESSMENT CRITERION 4
The different records required to assist the operation is described.

SPECIFIC OUTCOME 5
Demonstrate basic understanding of record keeping activities on the farm.

OUTCOME RANGE
Record keeping includes but is not limited to systematic filing of documents of the farming operations and personnel, both electronically and manually etc.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1
Your understanding of record keeping is explained.

**ASSESSMENT CRITERION 2**
The importance of a systematic filing system for records in accordance with GAP (good agricultural practices) and GMP (good manufacturing practices) principles is discussed.

**ASSESSMENT CRITERION 3**
How and where certain files will be found is demonstrated e.g. regarding chemical usage, training or environmental issues etc.

**ASSESSMENT CRITERION 4**
The process that will be followed to find or identify where a problem in the operation occurred is explained.

**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**
A competent learner will demonstrate a basic knowledge of:

- Basic principles of different regulations, requirements and regulatory aspects with reference to the
agricultural enterprise are understood.
• Good agricultural/manufacturing/processing/health practices.
• Standard operation procedures on the farm.
• Food borne illnesses.
• Impact of food safety and quality in trade.
• Contamination risks.
• Contamination preventative measures.
• Risk factors related to food safety.
• Principles of food safety and quality.
• Basic principles of environmental and conservation management.
• Basic principles of waste and pollution management.
• Basic principles of natural resource management.
• Basic record keeping practices.
• Agricultural hygiene principles.
• Effective personal hygiene practices.

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
Team work 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

This unit standard has reference to workers who are in a management or supervisory level of operations within different fields of the agricultural enterprise to assist with the process of assuring that accreditation for the different export markets are achieved or adhered to.

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