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Citrus Orchard Foreman Occupational Learning

Work Scenario Guide

H1: Harvest Orchard Hygiene

Qualification:	110667 – Occupational Certificate: Orchard and Vineyard Foreman
Work Scenario:	H1: Harvest Orchard Hygiene
Learning Area:	H: Maintain neat, hygienic orchards
Scenario Description:	You need to oversee orchard sanitation during harvest, in terms of waste management, pest and disease management, and food safety.

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1st edition (06/2026)

Content originator:
Citrus Academy

Occupational alignment:
Ukudla Namanzi (Pty) Ltd

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Alignment Information

Qualification

The content of this learner guide is aligned to the following occupational qualification:

SAQA QUAL ID	Qualification Title			
110667	Occupational Certificate: Orchard and Vineyard Foreman			
Originator				
Development Quality Partner – AgriSETA				
Primary Or Delegated Quality Assurance Functionary			NQF Sub-Framework	
-			OQSF - Occupational Qualifications Sub-Framework	
QUALIFICATION TYPE		FIELD		SUBFIELD
Occupational Certificate		Field 01 - Agriculture and Nature Conservation		Primary Agriculture
Abet Band	Minimum Credits	Pre-2009 NQF Level	NQF Level	Qual Class
Undefined	147	Not Applicable	NQF Level 04	Regular-ELOAC

Modules

The content of this learner guide is aligned to the following modules of the occupational qualification above.

Module Code	Module Title	Level	Credits
Knowledge Modules			
611202-001-00-KM-01	Plant Structure and Physiology	4	5
611202-001-00-KM-02	Vineyard or Orchard Establishment	3	2
611202-001-00-KM-03	Vineyard or Orchard Manipulation Processes	3	8
611202-001-00-KM-04	Harvesting	3	4
611202-001-00-KM-05	Basic Principles of Plant Nutrition	4	4
611202-001-00-KM-06	Crop Protection	3	3
611202-001-00-KM-07	Assets in Horticultural Production	3	2
611202-001-00-KM-08	Farm Business Management and Farming Process Management	4	8
611202-001-00-KM-09	Human Resource Management and Processes	4	8
611202-001-00-KM-10	Overseeing Farming Resource Utilisation	4	8
Practical Skill Modules			
611202-001-00-PM-01	Organise, Allocate and Monitor Availability and Productive Use of Resources	4	5
611202-001-00-PM-2a	Set Team and Individual Performance Goals to Enhancing Team Performance	4	10
611202-001-00-PM-2b	Control Vineyard or Orchard Practices	4	10

611202-001-00-PM-03	Supply Accurate Daily Orchard or Vineyard and Production Information	4	10
Work Experience Modules			
611202-001-00-WM-01	Vineyard or Orchard Resource Optimisation	4	20
611202-001-00-WM-02	Skilled and Motivated Work Team Output	4	20
611202-001-00-WM-03	Daily Orchard or Vineyard and Production Information Availability	4	20

Learning Outcomes

The content of this learner guide is aligned to the following learning outcomes of the modules above.

Knowledge Topics	
Outcome Code	Module Title
KM-04-KT02	Principles and practices of harvesting crop
IAC0208	The importance of harvesting area being clean from waste material is discussed
IAC0209	Orchard / vineyard sanitation practices to be applied during and after harvesting are outlined
IAC0210	The procedure for dealing with or disposing of an infested crop is outlined
KM-05-KT07	Food Safety
IAC0701	The principles of hygiene are outlined
IAC0702	The causes of contamination are described
Practical Skills	

Chapter 1

Orchard Hygiene

learning outcomes

The content of this chapter is aimed at helping you to:

- Maintain hygienic orchards to enhance orchard health and limit pests and diseases.

1. Introduction to Orchard Hygiene

Orchard hygiene (or sanitation) is an important part of maintaining healthy, productive citrus orchards. Keeping an orchard hygienic refers to 'keeping the orchard clean'. This generally involves practices like removing dead plant material and other waste.

Keeping your orchards hygienic is necessary for many reasons. Firstly, having a clean, uncluttered orchard, particularly in between tree rows, makes many production practices much easier. If a tractor has to constantly stop to clear branches off the road, its journey will take much longer. The same applies for workers trying to scout and harvest.

Aside from making production practices quicker, hygienic orchards also breed less pests and diseases, as many of these unwanted organisms reproduce in decaying plant matter. If you leave piles of dead branches or rotting leaves and fruit in the orchard, you are creating perfect breeding grounds for the pests you don't want.

This also means that proper sanitation practices can save you significant money, as paying a worker a small amount to remove some dead branches and fruit can end up saving you a lot more in the chemicals you would have had to use to fight the pests that would have bred there.

Now that we know how important hygiene is, let's discuss some of the actual practices of orchard hygiene. The key hygiene practices you should implement are:

- Waste management
- Weed removal
- Equipment cleaning and maintenance
- Water system management

1.1. Waste Management

Arguably the single most important practice in terms of orchard hygiene is the removal of leftover plant material. This includes fallen or rejected fruit, leaves, and dead branches. This plant material can become breeding grounds for pests like fruit flies and pathogens like fungal spores that cause diseases. To reduce the likelihood of pest and disease outbreaks, you need to remove any dead or decaying plant matter on a regular basis, such as once a week.

Once removed, the waste should be properly disposed of to prevent recontamination. Waste management is discussed in detail in the next chapter.

1.2. Weed Removal

Weeds and grasses not only compete with citrus trees for nutrients and water, but they can also serve as hosts for pests and diseases. This means that removing weeds and keeping grass neat in your orchards is very important. For specific information on both weed and grass management, read the material about weed control.

1.3. Equipment cleaning and maintenance

Another important part of orchard sanitation involves the equipment used in the orchard. Any orchard equipment, from large vehicles like tractors, down to small tools like clippers, must be kept clean, to prevent the spread of pests and diseases.

Tools like pruning shears can transfer pathogens from one tree to another if not disinfected after each use. The same goes for harvesting equipment, which may come into contact with both healthy and infected fruit, risking cross-contamination. By regularly cleaning and sanitizing these tools, you can prevent the movement of harmful organisms within the orchard.

To clean equipment effectively, you can use a range of disinfectants. Whatever disinfectant you use, make sure you follow the manufacturer's instructions regarding dosage and usage, and dispose of the used containers properly.

1.4. Water system management

The water systems in your orchards are another area where sanitation is very important. Irregular or poorly performed irrigation can lead to the accumulation of standing water, which creates ideal conditions for pests and diseases to breed. For specific information on how to clean and maintain irrigation systems, read the material about irrigation maintenance.

2. Orchard Sanitation Best Practices

Now that we've discussed the practices that make up good orchard sanitation and hygiene, let's discuss some specific best practices that will help you facilitate these practices effectively.

First and foremost, for sanitation practices to work, they need to be timely. This means that they are done at the right time, and regularly. Orchard sanitation will not work if you only do it once every few months, and doing it too often is a waste of manpower and money. The best practice is to perform orchard sanitation at regular intervals.

We cannot recommend specific intervals, since the amount of sanitation needed will depend on the size of the orchards and your specific farm's environment. A farm with high winds and lots of surrounding forests may have to clean their orchard far more often than another farm. Once you have found an interval that keeps the orchard clean (free from disease and pests), make sure that sanitation is performed regularly at this interval.

Aside from this regular sanitation, certain production practices require sanitation tasks to be performed right after them. For example, you should always clear the orchard of dead material after harvesting or after major pruning, as this is when the risk of pest and disease spread is highest.

You should establish a sanitation schedule, that lines up with the orchard's growth cycle. This schedule should be flexible to account for unexpected pest or disease outbreaks, but regular.

Sanitation forms a part of IPM, and should be seen as one of the ongoing practices that form part of an IPM strategy. By combining sanitation with other IPM strategies, you should be

able to effectively manage pest populations, while maintaining the health and productivity of the orchard.

Finally, cross-contamination is a major risk in orchard sanitation. Infected materials can easily be transferred from one part of an orchard to another through production practices or environmental phenomena like wind. To prevent this, your workers should follow strict hygiene protocols, such as changing gloves or sanitizing footwear between tasks. It is also important that workers are trained to recognize signs of pests or diseases, so they can report these quickly.

3. Monitoring

As with most production practices, regular monitoring is essential to ensure that hygiene practices are effective and being performed properly. Your orchard managers should maintain detailed records of all sanitation activities, including dates and practices performed.

summary

Chapter 1 – Orchard Hygiene

- Keeping an orchard hygienic refers to 'keeping the orchard clean', which generally involves practices like removing dead plant material and other waste.
- Having a clean, uncluttered orchard, particularly in between tree rows, makes many production practices much easier.
- Hygienic orchards breed less pests and diseases, as many of these unwanted organisms reproduce in decaying plant matter.
- The key orchard hygiene practices you should implement are Waste removal, Weed removal, Equipment cleaning and maintenance, and Water system management.
- Weeds and grasses not only compete with citrus trees for nutrients and water, but they can also serve as hosts for pests and diseases.
- Any orchard tools and equipment must be kept clean to prevent the spread of pests and diseases.
- Disinfectants should be used to clean equipment effectively.
- Sanitation practices need to be done at the right time, and at regular intervals.
- Certain production practices require sanitation tasks to be performed right after them, such as harvest or pruning.

assessment activities

- ✓ **Activity P1:** Complete this activity to test your knowledge of orchard hygiene.

Chapter 2

Waste Management

learning outcomes

The content of this chapter is aimed at helping you to:

- Dispose of waste in a safe, environmentally responsible way.

1. Orchard Sanitation during Harvest

Harvesting is a complex process that produces a lot of waste. This waste can be in the form of discarded fruit and plant material such as stems or leaves, or non-organic waste such as chemical containers or broken tools and equipment. Plant material can become a breeding ground for diseases and pests, and non-organic waste can be damaging to the environment, so you need to make sure that waste is properly disposed of.

Aside from preventing the spread of diseases and pests, many accreditation schemes require responsible waste disposal to remain accredited. Further, many consumers, especially in wealthier markets overseas, demand fruit that is sustainably produced, and waste management is a big part of farming sustainably.

2. Waste Management Processes

Successful waste management, as with most production practices, is dependent on training. The training of waste disposal teams must ensure that members understand the importance of their duties and the effect that the successful completion of these duties will have on ensuring sustainable farming through conservation of natural resources. Any waste management practices must not negatively affect the environment.

Three distinct processes form part of any successful waste management plan, being:

- Waste Auditing
- Waste Removal
- Waste Disposal

2.1. Waste Auditing

Waste auditing is a process where you investigate each harvesting process and procedure and note how much and what kinds of waste are produced. This information is then used to develop plans for the collection and disposal of the waste. In a typical harvest process, the two most common kinds of waste are natural plant material and waste created by the presence of humans in the orchard.

Waste audits are also performed after creating and implementing the waste management plan, to check if the plan is effective in the removal and the disposal of waste. During the audit process environmental checks must be done by having soil and water samples collected and analysed by independent laboratories. Regular testing and analysis of test results must be done to show the effectiveness of the waste management plan and to highlight areas where the plan can be improved.

2.2. Waste Removal

To ensure waste removal processes are efficient, you need to appoint waste removal teams. Waste removal teams collect biodegradable waste such as plant, flower, and fruit material from orchards before and after the harvest. These waste removal teams also collect non-biodegradable waste for recycling from specified collection points.

2.3. Waste Disposal

After removal, waste is separated into different recycling groups and sent to recycling centres. Any non-biodegradable waste that cannot be recycled is dumped in accordance with local legislation. On some smaller farms and production areas, recyclable waste must be stored until enough waste is collected to be sent to recycling centres.

3. Classifying Waste

Once a waste audit has been performed identifying waste that is produced, waste needs to be classified. After classifying waste ways of collection and disposal can be planned and implemented. The waste produced during harvesting is usually classified into two distinct groups: biodegradable and non-biodegradable waste.

definition

Biodegradable Waste

Biodegradable waste refers to waste that is organic, meaning that it can be broken down by natural processes in the environment. These materials decompose (or degrade) over time and return to the environment, usually without causing long-term harm.

Non-biodegradable Waste

Non-biodegradable waste refers to waste that is inorganic and cannot be easily broken down by natural processes. These kinds of waste take a long time to decompose, and some do not decompose at all. This means that they often accumulate in landfills, which can cause pollution.

3.1. Biodegradable Waste

Most of the waste produced during the harvesting period is made up of plant matter. This is old or infected fruit and dead and dry wood from trees. Teams must be created to clear the orchard directly after harvesting of all biodegradable waste. Teams should also clear orchards before harvesting to lessen the risk of contamination.

Fruit waste is disposed of by either chopping up waste and dispersing it over a wide area to dry or by burying the waste at least 400 metres away from the orchard, at least 30cm deep. Other biodegradable waste such as dead wood and leaves are usually disposed of by burning.

When burning biodegradable waste, you must be careful to ensure that burning is done well away from established orchards. Preferably, burning should take place in prepared pits to prevent the fire from spreading, with these pits being covered again after burning.

3.2. Non-Biodegradable Waste

Non-biodegradable waste is further reclassified into recyclable waste and non-recyclable waste (discussed below). All recyclable waste should be sent to local recycling centres and non-recyclable waste must be disposed of by following local municipal regulations. All non-biodegradable waste must be collected daily by waste removal teams. You should have several bins for different waste types (such as glass, plastic, paper, and other waste) available at harvesting sites.

Any chemical waste must be collected and taken to recycling centre or removed by a waste management service equipped to deal with chemical waste. Chemical waste must never be allowed to become part of the ecosystem and pollute ground water reserves.

4. Recycling

definition

Recyclable Waste

Recyclable waste refers to waste that can be processed and converted into new products through recycling. These materials are typically collected, cleaned, and reused for manufacturing. This reuse reduces the need for new raw materials, which helps to conserve resources. Recycling helps to minimize environmental damage, reduce waste, and lower energy consumption.

The recycling of waste is required by most independent accreditation schemes. Recycling is an important part of ensuring sustainable farming by minimising the environmental damage of the farm or production area. On farms, recyclable waste is generally created human action rather than industrial operations. This means that the amount of waste produced is generally not enough to justify the development of recycling plants on most farms or production areas.

This means that it is the responsibility of the farm owner or manager to identify and contact local recycling centres to organise waste management practices. It may also be necessary to construct waste storage facilities where waste can be stored until it can be taken to recycling facilities.

5. Waste Disposal Regulations

All waste management practices must adhere to good agricultural practice guidelines. These guidelines are set to ensure sustainability and protect the environment. Waste disposal must be done in accordance with these legal and social regulations.

Waste disposal is not only strictly regulated by local and national laws and regulations, but also accreditation schemes (such as EurepGAP or other GAP schemes) that a producer must comply with before he can export fruit.

Most GAP schemes require proof of waste management audits and compliance. The audit and testing record are checked and analysed when external audits are performed by independent service providers to verify the effectiveness of the waste management plan. Proving the effectiveness of the waste management plan is a prerequisite before accreditation certificates are issued.

6. Recordkeeping

As with all other parts of the citrus harvesting process, recordkeeping is critical. Records allow you to monitor the effectiveness of the waste management and disposal plan. The records you keep should show how much waste is collected daily, as well as how this waste

was disposed of. Any waste that was not collected must be noted and reason provided as to why the waste was not collected.

Records must be kept and used to identify problem areas and ways to improve the waste management and disposal plan. Records are also used to provide proof of compliance to regulations that must be adhered to. If your farm is a large operation, you may need to appoint waste removal and collection team leaders to handle the responsibility of completing the records.

summary

Chapter 2 – Waste Management

- The waste management plan consists of three different processes; the waste audit, where waste type is identified and classified; waste removal, where waste is collected; and waste disposal where waste is disposed of according to its classification.
- Waste is classified into non-biodegradable and biodegradable waste.
- Most non-biodegradable waste must be recycled where possible.
- The waste management and disposal plan must adhere to regulations predetermined by local and national authorities as well as any waste disposal regulations stipulated by accreditation schemes.
- Records of waste management and disposal must be kept not only to show the effectiveness of the plan but also be used to improve the waste disposal plan where needed.
- The development of a waste management plan must always be done according to GAP.
- A waste disposal plan must be implemented to be of benefit to both the producer and the environment.
- Recordkeeping practices must be managed to ensure compliance to regulations.
- Records of internal audits and testing must be kept proving the management plans effectiveness.
- During external audits by independent accreditation authorities, records will be analysed before a producer can obtain accreditation.

assessment activities

- ✓ **Activity P2:** Complete this activity to test your knowledge of waste management.
- ✓ **Activity F1:** Complete this activity to test your knowledge of the entire module.