



Federal Democratic Republic of Ethiopia  
OCCUPATIONAL STANDARD  
SMALL SCALE IRRIGATION  
DEVELOPEMENT

NTQF Level I-IV



*Ministry of Education  
August 2016*

## Introduction

Ethiopia has embarked on a process of reforming its TVET-System. Within the policies and strategies of the Ethiopian Government, technology transformation – by using international standards and international best practices as the basis, and, adopting, adapting and verifying them in the Ethiopian context – is a pivotal element. TVET is given an important role with regard to technology transfer. The new paradigm in the outcome-based TVET system is the orientation at the current and anticipated future demand of the economy and the labor market.

The Ethiopian Occupational Standards (EOS) is the core element of the Ethiopian National TVET-Strategy and an important factor within the context of the National TVET-Qualification Framework (NTQF). They are national Ethiopian standards, which define the occupational requirements and expected outcome related to a specific occupation without taking TVET delivery into account.

This document details the mandatory format, sequencing, wording and layout for the Ethiopia Occupational Standard which comprised of Units of Competence.

A Unit Title describes a distinct work activity. It is documented in a standard format that comprises:

- Occupational title and NTQF level
- Unit title
- Unit code
- Unit descriptor
- Elements and Performance criteria
- Variables and Range
- Evidence guide

Together all the parts of a Unit Title guide the assessor in determining whether the candidate is competent.

The ensuing sections of this EOS document comprise a description of the occupation with all the key components of a Unit Title:

- chart with an overview of all Units of Competence for the respective level including the Unit Codes and the Unit Titles
- contents of each Unit Title (competence standard)
- occupational map providing the Technical and Vocational Education and Training (TVET) providers with information and important requirements to consider when designing training programs for this standards and for the individual, a career path

## UNIT OF COMPETENCE CHART

Occupational Standard: Small Scale Irrigation Development

Occupational Code: **AGR SSI1**

*NTQF Level I*

<p><a href="#"><u>AGR SSI1 01 0816</u></a> Support Irrigation and Drainage Works</p>	<p><a href="#"><u>AGR SSI1 02 0816</u></a> Identify Basic Machinery and Equipment</p>	<p><a href="#"><u>AGR SSI1 03 0816</u></a> Support Irrigation Water Source Identification</p>
<p><a href="#"><u>AGR SSI1 04 0816</u></a> Support Nursery for Irrigation Work</p>	<p><a href="#"><u>AGR SSI1 05 0816</u></a> Identify Basic Irrigation Design and Surveying Tools</p>	<p><a href="#"><u>AGR SSI1 06 0816</u></a> Support Basic Irrigation Structure Works</p>
<p><a href="#"><u>AGR SSI1 07 0816</u></a> Develop Understanding of Basic Soil Water Plant Relationships</p>	<p><a href="#"><u>AGR SSI1 08 0816</u></a> Develop Understanding of Data Recording in Irrigation Work</p>	<p><a href="#"><u>AGR SSI1 09 0816</u></a> Support Basic Natural Resource Conservation Work</p>
<p><a href="#"><u>AGR SSI1 10 0816</u></a> Support Irrigation for Pasture Establishment</p>	<p><a href="#"><u>AGR SSI1 11 0816</u></a> Support Basics of Human Nutrition</p>	<p><a href="#"><u>AGR SSI1 12 0816</u></a> Perform Basic Measurement and Calculation</p>
<p><a href="#"><u>AGR SSI1 13 0816</u></a> Operate a Personal Computer</p>	<p><a href="#"><u>AGR SSI1 14 0816</u></a> Develop Understanding of Basic Chemical Safety Rules</p>	<p><a href="#"><u>AGR SSI1 15 0816</u></a> Develop Understanding of Basic Irrigation Extension</p>
<p><a href="#"><u>AGR SSI1 16 0816</u></a> Apply Quality Standards</p>	<p><a href="#"><u>AGR SSI1 17 0816</u></a> Demonstrate Work Values</p>	<p><a href="#"><u>AGR SSI1 18 0816</u></a> Work with Others</p>
<p><a href="#"><u>AGR SSI1 19 0816</u></a> Develop Understanding of Entrepreneurship</p>	<p><a href="#"><u>AGR SSI1 20 0816</u></a> Receive and Respond to Workplace Communication</p>	<p><a href="#"><u>AGR SSI1 21 0816</u></a> Apply 3S</p>

**NTQF Level II**

<b><u>AGR SSI2 01 0816</u></b> Lay Micro Irrigation Systems	<b><u>AGR SSI2 02 0816</u></b> Assist the Operation of Gravity Fed Irrigation	<b><u>AGR SSI2 03 0816</u></b> Assist in Determining Basic Properties of Soil
<b><u>AGR SSI2 04 0816</u></b> Observe and Report on Weather	<b><u>AGR SSI2 05 0816</u></b> Assist with the Operation of Pressurized Irrigation	<b><u>AGR SSI2 06 0816</u></b> Maintain Gravity-Fed Irrigation Systems
<b><u>AGR SSI2 07 0816</u></b> Maintain Pressurized Irrigation Systems	<b><u>AGR SSI2 08 0816</u></b> Assist Irrigation Drainage Systems Development	<b><u>AGR SSI2 09 0816</u></b> Operate Small Motorized and Manual Irrigation Pumps
<b><u>AGR SSI2 10 0816</u></b> Maintain Small Motorized and Manual Irrigation Pump	<b><u>AGR SSI2 11 0816</u></b> Assist Erosion and Sediment Control Activities	<b><u>AGR SSI2 12 0816</u></b> Assist Establishment of Irrigated Crops
<b><u>AGR SSI2 13 0816</u></b> Assist Basic Integrated Pest Management (IPM) for Irrigated Crops	<b><u>AGR SSI2 14 0816</u></b> Assist in Identifying and Selection of Irrigation Methods	<b><u>AGR SSI2 15 0816</u></b> Assist Irrigation Construction Work
<b><u>AGR SSI2 16 0816</u></b> Assist Construction of Water Harvesting Structures	<b><u>AGR SSI2 17 0816</u></b> Read Technical Drawing	<b><u>AGR SSI2 18 0816</u></b> Assist Estimation of Crop Water Requirements
<b><u>AGR SSI2 19 0816</u></b> Assist Irrigation Scheduling	<b><u>AGR SSI2 20 0816</u></b> Understand and Assess Groundwater	<b><u>AGR SSI2 21 0816</u></b> Participate in Workplace Communication
<b><u>AGR SSI2 22 0816</u></b> Work in Team Environment	<b><u>AGR SSI2 23 0816</u></b> Develop Business Practice	<b><u>AGR SSI2 24 0816</u></b> Standardize and Sustain 3S

**NTQF Level III**

**AGR SSI3 01 0816**  
Measure and Apply  
Irrigation Water

**AGR SSI3 02 0816**  
Operate and Process  
Fertigation Equipment

**AGR SSI3 03 0816**  
Install Drainage Systems

**AGR SSI3 04 0816**  
Measure Drainage System  
Performance

**AGR SSI3 05 0816**  
Analyze and Interpret  
Irrigation Related Data

**AGR SSI3 06 0816**  
Operate Pressurized  
Irrigation Systems

**AGR SSI3 07 0816**  
Operate Gravity Fed  
Irrigation Systems

**AGR SSI3 08 0816**  
Implement Soil Fertility  
Management

**AGR SSI3 09 0816**  
Estimate of Costing  
Irrigation Work

**AGR SSI3 10 0816**  
Determine Crop Water  
Requirement

**AGR SSI3 11 0816**  
Troubleshoot Irrigation and  
Drainage Systems

**AGR SSI3 12 0816**  
Carry out Surveying and  
Leveling

**AGR SSI3 13 0816**  
Implement Soil and Water  
Conservation Measures

**AGR SSI3 14 0816**  
Construct Water  
Harvesting Structures

**AGR SSI3 15 0816**  
Measure Water Flow In-  
pipes and Open Channels

**AGR SSI3 16 0816**  
Maintain Pressurized  
Irrigation Systems

**AGR SSI3 17 0816**  
Implement Post-harvest  
Principles

**AGR SSI3 18 0816**  
Apply Watershed  
Management Principles

**AGR SSI3 19 0816**  
Establish Irrigation  
Related Environmental  
Impact Assessment  
Program

**AGR SSI3 20 0816**  
Monitor Implementation of  
Work Plan/Activities

**AGR SSI3 21 0816**  
Apply Quality Control

**AGR SSI3 22 0816**  
Lead Workplace  
Communication

**AGR SSI3 23 0816**  
Lead Small Teams

**AGR SSI3 24 0816**  
Improve Business Practice

**AGR SSI3 25 0816**

Prevent and Eliminate  
MUDA

**NTQF Level IV**

<p><b><u>AGR SSI4 01 0816</u></b> Plan Irrigation Project</p>	<p><b><u>AGR SSI4 02 0816</u></b> Supervise Irrigation System</p>	<p><b><u>AGR SSI4 03 0816</u></b> Identify Potential Water Sources for Irrigation Development</p>
<p><b><u>AGR SSI4 04 0816</u></b> Manage and Improve Irrigation Practices and Develop Value Chains</p>	<p><b><u>AGR SSI4 05 0816</u></b> Manage Salinity of Irrigated Land</p>	<p><b><u>AGR SSI4 06 0816</u></b> Implement Onsite Irrigation Installation Work</p>
<p><b><u>AGR SSI4 07 0816</u></b> Audit Irrigation System</p>	<p><b><u>AGR SSI4 08 0816</u></b> Manage Construction of Irrigation Schemes</p>	<p><b><u>AGR SSI4 09 0816</u></b> Coordinate Work Site Activities</p>
<p><b><u>AGR SSI4 10 0816</u></b> Monitor Environmental Policies Implementation</p>	<p><b><u>AGR SSI4 11 0816</u></b> Monitor and Control Irrigation Drainage Systems</p>	<p><b><u>AGR SSI4 12 0816</u></b> Plan and Organize Work</p>
<p><b><u>AGR SSI4 13 0816</u></b> Migrate to New Technology</p>	<p><b><u>AGR SSI4 14 0816</u></b> Establish Quality Standards</p>	<p><b><u>AGR SSI4 15 0816</u></b> Develop Individuals and Team</p>
<p><b><u>AGR SSI4 16 0816</u></b> Utilize Specialized Communication Skills</p>	<p><b><u>AGR SSI4 17 0816</u></b> Manage Micro, Small and Medium Enterprises (MSMEs)</p>	<p><b><u>AGR SSI4 18 0816</u></b> Apply Problem Solving Techniques and Tools</p>

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Support Irrigation and Drainage Works
Unit Code	<a href="#">AGR SSI1 01 0816</a>
Unit Descriptor	This competence standard covers the process of supporting the installation, operation and maintenance of Irrigation and drainage systems under direct supervision. It requires the ability to prepare materials, tools and equipment for irrigation work and Drainage Work, undertake irrigation and Drainage activities, handle materials and equipment, and clean up on completion of work. Supporting irrigation and drainage work requires knowledge of safe work practices, irrigation and drainage work techniques, irrigation and drainage tools and equipment, understanding the role of gender in irrigation and drainage work and repair and maintenance of irrigation and drainage components and systems.

Elements	Performance Criteria
1. Prepare materials, tools and equipment for irrigation and drainage work	<p>1.1 The required materials, <b>tools and equipment</b> are identified according to lists provided and/or supervisor's <b>instructions</b>.</p> <p>1.2 Checks are conducted on all materials, tools and equipment with insufficient or faulty items reported to the supervisor.</p> <p>1.3 Techniques used when loading and unloading materials demonstrate correct manual handling and minimize damage to the load and the vehicle.</p> <p>1.4 Suitable <b>Personal Protective Equipment (PPE)</b> is selected and checked prior to use.</p> <p>1.5 Irrigation and drainage support is provided according to OHS requirements, <b>gender policy</b> and according to <b>workplace information</b>.</p> <p>1.6 <b>OHS hazards</b> are identified and reported to the supervisor.</p>
2. Undertake irrigation and drainage work as directed	<p>2.1 Instructions and directions provided by supervisor are followed, and clarification sought when necessary.</p> <p>2.2 Irrigation and drainage work is undertaken in a safe and environmentally appropriate manner according to enterprise guidelines.</p> <p>2.3 Interactions with other staff and customers are carried out in a positive and professional manner.</p> <p>2.4 The role of gender in interaction with staff and customer is understood.</p> <p>2.5 Enterprise policy and procedures along with gender policy and guideline in relation to workplace practices, handling and disposal of materials is observed.</p>



	2.6 Problems or difficulties in completing work to required standards or timelines are reported to supervisor.
2. Handle materials and equipment	<p>3.1 <b>Waste material</b> and debris produced during irrigation and drainage work is stored in a designated area according to supervisor's instructions.</p> <p>3.2 Materials, equipment and machinery are handled and transported according to supervisor's instructions and enterprise guidelines.</p> <p>3.3 A clean and safe work site is maintained while undertaking irrigation activities.</p>
3. Clean up on completion of irrigation and drainage activities	<p>4.1 Materials are returned to store or disposed of according to supervisor's instructions.</p> <p>4.2 Tools and equipment are cleaned, maintained and stored according to manufacturer's specifications and supervisor's instructions.</p> <p>4.3 Site is <b>made good</b> according to supervisor's instructions and good environmental practices.</p> <p>4.4 Work outcomes are reported to the supervisor.</p>

Variable	Range
Tools and equipment may include:	Leveling equipment, wheelbarrow, string lines, tape measures, marking gauges, spades, shovels, crow bars, rakes, brooms, sanding blocks and hacksaws.
Instructions may include:	Standard Operating Procedures (SOPs), enterprise policy and procedures, specifications, work notes, gender policy and guidelines, Material Safety Data Sheets (MSDSs), manufacturer's instructions, or verbal directions from manager or supervisor.
Personal Protective Equipment (PPE)	Steel capped boots/shoes, overalls, gloves, sun hat, sunscreen lotion, safety goggles, face mask and ear protectors.
Gender policy	Is the main approach of the federation how to address, design, implement, monitor and evaluate gender issue in an enterprise or organization.
Workplace information are:	Procedures for disposing of waste materials, aware about gender, work instructions or verbal instructions from the supervisor.
OHS Hazards may include:	solar radiation, dust, noise, air- and soil-borne micro-organisms, chemicals and hazardous substances, sharp hand tools and equipment, manual handling, holes, and slippery and uneven surfaces.
Waste materials may apply to:	Plant debris, litter and broken components, mulches, plastic, metal, and paper-based materials. These may be recycled, re-used, returned to the manufacturer, or disposed of according to enterprise work procedures.
Site is made good means:	Paths are swept and cleaned, work area is left in a good state, disturbed areas are repaired, all materials, debris, tools and

	equipment are removed from site, and other signs of disturbance or damage are corrected.
Tasks included under irrigation and drainage work may be	<ul style="list-style-type: none"> <li>• Assisting with installation of irrigation and/or drainage pipes and components for gravity fed or pressurized systems, including digging trenches, back filling of trenches and completing other basic tasks as instructed.</li> <li>• Assisting with maintenance of irrigation and/or drainage systems including clearing blockages, and completing other basic tasks as instructed.</li> <li>• Work with a range of materials including plastic and metal pipes and components using hand tools commonly used in irrigation and drainage work.</li> <li>• Associated irrigation and drainage activities including assisting in establishing work base, clearing site, erecting barriers and signs, unloading and loading of materials by considering gender issues, setting out of works, cleaning up site and disposal of debris and materials.</li> </ul>

### Evidence Guide

Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• apply basic construction techniques</li> <li>• demonstrate safe work practices</li> <li>• perform basic repair and maintenance of irrigation and drainage components and systems</li> <li>• collect, analyze and organize information</li> </ul>
Underpinning Knowledge and Attitude	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• safe work practices</li> <li>• basic gender concepts</li> <li>• preparing for irrigation work and cleaning up on completion</li> <li>• basic construction techniques</li> <li>• irrigation tools and equipment</li> <li>• maintenance practices for planted areas</li> <li>• basic repair and maintenance of irrigation components and systems</li> <li>• work values and Ethics</li> <li>• accountable to work</li> <li>• loyalty and honest to the work he/she being doing</li> <li>• Respect and follow rules and regulations of the organization</li> <li>• Commitment/ Dedication</li> <li>• Free from gender biasness</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• identify and prepare materials, tools and equipment for irrigation and drainage work</li> <li>• undertake irrigation and drainage work as directed</li> <li>• handle materials and equipment</li> <li>• clean up on completion of work</li> <li>• collect, analyze and organize information</li> <li>• plan and organize activities in order to complete tasks</li> </ul>

	<p>efficiently in a logical sequence and in a timely manner</p> <ul style="list-style-type: none"> <li>• communicate and co-operate with other staff in completing irrigation tasks</li> <li>• use mathematical ideas and techniques in counting, tallying and estimation are required when handling materials, tools and equipment</li> <li>• use technology in the use of irrigation and drainage tools and equipment</li> </ul>
Resources Implication	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> <li>• access is required to real or appropriately simulated situations, including work areas, materials and equipment</li> <li>• documentation and information on workplace practices, gender policy guidelines and OHS practices</li> <li>• specifications and work instructions</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written test/Oral questioning on underpinning knowledge</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Identify Basic Machinery and Equipment
Unit Code	<a href="#">AGR SSI1 02 0816</a>
Unit Descriptor	This competency standard covers the operation and maintenance of basic machinery and equipment. Competency requires the application of skills and knowledge to a limited range of tasks including pre-operational checks, and the cleaning and storage of tools and equipment. In addition, competency requires an awareness of workplace safety and positive environmental practices associated with equipment operation. The work in this standard is likely to be under direct supervision with regular checking.

Elements	Performance Criteria
1. Prepare basic machinery and equipment for use	<p>1.1 <b>Machinery and equipment</b> are identified and selected in accordance with supervisor's instructions</p> <p>1.2 Routine <b>pre-operational checks of machinery and equipment</b> are carried out to manufacturer's specifications and/or <b>enterprise procedures</b>.</p> <p>1.3 Unsafe or faulty machinery and equipment are identified and segregated for repair or replacement in line with enterprise requirements</p> <p>1.4 <b>Occupational Health and Safety hazards</b> in the workplace are identified and reported to the supervisor</p>
2. Support basic machinery and equipment Operation	<p>2.1 Suitable <b>personal protective clothing and equipment</b> is selected, used, maintained and stored in accordance with <b>Occupational Health and Safety requirements</b></p> <p>2.2 Machinery and equipment operations are supported to manufacturers specifications and in accordance with supervisor's instructions</p> <p>2.3 Work is completed to supervisor's satisfaction and in accordance with Occupational Health and Safety requirements</p> <p>2.4 <b>Environmental implications associated with operation and maintenance</b> are identified and reported verbally to the supervisor</p>
3. Check, clean and store basic machinery and equipment	<p>3.1 Machinery and equipment use is detailed and recorded in accordance with enterprise requirements</p> <p>3.2 Machinery and equipment are cleaned, secured and stored to manufacturers specifications and supervisors instructions</p> <p>3.3 Malfunctions, faults, wear or damage to machinery and equipment are identified and reported in line with enterprise requirements</p> <p>3.4 Workplace areas are cleaned and maintained in line with Occupational Health and Safety and enterprise requirements</p>

Variable	Range
Machinery and equipment may include:	<p>Small engine machinery such as:</p> <ul style="list-style-type: none"> <li>• mowers</li> <li>• brush cutters</li> <li>• pumps</li> <li>• air compressors</li> <li>• generators</li> </ul> <p>Hand tools equipment such as:</p> <ul style="list-style-type: none"> <li>• wheelbarrows</li> <li>• spades</li> <li>• shovels and forks</li> </ul> <p>Other material like sprinkler, drip and surface irrigation structure, triple pump, rope and washer pump, solar pump, wind mill pump, bucket, dynamo or electric pump, tensometer, infiltrometer, water measuring device, farm machinery e.t.c</p> <p>This unit excludes:</p> <ul style="list-style-type: none"> <li>• electrically powered tools</li> <li>• vehicles</li> <li>• chainsaws</li> </ul>
Pre-operational checks on machinery and equipment may include checking:	<ul style="list-style-type: none"> <li>• fuels, fuel lines and oils</li> <li>• battery electrolyte levels, wheels and tyre pressure</li> <li>• air filters</li> <li>• safety guards</li> <li>• preparation on equipment may include</li> <li>• cleaning, lubricating</li> <li>• identifying and segregating unsafe or faulty equipment for repair or replacement</li> </ul>
Enterprise procedures	<p>Standard Operating Procedures (SOPs), industry standards, production schedules, Material Safety Data Sheets (MSDSs), work notes, product labels, manufacturers specifications, operators manuals, enterprise policies and procedures (including waste disposal, recycling and re-use guidelines), Occupational Health and Safety procedures, supervisors oral or written instructions, work and routine maintenance plans could be included in enterprise requirements</p>
Occupational Health and Safety hazards may include:	<ul style="list-style-type: none"> <li>• exposure to loud noise and fumes, solar radiation, dust</li> <li>• ergonomic hazards associated with posture and vibration</li> <li>• hazardous substances (fuels, oils, fertilizer), oil and grease spills</li> <li>• the presence of bystanders, livestock and wildlife</li> <li>• uneven and varying terrain gradients, potholes, ditches, gullies, embankments, obstacles</li> <li>• rocks</li> <li>• logs</li> <li>• fences</li> <li>• debris</li> <li>• buildings</li> <li>• extreme weather conditions, electricity, overhead hazards</li> </ul>

	<p>such as:</p> <ul style="list-style-type: none"> <li>➤ power lines mechanical malfunctions</li> <li>➤ exposed moving parts</li> <li>➤ other machinery including hydraulics</li> </ul>
Personal protective clothing and equipment may include:	<ul style="list-style-type: none"> <li>• boots</li> <li>• hat/hard hat</li> <li>• overalls</li> <li>• gloves</li> <li>• protective eyewear</li> <li>• hearing protection]</li> <li>• safety harness</li> <li>• respirator or face mask</li> <li>• sun protection, e.g., sun hat, sunscreen</li> </ul>
Occupational Health and Safety requirements may include:	<ul style="list-style-type: none"> <li>• the safe operation and maintenance of machinery and equipment including guarding of exposed moving parts</li> <li>• manual handling, including safe lifting and carrying techniques</li> <li>• handling and storage of hazardous substances, and the appropriate use, maintenance and storage of personal protective clothing and equipment</li> <li>• outdoor work including protection from solar radiation, hazardous noise and organic and other dusts</li> <li>• identifying and reporting hazards</li> <li>• projection of people in the workplace</li> </ul>
Environmental implications associated with the operation and maintenance are:	<ul style="list-style-type: none"> <li>• negative environmental impacts may result from excessive noise and exhaust emissions, the incorrect use and disposal of maintenance debris (oil containers, chemical residues), hazardous substances (fuel, fertilizer), and damage to fauna and flora in natural areas</li> <li>• impacts may also include run-off flows of water and cleaning agents from servicing, maintenance and cleaning activities, soil disturbance and dust problems from high activity traffic (including irrigation equipment)</li> </ul>
The sport and recreation industry covers:	<ul style="list-style-type: none"> <li>• industry sectors of community recreation, fitness, outdoor recreation and sport</li> <li>• significant roles played by activity organizations, industry peak bodies, professional organizations</li> <li>• large volunteer base</li> <li>• high turnover of volunteers</li> <li>• high levels of part time and casual employment</li> <li>• irregular working hours</li> <li>• relatively few professional positions</li> <li>• workforce employed mostly in operational positions</li> <li>• mainly small business or self-employed personnel</li> <li>• slow to take up technology</li> <li>• over 2/3 of the sport and recreation industry have no formal/recognized qualifications</li> <li>• significant reliance upon industry credentials and involvement in the activity itself</li> </ul>

<b>Evidence Guide</b>			
Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• operate of basic machinery and equipment</li> <li>• select, maintain and utilize a range of machinery and equipment to complete designated work tasks</li> <li>• carry out pre-operational checks</li> <li>• recognize and report equipment faults and workplace hazards</li> <li>• interpret and follow instructions</li> <li>• maintain equipment usage records</li> <li>• clean, secure and store equipment after use</li> <li>• demonstrate a safe workplace and environmentally responsible practices</li> </ul>		
Underpinning Knowledge and Attitude	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Pre-operational and safety checks for basic machinery and equipment</li> <li>• Hazards associated with the operation of basic machinery and equipment</li> <li>• Operating principles and operating methods for basic machinery and equipment</li> <li>• Procedures for cleaning, securing and storing basic machinery and equipment</li> <li>• Risks associated with the operation of machinery and equipment in different weather and difficult terrain conditions</li> <li>• Relevant regulations and Codes of Practice with regard to workplace Occupational Health and Safety requirements, and the use and control of hazardous substances</li> <li>• Environmental impacts and minimization measures associated with the operation of basic machinery and equipment</li> <li>• Enterprise policies with regard to machinery and equipment use, recording and reporting routines</li> <li>• work values and Ethics</li> <li>• accountable to work</li> <li>• loyalty and honest to the work he/she being doing</li> <li>• Respect and follow rules and regulations of the organization</li> <li>• Commitment/ Dedication</li> </ul>		
Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>• use Personal protective clothing and equipment and when and how it should be used, maintained and stored</li> <li>• Communicating ideas and information with regard to basic machinery and equipment operation, safety procedures and their application</li> <li>• Collect, analyze and organize information regard to the performance of machinery, equipment, identified faults, and Occupational Health and Safety concerns may be reported for repair and organized by records</li> </ul>		
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	<ul style="list-style-type: none"> <li>• Plan and organize activities involving use of basic machinery and equipment</li> <li>• Working with others and in teams in methods and procedures to complete maintenance and job functions to achieve work plan requirements</li> <li>• Using basic mathematical ideas and techniques in the calculation and measurement of volumes, weights and consumption, particularly in relation to pre-operational checks</li> <li>• Use technology to communicate, measure and record information with regard to machinery and equipment maintenance, usage and performance</li> </ul>
Resources Implication	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• Specifications and work instructions</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>



<b>Occupational Standard: Small Scale Irrigation Development Level I</b>	
<b>Unit Title</b>	<b>Support Irrigation Water Source Identification</b>
<b>Unit Code</b>	<b><u>AGR SSI1 03 0816</u></b>
<b>Unit Descriptor</b>	This unit covers the process of supporting identification of spring, well and floodways under direct supervision. It requires the ability to identify different irrigation water sources (Ground water sources, wells (shallow and deep), spring, surface water sources, river and stream, lakes. Floodways, water harvesting methods. It requires the knowledge of surface and ground water hydrology principles, water harvesting principles, catchments area identification. Best type and species of trees for afforestation, Environmental issues, guidelines and legislations.

<b>Element</b>	<b>Performance criteria</b>
1. Identify potential Irrigation Water sources	<p>1.1. Potential areas are identified using standard technique</p> <p>1.2. Water contributors are identified using standard technique</p> <p>1.3 Potential water ways are identified</p> <p>1.4. Soil moisture status &amp; level of ground water are checked using standard technique</p> <p>1.5. Appropriate practices to identify ground water area and recharge underground water table are checked.</p> <p>1.6 Appropriate type and species of trees for afforestation purpose of degraded land are identified to improve soil intake characteristics.</p>
2. Identify water harvesting techniques	<p>2.1 Different water harvesting techniques are identified.</p> <p>2.2. Proper site for water harvesting is identified using standard technique</p> <p>2..3.Appropriate water harvesting technique is chosen/identified based on applicability &amp; adaptability</p> <p>2.4 Appropriate shade &amp; lining materials are selected to reduce evaporation &amp; seepage loss respectively</p>
3. Identify catchment areas	<p>3.1.Catchment area is identified and characterized for climatic variables</p> <p>3.2. Appropriate shade &amp; lining materials are identified to reduce evaporation &amp; seepage loss respectively</p> <p>3.3 Identify potential irrigation water source for implementation to project stage as directed by community need assessment</p>

<b>Variable</b>	<b>Range</b>
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Occupational Health & safety	<ul style="list-style-type: none"> <li>• Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust.</li> </ul>
Tools and equipment	<ul style="list-style-type: none"> <li>• Tape meter, line level, chaining pins, ranging pole, staff, clinometers, Global positioning system, compass, Auger, core sampler, spatula, oven, pressure apparatus, sensitive balance, sieve, soil grinder, hydro meter, shaker and measuring cylinder, thermometer, stop watch, flasks, shovel, rakes, spades, rope, plumb bob, hoe, tracing paper, pencil, graph paper, fixer, topographic map, drawing compass set.</li> </ul>
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of competence	<p>A candidate must demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• identify river, spring, spate, relay pump and shallow well as well as micro dam water source</li> <li>• Identify proper site for water harvesting</li> <li>• Choose appropriate water harvesting technique based on applicability &amp; adaptability</li> <li>• Identify type of construction materials and equipment considering criteria: such as availability, cost and applicability</li> <li>• Select appropriate shade &amp; lining materials to reduce evaporation &amp; seepage loss respectively</li> </ul>
Underpinning Knowledge and Attitude	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Surface and ground water hydrology,</li> <li>• Water harvesting principles,</li> <li>• Identified proper site for water harvesting</li> <li>• Catchment area identification,</li> <li>• Forestry development,</li> <li>• Environmental issues, guidelines and legislation</li> <li>• work values and Ethics</li> <li>• accountable to work</li> <li>• loyalty and honest to the work he/she being doing</li> <li>• Respect and follow rules and regulations the organization</li> <li>• Commitment/ Dedication</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Identify proper site for water harvesting</li> <li>• Identify catchments areas</li> <li>• Identify water harvesting techniques</li> <li>• Identify potential Irrigation surface Water sources</li> <li>• Interpret environmental issues, guidelines and legislation</li> </ul>

Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</li> </ul>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The Unit Title should be assessed in conjunction with other relevant units in this occupation</li> </ul>

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Support Nursery for Irrigation Work
Unit Code	<a href="#">AGR SSI1 04 0816</a>
Unit Descriptor	This unit requires the ability to prepare materials, tools and equipment for irrigated nursery work, Support undertaking nursery work activities, store and stockpile materials, and clean up on completion of work. Supporting nursery work requires knowledge of safe work practices, nursery hygiene and quality control, nursery plant maintenance activities, basic stock control procedures and propagation techniques.

Elements	Performance Criteria
1. Prepare materials, tools and equipment for nursery work	<p>1.1 The required materials, <b>tools and equipment</b> are identified according to lists provided and/or supervisor's <b>instructions</b>.</p> <p>1.2 Checks are conducted on all materials, tools and equipment, with insufficient or faulty items reported to the supervisor.</p> <p>1.3 Techniques are used when loading and unloading materials to demonstrate correct manual handling, and minimize damage to the load and the vehicle.</p> <p>1.4 Suitable <b>Personal Protective Equipment (PPE)</b> is selected and checked prior to use.</p> <p>1.5 Nursery support for irrigation work is provided according to OHS requirements and <b>workplace information</b>.</p> <p>1.6 <b>OHS hazards</b> are identified and reported to the supervisor.</p>
2. Undertake nursery work as directed	<p>2.1 Instructions and directions provided by supervisor are followed, and clarification sought when necessary.</p> <p>2.2 <b>Nursery work for irrigation</b> is undertaken in a safe and environmentally appropriate manner according to nursery guidelines.</p> <p>2.3 Interactions with other staff and customers are carried out in a positive and professional manner.</p> <p>2.4 Nursery policy, procedures and OHS requirements in relation to workplace <b>hygiene practices</b>, handling and <b>disposal</b> of materials are observed.</p> <p>2.5 Problems or difficulties in completing work to required standards or timelines are reported to supervisor.</p>
3. Store and stockpile materials	<p>3.1 Plant debris and waste material produced during nursery activities are stored according to supervisor's instructions.</p> <p>3.2 Plant debris and waste materials are prepared and processed in an appropriate and safe manner according</p>

	<p>to supervisor's instructions.</p> <p>3.3 Surplus materials are stockpiled for removal according to supervisor's instructions.</p> <p>3.4 A clean and safe work site is maintained while completing nursery activities.</p>
4. Clean up on completion of nursery work	<p>4.1 Plants and materials are stored according to supervisor's instructions and OHS requirements.</p> <p>4.2 Tools and equipment are cleaned, maintained and stored according to manufacturers' specifications and supervisor's instructions.</p> <p>4.3 Work outcomes are reported to the supervisor.</p>

Variable	Range
Tools and equipment	<p>May include:</p> <ul style="list-style-type: none"> <li>• manual or electronic ticketing/labeling equipment, wheelbarrows, trolleys, motorized trolleys, different scissors, cleaning equipment, secateurs, knives, media trays, water spray container, dibblers, and rubbish bins, chemical sprayer's</li> </ul>
Instructions	<p>May include:</p> <ul style="list-style-type: none"> <li>• Standard Operating Procedures (SOPs), company policy and procedures in regard to product merchandising and displays, specifications, work notes, Material Safety Data Sheets (MSDSs), manufacturer's instructions, product labels, or verbal directions from manager, supervisor, or senior operator</li> </ul>
Personal Protective Equipment (PPE)	<p>May include:</p> <ul style="list-style-type: none"> <li>• steel capped boots/shoes, overalls, gloves, sun hat, sunscreen lotion, safety goggles, face mask and ear protectors</li> </ul>
Workplace information	<p>May include:</p> <ul style="list-style-type: none"> <li>• procedures for disposing of waste materials, work instructions or verbal instructions from the supervisor, OHS legislative requirements and relevant Codes of Practice</li> </ul>
OHS hazards	<p>May include:</p> <ul style="list-style-type: none"> <li>• slippery or uneven surfaces, moving machinery and vehicles, solar radiation, and potential dangers from handling potting media, fertilizers, fungicide and pesticides chemical, watering systems, and spider and insect bites.</li> </ul>
Nursery work for irrigation	<p>May be include:</p> <ul style="list-style-type: none"> <li>• Site selection for nursery, preparing lay out, identify water source etc.</li> <li>• Collecting seed for nursery activities</li> <li>• assisting with the display of nursery products (e.g., plant, goods and supplies) including unpacking, placing where directed, replenishing as required, preparing and placing</li> </ul>

	<p>price tickets, labels and other display materials</p> <ul style="list-style-type: none"> <li>• provide nursery plant care including watering, weeding, removing dead materials, staking, trimming, and potting on of plants as directed</li> <li>• load and unload nursery stock including preparing stock for dispatch, and checking stock on receipt or at dispatch against documentation</li> <li>• supporting propagation activities including assisting with preparing planting media, collecting propagating materials, and blocking up plants in correct patterns and spacing</li> </ul>
Hygiene practices	<p>May be applied in:</p> <ul style="list-style-type: none"> <li>• disinfestations and storage of planting media, disinfestations of contaminated plants and materials, hand washing, footbaths, sanitizing/sterilizing tools, equipment and benching, access restrictions, and handling practices which minimize cross contamination.</li> </ul>
Environmental waste disposal	<p>May include:</p> <ul style="list-style-type: none"> <li>• prompt removal and/or disinfestations of organic waste, use of mixing site, neutralizing pits for disposal of chemicals and cleaning products, recycling seed trays, poly trays, bags, and recycling waste water or disposing using approved discharge system</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>Assessment requires evidence that the candidate to:</p> <ul style="list-style-type: none"> <li>• carry out nursery related activities according to instructions and within the required timelines</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• safe work practices</li> <li>• nursery hygiene and quality control</li> <li>• nursery plant maintenance activities</li> <li>• basic stock control procedures</li> <li>• propagation techniques</li> <li>• OHS legislative requirements and codes of practice</li> </ul>
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> <li>• prepare materials, tools and equipment for nursery work</li> <li>• undertake nursery work as directed</li> <li>• store and stockpile materials</li> <li>• clean up on completion of nursery work</li> </ul>
Resources Implication	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting</p>

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Identify Basic Irrigation Design and Surveying Tools
Unit Code	<a href="#">AGR SS11 05 0816</a>
Unit Descriptor	This unit requires the ability to prepare materials, tools and equipment relevant for performing irrigation design and surveying work. It also requires knowledge of safe work practices on the principal surveying instruments and accessories and their primary use for design and surveying works.

Elements	Performance Criteria
1. Prepare materials, tools and equipment for irrigation design and surveying work	<p>1.1 The required materials, <b>tools and equipment</b> are identified according to lists provided and/or supervisor's <b>instructions</b>.</p> <p>1.2 Checks are conducted on all materials, tools and equipment with insufficient or faulty items reported to the supervisor.</p> <p>1.3 Suitable <b>Personal Protective Equipment (PPE)</b> is selected and checked prior to use.</p> <p>1.4 Irrigation design and surveying support is provided according to OHS requirements, gender policy and according to <b>workplace information</b>.</p> <p>1.5 <b>OHS hazards</b> related with irrigation design and surveying instrument identification, use and working with it are identified and reported to the supervisor.</p>
2. Undertake irrigation design and surveying tools identification work	<p>2.1. Elementary Surveying Equipment are identified</p> <p>2.2. The principal surveying instruments and accessories and their primary use are identified.</p> <p>2.3. Electronic and Self-Leveling Surveying Equipment are identified and installed.</p>
3. Care and Handling of Surveying Instruments	<p>3.1. Tapes and Chains are <b>maintained</b>.</p> <p>3.2. Surveying Instruments and Accessories are Transported.</p> <p>3.3. Mounting Instruments on Tripod is performed.</p> <p>3.4. Cleaning and Storing Equipment is being conducted.</p> <p>3.5. Checking and Adjusting Instruments is done prior to work.</p>

Variable	Range
Tools and equipment	<p>May include:</p> <ul style="list-style-type: none"> <li>• Tapes, Levels, Clinometers, Engineer's Transit, Electronic Surveying Systems, The electronic theodolite, Electronic Distance-Measuring Equipment, Field Books and Special Forms, GPS, different soft ware, Topo Map</li> </ul>

Instructions	<p>May include:</p> <ul style="list-style-type: none"> <li>• Standard Operating Procedures (SOPs), company policy and procedures in regard to product merchandising and displays, specifications, work notes, Material Safety Data Sheets (MSDSs), manufacturer's instructions, product labels, or verbal directions from manager, supervisor, or senior operator</li> </ul>
Personal Protective Equipment (PPE)	<p>May include:</p> <ul style="list-style-type: none"> <li>• steel capped boots/shoes, overalls, gloves, sun hat, sunscreen lotion, safety goggles, face mask and ear protectors</li> </ul>
Workplace information	<p>May include:</p> <ul style="list-style-type: none"> <li>• procedures for disposing of waste materials, work instructions or verbal instructions from the supervisor, OHS legislative requirements and relevant Codes of Practice</li> </ul>
OHS hazards	<p>May include:</p> <ul style="list-style-type: none"> <li>• heavy materials and equipment, slippery or uneven surfaces, moving machinery and vehicles, solar radiation, and potential dangers from handling potting media, fertilizers, watering systems, and spider and insect bites.</li> </ul>
Maintaining	<p>May include:</p> <ul style="list-style-type: none"> <li>• Calibration, keeping the instruments adjusted and operating accurately, avoid dragging the tape with markings face down</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>Assessment requires evidence that the candidate to:</p> <ul style="list-style-type: none"> <li>• carry out identification of basic irrigation design and surveying tools and related activities according to instructions within the required timelines</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• safe work practices</li> <li>• Surveying tools and equipment identification</li> <li>• Simple maintenance activities of surveying and design equipments for irrigation</li> <li>• basic stock control procedures</li> <li>• OHS legislative requirements and codes of practice</li> </ul>
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> <li>• prepare materials, tools and equipment for basic irrigation design and survey work</li> <li>• undertake irrigation design and survey tools and equipment identification as directed</li> <li>• store and stockpile materials</li> <li>• clean up on completion of basic surveying and design work for irrigation tools and equipment</li> </ul>
Resources Implication	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>



Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Support Basic Irrigation Structure Works
Unit Code	<a href="#">AGR SSI1 06 0816</a>
Unit Descriptor	This unit covers the knowledge, attitudes and skills required to support basic irrigation structure work on water system (abstraction, conveyance, distribution and collection of drain) to confirmed work quality.

Elements	Performance Criteria
1. Identify and prepare material for irrigation structure work	<p>1.1 <b>Tools and equipment</b> selected to carry out tasks are consistent with the requirements of the job.</p> <p>1.2 Equipment and tools are selected and checked to meet safety and work requirements of task and site.</p> <p>1.3 Techniques are used when loading and unloading materials to demonstrate correct manual handling, and minimize damage to the load and the vehicle.</p> <p>1.4 Suitable <b>Personal Protective Equipment (PPE)</b> is selected and checked prior to use.</p> <p>1.5 Irrigation structure work is provided according to OHS requirements and <b>workplace information</b>.</p>
2. Support Surface irrigation structures	<p>2.1 Identification of <b>Diversion structures</b> works are undertaken</p> <p>2.2 <b>Conveyance, distribution and management structures</b> are identified</p> <p>2.3 Undertake identification of Field distribution systems</p>
3. Maintain, clean up and store worksite and equipment	<p>3.1 Equipment, tools and materials are checked, maintained and stored according to manufacturer guidelines and organizational procedures.</p> <p>3.2 Work site and environmental improvements or controls are restored to complete work according to plans and organizational requirements.</p>

Variable	Range
Tools and equipment	<ul style="list-style-type: none"> <li>• May include but not limited to: Water mains, Services, Valves, Meters</li> <li>• Pipes including: Polyvinyl chloride (PVC), Polyethylene, Cast iron</li> <li>• Fittings including: Jointing systems for pipe types, e.g. J-bolt, Bolted flanges Others construction materials (cement, sand, aggregate, reinforcement bar, timber, eucalyptus poles, nails, black wire, bitumen, construction joints, water stops...)</li> </ul>
Personal Protective Equipment (PPE)	May include but not limited to Gloves, Hard hat, Safety shoe, Goggles, Ear muf, Mouth clamp

OHS hazards	May include: <ul style="list-style-type: none"> <li>• procedures for disposing of waste materials, work instructions or verbal instructions from the supervisor, OHS legislative requirements and relevant Codes of Practice</li> </ul>
Workplace information	May include: <ul style="list-style-type: none"> <li>• heavy materials and equipment, slippery or uneven surfaces, moving machinery and vehicles, solar radiation, and potential dangers from handling potting media, fertilizers, watering systems, and spider and insect bites.</li> </ul>
Diversion structures	Weir and barrage
Conveyance, distribution and management structures	Water control gates, Stop logs, Trash rack, Simple drop structure , Crossing culverts, Flumes, Drops, Division boxes, Night storage, Regulators, Aqueduct, Field off takes, Siphons, pipes and spiles

<b>Evidence Guide</b>	
Critical Aspects of Competence	The candidate should demonstrate the ability to support basic irrigation structure work to: <ul style="list-style-type: none"> <li>• Identify and prepare material for irrigation structure work</li> <li>• Support Surface irrigation structures</li> <li>• Check quality of work</li> <li>• Clear the work site and equipment</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• OHS procedures, personal work site safety procedures</li> <li>• Equipment operation, capacity and limitations</li> <li>• Effects of weather and conditions on operation of site</li> <li>• Environmental aspects of irrigation structure work</li> </ul>
Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> <li>• Undertake irrigation structure work, identification material identification, Identify and respond to operational problems,</li> <li>• Interpret plans, instructions and standard operating procedures, Use safety and personal protective equipment Use tools and machinery Identify hazards Give and receive instructions Communicate with others Work effectively as part of a team</li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Develop Understanding of Basic Soil Water Plant Relationships
Unit Code	<a href="#">AGR SSI1 07 0816</a>
Unit Descriptor	This unit covers effective management of soil and water resources for crop production requires the producer to understand the basic relationships between the soil, the plant, and the water.

Elements	Performance Criteria
1 Investigate Soil's Physical Characteristics	1.1 <b>Soil types</b> are identified according to enterprise producer. 1.2 <b>Soil characteristics</b> are understood based on their properties,
2 Understand how soil characteristics affect plant growth and development	2.1 <b>Soil condition</b> is identified according to OHS producer. 2.2 <b>Effect of soil structure</b> on plants is determined according to OHS producer.
3 Understand Soil and Water relationship	3.1 Soil Water Content is identified as directed by supervisor. 3.2 Soil Water Tension is understood based on characteristics. 3.3 Use of Water by Plants is understood according to the work procedure. 3.4 Soil and Water Quality is identified according to work procedure.

Variable	Range
Soil types	May includes :- loams, clays, silts, sands soils
Soil characteristics	May includes :Soil Composition, Soil Texture, Soil Structure, Soil Bulk Density and Porosity
Soil condition	May be(stability, availability of nutrients and water, effects of organic and inorganic fertilizer application, pH, and organic matter)
Effect of soil structure	May be includes rooting depth, availability of plant nutrients, drainage, water logging
Tools and equipment	may include <ul style="list-style-type: none"> <li>Oven dry, sensitive balance, cylinder flask, hand or mechanical augers, soil textural classification triangle, hydrometer, infiltrometer, core sampler, and others.</li> </ul>
Instructions	may include: <ul style="list-style-type: none"> <li>Standard Operating Procedures (SOPs), specifications, work notes, Material Safety Data Sheets (MSDSs), manufacturer's instructions, or verbal directions from manager, supervisor, or senior field operators.</li> </ul>
Personal protective clothing and equipment	may include steel-capped boots/shoes, overalls, gloves, sun hat, sunscreen lotion, safety goggles, face mask and ear protectors.

Workplace information	may include: <ul style="list-style-type: none"> <li>• Procedures for appropriate use of materials, work instructions or verbal instructions from the supervisor.</li> </ul>
OHS Hazards associated	may include: <ul style="list-style-type: none"> <li>• Heavy materials and equipment, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and insect bites, solar radiation and dust.</li> </ul>

### Evidence Guide

Critical aspects of Competence	Assessment requires evidence that the candidate to: <ul style="list-style-type: none"> <li>• identify, collect and analyze data,</li> <li>• schedule work program,</li> <li>• Organize and analyze collected data.</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: <ul style="list-style-type: none"> <li>• Soil types</li> <li>• Soil characteristics</li> <li>• Soil condition is identified according to OHS producer.</li> <li>• Effect of soil structure on plants</li> <li>• Soil Water Content</li> <li>• Soil Water Tension</li> <li>• Use of Water by Plants</li> <li>• Soil and Water Quality</li> </ul>
Underpinning Skills	Demonstrate skills to: <ul style="list-style-type: none"> <li>• Understand how soil characteristics affect plant growth and development</li> <li>• Understand Soil and Water relation ship</li> <li>• Investigate soil's physical characteristics</li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	The following resources MUST be provided: <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment or simulated location with necessary tools and equipment as well as consumable materials includes: <ul style="list-style-type: none"> <li>➢ Approved assessment tools</li> <li>➢ Certified assessor /Assessor's panel</li> </ul> </li> </ul>

<b>Occupational Standard: Small Scale Irrigation Development Level I</b>	
<b>Unit Title</b>	<b>Develop Understanding of Data Recording in Irrigation Work</b>
<b>Unit Code</b>	<a href="#"><u>AGR SSI1 08 0816</u></a>
<b>Unit Descriptor</b>	This unit of competency deals with the skills, knowledge and attitude required to undertake data recording through need assessment of the target groups.

<b>Elements</b>	<b>Performance Criteria</b>
1. Record and collect data	1.1 Sampling techniques is selected according to target group/population status. 1.2 Data is collected through recording from pre-set target groups with selected tool.
2. Analyze data	2.1 Collected and recorded data is organized based on type of information collected. 2.2 Data is analyzed and interpreted following data analysis and interpretation procedures.
3 Identify and prioritize recorded needs/Problems	3.1 Needs are listed out from collected data according to guideline. 3.2 Needs are prioritized on the basis of community demand.

<b>Variable</b>	<b>Range</b>
Occupational Health and Safety(OHS)	• Keeping documents in safe place
Tools and Equipment	Stationary, computer, calculating machine, flashes and other consumable materials ( toner, CD, etc), shelves, video camera
Types and sources of information	Primary data from customers, stakeholders, etc and secondary data from relevant literatures.

<b>Evidence Guide</b>	
Critical Aspects of Assessment	Assessment requires evidence that the candidate to: <ul style="list-style-type: none"> <li>• Record and collect data</li> <li>• Analyze data</li> <li>• Identify and prioritize recorded needs/Problems</li> </ul>
Underpinning knowledge and Attitude	Demonstrate knowledge of: <ul style="list-style-type: none"> <li>• Basic computer skill</li> <li>• Basic knowledge on research</li> <li>• Basic statistical knowledge</li> </ul>
Underpinning skills	Demonstrate skill of: <ul style="list-style-type: none"> <li>• identify , collect and analyze data,</li> <li>• schedule work program,</li> <li>• organize and analyze collected data</li> </ul>
Resource Implications	Workplace or fully equipped assessment or simulated location with necessary tools and equipment as well as consumable materials includes:

	<ul style="list-style-type: none"> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> <li>• oral question</li> <li>• Theoretical exam/written tests</li> <li>• Portfolio Assessment (E.g. Certificate from training providers)</li> </ul>
Context of assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Support Basic Natural Resource Conservation Work
Unit Code	<a href="#">AGR SSI1 09 0816</a>
Unit Descriptor	This competence standard covers the process of supporting conservation and afforestation work under supervision in parks, natural areas, agricultural lands, or areas undergoing rehabilitation and in tree nurseries; undertaking conservation and seedling production and planting activities, store and stockpile materials, and cleaning up on completion of conservation and afforestation work.

Elements	Performance Criteria
1. Prepare materials, tools and equipment for conservation and afforestation work	<p>1.1 The required materials, <b>tools and equipment</b> are identified according to lists provided and/or supervisor's <b>instructions</b>.</p> <p>1.2 Checks are conducted on all materials, tools and equipment with insufficient or faulty items reported to the supervisor.</p> <p>1.3 Techniques used when loading and unloading materials demonstrate correct manual handling and minimize damage to the load and the vehicle.</p> <p>1.4 Suitable <b>Personal Protective Equipment (PPE)</b> is selected and checked prior to use</p> <p>1.5 Conservation and afforestation support is provided according to OHS requirements and according to <b>workplace information</b>.</p> <p>1.6 <b>OHS hazards</b> are identified and reported to the supervisor.</p>
2. Undertake conservation and afforestation work as directed	<p>2.1. Instructions and directions provided by supervisor are followed and clarification sought when necessary.</p> <p>2.2. <b>Conservation and afforestation work</b> is undertaken in a safe and environmentally appropriate manner according to work site guidelines.</p> <p>2.3. Interactions with other staff and clients are carried out in a positive and professional manner.</p> <p>2.4. Policy and procedures in relation to workplace handling and disposal of materials is observed.</p> <p>2.5. Enterprise policy and procedures in relation to workplace practices, handling and disposal of materials is observed.</p> <p>2.6. Problems or difficulties in completing work to required standards or timelines are reported to supervisor.</p>
3. Store, Handle and stockpile materials and equipment	<p>3.1 Plant debris and waste material produced during conservation activities are stored in a designated area according to supervisor's instructions.</p>



	<p>3.2 Waste material produced during conservation and afforestation work is stored in a designated area according to supervisor's instructions.</p> <p>3.3 Plant debris and waste materials are prepared and processed in an appropriate and safe manner according to supervisor's instructions.</p> <p>3.4 Surplus materials are stockpiled for removal according to supervisor's instructions.</p> <p>3.5 A clean and safe work site is maintained while completing conservation and afforestation activities</p> <p>3.6 Materials, equipment and machinery are handled and transported according to supervisor's instructions and enterprise guidelines</p>
4. Clean up on completion of conservation and afforestation work	<p>4.1. <b>Plants</b> and materials are stored in a designated area according to supervisor's instructions.</p> <p>4.2. Tools and equipment are cleaned, maintained and stored according to manufacturer's specifications and supervisor's instructions.</p> <p>4.3. Work outcomes are reported to the supervisor.</p>

Variable	Range
Tools and equipment	<p>may include</p> <ul style="list-style-type: none"> <li>• Secateurs, spades, shovels, rakes, spray equipment, and hand or mechanical augers.</li> </ul>
Instructions	<p>may include:</p> <ul style="list-style-type: none"> <li>• Standard Operating Procedures (SOPs), specifications, work notes, Material Safety Data Sheets (MSDSs), manufacturer's instructions, or verbal directions from manager, supervisor, or senior field operators.</li> </ul> <p>May be:</p> <ul style="list-style-type: none"> <li>• Through supervisor's directions, planting plans and specifications and/or landholders instructions</li> </ul>
Personal Protective Equipment (PPE)	<p>may include</p> <ul style="list-style-type: none"> <li>• Steel-capped boots/shoes, overalls, gloves, sun hat, sunscreen lotion, safety goggles, face mask and ear protectors.</li> </ul>
Workplace information	<p>may include:</p> <ul style="list-style-type: none"> <li>• Procedures for disposing of waste materials, work instructions or verbal instructions from the supervisor.</li> </ul>
OHS Hazards	<p>may include:</p> <ul style="list-style-type: none"> <li>• Heavy materials and equipment, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and insect bites, solar radiation and dust.</li> </ul>
Conservation and afforestation work	<p>may include:</p> <ul style="list-style-type: none"> <li>• Land management fieldwork including assisting with setting out of conservation works and earthworks, site surveying, manual excavations, erection of structures,</li> </ul>

	<p>draining of dams or other holding areas, and on-site erection or dismantling of structures such as protective fences and signs.</p> <ul style="list-style-type: none"> <li>• Re-vegetation activities including assisting with planting programs, direct seeding operations, assisted natural regeneration, assisting with natural regeneration, protection of remnant vegetation, and removal of weeds by hand, cleaning up of on-site debris, release of animals, collecting plants or seeds for propagation.</li> <li>• Maintenance of conservation areas including weed and disease control, mulching, pruning, fertilizing, pruning, watering, securing plants (e.g., staking, tying), repair of installation of guards and protective fencing.</li> </ul>
Plants	may be container grown, tube grown or bare rooted trees, shrubs and groundcovers across a range of life forms and growth habits.

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>Must demonstrate knowledge and skills competence to:</p> <ul style="list-style-type: none"> <li>• Prepare materials, tools and equipment for conservation and afforestation work.</li> <li>• Undertake conservation and afforestation work as directed.</li> <li>• handle materials and equipment</li> <li>• cleaning up on completion of work</li> <li>• communicate ideas and information about the job, tasks and problems</li> <li>• collect, analyze and organize information with further clarification</li> <li>• plan and organize activities in a logical sequence and in a timely manner</li> <li>• plan and organize activities with the supervisor and other team members</li> <li>• Apply mathematical ideas and skills in counting, tallying and estimation when handling plants or other materials.</li> <li>• Use of tools, equipment and communication systems..</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrate knowledge of:</p> <ul style="list-style-type: none"> <li>• Tools and equipment used in conservation work.</li> <li>• Re-vegetation techniques including planting, direct seeding assisted natural regeneration and protection of remnant vegetation.</li> <li>• Maintenance tasks for conservation areas.</li> <li>• Common bush land weeds.</li> <li>• Personal protective equipment.</li> <li>• Team work and following instructions.</li> <li>• Techniques for cleaning a site and disposing of debris.</li> <li>• Safe work practices</li> <li>• Repair and maintenance of structures.</li> <li>• Preparing materials, tools and equipment for afforestation work</li> </ul>

	<ul style="list-style-type: none"> <li>• Undertaking work as directed</li> <li>• Handling materials and equipment</li> <li>• Using mathematical ideas and skills in counting, tallying and estimation</li> </ul>
Underpinning Skills	<p>Demonstrate skills and ability to:</p> <ul style="list-style-type: none"> <li>• Prepare materials, tools and equipment for conservation and afforestation work.</li> <li>• Undertake conservation and afforestation work as directed.</li> <li>• Store, handle and stockpile materials and equipment</li> <li>• Clean up on completion of conservation and afforestation work.</li> <li>• communicate ideas and information about the job, tasks and problems</li> <li>• collect, analyze and organize information with further clarification</li> <li>• plan and organize activities with the supervisor and other team members</li> <li>• Plan and organize activities in a logical sequence and in a timely manner.</li> <li>• work with others and in teams</li> <li>• Apply mathematical ideas and skills in counting, tallying and estimation when handling plants or other materials.</li> <li>• Apply and use of tools, equipment and communication systems.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:  Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Support Irrigation for Pasture Establishment
Unit code	<u>AGR SSI1 10 0816</u>
Unit Descriptor	This competence standard covers the process of supporting irrigation for pasture establishment under routine supervision. It requires the ability to prepare materials, tools and equipment for irrigated pasture, handle materials and equipment, undertake pasture establishment under irrigation and Handle materials and equipment.

Elements	Performance criteria
1. Prepare materials, tools and equipment for irrigated pasture	<p>1.1 The required <b>materials, tools and equipment</b> are identified according to lists provided and/or supervisor's <b>instructions</b>.</p> <p>1.2 Checks are conducted on all materials, tools and equipment with insufficient or faulty items reported to the supervisor.</p> <p>1.3 Techniques used when loading and unloading materials demonstrate correct manual handling and minimize damage to the load and the vehicle.</p> <p>1.4 Suitable <b>Personal Protective Equipment (PPE)</b> is selected and checked prior to use.</p> <p>1.5 Work support is provided according to OHS requirements and according to <b>workplace information</b>.</p> <p>1.6 <b>OHS hazards</b> are identified and reported to the supervisor.</p>
2. Undertake pasture establishment under irrigation	<p>2.1 <b>Instructions</b> and directions provided by supervisor are followed and clarification sought when necessary.</p> <p>2.2. site selection and land preparation is identified according to enterprise requirements</p> <p>2.3. Pasture establishment methods under irrigation are identified as supervisor instruction.</p> <p>2.4 Work <b>tasks</b> are undertaken in a safe and environmentally appropriate manner according to enterprise guidelines.</p> <p>2.5 Interactions with other staff and customers are carried out in a positive and professional manner.</p> <p>2.6 Enterprise policy and procedures in relation to workplace practices, handling and disposal of materials is observed.</p> <p>2.7 Problems or difficulties in completing work to required standards or timelines are reported to supervisor.</p>
3. Handle irrigation materials and equipment for pasture establishment	<p>3.1 <b>Waste materials</b> produced during work are stored in a designated area according to supervisor's instructions.</p> <p>3.2 Materials, equipment and machinery are handled and transported according to supervisor's instructions and enterprise guidelines.</p> <p>3.3 A clean and safe work site is maintained while working.</p>

<b>variable</b>	<b>Range</b>
Materials	<p>may include:</p> <ul style="list-style-type: none"> <li>• rope, standing hay, hay, silage, urea, molasses, salt, fuel, feeds, seed, seedling, grass cut, empty sacks and plastic sheets, sprinkler and surface irrigation</li> </ul>
Tools and equipment	<p>may include:</p> <ul style="list-style-type: none"> <li>• hoe, plough, harnesses, sickle, meter, tractor with its accessories, combine harvester, disk, barrel, weighing scale, graduated cylinder, watering can, silo, store, chopper, watering plastic tube, spade, wheelbarrow, bailer, shovel, rack, hoe, hayfork, wheel barrow, water pump, and axe.</li> </ul>
Instructions	<p>may include:</p> <ul style="list-style-type: none"> <li>• Standard Operating Procedures (SOPs),</li> <li>• enterprise policy and procedures,</li> <li>• specifications, work notes,</li> <li>• Material Safety Data Sheets (MSDSs),</li> <li>• manufacturer's instructions, or</li> <li>• verbal directions from manager or supervisor.</li> </ul>
Personal Protective Equipment (PPE)	<p>may include:</p> <ul style="list-style-type: none"> <li>• steel capped boots/shoes, overalls, gloves, sun hat, sunscreen lotion, safety goggles, face mask and ear protectors</li> </ul>
Work information	<p>may include:</p> <ul style="list-style-type: none"> <li>• procedures for disposing of waste materials, work instructions or verbal instructions from the supervisor.</li> </ul>
OHS hazards	<p>may include:</p> <ul style="list-style-type: none"> <li>• solar radiation, dust, noise, air- and soil-borne micro-organisms, fire hazard, chemicals and hazardous substances, sharp hand tools and equipment, manual handling, holes, and slippery and uneven surfaces.</li> </ul>
Task	<p>May include assistance with regular pasture establishment and preservation work, carrying out routine handling materials and equipment, fixtures and fittings.</p>
Waste materials	<p>May include:</p> <ul style="list-style-type: none"> <li>• Plant debris, litter and broken components, plastic, metal, and paper-based materials. These may be recycled, re-used, returned to the manufacturer or disposed of according to enterprise work procedures.</li> </ul>

<b>Evidence Guide</b>	
Critical Aspect of Competence	<p>must demonstrate knowledge and competence to:</p> <ul style="list-style-type: none"> <li>• prepare materials, tools and equipment</li> <li>• undertake irrigated pasture establishment activities</li> <li>• handle materials and equipment</li> </ul>
Underpinning Knowledge	<p>Demonstrate knowledge of:</p> <ul style="list-style-type: none"> <li>• safe work practices</li> <li>• Irrigated pasture establishment techniques</li> <li>• tools and equipment</li> <li>• repair and maintenance of buildings, fixtures or fittings</li> </ul>

Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>• prepare materials, tools and equipment for work</li> <li>• undertake work as directed</li> <li>• handle materials and equipment</li> <li>• clean up on completion of work.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:  Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Support Basics of Human Nutrition
Unit Code	<a href="#">AGR SSI1 11 0816</a>
Unit Descriptor	This unit covers knowledge ,skill and attitude required to categorize agricultural foods items, recognize malnutrition in the community, Identify the role of agriculture in nutrition, demonstrate diversified agricultural food production and consumption and perform proper handling and storage of agricultural food products.

Elements	Performance Criteria
1. Identify Categories of agricultural foods items	<p>1.1 Basic <b>terminologies and concepts</b> in nutrition are identified and explained.</p> <p>1.2 <b>Food groups, nutrient group</b> and their <b>sources</b> of balanced diet are identified and explained.</p> <p>1.3 <b>Origin</b> and composition of Food stuffs are identified and described.</p> <p>1.4 <b>Energy dense</b> and <b>nutrient dense</b> food sources are identified and explained.</p>
2. Recognize malnutrition in the community	<p>2.1 Forms, causes and consequences of <b>malnutrition</b> in different groups of community are identified.</p> <p>2.2 Importance of adequate and balanced diet is identified and promoted.</p>
3. Identify the role of agriculture in nutrition	<p>3.1. The role of Agriculture as source of variety foods is recognized.</p> <p>3.2. The contribution of agriculture sector in nutrition sensitive intervention is described.</p> <p>3.3. <b>Nutrition sensitive agricultural practices</b> are identified and communicated.</p>
4. Demonstrate diversified Agricultural food production and consumption	<p>4.1 Importance of diet diversification is identified and discussed accordingly.</p> <p>4.2 Techniques of diversified food production are identified.</p> <p>4.3 <b>Techniques of enhancing</b> the nutrient content of family foods are assessed and implemented.</p> <p>4.4 Utensils are identified and cooking techniques are demonstrated for specific agricultural products.</p> <p>4.5 PPE is selected and used in accordance to OHS requirement and code of ethics.</p> <p>4.6 Balanced and nutrient dense diet preparation using food stuff ingredients is demonstrated.</p>

5. Perform proper handling and storage of agricultural food products	<p>5.1. Importance of <b>hygiene</b> for nutrition is explained.</p> <p>5.2 <b>Storage facilities</b> are identified.</p> <p>5.3 Agricultural products are <b>safely handled and stored</b>.</p>
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Variable	Range
Terminologies and concepts	<p>may include:</p> <ul style="list-style-type: none"> <li>• Food</li> <li>• Diet: <ul style="list-style-type: none"> <li>➤ Nutrient</li> <li>➤ Balanced Diet</li> <li>➤ Nutritious food</li> </ul> </li> <li>• Hidden hunger</li> <li>• Malnutrition</li> <li>• Stunting</li> <li>• Underweight</li> <li>• overweight</li> <li>• Nutrition</li> <li>• diversification</li> <li>• Body growth</li> <li>• Body) Development</li> <li>• Food fortification</li> <li>• Bioavailability</li> <li>• Food taboos</li> <li>• Window of opportunity</li> <li>• fortification</li> <li>• Food security</li> <li>• Nutrition security</li> <li>• Small holder farmer</li> <li>• Cretinism</li> </ul>
Food groups	<p>may include:</p> <ul style="list-style-type: none"> <li>• Vegetables food group</li> <li>• Fruits food group</li> <li>• Legumes and nuts food group</li> <li>• Animal source food group</li> <li>• Fats oils and sweets food group</li> <li>• Staples food group</li> </ul>
Nutrient Sources	<p>may include:</p> <ul style="list-style-type: none"> <li>• Carbohydrates</li> <li>• Lipids/Fats</li> <li>• Proteins</li> <li>• Minerals</li> <li>• Vitamins</li> </ul>
Food origin	<p>may include:</p> <ul style="list-style-type: none"> <li>• Animal</li> <li>• Plant</li> </ul>
Energy dense	<p>may include:</p> <ul style="list-style-type: none"> <li>• calories</li> <li>• nutrient</li> </ul>



Nutrient dense	<p>may include:</p> <ul style="list-style-type: none"> <li>• vitamins</li> <li>• minerals</li> <li>• fibers</li> </ul>
Malnutrition	<p>may include:</p> <ul style="list-style-type: none"> <li>• under nutrition: <ul style="list-style-type: none"> <li>➢ stunting</li> <li>➢ wasting</li> <li>➢ underweight</li> </ul> </li> <li>• over nutrition: <ul style="list-style-type: none"> <li>➢ obesity</li> <li>➢ overweight</li> </ul> </li> </ul>
Nutrition sensitive Agricultural practices	<p>may include:</p> <ul style="list-style-type: none"> <li>• nutrition sensitive intervention</li> <li>• Diversification: <ul style="list-style-type: none"> <li>➢ Production of fruits, vegetable, nutritious roots, cereals, pulse, and mushroom</li> <li>➢ Animal source foods (Dairy, poultry, shoat, fish)</li> </ul> </li> </ul>
Techniques of enhancing	<p>may include:</p> <ul style="list-style-type: none"> <li>• fortification,</li> <li>• germination,</li> <li>• fermentation,</li> <li>• roasting,</li> <li>• cooking</li> </ul>
Hygiene	<p>May includes,</p> <ul style="list-style-type: none"> <li>• Food hygiene</li> <li>• Personal hygiene</li> <li>• Environmental hygiene</li> </ul>
Storage facilities	<p>May include:</p> <ul style="list-style-type: none"> <li>• Bins</li> <li>• Refrigerator</li> <li>• Shelf</li> <li>• Rack</li> <li>• Barn</li> </ul>
Safely handled and stored	<p>May include:</p> <ul style="list-style-type: none"> <li>• Sanitation</li> <li>• Ventilation</li> </ul>

### Evidence Guide

Critical Aspects of Competence	<p>Must demonstrate knowledge and skills competence to:</p> <ul style="list-style-type: none"> <li>• distinguish energy- dense and nutrients- dense foods</li> <li>• explain the need for variety and diversification of foods</li> <li>• basic principles of producing quality/ nutritious agricultural products</li> <li>• explain agricultural food types, and sources</li> <li>• demonstrate preparation of a variety of energy- dense and nutrients- dense foods</li> <li>• explain nutritional requirements for children and pregnant women</li> </ul>
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	<ul style="list-style-type: none"> <li>• Describe forms, causes and consequences of excess or deficient intake of certain food types</li> <li>• inspect the work area to identify common food product food, safety hazards and associated risks</li> <li>• maintain personal hygiene and conduct to minimise risk to food product safety</li> <li>• handle and store food product safely</li> <li>• Complete recording/reporting requirements.</li> <li>• Identify sources of information on food safety and personal hygiene requirements, such as enterprise SOPs or codes of practice.</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrate knowledge of:</p> <ul style="list-style-type: none"> <li>• terminologies and concepts of nutrition</li> <li>• food groups and nutrient composition and diet requirement</li> <li>• adequate and balanced diets</li> <li>• need for variety and diversification of foods</li> <li>• basic principles of producing quality/ nutritious agricultural products</li> <li>• agricultural food types, and sources</li> <li>• effect of food production and /or preparation on nutrient content of a variety of energy- dense and nutrients- dense foods</li> <li>• child and maternal nutrition</li> <li>• forms, causes and consequences of malnutrition</li> <li>• basic food safety principles and requirements</li> <li>• common hazards and sources of contamination in area of work</li> <li>• enterprise food safety recording requirements</li> <li>• enterprise hygiene and food safety procedures</li> <li>• legal and regulatory requirements pertaining to food production, storage, handling and packaging relevant to area of work</li> <li>• Occupational Health and Safety (OHS) requirements</li> <li>• Personal hygiene practices and clothing requirements relevant to area of work.</li> </ul>
Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>• categorize agricultural food items into major food groups based on their nutrient contents</li> <li>• identify local varieties of animal and plant products,</li> <li>• demonstrate production and /or preparation of nutrient rich diets</li> <li>• explain appropriate information with regard to diversified foods for pregnant women and children</li> <li>• demonstrate various methods of integrated nutritious agricultural products production</li> <li>• promote consumption of multiple food items</li> <li>• discuss the consequences of excess or deficient intake of certain food types</li> </ul>

	<ul style="list-style-type: none"> <li>• explain the importance of diversifying family diet with a variety of agricultural food products</li> <li>• explain how to enhance nutrient content using different food groups</li> <li>• handling food products to prevent damage, spoilage and waste</li> <li>• identifying hazards, contaminants and risks or control points</li> <li>• reporting food safety hazards and risks to appropriate personnel</li> <li>• storing food products in appropriate areas at correct temperatures</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</li> </ul>
Assessment Methods	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Perform Basic Measurement and Calculation
Unit Code	<a href="#">AGR SSI1 12 0816</a>
Unit Descriptor	This unit describes the skills and knowledge required to perform basic measurement and calculation works carried out during measurements. It also requires the ability to prepare materials, tools and equipment used in measurements and working simple activities with it including use of GPS.

Elements	Performance Criteria
1. Prepare materials, tools and equipment for measurements	1.1 Suitable <b>Personal Protective Equipment (PPE)</b> is selected and checked prior to use. 1.2 The required materials, <b>tools and equipment</b> are identified according to their relevance to measurements 1.3 Checks are conducted on all materials, tools and equipment, with failure to operate correctly and accurately. 1.4 Techniques are used when performing installation, reading and taking measurement 1.5 OHS hazards are identified and reported to the supervisor.
2. Perform simple measurement techniques	2.1 Checks are conducted on all materials, tools and equipment, with failure to operate correctly and accurately. 2.2 Techniques are used when performing installation, reading and taking simple measurement. 2.3 The required calculation on distance, area, volume and discharges are performed. 2.4 Measurement errors are corrected and minimized to the acceptance level.
3. Working with hand held GPS	3.1 Checks and setting of GPS are conducted to operate and locate the point correctly and accurately. 3.2 Track line and track point are taken by using GPS's 3.3 Saving the reading and measurement data's are performed. 3.4 Loading data to the computer which has GIS software

Variable	Range
Personal Protective Equipment (PPE)	may include: <ul style="list-style-type: none"> <li>Steel-capped boots/shoes, overalls, gloves, sun hat, sunscreen lotion, safety goggles, face mask and ear protectors.</li> </ul>

Tools and equipment	may include <ul style="list-style-type: none"> <li>Measuring tape, Theodolite, clinometer, compass, ranging pole, string, pegs/pins, water level, GPS</li> </ul>
Workplace information	may include: Procedures for working with materials, work instructions or verbal instructions from the supervisor.
OHS Hazards	may include: <ul style="list-style-type: none"> <li>Heavy materials and equipment, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and insect bites, solar radiation and dust.</li> </ul>
Instructions	may include: <ul style="list-style-type: none"> <li>Standard Operating Procedures (SOPs), specifications, work notes, Material Safety Data Sheets (MSDSs), manufacturer's instructions, or verbal directions from manager, supervisor, or senior field operators.</li> </ul>

### Evidence Guide

Critical Aspects of Competence	Must demonstrate knowledge and skills competence to: <ul style="list-style-type: none"> <li>Prepare materials, tools and equipment for measurement work.</li> <li>Undertake simple measurement work as directed.</li> <li>Handling materials and equipment appropriately after measurements.</li> <li>Checking up on correct performance of measurement tools, equipment and materials.</li> <li>communicate ideas and information about the job, tasks and problems</li> <li>collect, analyze and organize information with further clarification</li> <li>plan and organize activities in a logical sequence and in a timely manner</li> <li>plan and organize activities with the supervisor and other team members</li> <li>Apply mathematical ideas and skills in counting, tallying and estimation when handling and measuring materials.</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: <ul style="list-style-type: none"> <li>Preparing materials, tools and equipment for Perform Basic Measurement and Calculation work</li> <li>Checking, setting and simple calibration work on measuring tools</li> <li>Undertaking measurement activities.</li> <li>Performing of simple calculation</li> <li>Repair and maintenance of equipment during failure to correct reading, measurement and working with it.</li> <li>Using mathematical ideas and skills in counting, tallying and estimation</li> <li>Team work and following instructions.</li> <li>Personal protective equipment.</li> <li>Safe work practices</li> </ul>

	<ul style="list-style-type: none"> <li>• Undertaking work as directed</li> <li>• Handling materials and equipment</li> </ul>
Underpinning Skills	<p>Demonstrate skills and ability to:</p> <ul style="list-style-type: none"> <li>• Prepare materials, tools and equipment for Perform Basic Measurement and Calculation work.</li> <li>• Undertake measurement and mathematical calculation work as directed.</li> <li>• store, handle and stockpile materials and equipment</li> <li>• communicate ideas and information about the job, tasks and problems</li> <li>• collect, analyze and organize information with further clarification</li> <li>• plan and organize activities with the supervisor and other team members</li> <li>• Plan and organize activities in a logical sequence and in a timely manner.</li> <li>• work with others and in teams</li> <li>• Apply and use of tools, equipment and communication systems.</li> </ul>
Resources Implication	<p>The following resources MUST be provided: Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Operate a Personal Computer
Unit Code	<a href="#">AGR SSI1 13 0816</a>
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to operate a Personal Computer (PC) in a home or small office environment. This entry level unit provides the learner with Information Technology (IT) literacy skills in setting up a personal computer, accessing files with application programs, sending and retrieving emails, using the internet, using peripheral devices, such as printers, scanners, webcams and data projectors, applying basic security procedures and power-management settings, and backing up and shutting down a personal computer.

Elements	Performance Criteria
1. Prepare to use the personal computer	<p>1.1 Identify <b>physical components</b> and associated <b>peripheral devices</b> of the <b>personal computer</b> to become familiar with the available network.</p> <p>1.2 Check physical <b>connectivity</b> of devices to ensure correct operation and performance.</p> <p>1.3 Boot up and follow <b>procedures</b> to activate the computer.</p>
2. Manage computer configurations	<p>2.1 Alter the computer <b>settings</b> to best suit the user.</p> <p>2.2 Configure <b>power-management settings</b> to minimise power consumption as an environmentally sustainable measure.</p> <p>2.3 Identify <b>operating system</b> and the <b>application programs</b> loaded on the computer to determine computer capability.</p> <p>2.4 Conduct basic software installation and removal to improve computer capability.</p> <p>2.5 Navigate and manipulate desktop environment to create and customise desktop icons and access application programs.</p>
3. Access and use basic application programs	<p>3.1 Open a folder with file documents containing <b>basic office applications</b>, make <b>minor changes</b> and save in a different folder.</p> <p>3.2 Send and retrieve a simple email message using the desktop icon to communicate with other parties.</p> <p>3.3 Access the internet using the web browser to view and conduct basic web information search.</p> <p>3.4 Use firewall and antivirus and malware scans to reduce <b>security risks and threats</b> in the system.</p>
4. Access and use basic peripheral devices	<p>4.1 Access external <b>storage devices</b> to retrieve, copy, move and save information in different mediums and locations.</p>

	4.2 Use <b>printer settings</b> on an installed printer to print a document Access <b>audiovisual (AV) devices</b> to view and play a multimedia file.
5. Shut down computer	5.1 Back up important documents and programs to minimise risk of data loss. 5.2 Save any work to be retained and close open application programs.

Variable	Range
Physical components	May include but not limited: <ul style="list-style-type: none"> <li>• keyboard</li> <li>• monitor</li> <li>• mouse</li> <li>• Processor</li> </ul>
Peripheral devices	May include but not limited: <ul style="list-style-type: none"> <li>• AV device</li> <li>• external memory device</li> <li>• multiscard reader and writer</li> <li>• network element: <ul style="list-style-type: none"> <li>➤ broadband router</li> <li>➤ Digital Subscriber Line (DSL) and cable modem</li> <li>➤ hub</li> <li>➤ wireless device</li> </ul> </li> <li>• Personal Digital Assistant (PDA) and MP3 player</li> <li>• printer</li> <li>• scanner</li> <li>• smartphone</li> <li>• tablet</li> <li>• Uninterruptible Power Supply (UPS)</li> <li>• Universal Serial Bus (USB) dongle, such as: <ul style="list-style-type: none"> <li>➤ Bluetooth</li> <li>➤ flash memory</li> <li>➤ wireless device.</li> </ul> </li> </ul>
Personal computer	May include but not limited: <ul style="list-style-type: none"> <li>• communications system</li> <li>• desktop</li> <li>• laptop</li> <li>• server</li> <li>• workstation.</li> </ul>
Connectivity	May include but not limited: <ul style="list-style-type: none"> <li>• AV connection</li> <li>• cable, wireless, infra-red or Bluetooth connection</li> <li>• internal connection or USB dongle</li> <li>• network or stand-alone computer</li> <li>• ports: <ul style="list-style-type: none"> <li>➤ firewire</li> <li>➤ High Definition Multimedia Interface (HDMI)</li> <li>➤ printer and USB</li> </ul> </li> </ul>



Procedures	<p>May include but not limited:</p> <ul style="list-style-type: none"> <li>• fingerscan</li> <li>• smartcard</li> <li>• user name and password</li> </ul>
Settings	<p>May include but not limited:</p> <ul style="list-style-type: none"> <li>• monitor settings: <ul style="list-style-type: none"> <li>➤ brightness</li> <li>➤ colour</li> <li>➤ contrast</li> </ul> </li> <li>• mouse settings: <ul style="list-style-type: none"> <li>➤ buttons</li> <li>➤ speed</li> </ul> </li> </ul>
Power-management settings	<p>May include but not limited:</p> <ul style="list-style-type: none"> <li>• automatic power off</li> <li>• hibernation settings</li> <li>• Monitor power-saver settings.</li> </ul>
Operating system	<p>May include but not limited:</p> <ul style="list-style-type: none"> <li>• open source</li> <li>• proprietary: <ul style="list-style-type: none"> <li>➤ Mac</li> <li>➤ Unix or Linux</li> <li>➤ Windows</li> </ul> </li> </ul>
Application programs	<p>May include but not limited:</p> <ul style="list-style-type: none"> <li>• email</li> <li>• instant messaging</li> <li>• internet or web browsers</li> <li>• Internet Protocol (IP) voice applications, such as Skype</li> <li>• media players</li> <li>• office applications</li> <li>• power-management software</li> <li>• search engines</li> <li>• Windows Explorer.</li> </ul>
Basic office applications	<p>May include but not limited:</p> <ul style="list-style-type: none"> <li>• media files</li> <li>• PowerPoint</li> <li>• spreadsheets</li> <li>• word processor.</li> </ul>
Minor changes	<p>May include but not limited:</p> <ul style="list-style-type: none"> <li>• altering basic text</li> <li>• Renaming documents.</li> </ul>
Security risks and threats	<p>May include but not limited:</p> <ul style="list-style-type: none"> <li>• security threats: <ul style="list-style-type: none"> <li>➤ cookies media used for backup</li> <li>➤ pop-ups</li> </ul> </li> <li>• screen visibility: <ul style="list-style-type: none"> <li>➤ spam</li> <li>➤ trojan horses</li> </ul> </li> <li>• unauthorised access: <ul style="list-style-type: none"> <li>➤ adware</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>➤ hackers</li> <li>➤ identity fraud</li> <li>➤ malware</li> <li>➤ phishing</li> <li>➤ spyware</li> <li>• viruses</li> <li>• web browser risks</li> <li>• worms.</li> </ul>
Storage devices	<p>May include but not limited:</p> <ul style="list-style-type: none"> <li>• disks: <ul style="list-style-type: none"> <li>➤ CD</li> <li>➤ DVD</li> <li>➤ blu-ray</li> </ul> </li> <li>• flash drives</li> <li>• server</li> <li>• solid state hard drives</li> <li>• virtual devices.</li> </ul>
Printer settings	<p>May include but not limited:</p> <ul style="list-style-type: none"> <li>• cartridge type</li> <li>• layout</li> <li>• number of copies</li> <li>• orientation</li> <li>• paper size</li> <li>• paper tray.</li> </ul>
Audiovisual (AV) devices	<p>May include but not limited:</p> <ul style="list-style-type: none"> <li>• data projector</li> <li>• external monitor</li> <li>• headset</li> <li>• microphone</li> <li>• speakers</li> <li>• webcam or digital camera.</li> </ul>

### Evidence Guide

Critical Aspects of Competence	<p>Assessment requires evidence that the candidate to:</p> <ul style="list-style-type: none"> <li>• use hardware and software</li> <li>• navigate around the desktop</li> <li>• use system features to perform tasks save results of work</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• basic parts of a computer and various hardware components</li> <li>• basic software operation and application packages</li> <li>• basic computer functions, including security functions</li> <li>• peripheral devices</li> <li>• storage devices</li> </ul>
Underpinning Skills	<p>Demonstrates skills of:</p> <ul style="list-style-type: none"> <li>• communication skills to: <ul style="list-style-type: none"> <li>➤ communicate with peers and supervisors</li> <li>➤ read and write basic workplace documents</li> <li>➤ seek assistance and expert advice</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• literacy skills to interpret user manuals and help functions</li> <li>• technical skills to: <ul style="list-style-type: none"> <li>➤ apply basic keyboarding skills</li> <li>➤ apply power-management settings</li> <li>➤ back up and save information</li> <li>➤ input user-access details for accessing a PC</li> <li>➤ install and remove software</li> <li>➤ manage mouse for different applications</li> <li>➤ save and retrieve files to and from various locations</li> <li>➤ send and retrieve emails</li> <li>➤ use peripheral and storage devices</li> <li>➤ Use the internet.</li> </ul> </li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Develop Understanding of Basic Chemical Safety Rules
Unit Code	<a href="#">AGR SSI1 14 0816</a>
Unit Descriptor	This competency standard covers the functions of a person working in an enterprise which uses chemicals and who needs to be aware of their use. Skills and knowledge include awareness of the use of chemicals, how they are handled, stored and transported, recognition of safety issues surrounding chemical use, and the ability to use personal protective equipment when instructed. It requires awareness of the duty of care to self, to others, and to the environment concerning chemicals. This person will be under close supervision in the workplace and will be required to follow instructions at all times.

Elements	Performance Criteria
1. Follow workplace requirements and instructions concerning chemicals	<p>1.1 <b>Roles and responsibilities</b> of people in the workplace are identified.</p> <p>1.2 <b>Safety procedures</b> involved in chemical handling and use are recognized and followed as required.</p> <p>1.3 Occupational health and safety hazards are identified and reported to the supervisor.</p> <p>1.4 <b>Organizational procedures</b> are followed with regard to chemicals.</p>
2. Recognize risks associated with chemicals	<p>2.1 Functions of chemicals in the workplace are recognized.</p> <p>2.2 Chemical labels and symbols are recognized and hazards identified.</p> <p>2.3 Chemical storage locations are identified.</p> <p>2.4 Instructions for transport, handling and storage of chemicals are recognized and observed.</p> <p>2.5 Instructions for use, maintenance and storage of <b>personal protective equipment</b> and <b>application equipment</b> are identified and observed.</p>
3. Follow chemical handling and storage rules	<p>3.1 Chemical handling and storage instructions on labels are followed.</p> <p>3.2 Safety rules are followed when working in areas where chemicals are stored.</p> <p>3.3 Appropriate personal protection equipment is obtained and used when working in areas where chemicals are stored.</p> <p>3.4 Procedures are followed in the event of an accident or spillage.</p>

<b>Variable</b>	<b>Range</b>
Roles and responsibility	May be: <ul style="list-style-type: none"> <li>• Roles will include own role and may include the supervisor, farm manager, team leader, owner or external contractor, and external emergency contact organizations.</li> </ul>
Safety procedures	may include: <ul style="list-style-type: none"> <li>• compliance with safety instruction on the label , information contained in Material Safety Data Sheets (MSDSs) such as use, maintenance and storage of personal protective equipment, first aid, systems of transport, storage and handling, procedures for the protection of environment and protection of others.</li> </ul>
Organizational procedures	may include: <ul style="list-style-type: none"> <li>• Storage, transport, mixing, loading, application, emergencies, recording, cleaning and disposal of chemicals.</li> </ul>
Personal Protective Equipment	may include: <ul style="list-style-type: none"> <li>• Equipment hats face shields, goggles, respirators, overalls, aprons, chemical resistant gloves and footwear.</li> </ul>
Application Equipment	May be: <ul style="list-style-type: none"> <li>• Knapsacks or hand held pneumatic sprayers, drench guns and spot on applicators.</li> </ul>
Legislation and Regulation	may include: <ul style="list-style-type: none"> <li>• Pesticides Acts, Occupational Health and Safety Acts and associated Hazardous Substances Regulations/ Codes of Practice, Dangerous Goods Acts, Poisons Act or Protection of the Environment Acts.</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	Must demonstrate knowledge and skills competence to: <ul style="list-style-type: none"> <li>• work in an agricultural or horticultural environment</li> <li>• Use of chemicals in the workplace, why they are used, where they are stored and how they are transported, and the safety requirements for handling chemicals.</li> <li>• Follow instructions and report concerns if unsafe practices, equipment or environmental conditions are observed.</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: <ul style="list-style-type: none"> <li>• Basic occupational health &amp; safety rules required to work near and around chemicals.</li> <li>• level of hazard and the poisons schedule</li> <li>• Chemicals being used for the control of pests and weeds.</li> <li>• Personal protection equipment and when and how it should be used, stored and maintained.</li> <li>• Correct wearing/fit of personal protective equipment.</li> <li>• Environmental impacts of chemical use.</li> </ul>
Underpinning Skills	Demonstrate skills to: <ul style="list-style-type: none"> <li>• Communicate information about spillages, accidents or deficiencies in procedures and practice.</li> <li>• Accurately interpret labels and instructions.</li> </ul>

	<ul style="list-style-type: none"> <li>• Follow workplace instructions and directions from the chemical label or Material Safety Data Sheets (MSDSs).</li> <li>• Collect, analyze and organize information on labels and Material Safety Data Sheets (MSDSs)</li> <li>• Work with others when dealing with chemicals.</li> <li>• Use mathematical ideas and techniques to interpret volumes and measurement requirements on labels</li> <li>• apply problem solving skills in the event of an accident or spillage</li> <li>• apply technology in using relevant personal protection equipment</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>

<b>Occupational Standard: Small Scale Irrigation Development Level I</b>	
<b>Unit Title</b>	<b>Develop Understanding of Basic Irrigation Extension</b>
<b>Unit Code</b>	<b><u>AGR SSI1 15 0816</u></b>
<b>Unit Descriptor</b>	This unit covers knowledge, skills and attitude required to understand the concepts, principles, approaches, models and methods of irrigation extension work. It also covers identifying and developing the entrepreneurial competencies.

<b>Elements</b>	<b>Performance Criteria</b>
1. Define the term extension	1.1 <b>History of extension</b> in Ethiopia is identified. 1.2 The term extension introduced briefly. 1.3 The reason <b>why extension</b> is explained. 1.4 The <b>role of extension</b> in irrigation agriculture is explained.
2. Understand Irrigation Extension Approaches	2.1 PIDM (Participatory Irrigation Development and Management Approach) is Introduced. 2.2 Understand irrigation based on <b>PIDM approach</b> .
3. Identify irrigation extension models, methods and principles	2.1. Irrigation <b>extension approach</b> are identified. 2.2. Irrigation <b>extension methods</b> are performed. 2.3. Irrigation <b>extension principles</b> are determined.

<b>Variable</b>	<b>Range</b>
History of extension	May include: <ul style="list-style-type: none"> <li>• Agricultural irrigation Extension in the World</li> <li>• Agricultural irrigation Extension in Ethiopia</li> <li>• Extension before 1991 and after 1991</li> </ul>
Why extension	May include: <ul style="list-style-type: none"> <li>• Objective of extension</li> <li>• Goals of extension</li> </ul>
Role of extension	<ul style="list-style-type: none"> <li>• In agricultural development</li> <li>• In disseminate technologies</li> <li>• In create awareness</li> <li>• In participate members and target groups</li> </ul>
PIDM approach	Participatory concept in irrigation development and management
Extension approach, principles and methods	May include: <ul style="list-style-type: none"> <li>• Approaches of extension work</li> <li>• Principles of irrigation extension works</li> <li>• Methods of performing irrigation extension work</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	Must demonstrate skills and knowledge competence to: <ul style="list-style-type: none"> <li>• define one's unique sense of purpose for working</li> <li>• clarify and affirmed work values/ethics/concepts</li> </ul>

	<p>consistently in the workplace</p> <ul style="list-style-type: none"> <li>• work practices satisfactorily and consistently in compliance with industry work ethical standards, organizational policy and guidelines</li> <li>• of personal behavior and relationships with co-workers and/or clients consistent with ethical standards, policy and guidelines</li> <li>• Use company resources in accordance with company ethical standard, policies and guidelines.</li> <li>• follow company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct/behavior</li> </ul>
Underpinning Knowledge	<p>Demonstrate knowledge of:</p> <ul style="list-style-type: none"> <li>• occupational health and safety</li> <li>• work values and ethics</li> <li>• awareness creation on public and individuals</li> <li>• Transfer knowledge, technology and innovation to the area of farmers, companies and industries residents.</li> <li>• company performance and ethical standards</li> <li>• company policies and guidelines</li> <li>• fundamental rights at work including gender sensitivity</li> <li>• work responsibilities/job functions</li> <li>• corporate social responsibilities</li> <li>• company code of conduct/values</li> <li>• balancing work and family responsibilities</li> </ul>
Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>• Interpersonal skills</li> <li>• Communication skills</li> <li>• Self-awareness, understanding and acceptance</li> <li>• Application of good manners and right conduct</li> </ul>
Resource Implications	<p>The following resources MUST be provided.</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>



<b>Occupational Standard: Small Scale Irrigation Development Level I</b>	
<b>Unit Title</b>	<b>Apply Quality Standards</b>
<b>Unit Code</b>	<b><a href="#">AGR SSI1 16 0816</a></b>
<b>Unit Descriptor</b>	This unit covers the knowledge, attitudes and skills required in applying quality standards in the operational activities.

<b>Elements</b>	<b>Performance Criteria</b>
1. Assess own work	<p>1.1 Completed work is checked against organization standards relevant to the activity being undertaken.</p> <p>1.2 An understanding is demonstrated on how the work activities and completed work relate to the next process and to the final appearance of the service / product.</p> <p>1.3 Faulty service is identified and isolated in accordance with policies and procedures.</p> <p>1.4 Faults and any identified causes are recorded and reported in accordance with standard procedures.</p>
2. Assess quality of service rendered	<p>2.1 Services rendered are <b>quality checked</b> against standards and specifications.</p> <p>2.2 Service rendered are evaluated using the appropriate evaluation parameters and in accordance with standards.</p> <p>2.3 Causes of any identified faults are identified and corrective actions are taken in accordance with policies and procedures.</p>
3. Record information	<p>3.1 Basic information on the quality performance is recorded in accordance with organization procedures.</p> <p>3.2 Records of work quality are maintained according to the requirements of the organization / enterprise.</p>
4. Study causes of quality deviations	<p>4.1 Causes of deviations from final outputs or services are investigated and reported in accordance with standard procedures.</p> <p>4.2 Suitable preventive action is recommended based on organization <b>quality standards</b> and identified causes of deviation from specified quality standards of final service or output.</p>
5. Complete documentation	<p>5.1 Information on <b>quality parameters</b> and other indicators of service performance is recorded.</p> <p>5.2 All service processes and outcomes are recorded.</p>

<b>Variable</b>	<b>Range</b>
Quality check	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Visual inspection</li> <li>• Physical measurements</li> <li>• Check against specifications/preferences</li> </ul>
Quality standards	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• materials</li> <li>• service</li> <li>• output</li> <li>• processes/procedures</li> </ul>

Quality parameters	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• style/design/specifications</li> <li>• durability</li> <li>• service variations</li> <li>• materials</li> <li>• damage and imperfections</li> </ul>
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<b>Evidence Guide</b>	
Critical Aspects of Competency	<p>Demonstrates skills and knowledge to:</p> <ul style="list-style-type: none"> <li>• Check completed work continuously against standard</li> <li>• Identify and isolate faulty service / workmanship</li> <li>• Check service rendered against organization standards</li> <li>• Identify and apply corrective actions on the causes of identified faults</li> <li>• Record basic information regarding quality performance</li> <li>• Investigate causes of deviations of services against standard</li> <li>• Recommend suitable preventive actions</li> </ul>
Underpinning Knowledge	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Relevant quality standards, policies and procedures</li> <li>• Characteristics of services</li> <li>• Safety environment aspects of service processes</li> <li>• Relevant evaluation techniques and quality checking procedures</li> <li>• Workplace procedures</li> <li>• Reporting procedures</li> </ul>
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> <li>• Interpret work instructions, specifications and standards appropriate to the required work or service</li> <li>• Carry out relevant performance evaluation</li> <li>• Maintain accurate work records in accordance with procedures</li> <li>• Meet work specifications</li> <li>• Communicate effectively within defined workplace procedures</li> </ul>
Resource Implications	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Work with Others
Unit Code	<a href="#">AGR SSI1 17 0816</a>
Unit Descriptor	This unit covers the knowledge, skills, and attitudes required to develop workplace relationship and contribute in workplace activities.

Element	Performance Criteria
1. Develop effective workplace relationship	<p>1.1. <b>Duties and responsibilities</b> are done in a positive manner to promote cooperation and good relationship</p> <p>1.2. Assistance is sought from <b>workgroup</b> when difficulties arise and addressed through discussions</p> <p>1.3. <b>Feedback on performance</b> provided by others in the team is encouraged, acknowledged and acted upon</p> <p>1.4. Differences in personal values and beliefs are respected and acknowledged in the development</p>
2. Contribute to work group activities	<p>1.1 <b>Support is provided to team members</b> to ensure workgroup goals are met</p> <p>1.2 Constructive contributions to workgroup goals and tasks are made according to <b>organizational requirements</b></p> <p>1.3 Information relevant to work are shared with team members to ensure designated goals are met</p>

Variable	Range
Duties and responsibilities	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Job description and employment arrangements</li> <li>• Organization's policy relevant to work role</li> <li>• Organizational structures</li> <li>• Supervision and accountability requirements including OHS</li> <li>• Code of conduct</li> </ul>
Work group	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Supervisor or manager</li> <li>• Peers/work colleagues</li> <li>• Other members of the organization</li> </ul>
Feedback on performance	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Formal/Informal performance appraisal</li> <li>• Obtaining feedback from supervisors and colleagues and clients</li> <li>• Personal, reflective behavior strategies</li> <li>• Routine organizational methods for monitoring service delivery</li> </ul>
Providing support to team members	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Explaining/clarifying</li> <li>• Helping colleagues</li> <li>• Providing encouragement</li> <li>• Providing feedback to another team member</li> <li>• Undertaking extra tasks if necessary</li> </ul>
Organizational requirements	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Goals, objectives, plans, system and processes</li> <li>• Legal and organization policy/guidelines</li> <li>• OHS policies, procedures and programs</li> <li>• Ethical standards</li> </ul>

	<ul style="list-style-type: none"> <li>• Defined resources parameters</li> <li>• Quality and continuous improvement processes and standards</li> </ul>
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<b>Evidence Guide</b>	
Critical Aspects of Competence	Demonstrates skills and knowledge to: <ul style="list-style-type: none"> <li>• Provide support to team members to ensure goals are met</li> <li>• Act on feedback from clients and colleagues</li> <li>• Access learning opportunities to extend own personal work competencies to enhance team goals and outcomes</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• relevant legislation that affects operations, especially with regards to safety</li> <li>• reasons why cooperation and good relationships are important</li> <li>• the organization's policies, plans and procedures</li> <li>• how to elicit and interpret feedback</li> <li>• workgroup member's responsibilities and duties</li> <li>• importance of demonstrating respect and empathy in dealings with colleagues</li> <li>• how to identify and prioritize personal development opportunities and options</li> </ul>
Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> <li>• read and understand the organization's policies and work procedures</li> <li>• write simple instructions for particular routine tasks</li> <li>• interpret information gained from correspondence</li> <li>• request advice, receive feedback and work with a team</li> <li>• organize work priorities and arrangement</li> <li>• select and use technology appropriate to a task</li> <li>• relate to people from a range of social, cultural and ethnic backgrounds</li> </ul>
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Receive and Respond to Workplace Communication
Unit Code	<a href="#">AGR SSI1 18 0816</a>
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to receive, respond and act on verbal and written communication.

Element	Performance Criteria
1. Follow routine spoken messages	1.1 Required information is gathered by listening attentively and correctly interpreting or understanding information/instructions. 1.2 Instructions/information is properly recorded. 1.3 Instructions are acted upon immediately in accordance with information received. 1.4 Clarification is sought from workplace supervisor on all occasions when any instruction/information is not clear.
2. Perform workplace duties following written notices	2.1 <b>Written notices and instructions</b> are read and interpreted correctly in accordance with <b>organizational guidelines</b> . 2.2 Routine written instruction is followed in sequence. 2.3 Feedback is given to workplace supervisor based on the instructions/information received.

Variable	Range
Written notices and instructions	May include but not limited to: <ul style="list-style-type: none"> <li>• Handwritten material</li> <li>• printed material</li> <li>• Internal memos</li> <li>• External communications</li> <li>• Electronic mail</li> <li>• Briefing notes</li> <li>• General correspondence</li> <li>• Marketing materials</li> <li>• Journal articles</li> </ul>
Organizational guidelines	May include but not limited to: <ul style="list-style-type: none"> <li>• Information documentation procedures</li> <li>• Company policies and procedures</li> <li>• Organization manuals</li> <li>• Service manual</li> </ul>

Evidence Guide	
Critical Aspects of Competence	Demonstrates skills and knowledge to: <ul style="list-style-type: none"> <li>• Demonstrate knowledge of organizational procedures for handling verbal and written communications</li> <li>• Receive and act on verbal messages and instructions</li> <li>• Demonstrate competence in recording instructions/information</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• organizational policies/guidelines in regard to processing internal/external information</li> <li>• ethical work practices in handling communications</li> <li>• communication process</li> </ul>

Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> <li>• receive and clarify conciseness messages/information/communication</li> <li>• record messages/information accurately</li> </ul>
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Demonstrate Work Values
Unit Code	<a href="#">AGR SSI1 19 0816</a>
Unit Descriptor	This unit covers the knowledge, skills and attitude required in demonstrating proper work values.

Elements	Performance Criteria
1. Define the purpose of work	<p>1.1 One's unique sense of purpose for working and the 'whys' of work are identified, reflected on and clearly defined for one's development as a person and as a member of society.</p> <p>1.2 Personal mission is achieved in harmony with company's values.</p>
2. Apply work values/ethics	<p>2.1 <b>Work values/ethics/concepts</b> are classified and reaffirmed in accordance with the transparent company ethical standards, policies and guidelines.</p> <p>2.2 <b>Work practices</b> are undertaken in compliance with industry work ethical standards, organizational policy and guidelines</p> <p>2.3 Personal behavior and relationships with co-workers and/or clients are conducted in accordance with ethical standards, policy and guidelines.</p> <p>2.4 <b>Company resources</b> are used in accordance with transparent company ethical standard, policies and guidelines.</p>
3. Deal with ethical problems	<p>3.1 Company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct are accessed and applied in accordance with transparent company ethical standard, policies and guidelines.</p> <p>3.2 <b>Work incidents/situations</b> are reported and/or resolved in accordance with company protocol/guidelines.</p> <p>3.3 Resolution and/or referral of ethical problems identified are used as learning opportunities.</p>
4. Maintain integrity of conduct in the workplace	<p>4.1 Personal work practices and values are demonstrated consistently with acceptable ethical conduct and company's core values.</p> <p>4.2 Instructions to co-workers are provided based on ethical, lawful and reasonable directives.</p> <p>4.3 Company values/practices are shared with co-workers using appropriate behavior and language.</p>

Variable	Range
Work values/ethics/concepts	<p>May include but are not limited to:</p> <ul style="list-style-type: none"> <li>• Commitment/ Dedication</li> <li>• Sense of urgency</li> <li>• Sense of purpose</li> <li>• Love for work</li> <li>• High motivation</li> <li>• Orderliness</li> <li>• Reliability and Dependability</li> </ul>

	<ul style="list-style-type: none"> <li>• Competence</li> <li>• Goal-oriented</li> <li>• Sense of responsibility</li> <li>• Being knowledgeable</li> <li>• Loyalty to work/company</li> <li>• Sensitivity to others</li> <li>• Compassion/Caring attitude</li> <li>• Balancing between family and work</li> <li>• Sense of nationalism</li> </ul>
Work practices	<p>May include but are not limited to:</p> <ul style="list-style-type: none"> <li>• Quality of work</li> <li>• Punctuality</li> <li>• Efficiency</li> <li>• Effectiveness</li> <li>• Productivity</li> <li>• Resourcefulness</li> <li>• Innovativeness/Creativity</li> <li>• Cost consciousness</li> <li>• 5S</li> <li>• Attention to details</li> </ul>
Company resources	<p>May include but are not limited to:</p> <ul style="list-style-type: none"> <li>• Consumable materials</li> <li>• Equipment/Machineries</li> <li>• Human</li> <li>• Time and Financial resources</li> </ul>
Work incidents/ Situations	<p>May include but are not limited to:</p> <ul style="list-style-type: none"> <li>• Violent/intense dispute or argument</li> <li>• Gambling</li> <li>• Use of prohibited substances</li> <li>• Pilferages</li> <li>• Damage to person or property</li> <li>• Vandalism</li> <li>• Falsification</li> <li>• Bribery</li> <li>• Sexual Harassment and Blackmail</li> </ul>

### Evidence Guide

Critical Aspects of Competence	<p>Demonstrates skills and knowledge to:</p> <ul style="list-style-type: none"> <li>• Define one's unique sense of purpose for working</li> <li>• Clarify and affirm work values/ethics/concepts consistently in the workplace</li> <li>• Demonstrate work practices satisfactorily and consistently in compliance with industry work ethical standards, organizational policy and guidelines</li> <li>• Demonstrate personal behavior and relationships with co-workers and/or clients consistent with ethical standards, policy and guidelines</li> <li>• Use company resources in accordance with company ethical standard, policies and guidelines.</li> <li>• Follow company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct/behavior</li> </ul>
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Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• Occupational health and safety</li> <li>• Work values and ethics</li> <li>• Company performance and ethical standards</li> <li>• Company policies and guidelines</li> <li>• Fundamental rights at work including gender sensitivity</li> <li>• Work responsibilities/job functions</li> <li>• Corporate social responsibilities</li> <li>• Company code of conduct/values</li> <li>• Balancing work and family responsibilities</li> </ul>
Underpinning Skills	Demonstrates skills in: <ul style="list-style-type: none"> <li>• Interpersonal skills</li> <li>• Communication skills</li> <li>• Self awareness, understanding and acceptance</li> <li>• Application of good manners and right conduct</li> </ul>
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Develop Understanding of Entrepreneurship
Unit Code	<a href="#">AGR SSI1 20 0816</a>
Unit Descriptor	This unit covers knowledge, skills and attitude required to understand the concepts, principles, functions, strategies and methods of entrepreneurship. It also covers identifying and developing the entrepreneurial competencies.

Elements	Performance Criteria
1. Describe and explain the concept, principles, and scope of entrepreneurship	<p>1.1 The concept and principles of entrepreneurship are analyzed and discussed.</p> <p>1.2 Entrepreneurial traits and distinguishing features, entrepreneurial motivations and types of entrepreneurs are identified and discussed.</p> <p>1.3 The role of entrepreneurship development for the Ethiopian economy is explained and discussed.</p> <p>1.4 Entrepreneurship for women and disables is discussed and analyzed.</p>
2. Discuss how to become an entrepreneur	<p>2.1 The positive mind set, attitude towards poverty and “can do mentality” is developed.</p> <p>2.2 Self-employment as an individual economic independence and personal growth is discussed and analyzed.</p> <p>2.3 Advantages and disadvantages of self-employment and being an employee are explained and discussed.</p> <p>2.4 Major competencies of successful entrepreneurs are identified and explained.</p> <p>2.5 Self-potential is assessed to determine if qualified to become an entrepreneur.</p> <p>2.6 The behaviors of successful entrepreneurs are identified and discussed.</p> <p>2.7 Business ideas are generated using appropriate tools, techniques and steps.</p> <p>2.8 Business opportunities are identified and assessed.</p>
3. Discuss how to start and organize an enterprise	<p>3.1 The concepts and <b>legal forms</b> of <b>business enterprises</b> in Ethiopia are identified and discussed</p> <p>3.2 Business Ethics is understood and developed.</p> <p>3.3 Facts about micro, small and medium enterprises are discussed, clarified and understood.</p> <p>3.4 Key success factors in setting up micro, small and medium businesses are identified and explained.</p> <p>3.5 Procedures for identifying suitable market for business are discussed and understood.</p> <p>3.6 <b>Major factors</b> to consider in selecting a location for a business are identified and discussed.</p>

	3.7 Amount of money needed to start an enterprise is estimated and various sources of finance identified and discussed.
4. Discuss how to operate an enterprise	<p>4.1 Processes of hiring and managing people are explained and discussed.</p> <p>4.2 The importance, techniques and application of self-management skills, negotiation skills and time management skills, decision skills are discussed and understood.</p> <p>4.3 The techniques and procedures of managing sales are explained and discussed.</p> <p>4.4 Factors to be considered in selecting suppliers and the steps to follow when doing business with them are identified and discussed.</p> <p>4.5 Awareness of how new technologies can affect micro, small and medium business is developed, and Characteristics of appropriate technology for use are explained and discussed.</p> <p>4.6 Risk assessment and management of business enterprise are performed regularly.</p> <p>4.7 Qualities are properly inspected and inventories properly managed.</p> <p>4.8 Basic concepts of Monitoring and Evaluation are explained and understood.</p>
5. Discuss how to prepare and use financial records	<p>5.1 Importance of <b>financial source documents</b> and record keeping is discussed.</p> <p>5.2 <b>Financial recording documents</b> are identified and prepared.</p> <p>5.3 Different types of cost and expense that occur in a business and how to manage them are discussed and understood.</p> <p>5.4 Factors and procedures in knowing the cost and expense of the enterprise are discussed and understood.</p> <p>5.5 Simple financial statements are prepared and understood</p>
6. Develop one's own business plan	<p>6.1 The concept, importance and process of preparing/ writing a business plan are discussed and understood</p> <p>6.2 <b>Feasibility of the business</b> idea is made clear and understood.</p> <p>6.3 Findings of the feasibility study are interpreted, assessed and analyzed.</p> <p>6.4 Standard structure and format are applied in preparing business plan.</p> <p>6.5 Problems that may arise or encounter when starting a business are identified and understand.</p>

Variables	Range
Legal forms	May include but not limited to: <ul style="list-style-type: none"> <li>• Sole proprietorship</li> <li>• Partnership</li> <li>• Cooperatives</li> <li>• Private Limited Company</li> </ul>

Business Enterprises	May include but not limited to: <ul style="list-style-type: none"> <li>• Micro</li> <li>• Small</li> <li>• Medium</li> </ul>
Major factors	May include but not limited to: <ul style="list-style-type: none"> <li>• Economics (local economy)</li> <li>• Population</li> <li>• Competition</li> </ul>
Financial source documents	May include but not limited to: <ul style="list-style-type: none"> <li>• Cash book</li> <li>• Vouchers</li> <li>• Invoices</li> <li>• Receipts</li> <li>• Check</li> </ul>
Financial Recording documents	May include but not limited to: <ul style="list-style-type: none"> <li>• Journal</li> <li>• Ledger</li> <li>• Fixed asset records</li> <li>• Inventory record</li> <li>• Payroll sheet</li> <li>• Account receivable</li> <li>• Account payable</li> <li>• Daily sales record</li> </ul>
Feasibility of the business	May include but not limited to: <ul style="list-style-type: none"> <li>• opportunities available</li> <li>• market competition</li> <li>• timing/ cyclical considerations</li> <li>• skills available</li> <li>• resources available</li> <li>• location and/ or premises available</li> <li>• risk related to a particular business opportunity, especially</li> <li>• in regard to Occupational Health and Safety and</li> <li>• environmental considerations</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	Demonstrates skills and knowledge to: <ul style="list-style-type: none"> <li>• Explain principles and concept of entrepreneurship</li> <li>• Discuss how to become entrepreneur</li> <li>• Discuss how to organize an enterprise</li> <li>• Discuss how to operate an enterprise</li> <li>• Discuss how to prepare and use financial records</li> <li>• Develop business plan</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: <ul style="list-style-type: none"> <li>• Entrepreneurship concepts, principles, roles and types</li> <li>• Entrepreneurial traits, motivation and distinguishing features</li> <li>• Types of entrepreneurs</li> <li>• Entrepreneurial competencies</li> <li>• Entrepreneurial behaviors</li> <li>• Business ideas and business opportunities</li> <li>• Self potential assessment</li> <li>• Types of enterprises</li> <li>• Legal forms of business ownership</li> <li>• Risk assessment and evaluation</li> </ul>

	<ul style="list-style-type: none"> <li>• Self-employment and employment</li> <li>• Managing sales, people and time</li> <li>• Facts about micro, small and medium enterprises</li> <li>• Micro, Small and Medium Enterprises</li> <li>• Key success factors for setting up micro, small and medium enterprises</li> <li>• Procedures for identifying suitable markets</li> <li>• Business location</li> <li>• Major factors for selecting business location</li> <li>• Quality control</li> <li>• Inventory management</li> <li>• Monitoring and evaluation</li> <li>• New technologies</li> <li>• Startup capital</li> <li>• Investment capital</li> <li>• Working capital</li> <li>• Financing options</li> <li>• Financial records</li> <li>• Costs and expenses</li> <li>• Business plan and Feasibility study</li> </ul>
Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>• Planning, organizing, hiring and leading skills</li> <li>• Self-management skills</li> <li>• Negotiation skills</li> <li>• Time management skills</li> <li>• Problem solving skills</li> <li>• Decision making skills</li> <li>• Selling skills</li> <li>• Risk assessment skills</li> <li>• Presentation skills</li> <li>• Inventory controlling skills</li> <li>• Using technology</li> <li>• Financial record keeping skills</li> <li>• Preparing simple financial statement</li> <li>• Financial reporting skills</li> <li>• Managing money</li> <li>• Suppliers selection skills</li> <li>• Monitoring and evaluation skills</li> </ul>
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level I	
Unit Title	Apply 3S
Unit Code	<a href="#">AGR SSI1 21 0816</a>
Unit Descriptor	This Unit Title covers the knowledge, skills and attitudes required by a worker to apply 3S techniques to his/her workplace. The unit assumes the worker has a particular job in the allocated workplace known by the individual.

Elements	Performance Criteria
1. Organize junior Kaizen Promotion Team (KPT).	<p>1.1. Basics, principles and stages of KPT are identified using appropriate procedures.</p> <p>1.2. Structure of <b>Junior KPT</b> is established in accordance with the organizational procedures.</p> <p>1.3. Effective and appropriate contributions are made to complement team activities and objectives using individual skills and competencies.</p> <p>1.4. Effective and appropriate forms of communications are used and undertaken with KPT members who contribute to know KPT activities and objectives.</p> <p>1.5. Kaizen Board (Visual Management Board) is prepared and used in harmony with different workplace contexts.</p>
2. Prepare for work.	<p>2.1. Work instructions are used to determine job requirements, including method, material and equipment.</p> <p>2.2. Job specifications are read and interpreted following working manual.</p> <p>2.3. <b>OHS requirements</b>, including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work.</p> <p>2.4. Appropriate materials are selected.</p> <p>2.5. <b>Safety equipment and tools</b> are identified and checked for safe and effective operation.</p>
3. Sort items.	<p>3.1. Plan is prepared to implement sorting activities.</p> <p>3.2. Cleaning activities are performed.</p> <p>3.3. All <b>items</b> in the workplace are identified following <b>the appropriate procedures</b>.</p> <p>3.4. Necessary and <b>unnecessary items</b> are listed using the <b>appropriate format</b>.</p> <p>3.5. <b>Red tag</b> strategy is used for unnecessary items.</p> <p>3.6. Unnecessary items are evaluated and placed in an appropriate place other than the workplace.</p> <p>3.7. <b>Necessary items</b> are recorded and quantified using appropriate format.</p>

	<p>3.8. Performance results are reported using appropriate formats.</p> <p>3.9. Necessary items are regularly checked in the workplace.</p>
4. Set all items in order.	<p>4.1. Plan is prepared to implement set in order activities.</p> <p>4.2. General cleaning activities are performed.</p> <p>4.3. Location/layout, storage and indication methods for items are decided.</p> <p>4.4. Necessary <b>tools and equipment</b> are prepared and used for setting in order activities.</p> <p>4.5. Items are placed in their assigned locations.</p> <p>4.6. After use, the items are immediately returned to their assigned locations.</p> <p>4.7. Performance results are reported using appropriate formats.</p> <p>4.8. Each item is regularly checked in its assigned location and order.</p>
5. Perform shine activities.	<p>5.1. Plan is prepared to implement shine activities.</p> <p>5.2. Necessary tools and equipment are prepared and used for shinning activities.</p> <p>5.3. <b>Shine activity</b> is implemented using appropriate procedures.</p> <p>5.4. Performance results are reported using appropriate formats.</p> <p>5.5. Regular shinning activities are conducted.</p>

Variable	Range
Junior KPT	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• 3S</li> <li>• 3MU (Mura, Muri and MUDA)</li> <li>• 4P (Policy, Procedure, People and Plant)</li> <li>• 4M (Material, Method, Man and Machine)</li> <li>• PDCA (Plan, Do, Check and Act)</li> </ul>
OHS requirements	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• Legislation/ regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.</li> <li>• Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices.</li> <li>• Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with workplace organization.</li> </ul>

	<ul style="list-style-type: none"> <li>• Emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation.</li> </ul>
Safety equipment and tools	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• dust masks / goggles</li> <li>• glove</li> <li>• working cloth</li> <li>• first aid</li> <li>• safety shoes</li> </ul>
Items	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• tools</li> <li>• jigs/fixtures</li> <li>• materials/components</li> <li>• machine and equipment</li> <li>• manuals</li> <li>• documents</li> <li>• personal items (e.g. bags, lunch boxes and posters)</li> <li>• safety equipment and personal protective equipment</li> <li>• other items which happen to be in the work area</li> </ul>
The appropriate procedures	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• steps for implementing 3S (sort, set in order and shine) activities.</li> <li>• written, verbal and computer based or in some other format.</li> </ul>
Unnecessary items	<p>are not needed for current production or administrative operation and include but not limited to:</p> <ul style="list-style-type: none"> <li>• defective or excess quantities of small parts and inventory</li> <li>• outdated or broken jigs and dies</li> <li>• worn-out bits</li> <li>• outdated or broken tools and inspection gear</li> <li>• old rags and other cleaning supplies</li> <li>• electrical equipment with broken cords</li> <li>• outdated posters, signs, notices and memos</li> </ul> <p>some locations where unneeded items tend to accumulate may include but not limited to:</p> <ul style="list-style-type: none"> <li>• in rooms or areas not designated for any particular purpose</li> <li>• in corners next to entrances or exists</li> <li>• along interior and exterior walls</li> <li>• next to partitions and behind pillars</li> <li>• under the eaves of warehouses</li> <li>• under desks and shelves and in desk and cabinet drawers</li> <li>• near the bottom of tall stacks of items</li> <li>• on unused management and production schedule boards</li> <li>• in tools boxes that are not clearly sorted</li> </ul>
Appropriate format	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• all items.</li> <li>• necessary and unnecessary items.</li> </ul>
Red tag	<p>A format prepared with a red color paper or card which is filled and attached temporarily on the unnecessary items until decision is made. The red tag catch people's attention because red is a color that stands out. So to fill and attach red tag on items, asks the following three questions:</p>



	<ul style="list-style-type: none"> <li>• Is this item needed?</li> <li>• If it is needed, is it needed in this quantity?</li> <li>• If it is needed, does it need to be located here?</li> </ul>
Necessary items	Are required in the workplace for current production or administrative operation in the amount needed.
Tools and equipment	May include but not limited to: <ul style="list-style-type: none"> <li>• paint</li> <li>• hook</li> <li>• sticker</li> <li>• signboard</li> <li>• nails</li> <li>• shelves</li> <li>• chip wood</li> <li>• sponge</li> <li>• broom</li> <li>• pencil</li> <li>• shadow board/ tools board</li> </ul>
Shine activity	May include but not limited to: <ul style="list-style-type: none"> <li>• Inspection</li> <li>• Cleaning</li> <li>• Minor maintenance may include: <ul style="list-style-type: none"> <li>➢ Tightening bolts</li> <li>➢ Lubrication</li> <li>➢ Replacing missing parts</li> </ul> </li> </ul>

### Evidence Guide

Critical Aspects of Competence	Demonstrates skills and knowledge to: <ul style="list-style-type: none"> <li>• Discuss how to organize KPT.</li> <li>• Describe the pillars of 5S.</li> <li>• Implement 3S in own workplace by following appropriate procedures.</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• Kaizen principle, pillars and concept</li> <li>• Key characteristic of Kaizen</li> <li>• Elements of Kaizen</li> <li>• Wastes/MUDA</li> <li>• Basics of KPT</li> <li>• Aims, benefits and principles of KPT</li> <li>• Stages of KPT</li> <li>• Structure and role of the components of Junior KPT</li> <li>• Concept and parts of Kaizen board</li> <li>• Concept and benefits of 5S</li> <li>• The pillars of 5S</li> <li>• Three stages of 5S application</li> <li>• Benefits and procedure of sorting activities</li> <li>• The concept and application of Red Tag strategy</li> <li>• OHS procedures</li> <li>• Benefits and procedure of set in order activities</li> <li>• Set in order methods/techniques</li> <li>• Benefits and procedure of shine activities</li> <li>• Inspection methods</li> </ul>

	<ul style="list-style-type: none"> <li>• Planning and reporting methods</li> <li>• Method of Communication</li> </ul>
Underpinning Skills	<p>Demonstrates skills of:</p> <ul style="list-style-type: none"> <li>• Participating actively in KPT</li> <li>• technical drawing</li> <li>• communication skills</li> <li>• planning and reporting own tasks in implementation of 3S</li> <li>• following procedures to implement 3S in own workplace</li> <li>• using sorting formats to identify necessary and unnecessary items</li> <li>• improving workplace layout following work procedures</li> <li>• preparing labels, slogans, etc.</li> <li>• reading and interpreting documents</li> <li>• observing situations</li> <li>• gathering evidence by using different means</li> <li>• recording activities and results using prescribed formats</li> <li>• working with others</li> <li>• solving problems by applying 3S</li> <li>• preparing and using Kaizen board</li> <li>• preparing and using tools and equipment to implement 3S</li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

# NTQF Level II

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Lay Micro Irrigation Systems
Unit Code	<a href="#">AGR SSI2 01 0816</a>
Unit Descriptor	This competency standard covers the process of installing micro-irrigation systems under routine supervision. It requires the ability to organize equipment and materials for installation work, set out and prepare site, install irrigation components, complete installation work, and communicate with work team members, supervisors, contractors and consultants. Installing micro-irrigation systems requires knowledge of methods and techniques of micro-irrigation, components of a micro-irrigation system, characteristics and operation of joints, valves and sprinkler components, operation of pumps and water flow rates, behavior of water on varying terrain and soil types and enterprise OHS procedures.

Element	Performance Criteria
1. Prepare tools and materials for installation work	<p>1.1. <b>Materials, tools and accessories</b> are selected according to irrigation design <b>requirements</b> and supervisors instructions.</p> <p>1.2. The site for installation of the <b>micro-irrigation system</b> is identified</p> <p>1.3. Parts and <b>accessories</b> delivered to site are checked according to system drawings and specifications.</p> <p>1.4. System specifications are checked to ensure that it is compatible with <b>water supply</b>.</p>
2. Set out and prepare site	<p>2.1. Measurement and marking out of irrigation lines are undertaken as directed by supervisor.</p> <p>2.2. Equipment operation and work practices conform to enterprise and legislative OHS requirements.</p> <p>2.3. Pre-operational and safety checks are carried out on tools, accessories according to manufacturer's specifications and enterprise work procedures.</p> <p>2.4. OHS hazards are identified, risks assessed, controls implemented and reported to the supervisor.</p> <p>2.5. Suitable safety and <b>Personal Protective Equipment (PPE)</b> are selected, used and maintained</p>
3. Install irrigation components	<p>3.1. Work is undertaken according to plan and supervisors instructions</p> <p>3.2. Components are assembled and connected according to plan, joints are completed and tested.</p>

	<p>3.3. A <b>clean and safe work area</b> is maintained while installation work is carried out.</p> <p>3.4. Tools are chosen appropriate to the task being undertaken and used according to guidelines and safe working practices are employed.</p>
4. Complete installation work	<p>4.1. Earthworks are finished off to (as per) plan specifications and enterprise work procedures.</p> <p>4.2. The site is restored and <b>waste material</b> removed from the site and disposed of in an environmentally aware and safe manner according to enterprise work procedures.</p> <p>4.3. System is flushed and commissioned as directed</p> <p>4.4. Tools are cleaned, maintained and stored according to enterprise work procedures.</p> <p>4.5. Operating faults are identified and reported to supervisor and/or corrective actions taken.</p>

Variable	Range
Tools, equipment and accessories may include:	surveying and leveling equipment such as automatic level, laser level, dumpy level, Cowley level, staff, boning rods, pegs, notebook, pencil and calculator; hand tools such as rakes, shovels, spades, rollers, wheelbarrows, hoses and hose fittings; pumps and pump fittings; and fitting and welding tools appropriate to the irrigation system
Requirements include:	identifying hazards; assessing risks and implementing controls; cleaning, maintaining and storing tools, equipment and machinery; appropriate use of PPE including sun protection; safe operation of tools, equipment and machinery; safe handling, use and storage of chemicals and hazardous substances; correct manual handling; basic first aid; personal hygiene, and reporting problems to supervisors.
Micro-irrigation system	Micro-irrigation systems may include low pressure micro-sprays and drippers.
Irrigation accessories	May include delivery equipment (pipes, fittings, emitters, sprinkler nozzles) and system controllers (valves, pressure regulator).
Water supply may be:	Underground, mains or surface storage including fixtures such as dams bores windmills, tanks, and channels.
Personal Protective Equipment (PPE) may include:	Hat, boots, overalls, gloves, goggles, respirator or face mask, face guard, hearing protection, sunscreen lotion and hard hat.
Tasks for maintaining a clean and safe work area may include:	Disabling unused tools, equipment and machinery and storing neatly out of the way of installation activities; safely storing materials on site; using signage and safety barriers during and removing after construction activities are completed; and swiftly and efficiently removing and processing debris and waste from the work area.

Waste material may include:	Unused construction and excavated materials, plant debris, litter and broken components. Waste may be removed to designated areas for recycling, reuse, and return to the manufacturer or disposal. Plant-based material may be mulched or composted, plastic, metal, paper-based materials may be recycled, re-used, returned to the manufacturer, or disposed of according to enterprise work procedures.
Work procedures may include:	supervisors oral or written instructions, installation program, enterprise Standard Operating Procedures (SOP), specifications, routine maintenance schedules, work notes, product labels and Material Safety Data Sheets (MSDS), manufacturers service specifications and operators manuals, waste disposal, recycling and re-use guidelines, and OHS procedures.
Safety equipment	May include safety signage and barriers.

<b>Evidence Guide</b>	
Critical Aspects of Competence	A candidate must demonstrate ability to: <ul style="list-style-type: none"> <li>• Describe methods, components and techniques of micro-irrigation</li> <li>• prepare for installation,</li> <li>• set out the installation works,</li> <li>• install and test the irrigation system,</li> <li>• Communicate with work team members, supervisors</li> <li>• Clean up the site.</li> </ul>
Underpinning Knowledge and Attitudes	knowledge of: <ul style="list-style-type: none"> <li>• Methods and techniques of micro-irrigation</li> <li>• Components of an micro-irrigation system</li> <li>• Characteristics and operation of joints, valves and sprinkler components</li> <li>• Operation of pumps and water flow rates</li> <li>• Behavior of water on varying terrain and soil types</li> <li>• Enterprise OHS procedures.</li> </ul>
Underpinning Skills	include the ability to: <ul style="list-style-type: none"> <li>• Organize tools, materials and accessories for installation work</li> <li>• Set out and prepare site</li> <li>• Install irrigation components</li> <li>• Complete installation work</li> <li>• Communicate with work team members, supervisors, contractors and consultants.</li> <li>• Collect and organize information enterprise work procedures and site and</li> <li>• irrigation system plans</li> </ul>

	<ul style="list-style-type: none"> <li>• Use mathematical ideas to measuring materials and interpreting/identify specifications for the irrigation installation.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• Specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor’s panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</p>

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Assist the Operation of Gravity Fed Irrigation
Unit Code	<a href="#">AGR SSI2 02 0816</a>
Unit Descriptor	This competency standard covers the process of assisting with the operation of gravity fed irrigation systems under routine supervision. It requires the ability to handle and shift loads, follow enterprise policy and procedures relating to irrigation duties, identify adverse environmental impacts of gravity fed irrigation system and take appropriate remedial action, estimate water levels and volumes/flow, and follow OHS procedures. Assisting with the operation of gravity fed irrigation systems requires knowledge of basic operation of gravity fed irrigation system, irrigation times for enterprise fields to deliver sufficient volume without over watering, manual handling procedures, and OHS procedures relating to general activities involved in irrigating field crops using gravity fed irrigation.

Element	Performance Criteria
1. Set up field for gravity fed irrigation	<p>1.1 <b>Irrigation equipment</b> is handled safely in accordance with OHS practices.</p> <p>1.2 Irrigation equipment is positioned in accordance with enterprise <b>requirements</b>.</p> <p>1.3 Rot buck area is checked for irrigation set up and action taken as required in accordance with enterprise policy and procedures.</p> <p>1.4 water delivery mechanisms are checked for irrigation set up and action taken as required in accordance with enterprise policy and procedures.</p> <p>1.5 Tarpaulins or other water control devices are positioned and secured as required in accordance with enterprise procedures.</p>
2. Carry out irrigation operations	<p>2.1 Gates and/or valves are opened and shut as necessary in accordance with enterprise procedures.</p> <p>2.2 Required head and water levels in head ditch are achieved and maintained to ensure sufficient water flow and availability to crops.</p> <p>2.3 Required number of siphons is started /opened in accordance with enterprise procedures.</p> <p>2.4 Progress of water flow in furrows is monitored in accordance with enterprise procedures.</p> <p>2.5 Siphons are lifted where irrigation is complete in accordance with enterprise procedures.</p> <p>2.6 Irrigation change is carried out and marked as required.</p>



	2.7 Irrigation equipment is shifted, as required, for irrigation changes in accordance with OHS guidelines.
3. Clean and store irrigation equipment as required	<p>3.1 <b>Equipment</b> is cleaned and prepared for storage, as necessary, in accordance with enterprise policy and procedures.</p> <p>3.2 Equipment is loaded for transport safely, if necessary, in accordance with OHS practices.</p> <p>3.3 Equipment is stored as required, in accordance with enterprise policy and procedures.</p>

Variable	Range
Irrigation equipment	This may be siphons, parshial flume, Water hose (high pressure), pressure gauge, gate valve
Requirements	These may include safe systems and procedures for the operation and maintenance of machinery and equipment, for outdoor work (including protection from solar radiation, dust and noise), manual handling, prevention of electrical injury, handling, transportation, protection against chemical residues, including that in/on foliage, water, soil and other items, and the use and maintenance of relevant personal protective clothing and equipment.
Equipment to be transported:	may include flatbed trucks and pipe trailers.
Environmental considerations may include:	Ensuring sufficient water flow to crops must include measures to prevent over watering.
Relevant gravity fed irrigation systems are:	These may include border check, contour irrigation, furrow irrigation, hillside flooding, basin irrigation, ebb and flow, and flood systems. Border check systems may be either permanent or temporary earth, plastic or concrete devices for insertion in a drain for reticulating water, contour banks used to collect and distribute water along the perimeter of an irrigation plot, contour banks within a plot to collect/distribute water, or larger scale systems to stop water exiting one area to another.

Evidence Guide	
Critical Aspects of Competence	<p>A candidate must demonstrate ability to:</p> <ul style="list-style-type: none"> <li>describe basic operation of gravity fed irrigation system</li> <li>identify and describe components of a gravity fed irrigation system</li> <li>set up fields for irrigation,</li> <li>operate, check, clean and store irrigation equipment,</li> <li>carryout all basic activities involved in irrigating field crops under routine supervision.</li> </ul>
Underpinning Knowledge	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>basic operation of gravity fed irrigation system</li> <li>irrigation times for enterprise fields to deliver sufficient volume without over watering</li> </ul>

	<ul style="list-style-type: none"> <li>• components of a gravity fed irrigation system including cleaning and storage requirements</li> <li>• manual handling procedures</li> <li>• required head and water levels in head ditch</li> <li>• OHS procedures relating to general activities involved in irrigating field crops using gravity fed irrigation.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• start up and close down the system</li> <li>• monitor progress of water flow</li> <li>• handle and shift loads</li> <li>• clean and store system components</li> <li>• interpret enterprise policy and procedures relating to irrigation duties</li> <li>• estimate water levels and volumes/flow</li> <li>• follow OHS procedures relating to general activities involved in irrigating field crops using gravity fed irrigation systems.</li> <li>• communicate ideas and information marking irrigation changes.</li> <li>• collect analyze and organize information by checking set up information for equipment. planning and organizing activities by organizing irrigation activities to occur simultaneously.</li> <li>• work with others and in teams co-coordinating irrigation activities with others.</li> <li>• use mathematical ideas and techniques estimating time and water levels for sufficient water flow.</li> <li>• solve problems in determining required action once set up information has been checked</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be accessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</p>

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Assist in Determining Basic Properties of Soil
Unit Code	<a href="#">AGR SSI2 03 0816</a>
Unit Descriptor	This competency standard covers the process of determining the basic properties of soil. It requires the ability to collect samples and perform basic tests. It requires knowledge of sample collection techniques, basic soil properties, and basic understanding of soil/plant relationships. Determining the basic properties of soil is likely to be under supervision from others, with checking related to overall progress. The work is usually done within routines, methods and procedures where some discretion and judgment is required in the selection of equipment and materials, organization of work, and the achievement of outcomes within time and budgetary constraints.

Element	Performance Criteria
1. Collect soil samples for testing	<p>1.1 <b>Tools and materials</b> are prepared for collecting soil samples.</p> <p>1.2 Area from which soil samples are to be collected is identified from workplace records or supervisors instructions.</p> <p>1.3 Soil sample located using site plans (<b>Services</b>) and in consultation with the supervisor.</p> <p>1.4 <b>OHS hazards</b> are identified, risks assessed and controls implemented and reported to the supervisor.</p> <p>1.5 Suitable safety equipment and <b>Personal Protective Equipment (PPE)</b> are selected, used, and maintained.</p> <p>1.6 <b>Samples</b> are taken from the designated area according to recognized sampling techniques and are prepared for on site or off site analysis</p> <p>1.7 Samples are labeled and recorded.</p>
2. Perform basic soil tests	<p>2.1 Soil profile is determined, where appropriate.</p> <p>2.2 Soils are tested or inspected for physical properties.</p> <p>2.3 Soils are tested for chemical properties.</p> <p>2.4 Results are recorded.</p>

Variable	Range
Tools and materials include:	Spades, augers, core sampler soil sample storing and recording materials, field test kits, and interpreting charts.
Services may include:	water supply, electricity, telecommunications, irrigation, storm water and drainage
OHS hazards may include:	disturbance or interruption of services, solar radiation, dust, noise, soil- and water-borne micro-organisms, chemicals and hazardous substances, sharp hand tools and equipment,

	manual handling, moving machinery and machinery parts, falling objects, and uneven surfaces.
PPE may include:	Hat, boots, overalls, gloves, goggles, respirator, or face mask, face guard, hearing protection, sunscreen lotion and hard hat.
Sampling activities may include	Collecting, preparing, packaging and labeling soil samples for off-site testing and/or on-site testing and analysis.
Tests may be:	Soils may be tested for depth, color, texture, structure, compaction, air-filled porosity, pH, salinity and nutrients.

<b>Evidence Guide</b>	
Critical Aspects of Competence	A candidate must be able to demonstrate the ability to : <ul style="list-style-type: none"> <li>• Describe sample and sampling techniques</li> <li>• collect soil samples</li> <li>• test soil samples,</li> <li>• Identify and describe recording techniques have been successfully and appropriately carried out.</li> </ul>
Underpinning Knowledge	Demonstrates knowledge and understanding of: <ul style="list-style-type: none"> <li>• soil sampling techniques</li> <li>• soil physical properties</li> <li>• soil chemical properties</li> <li>• soil plant relationships</li> <li>• basic soil field tests</li> <li>• Techniques to ameliorate soil properties.</li> </ul>
Underpinning Skills	include the ability to: <ul style="list-style-type: none"> <li>• collect soil samples</li> <li>• perform basic soil tests</li> <li>• Record and store information.</li> <li>• communicate ideas and information through reporting results of soil tests to supervisor or others orally or in writing.</li> <li>• collect and organize soil information through recording and filing results.</li> <li>• plan and organize activities according to workplace procedures work in team with other to achieve an outcome.</li> <li>• apply problem-solving skills through identifying and resolving problems with the sampling process.</li> <li>• use of technology through the use of standard soil testing equipment.</li> </ul>
Resources Implication	The following resources MUST be provided: <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> </ul>

	<ul style="list-style-type: none"> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</li> </ul>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competency may be assessed in the work place or in a simulated work place setting</li> <li>• This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</li> </ul>

<b>Occupational Standard: Small Scale Irrigation Development Level II</b>	
<b>Unit Title</b>	<b>Observe and Report on Weather</b>
<b>Unit Code</b>	<a href="#"><u>AGR SSI2 04 0816</u></a>
<b>Unit Descriptor</b>	This unit of competence specifies the outcomes required to observe and report on weather and climate conditions for an agricultural, horticultural or land management enterprise. It also requires the application of skills and knowledge to recognize adverse weather and climate conditions and to monitor record and report on weather and climate information. The work is likely to be carried out with limited supervision, within enterprise guidelines.

<b>Element</b>	<b>Performance Criteria</b>
1. Check weather and climate information.	1.1 Weather and climate information is checked to determine likely conditions. 1.2 Changed weather and climate situations are familiarized. 1.3 Likely impact of changes in weather and climate are anticipated in respect to irrigation and other development tasks. 1.4 Report is made to supervisor of anticipated impact of weather and climate.
2. Carry out preventative action.	2.1 Information and advice is promptly disseminated to relevant personnel. 2.2 Preventative action is determined according to the known effects on livestock, crops and work tasks. 2.3 Actions to minimize loss and damage are implemented. 2.4 Livestock, horticultural or crop management program or schedule of work tasks are adjusted and revised according to weather and climatic changes.
3. Monitor weather and climate.	3.1 Regular updates are accessed to familiarized ongoing suitability of current programs. 3.2 Viability of livestock, horticultural or crop management practices are reviewed to ensure suitability within meteorological conditions. 3.4 Relevant information is documented and recorded according to enterprise requirements.

<b>Variable</b>	<b>Range</b>
Weather and climate information may be sourced from:	Radio, T.V., Internet, email, fax, telephone, newspapers, word of mouth, weather station on property and interpretive tools.
Weather and climate information may include:	Reports, warnings, data collected from property weather station, and glazier alerts.

Preventative actions may include:	Provision of shelter, shedding animals, covering fodder, moving fodder, firefighting equipment, auxiliary power, supplies, moving stock, securing equipment and buildings, preparing fire breaks and assured water supply, rescheduling Work tasks, operating sprinklers in order to cool animals in extreme heat.
Relevant personnel may include:	Other staff and colleagues, owners and managers, and neighbors.
Loss and damage May need to be Minimized may include:	To staff, livestock, crops, fodder, produce, buildings sheds And/or other physical resources.
Regular updates may be obtained from:	Radio, T.V., Internet, email, fax, telephone, newspapers, word of mouth, weather station on property, and interpretive tools.
Warnings may include:	Fire, flood, wind, rain, hail, storm, cyclones, heat waves, snow, dust, frost, gale, glazier alerts, and rapid changes in Temperature or weather conditions.

<b>Evidence Guide</b>	
Critical Aspects of Competence	A candidate must be able to demonstrate the ability to: <ul style="list-style-type: none"> <li>describe relevant legislative health and OHS requirements,</li> <li>describe effects of weather condition on irrigation.</li> <li>Communicate information.</li> <li>monitor physical signs in the context of available information</li> <li>relate forecasts to impact on current operations and activities</li> </ul>
Underpinning Knowledge	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>effects of weather condition on irrigation</li> <li>relevant legislative health and OHS requirements, especially as they relate to weather and climate monitoring and preparations for hazardous weather</li> <li>weather and climate conditions and its impact upon farming and crop production activities</li> <li>working knowledge of climate and weather</li> <li>Effects of prolonged dry periods on irrigation.</li> <li>Record data from weather and climate stations.</li> </ul>
Underpinning Skills	skills to: <ul style="list-style-type: none"> <li>Communicate information.</li> <li>monitor physical signs in the context of available information</li> <li>Use technology to access a range of information resources and record information.</li> <li>plan and organize activities and resources to minimize impact of adverse weather and climate</li> </ul>
Resources Implication	The following resources MUST be provided: <ul style="list-style-type: none"> <li>Access to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>Documentation and information on workplace practices and OHS practices.</li> <li>specifications and work instructions</li> <li>Approved assessment tools</li> <li>Certified assessor /Assessor's panel</li> </ul>

Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting. This unit of competency could be assessed on its own or in combination with other competencies relevant to the job function.</p>



Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Assist with the Operation of Pressurized Irrigation
Unit Code	<a href="#">AGR SSI2 05 0816</a>
Unit Descriptor	This competency standard covers the process of assisting with the operation of pressurized irrigation systems under routine supervision. It requires the ability to handle and shift loads, follow enterprise policy and procedures relating to irrigation duties, estimate water levels and volumes/flow, and follow OHS procedures. Assisting with the operation of pressurized irrigation systems requires knowledge of basic operation of pressurized irrigation system, irrigation times to deliver sufficient volume without over watering, manual handling procedures, and OHS procedures relating to pressurized irrigation systems.

Element	Performance Criteria
1. Assist with setting up of movable irrigation components	<p>1.1 Irrigation equipment is handled safely in accordance with <b>OHS</b> practices.</p> <p>1.2 Irrigation equipment is positioned, if necessary, in accordance with enterprise requirements.</p> <p>1.3 <b>Irrigation components</b> are checked and <b>action</b> taken, as required.</p> <p>1.4 Assemble and join irrigation system components where required.</p> <p>1.5 Water <b>outlets</b> are checked in accordance with enterprise practices.</p>
2. Carry out irrigation operations	<p>2.1 Valves are opened and shut, as necessary, in accordance with enterprise procedures.</p> <p>2.2 Required pressures and water flows are achieved and maintained to ensure sufficient water availability.</p> <p>2.3 Equipment is relocated, if necessary, in accordance with enterprise procedures and OHS guidelines.</p>
3. Clean and store irrigation equipment as required	<p>3.1 Equipment is cleaned and prepared for storage, as necessary, in accordance with enterprise policy and procedures.</p> <p>3.2 Equipment is loaded for <b>transport</b> safely, if necessary, in accordance with OHS practices.</p> <p>3.3 Equipment is stored, as required, in accordance with enterprise policy and procedures</p>

Variable	Range
Relevant pressurized irrigation systems may include:	Micro -irrigation systems and spray irrigation systems. Micro-irrigation systems may be mains pressure, low pressure, below or above ground, sprays systems, drip

	<p>emitter trickle-tape, mini-sprinklers, capillary pop ups and gear driven sprinklers.</p> <p>Spray irrigation systems may be traveling irrigators (soft hose, hard hose boom type) centre pivot, linear move, powered side roll hand shift permanent (installed), and bike shift/easy shift. Irrigation systems may range from manual operation and monitoring to fully automated with computer control and monitoring.</p>
OHS requirements may include:	<p>Safe systems and procedures for the operation and maintenance of machinery and equipment, for outdoor work (including protection from solar radiation, dust and noise), manual handling, prevention of electrical injury, handling, transportation, use and storage of farm chemicals, protection against chemical residues including that in/on foliage, water, soil and other items, and the use and maintenance of relevant personal protective clothing and equipment.</p>
Irrigation components may include:	<p>Pumps, pipes, valves (including solenoids), and sprinkler heads/emitters.</p> <p>What action may be required after checking components? Action may include remove, repair, replace or clean components. It may also include bleeding solenoid valves, lubrication and priming pumps.</p>
Outlets may include:	<p>Drip lines, pipes, risers, valves, sprinklers and emitters.</p>
Equipment to be transported	<p>may include utility, flatbed trucks, pipe trailer, or four-wheel motorbike.</p>

### Evidence Guide

Critical Aspects of Competence	<p>A candidate must demonstrate ability to:</p> <ul style="list-style-type: none"> <li>• Set up irrigation systems,</li> <li>• Operate, check, clean and store irrigation equipment,</li> <li>• Operate irrigation systems (i.e., turn on and off)</li> <li>• Regulate system to achieve and maintain correct operating pressures and water flows</li> <li>• Communicate ideas and information checking irrigation set up.</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Basic operation of pressurized irrigation system</li> <li>• Irrigation times to deliver sufficient volume without over watering</li> <li>• Manual handling procedures</li> <li>• OHS procedures relating to using pressurized irrigation systems.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Shift and transfer loads</li> <li>• Follow enterprise policy and procedures relating to irrigation duties</li> <li>• Assemble and join irrigation system components</li> <li>• Operate irrigation systems (i.e., turn on and off)</li> <li>• Regulate system to achieve and maintain correct operating pressures and water flows</li> </ul>

	<ul style="list-style-type: none"> <li>• Estimate water flow.</li> <li>• Communicate ideas and information checking irrigation set up.</li> <li>• Collect analyze and organize information</li> <li>• Plan and organize activities to occur simultaneously or as required.</li> <li>• Co-ordinate irrigation activities with others. Use mathematical ideas and techniques in estimating irrigation time and water volume for sufficient availability to plants/crops.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</p>

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Maintain Gravity-Fed Irrigation Systems
Unit Code	<a href="#">AGR SS12 06 0816</a>
Unit Descriptor	This competence standard covers the process of maintaining gravity fed irrigation systems under routine and scheduled supervision. It requires the ability to read and follow operational procedures for gravity fed irrigation system maintenance, remove and treat weeds, record and report maintenance observations and activities, and follow OHS procedures. Maintaining gravity fed irrigation systems requires knowledge of types of channels, furrows, borders, fittings and outlets, system cleaning procedures, damage and problems that can occur with gravity-fed irrigation systems, and weeds.

Element	Performance Criteria
1. Carry out pre- and post-seasonal maintenance preparation	<p>1.1 Plans the maintenance activities.</p> <p>1.2 Tools and materials is prepared pre-season for effective operation in accordance with design specifications and enterprise standards.</p> <p>1.3 System is closed and made resistant to damage during post-season in accordance with design specifications and standards.</p> <p>1.4 Equipment is stored during post-season according to standards.</p>
2. Carry out routine and periodical maintenance activities on gravity fed irrigation delivery systems	<p>2.1 All <b><i>routine and periodical maintenance</i></b> activities are carried out according to the maintenance program, <b><i>OHS requirements</i></b> and the manufacturers' specifications.</p> <p>2.2 Mechanical equipment is serviced in accordance with the operators' manual or as directed.</p> <p>2.3 Supply and distribution system is flushed and cleaned as directed.</p> <p>2.4 System inlets, <b><i>outlets</i></b>, structures, and fittings are maintained as directed.</p> <p>2.5 System is checked for smooth running and is free of damage, leaks, and blockages in channels, drains, and outlets, as necessary, in accordance with design specifications and enterprise procedures.</p> <p>2.6 Silt is cleared from channels, drains, sumps, and crossings with no disruption to gradients and levels, as necessary.</p> <p>2.7 <b><i>Adverse environmental impacts</i></b> of the irrigation system are identified and reported.</p> <p>2.8 Appropriate materials are used for backfilling and building/repairing <b><i>banks</i></b> in accordance with enterprise standards.</p>

3. Clear system of weeds using mechanical or chemical methods	<p>3.1 Weeds are removed/ controlled in accordance with enterprise standards, <b>OHS, and environmental requirements</b>.</p> <p>3.2 Crops and plants are protected from damage in accordance with enterprise standards.</p> <p>3.3 Water flow from outlets is checked, as necessary, to verify freedom from blockage.</p>
4. Record and report maintenance activities	<p>4.1 All damage and blockage caused by pests and vermin are recorded by damage type, location and the section of the system affected.</p> <p>4.2 Damage or faulty irrigation components are recorded and reported, and action taken to effect repairs.</p> <p>4.3 All routine maintenance activities are recorded and reported in accordance with standards.</p>

<b>Variable</b>	<b>Range</b>
Routine and periodical maintenance may include:	<p>Periodical maintenance for the pumping unit may include changing engine oil, replacing the oil filter, replacing the air cleaner, checking battery water level, pre-cleaner, gear box oil, cooling system/water, fuel, battery charge and fuel tank, greasing the pump jack shaft and bearings, and flushing (De-silting) the pump, etc.</p> <p>Weed control, flushing and supply distribution, de silting channels, de-scaling and irrigation structures service.</p> <p>Environmental considerations may include environmentally safe disposal of oils/grease and other contaminants.</p>
OHS requirements may include:	<p>systems and procedures for safe manual handling, outdoor work (including protection from solar radiation, dust and noise), selection, use and maintenance of relevant personal protective clothing and equipment, selection, care and safe use of hand tools, and safe systems for the prevention of electrical injury.</p>
Outlets may include:	Siphons, cups and flumes, pipes and gates/slides/doors.
Adverse environmental impacts may include:	Leaking channels or water storages and the secondary impacts of erosion and salinity.
Banks may require:	Banks may be damaged by washouts, subsidence, run-off, and/or animals.
OHS and environmental requirements	<p>may include safe systems and procedures for the operation and maintenance of machinery and equipment, the handling, transporting, use and storage of farm chemicals, and protection against chemical residues, including that in/on foliage, water, soil and other items.</p> <p>Environmental considerations may include choice of chemical versus mechanical weed control/removal, use of hand versus powered equipment, and procedures for avoiding chemical contamination of water supplies.</p>
Pre-season maintenance may include:	Weed control, motor servicing, flushing and supply distribution, de silting channels, and decaling and equipment service.

Post-season maintenance may include:	Disconnecting electrics, motor servicing, reports of equipment and machinery damage, flushing and draining, protection from environmental damage, and servicing equipment.
Gravity fed irrigation systems may include:	Border check, contour irrigation, furrow irrigation, hillside flooding and basin irrigation. Border check systems may be either permanent or temporary earth, plastic or concrete devices for insertion in a drain for reticulating water, contour banks used to collect and distribute water along the perimeter of an irrigation plot, contour banks within a plot to collect/distribute water, or larger scale systems to stop water exiting one area to another. Gravity fed systems may range from manual operation and monitoring to fully automated with computer control and monitoring.
Mechanical methods may include:	Graders, backhoes, front-end loaders, ploughs, and molding boards.

<b>Evidence Guide</b>	
Critical Aspects of Competence	A candidate must be able to demonstrate the ability to: <ul style="list-style-type: none"> <li>• apply enterprise and OHS procedures relating to gravity fed irrigation maintenance</li> <li>• describe types of channels, furrows, borders, fittings and outlets system cleaning procedures</li> <li>• describe damage and problems that can occur with gravity-fed irrigation systems</li> <li>• check for problems and return the system to smooth running, build or repair banks,</li> <li>• control weeds and silt build-up,</li> <li>• carry out maintenance activities under routine supervision.</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• enterprise and OHS procedures relating to gravity fed irrigation maintenance</li> <li>• types of channels, furrows, borders, fittings and outlets</li> <li>• system cleaning procedures</li> <li>• damage and problems that can occur with gravity-fed irrigation systems</li> <li>• weed types encountered in gravity fed irrigation systems and their control</li> <li>• environmentally safe disposal procedures for chemical containers and residues, oils/grease and used parts</li> </ul>
Underpinning Skills	include the ability to: <ul style="list-style-type: none"> <li>• read and follow procedures for gravity fed irrigation system maintenance</li> <li>• identify adverse environmental impacts of gravity fed irrigation system and take appropriate remedial action</li> <li>• read instructions and safely use chemicals for weed control</li> <li>• use mechanical equipment to build/repair banks and for weed removal</li> <li>• record and report maintenance observations and activities</li> <li>• Follow OHS procedures relating to gravity fed irrigation</li> </ul>

	<p>maintenance.</p> <ul style="list-style-type: none"> <li>• Communicate ideas and information through reporting damage, faulty systems and routine maintenance activities.</li> <li>• Collect and organize information while recording maintenance activities.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</p>

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Maintain Pressurized Irrigation Systems
Unit Code	<a href="#">AGR SSI2 07 0816</a>
Unit Descriptor	This competency standard covers the process of maintaining pressurized irrigation systems, including the repair and replacement of basic, simple components under routine supervision. It requires the ability to read and follow an operators manual and manufacturers specifications for pressurized irrigation systems, maintain selected irrigation system components, and record and report maintenance observations and activities. Maintaining pressurized irrigation systems requires knowledge of major components of a pressurized irrigation delivery system, maintenance requirements and procedures for system components, and environmentally safe disposal procedures for chemicals.

Element	Performance Criteria
1. Carry out pre- and post-season maintenance	<p>1.1. Equipment is prepared pre-season for effective operation in accordance with design specifications and enterprise standards.</p> <p>1.2. System is flushed, cleaned, closed down and maintained post-season in accordance with design specifications and enterprise standards.</p> <p>1.3. Equipment requiring storage is dismantled, loaded, transported and stored without damage according to enterprise standards and <b>safe working practices</b>.</p>
2. Carry out periodic and routine maintenance activities on pressurized irrigation delivery systems	<p>2.1. All maintenance activities are carried out according to the maintenance program and the manufacturers' specifications.</p> <p>2.2. <b>Mechanical equipment is serviced</b> in accordance with the operator's manual or as directed.</p> <p>2.3. Supply and distribution systems are flushed and cleaned with sprinklers, emitters and/or drip line tapes replaced as directed.</p> <p>2.4. Outlets, strainers, pump screens and filters are cleaned and replaced as directed.</p> <p>2.5. System is visually inspected for leaks, operating faults and dry areas, and observations recorded in the maintenance book.</p> <p>2.6. Operation area is maintained in a clean and safe condition, and <b>OHS procedures</b> are followed.</p> <p>2.7. System maintenance is carried out at scheduled times using equipment and <b>materials</b> in accordance with enterprise standards and manufacturers specifications.</p> <p>2.8. <b>Parts</b> are inspected for wear or blockage and reported or replaced according to enterprise guidelines.</p>



	2.9. <b>Outlets</b> are removed and cleaned and damaged ones are reassembled and replaced according to manufacturer's specifications.
3. Record and report maintenance activities	<p>3.1. All damage and blockage caused by pests and vermin is recorded by damage type, location and the section of the system affected.</p> <p>3.2. Damage or faulty pumps, valves, electrical components are recorded and reported, and action taken to effect repairs.</p> <p>3.3. All routine maintenance activities are recorded and reported.</p>

Variable	Range
Safe working practices may include:	<ul style="list-style-type: none"> <li>• Safe procedures for manual handling, and the operation of machinery and equipment.</li> </ul>
Servicing of mechanical equipment may include:	<ul style="list-style-type: none"> <li>• Periodical maintenance for pumping unit may include changing engine oil, replacing the oil filter, replacing the air cleaner, checking battery water level, pre-cleaner, gear box oil, cooling system/water, fuel, battery charge and fuel tank, greasing the pump jack shaft and bearings, and flushing (de-silting) the pump.</li> <li>• Centre control tower maintenance may include greasing head of pivot and all gearboxes, checking tyre pressure, and cleaning electrical controls of authorized components.</li> <li>• There may be environmental considerations relating to the servicing of mechanical equipment such as disposal of oils/grease and used parts.</li> </ul>
OHS procedures may include:	<ul style="list-style-type: none"> <li>• Prevention of electrical injury, protection against cleansing agents including acids, and safe systems and procedures for protection against risks of slips and falls.</li> </ul>
Materials may include:	<ul style="list-style-type: none"> <li>• Gland packing, rubber rings, belts and pulleys, hazardous substances, or chemicals.</li> </ul>
Parts may include:	<ul style="list-style-type: none"> <li>• Pipes, jets, micro jets, laterals, sprinklers, emitters, integrated drip line" thin wall", seals and outlets.</li> </ul>
Outlets removed and cleaned or replaced may include:	<ul style="list-style-type: none"> <li>• Outlets drip lines, cups and fluming, pipes, risers, valves, sprinklers and emitters.</li> </ul>
Pre-season maintenance may include:	<ul style="list-style-type: none"> <li>• Weed control, motor servicing, flushing and supply distribution, descaling and equipment service</li> </ul>
Post-season maintenance may include:	<ul style="list-style-type: none"> <li>• Disconnecting electrics, motor servicing, reports of equipment and machinery damage, flushing and draining, protection from environmental damage, and servicing equipment.</li> </ul>
Enterprise standards for flushing and cleaning the system may include:	<ul style="list-style-type: none"> <li>• Environmental considerations such as the identification of the impacts of pumping water from any ground or underground source and appropriate remedial action, and procedures for dealing with cleaning agents and waste water</li> </ul>

Pressurized irrigation systems	<ul style="list-style-type: none"> <li>• Irrigation systems may range from manual operation and monitoring to fully automated with computer control and monitoring.</li> <li>• They may include micro-irrigation systems and spray irrigation systems.</li> <li>• Micro-irrigation systems may be mains pressure, low pressure, below or above ground, sprays systems, drip emitter trickle, t-tape, mini-sprinklers, and capillary. Spray irrigation systems may be travelling irrigators (soft hose, hard hose, boom type) centre pivot, linear move, powered side roll, hand shift, permanent (installed), and bike shift/easy shift.</li> </ul>
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<b>Evidence Guide</b>	
Critical Aspects of Competence	A candidate must demonstrate the ability to: <ul style="list-style-type: none"> <li>• Inspect and replace worn parts,</li> <li>• Follow procedures to carry out routine maintenance with only routine supervision.</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• Enterprise and OHS procedures relating to pressurized irrigation system maintenance</li> <li>• Major components of a pressurized irrigation delivery system</li> <li>• Maintenance requirements and procedures for system components</li> <li>• Environmentally safe disposal procedures for chemical containers and residues, oils/grease and used parts.</li> </ul>
Underpinning Skills	include the ability to: <ul style="list-style-type: none"> <li>• Read and follow an operators manual and manufacturers specifications for pressurized irrigation systems</li> <li>• Maintain selected irrigation system components</li> <li>• Record and report maintenance observations and activities.</li> <li>• Carry out pre- and post-season maintenance</li> <li>• Carry out routine maintenance activities on pressurized irrigation delivery systems</li> </ul>
Resources Implication	The following resources MUST be provided: <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require</li> </ul>

	<p>evidence of process</p> <ul style="list-style-type: none"> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Assist Irrigation Drainage Systems Development
Unit Code	<a href="#">AGR SSI2 08 0816</a>
Unit Descriptor	This competency standard covers the process of installing and construction of surface and/or subsurface irrigation drainage systems under routine supervision. It requires the ability to read site specifications and drainage system plans, set out drainage system works, measure materials, level and align earthworks, and use relevant equipment, tools and machinery, soil characteristics, and enterprise OHS procedures.

Element	Performance Criteria
1. Prepare for drainage system installation and construction activities	<p>1.1. The construction site for the <b>drainage system</b> and construction method is identified according to the site and drainage system plans and enterprise <b>work procedures</b>.</p> <p>1.2. <b>Materials, tools, equipment and machinery</b> are selected according to drainage system design requirements and enterprise work procedures.</p> <p>1.3. Pre-operational and safety checks are carried out on tools, equipment and machinery according to manufacturer's specifications and enterprise work procedures.</p> <p>1.4. <b>OHS hazards</b> are identified, risks assessed, controls implemented and reported to the supervisor.</p> <p>1.5. Suitable safety and <b>Personal Protective Equipment (PPE)</b> are selected, used and maintained.</p>
2. Installation of subsurface drainage systems	<p>1.1. Materials required for the job are transported to the location and stacked in a safe position.</p> <p>1.2. Setting out and excavation of trenches are carried according to design specification</p> <p>1.3. bedding materials are laid in accordance of design specifications</p> <p>1.4. pipes are Lowered and positioned</p> <p>1.5. Site is cleared and excess soil, debris and unwanted materials removed in accordance with organizational procedures and <b>environmental requirements</b>.</p> <p>1.6. Tools and equipment are cleaned, maintained and stored.</p>
3. Prepare the site for construction of surface drainage system	<p>3.1. Symbols and terminology are recognized to ensure the concept of the <b>surface drainage system</b> plan is clearly understood according to industry practice.</p> <p>3.2. Layout of <b>services</b> is identified, depths checked against the site or drainage system plan and discrepancies are reported to the supervisor and the relevant authority.</p>

	3.3. Survey, measurement and marking out of the site are completed according to plan specifications and enterprise work procedures.
4. Assist construction of surface drainage system	<p>4.1. Excavations are completed without damage to services, facilities, features and established plants according to plan specifications and enterprise work procedures.</p> <p>4.2. The drainage system is constructed according to the drainage system plan and enterprise work procedures.</p> <p>4.3. The drainage system is checked for configuration and capacity consistent with the drainage system plan and according to enterprise work procedures.</p> <p>4.4. The supervisor is consulted and remedial action is taken when the drainage system operation does not meet the plan specifications.</p>
5. Complete construction of surface drainage system	<p>5.1. Earthworks are finished off to the plan specifications and enterprise work procedures.</p> <p>5.2. The site is restored and <b>waste material</b> is removed from the site and disposed of in an environmentally aware and safe manner according to enterprise work procedures.</p> <p>5.3. Tools, equipment and machinery are cleaned, maintained and stored according to enterprise work procedures.</p> <p>5.4. A <b>clean and safe work area is maintained</b> throughout and on completion of work.</p> <p>5.5. Work outcomes are recorded or reported to the supervisor according to enterprise work procedures.</p>

Variable	Range
Drainage systems may include:	surface drains, mole drains, sand slit, sub-surface traps, pit and trap systems, etc.
Work procedures may include:	supervisors oral or written instructions, installation program, enterprise Standard Operating Procedures (SOPs), specifications, routine maintenance schedules, work notes, product labels and Material Safety Data Sheets (MSDS), manufacturers service specifications and operators manuals, waste disposal, recycling and re-use guidelines, and OHS procedures.
Materials may include:	Drainage system components, glues, pipes, welds, construction materials for drain surfaces and slopes, and backfill materials.
Tools, equipment and machinery may include:	surveying and leveling equipment such as automatic level, laser level, dumpy level, Cowley level, staff, boning rods, pegs, notebook, pencil and calculator; hand tools such as rakes, shovels, spades, rollers, wheelbarrows, hoses and hose fittings; machinery such as bobcats, ditch witches, backhoes, front-end loaders, graders, mechanical rollers, trucks, hydraulic trailers, and tractors and 3-point linkage equipment; pumps and pump fittings; and fitting and welding

	tools appropriate to the drainage system.
PPE may include:	Hat, boots, overalls, gloves, goggles, respirator or face mask, face guard, hearing protection, sunscreen lotion and hard hat.
OHS hazards may include:	Disturbance or interruption of services, solar radiation, dust, noise, soil and waterborne micro-organisms, chemicals and hazardous substances, manual handling, moving vehicles, machinery and machinery parts, uneven surfaces and flying and falling objects. Safety equipment may include signage and barriers.
Environmental requirements	may include recycling or environmentally safe disposal of excess soil, debris and unwanted materials.
Surface drainage system	is the orderly removal of excess water from the surface of land through improved natural channels or constructed ditches and through shaping of the land surface. The basic surface drainage systems are the random, the parallel, and the cross slope or diversion system.
Services may include:	Water supply, gas, power (electricity), telecommunications, irrigation, storm water and drainage.
Waste material may include:	<ul style="list-style-type: none"> <li>• Unused construction and excavated materials, and plant debris, litter and broken components.</li> <li>• Plant-based material may be mulched or composted, plastic, metal, paper-based materials may be recycled, re-used, returned to the manufacturer or disposed of according to enterprise work procedures.</li> <li>• Waste may be removed to designated areas for recycling, reuse, and return to the manufacturer or disposal.</li> </ul>
Maintaining clean and safe work area	Tasks may include disabling unused tools, equipment and machinery and storing neatly out of the way of installation and construction activities; safely storing materials on site; using signage and safety barriers during construction and removing them after activities are completed, and swiftly and efficiently removing and processing debris and waste from the work area.
Subsurface drainage systems	is the removal of excess water and dissolved salts from soils via groundwater flow to the drains so that the water table depth and root-zone salinity are controlled.
OHS requirements may include:	Identifying hazards, assessing risks and implementing controls, cleaning, maintaining and storing tools, equipment and machinery, appropriate use of PPE including sun protection; safe operation of tools, equipment and machinery, safe handling, use and storage of chemicals and hazardous substances, correct manual handling, basic first aid, personal hygiene and reporting problems to supervisors.

### Evidence Guide

Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• Describe purpose , types of irrigation drainage systems</li> <li>• Identify and describe components of irrigation drainage system</li> <li>• Prepare for installation and construction activities,</li> </ul>
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	<ul style="list-style-type: none"> <li>• Set out and excavate the installation(trenches) and construction(open ditches) site,</li> <li>• Clean up the installation and construction site.</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates Knowledge of:</p> <ul style="list-style-type: none"> <li>• The purposes of drainage systems and the application of drainage system plans to the physical situation</li> <li>• Workplace and equipment safety requirements for excavating, filling trenches and laying pipes.</li> <li>• Drainage pipes, types and sizes</li> <li>• Hand and power tools and equipment</li> <li>• Describe drainage types, components , installation and construction techniques</li> <li>• Environmental impacts of irrigation drainage systems</li> <li>• Soil characteristics</li> <li>• Enterprise OHS procedures.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Communicate with work team members, supervisors,</li> <li>• Identify site specifications and drainage system plans</li> <li>• Set out drainage system works</li> <li>• Level and align earthworks</li> <li>• Use equipment, tools and machinery</li> <li>• Implement and follow relevant enterprise OHS and environmental policies and procedures</li> <li>• Communicate ideas and information in written, orally with the work group, supervisor,</li> <li>• Use mathematical ideas and techniques in measuring materials.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>

Context of Assessment	<ul style="list-style-type: none"> <li>• Competency may be assessed in the work place or in a simulated work place setting.</li> <li>• This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</li> <li>• drainage system must be transferable to a different work environment. For example, this could include different types of drainage systems, soil types and enterprises.</li> </ul>
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<b>Occupational standard: Small Scale Irrigation Development Level II</b>	
<b>Unit Title</b>	<b>Operate Small Motorized and Manual Irrigation Pumps</b>
<b>Unit Code</b>	<a href="#"><u>AGR SSI2 09 0816</u></a>
<b>Unit Descriptor</b>	This unit of competence covers the process of site selection for the respective selected small motorized and manual irrigation pumps, installing and operating the pumps. It requires the ability to characterize small motorized and manual irrigation pumps, optimize the power requirement, and compare initial investment with final outcomes. Characterizing and Operating small motorized and manual irrigation pumps requires the knowledge of determining capacity (horse power) required, characterizing and operating small motorized and manual irrigation pumps, estimating brake horse power and computing efficiency and total head requirement, understand OHS procedure and system performance criterion, understand extension and participatory approach ,communication, developments in related technology, indigenous practices and economic analysis, environmental issues, and environmental protection agency regulations.

<b>Elements</b>	<b>Performance criteria</b>
1. Select site for irrigation pumps	<p>1.1. Site is checked for proximity of resources.</p> <p>1.2. Power requirement for suction &amp; delivery head is optimized using standard technique.</p> <p>1.3. Irrigation system after pumping is decided based on local topographic conditions.</p>
2. Select small motorized and manual irrigation pumps	<p>2.1.Total water demand and lifting head is estimated considering irrigation method, crop water requirement and conveyance system efficiency.</p> <p>2.2. Available power source identified based on local conditions and economic considerations.</p> <p>2.3. Initial investment is compared with final outcomes.</p>
3. Install small motorized and manual irrigation pumps	<p>3.1.The <b><i>small motorized and manual irrigation pumps</i></b> are placed considering topographic conditions.</p> <p>3.2. Parts are fixed together as of manufacturer’s installation procedures.</p> <p>3.3.Irrigation pumps are placed on well leveled bed and anchored firmly.</p>
4. Operate small motorized and manual irrigation pumps	<p>4.1.Small motorized and manual irrigation pumps are characterized.</p> <p>4.2. Capacity(horse power) required, brake horse power, efficiency and total head requirement are estimated and determined.</p> <p>4.3 Pump is Maintained according to <b><i>Occupational Health &amp; Safety (OHS)</i></b> procedure and system performance criterion.</p>

<b>Variable</b>	<b>Range</b>
Small motorized and manual irrigation pumps	May include manually operated, animal, fuel, solar, wind and electrical power operated (pumps).
Occupational Health & Safety (OHS)	<ul style="list-style-type: none"> <li>• Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust.</li> <li>• Glove, safety wear, helmet and eye glass</li> </ul>
Tools and equipments	<ul style="list-style-type: none"> <li>• Treadle pump, rope and washer, suction hose and delivery hose, pumps, foot valve.</li> </ul>
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• Sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of competence	<p>A candidate must demonstrate ability to:</p> <ul style="list-style-type: none"> <li>• Select pumping site.</li> <li>• Select small motorized and manual irrigation pumps</li> <li>• fix Parts together as of manufacturer’s installation procedures</li> <li>• Pump operation.</li> </ul>
Underpinning Knowledge	<p>Characterizing and Operating small motorized and manual irrigation pumps requires the knowledge of:</p> <ul style="list-style-type: none"> <li>• Determining capacity(horse power) required,</li> <li>• Characterizing and operating small motorized and manual irrigation pumps,</li> <li>• Estimating brake horse power and computing efficiency and total head requirement,</li> <li>• OHS procedure and system performance criterion</li> <li>• Understand extension and participatory approach ,communication, developments in related technology, indigenous practices and economic analysis,</li> <li>• Environmental issues and environmental protection agency regulations.</li> </ul>
Underpinning Skills	<p>Skills include the ability to:</p> <ul style="list-style-type: none"> <li>• Characterize and operate small motorized and manual irrigation pumps,</li> <li>• Estimate brake horse power and computing efficiency and total head requirement,</li> <li>• Select site for pumps</li> <li>• Select water pumps</li> <li>• Install water pumps</li> </ul>
Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> </ul>

	<ul style="list-style-type: none"> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

<b>Occupational Standard: Small Scale Irrigation Development Level II</b>	
<b>Unit Title</b>	<b>Maintain Small Motorized and Manual Irrigation Pump</b>
<b>Unit Code</b>	<a href="#"><u>AGR SSI2 10 0816</u></a>
<b>Unit Descriptor</b>	This competency standard covers the process of carrying out periodic and routine maintenance activities for small motorized and manual irrigation pump including identify, repair and replacement of components under routine supervision. It requires the ability to read and follow operational and maintenance procedures for small motorized and manual irrigation pump maintenance, record and report maintenance observations and activities, safely use chemicals, and follow OHS procedures relating to small motorized and manual irrigation pump maintenance. small motorized and manual irrigation pump requires knowledge of different types of small motorized and manual irrigation pump and cleaning procedures, OHS procedures, equipment used to clean and maintain small motorized and manual irrigation pump, legislation regarding pumps, oils/grease and used parts.

<b>Element</b>	<b>Performance Criteria</b>
1. Carry out pre- and post-seasonal periodic maintenance	<p>1.1 Equipment is prepared pre-season for effective operation in accordance with design specifications and enterprise standards.</p> <p>1.2 System is flushed, cleaned, closed down and maintained post-season in accordance with design specifications and enterprise standards.</p> <p>1.3 Mechanical equipment is serviced in accordance with the operator's manual or as directed.</p> <p>1.4 Equipment requiring storage is dismantled, loaded, transported and stored without damage according to enterprise standards.</p>
2. Carry out routine maintenance activities on small motorized and manual irrigation pump	<p>2.1 All maintenance activities are carried out according to the maintenance program and the manufacturer's specifications.</p> <p>2.3 small motorized and manual irrigation pump components are flushed and cleaned, with simple components replaced as directed.</p> <p>2.4 small motorized and manual irrigation pump is visually inspected for operating faults(turbines, diesel, dynamo), and observations are recorded in the maintenance book.</p> <p>2.5 Operation area is maintained in a clean and safe condition, and OHS procedures are followed.</p>
3. Maintain system components	<p>3.1 System maintenance is carried out at scheduled times using equipment and materials in accordance with enterprise standards.</p>

	<p>3.2 <b>Components</b> are inspected operating faults and reported or replaced according to enterprise guidelines.</p> <p>3.3 Operation area is maintained in a clean and safe condition, and <b>OHS procedures</b> are followed.</p>
4. Record and report maintenance activities	<p>4.1 All damage and blockage caused by vermin is recorded by damage type, location and the section of the system affected.</p> <p>4.2 Damage or faulty pumps, valves, electrical components and computer systems are recorded and reported, and action taken to effect repairs.</p> <p>4.3 All routine and periodic maintenance activities are recorded and reported in accordance with enterprise standards.</p>

Variable	Range
Pre-season maintenance may include:	Checking, inspecting and servicing pumps operation and the like.
Post-season maintenance may include:	Draining and flushing diesel tanks of diesel sediments, treating and flushing the system, capping open pipes on fixed systems, and covering fixed systems to protect from environmental degradation.
Components may include:	impeller, high tensile shaft, bearing pedestal, stuffing box, flanges and coupling , foot valve
Requirements may include:	systems and procedures for safe manual handling, outdoor work (including protection from solar radiation, dust and noise), selection, use and maintenance of relevant personal protective clothing and equipment, selection, care and safe use of hand tools, and safe systems for the prevention of electrical injury.
Enterprise guidelines	Enterprise guidelines will identify OHS and environmental considerations. OHS requirements may include safe systems and procedures for the operation and maintenance of machinery and equipment, the handling, transporting, use and storage of farm chemicals, and protection against chemical residues, including that in/on foliage, water, soil and other items
Environmental considerations may include:	Choice of chemical versus mechanical weed control/removal, use of hand versus powered equipment, and procedures for avoiding chemical contamination of water supplies.

Evidence Guide	
Critical Aspects of Competence	<p>A candidate must demonstrate ability to:</p> <ul style="list-style-type: none"> <li>inspect, repair and replace simple pump components</li> <li>Carry out maintenance activities under routine supervision.</li> <li>Apply OHS procedures relating to drainage system maintenance.</li> <li>carry out pre- and post-season maintenance</li> </ul>

	<ul style="list-style-type: none"> <li>record and report maintenance observations and activities</li> </ul>
Underpinning Knowledge and Attitudes	<p>knowledge of:</p> <ul style="list-style-type: none"> <li>Basic types of small motorized and manual irrigation pump</li> <li>pump cleaning procedures</li> <li>OHS procedures relating to pump maintenance</li> <li>Equipment used to clean and maintain pump</li> <li>legislation regarding the use of pump</li> <li>Environmentally safe disposal procedures oils/grease and used parts.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>Read and follow operational procedures pump maintenance</li> <li>Follow OHS procedures relating to drainage system maintenance.</li> <li>Carry out pre- and post-season maintenance</li> <li>Carry out routine maintenance activities on drainage systems Maintain system components</li> <li>Record and report maintenance observations and activities</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>Documentation and information on workplace practices and OHS practices.</li> <li>specifications and work instructions</li> <li>Approved assessment tools</li> <li>Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>Written exam/test on underpinning knowledge</li> <li>questioning or interview on underpinning knowledge</li> <li>project-related conditions (real or simulated) and require evidence of process</li> <li>Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</p>

<b>Occupational Standard: Small Scale Irrigation Development Level II</b>	
<b>Unit Title</b>	<b>Assist Erosion and Sediment Control Activities</b>
<b>Unit Code</b>	<a href="#"><u>AGR SSI2 11 0816</u></a>
<b>Unit Descriptor</b>	This competency standard covers the process of assessing erosion and sediment control activities. It requires the ability to identify erosion and sediment control structures, assessing routine work in compliance with control measures, under take work in accordance to legislation and community expectation and project specifications. Assessing erosion and sediment control activities requires knowledge of basic issues related to erosion and sedimentation, role of vegetation, characteristics of soils with an emphasis on erosion prone soils, relevant legislation, and local environmental parameters.

<b>Element</b>	<b>Performance Criteria</b>
1. Assess work site practices with erosion and sediment control principles	1.1 Erosion and sedimentation legislation is adhered. 1.2 Procedures relating to erosion and sediment control are applied. 1.3 <b><i>Erosion and sediment control work</i></b> is properly performed according to community and agency guidelines and best practice procedures.
2. Implement erosion and sediment control principles	2.1 Implement erosion and sediment control legislation. 2.2 practices for erosion and sediment control are applied.

<b>Variable</b>	<b>Range</b>
Erosion and sediment control work may include:	Land shaping including batter stabilization, banks, channels, and sediment basins, traps, filters, and fences. Also includes re-vegetation.
Erosion and sediment control structures may include:	Grade stabilizing structures, outlet protection structures, storm water detention measures, dust control, and rural roads and tracks.

<b>Evidence Guide</b>	
Critical Aspects of Competence	A candidate must be able to demonstrate the ability to: <ul style="list-style-type: none"> <li>• Perform erosion and sediment control work is properly completed according to community and agency guidelines and best practice procedures.</li> <li>• Identify erosion and sediment control structures/measures/practices.</li> <li>• Carry out routine work with control measures and structures.</li> <li>• Communicating ideas and information</li> <li>• Conduct erosion and sediment control activities on development sites</li> <li>• Using mathematical ideas and techniques to measurement and timing</li> </ul>

Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Relevant legislation.</li> <li>• Cost of erosion and sedimentation mitigation strictures</li> <li>• Water quality.</li> <li>• Re-occurring maintenance/repair/monitoring.</li> <li>• Basic catchments characteristics</li> <li>• Role of vegetation.</li> <li>• Characteristics of soils with an emphasis on erodible soils.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Identify erosion and sediment control structures/measures/practices.</li> <li>• Carry out routine work with control measures and structures.</li> <li>• Undertake activities in accordance with legislation/community expectation and project specifications.</li> <li>• Communicating ideas and information</li> <li>• Collect and organize information</li> <li>• Plan and organize erosion and sediment control activities on development sites</li> <li>• Working with others and in teams</li> <li>• Conduct erosion and sediment control activities on development sites</li> <li>• Using mathematical ideas and techniques to measurement and timing</li> <li>• Solve technical and organizational problems while conducting erosion and sediment control activities on development sites,</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>



Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.
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Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Assist Establishment of Irrigated Crops
Unit Code	<a href="#">AGR SSI2 12 0816</a>
Unit Descriptor	<p>This competence standard covers the process of planting and establishing crops such as fruit, vegetables, flowers, foliage, plants and herbs. Crop planting and establishment is likely to be under routine supervision with intermittent checking. Responsibility for some role sand co-ordination within a team may be required.</p> <p>Competency at this level requires the application of knowledge and skills to a range of planting tasks, including site clearance and preparation, the handling and planting of a range of planting materials, and the care of young plants. Crop establishment activities are usually undertaken within established routines, methods and procedures.</p>

Element	Performance Criteria
1. Prepare for crop establishment operations	<p>1.1 <b>Instructions</b> about establishing the crop are interpreted and clarified with the supervisor.</p> <p>1.2 <b>Machinery, equipment and tools</b> are selected and prepared for the task being undertaken.</p> <p>1.3 <b>OHS hazards</b> are identified, risks assessed and reported to the supervisor.</p> <p>1.4 The <b>environmental implications</b> of the crop establishment program are identified and discussed with the supervisor.</p> <p>1.5 Suitable <b>Personal Protective Equipment (PPE)</b> is selected, used and maintained.</p>
2. Prepare the site for planting	<p>2.1 Old crop and other waste materials are removed and <b>disposed of</b> in full consideration of environmental implications.</p> <p>2.2 Where soil is the growing media, samples are taken for <b>testing</b> according to established procedures.</p> <p>2.3 Where soil is the growing media, <b>soil treatment/ amendments</b> are applied according to soil test results and supervisors instructions.</p> <p>2.4 Growing media is prepared according to the crop establishment plan.</p> <p>2.5 <b>Crop protection</b> is implemented according to guidelines.</p> <p>2.6 The planting pattern is marked out according to the crop establishment plan.</p> <p>2.7 Materials &amp; tools are operated according to enterprise guidelines.</p>

3. Carry out planting operations	<p>3.1 <b>Planting material</b> is selected according to the type of crop and enterprise quality standards.</p> <p>3.2 Planting material is treated according to the crop and supervisor's instructions.</p> <p>3.3 Planting material, waiting to be planted is maintained under conditions that will ensure maximum viability.</p> <p>3.4 Planting material is handled and transported to the site with no signs of transport damage.</p> <p>3.5 Planting is carried out according to the planting plan.</p>
4. Care for young plants	<p>4.1 <b>Treatments</b> are applied to plantings according to the supervisor's instructions.</p> <p>4.2 <b>Water is applied</b> to plantings according to the irrigation schedule and established sustainable farming practices.</p> <p>4.3 <b>Plantings are trained</b> according to the supervisors directions.</p>

Variable	Range
Instructions may include:	<ul style="list-style-type: none"> <li>Standard Operating Procedures (SOPs), company policy and procedures in regard crop establishment, specifications, work notes, Material Safety Data Sheets, manufacturer's instructions, product labels, or verbal directions from the manager, supervisor, or senior operator.</li> </ul>
Machinery, equipment and tools may include:	<ul style="list-style-type: none"> <li>Tractors, rotary hoes, cultivators, fertilizer spreaders, surveying and measuring equipment, seeding or planting machinery.</li> </ul>
OHS hazards may include:	<ul style="list-style-type: none"> <li>the use of machinery, moving machinery and machinery parts, falling trees and plant debris, chemicals and hazardous substances, manual handling, solar radiation, dust, and noise</li> </ul>
Environmental implications	<ul style="list-style-type: none"> <li>Negative environmental implications may include the</li> <li>contamination of off-site ground water or soils from solids,</li> <li>debris, nutrients or chemicals; land disturbance, spread of</li> <li>Noxious weeds and water run-off.</li> </ul>
PPE may include:	<ul style="list-style-type: none"> <li>Hat, boots, overalls, gloves, goggles, respirator or face mask, hearing protection, sunscreen lotion and hardhat.</li> </ul>
Waste disposal of may include:	<ul style="list-style-type: none"> <li>Disinfestations, ploughing organic waste into the soil, mulching or composting of plant material, bagging and removal of seed heads, and disposing of noxious or poisonous material at approved disposal sites.</li> </ul>
Soil samples testing may include:	<ul style="list-style-type: none"> <li>Tests pH, salinity, water repellence, slaking, proportion of organic matter.</li> </ul>
Soil treatments/ amendments may include:	<ul style="list-style-type: none"> <li>Gypsum, organic matter, artificial fertilizers or the planting of a temporary or permanent cover crop.</li> </ul>
Crop protection may include:	<p>Wind protection such as artificial structures, permanent shelter belts or temporary plantings of cereals, stakes; and mulch, including straw, plastic, cover crop or any vegetative material.</p>

Planting material may include:	<ul style="list-style-type: none"> <li>• Seeds, seedlings, runners, cuttings or bare rooted trees.</li> </ul>
Treatment of planting material before planting	<ul style="list-style-type: none"> <li>• Pre-plant treatments may include fungicide dips, fungicide dusts for seeds, root trimming, shoot trimming, crown gall dips and anti transpirants.</li> </ul>
Treatments to the care of young plants	<ul style="list-style-type: none"> <li>• Treatments may include pest and disease prevention and control, weed prevention and control, frost, fertilizers, and mulch.</li> </ul>
Maintaining planting material while waiting to be planted	<ul style="list-style-type: none"> <li>• Maintaining plants may include keeping seeds and tubers dry and cool, keeping plants and plantlets cool and moist to prevent dehydration.</li> </ul>
Applying water to plants	<ul style="list-style-type: none"> <li>• Water may be applied using irrigation systems, which may include drips; overheads, central pivot, micro irrigation, under tree, and flood.</li> </ul>
Ways of training plants	<ul style="list-style-type: none"> <li>• Training may involve thinning, trimming, staking or trellising.</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• interpret a site map,</li> <li>• clear the site of old plantings,</li> <li>• prepare the soil and site for plantings,</li> <li>• Prepare the plants, plant the crop and maintain the new crop.</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge and understanding of:</p> <ul style="list-style-type: none"> <li>• Principles of sustainable horticultural practices</li> <li>• Importance of field hygiene and quality control in regard to crop establishment</li> <li>• Principles and operations of a range of irrigation systems use for field crops</li> <li>• Nutritional, water and other requirements of the crop</li> <li>• The importance of correct timing and procedures for crop planting</li> <li>• Range of pre-planting soil treatments and their importance</li> <li>• Methods of waste disposal causing minimal impact on the environment.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Participate in teams and contribute to team objectives</li> <li>• Communicate ideas and information relating to preparation, planting and crop care, and problems encountered with other members of the work team and the supervisor.</li> <li>• Read and interpret a range of workplace information</li> <li>• Calculate spacing and planting patterns, measure quantities of treatment</li> <li>• Calibrate spray equipment and determining quantities and application rates for treatment.</li> <li>• Operate machinery to manufacturers specifications and enterprise procedures</li> </ul>

	<ul style="list-style-type: none"> <li>• Safely apply appropriate agricultural chemicals</li> <li>• Collect, analyze and organize information and Enterprise work procedures, such as a daily planting plan, mulching, fertilizing and water requirements of crops,</li> <li>• Plan and organize activities materials, tools, equipment and work activities for crop establishment routines</li> <li>• Solve problems relating to site preparation, crop planting, treatments, watering, machinery and equipment, workplace safety,</li> <li>• Use technology in the preparation, use and maintenance of horticultural equipment and machinery used for spreading of fertilizer or other crop treatments.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor’s panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting.</p>

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Assist Basic Integrated Pest Management (IPM) for Irrigated Crops
Unit Code	AGR SSI2 13 0816
Unit Descriptor	This unit covers the process of assisting with controlling plant pests, diseases and disorders taking into consideration Integrated Pest Management (IPM) options Implementation is likely to be under close supervision and defines the standard required to: identify significant plant pests, diseases and disorders, and beneficial organisms; for the enterprise; apply a range of control or treatment options; recognize and control risks to environment (including spray drift and chemical spillage); clean and store equipment correctly; observe the treatment site and record plant treatments.

Element	Performance criteria
1. Understand principles of Integrated Pest Management (IPM)	1.1. The principles of IPM Described 1.2. The methods of pest management identified and described 1.3. The role of IPM in modern agriculture discussed. 1.4. IPM in different crop ecosystems explained
2. Assess pests and disease infestation	2.1. Scope and size of the infestation are assessed. 2.2. Plants <b>pests, diseases and disorders</b> and beneficial organisms are identified and reported or recorded in field notes.
3. Plan the implementation of control measures	3.1. Control measures suitable for the infestation are selected from IPM strategy. 3.2. <b>Tools, equipment</b> and machinery are selected for each work activity according to enterprise work procedures. 3.3. <b>Occupational Health and Safety (OHS)</b> hazards are identified, risks assessed and risk controls are implemented. 3.4. Personal Protective Equipment (PPE) is selected, used and maintained according to procedures. 3.5. Control measures selected need to be in full consideration of OHS and environmental implications.
4. Implement control measures	4.1. Enterprise work team, contractors and IPM product suppliers are coordinated in a sequential, timely and effective manner in consultation with the supervisor. 4.2. Control measures are implemented according to the IPM standards or industry Code of Practice. 4.3. A clean and safe work area is maintained throughout and on completion of each activity. 4.4. Records are maintained as required by enterprise

	guidelines.
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Variable	Range
Pests, diseases and disorders may include:	The range of pests, diseases and disorders of plants managed or controlled by using a range of integrated measures of management and control.
Tools and equipments	Mechanized and manually operated spray applicators and cultivators, tractors, trailed equipment, insect traps, soil, fertilizer and plant tissue test kits and sampling equipment, hat, boots, overalls, gloves, goggles, respirator or face mask, and hearing protection.
Occupational Health & Safety (OHS)	Identifying hazards, assessing risks and implementing controls, cleaning, maintaining and storing tools, equipment and machinery, appropriate use, maintenance and storage of PPE including sun protection, safe operation of tools, equipment and machinery, safe handling, use and storage of chemicals, organically based materials and hazardous substances, correct manual handling, basic first aid, personal hygiene, and reporting problems to supervisors and safety procedures for the protection of others.
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• Sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>

Evidence Guide	
Critical Aspects of competence	<p>The evidence required to:</p> <ul style="list-style-type: none"> <li>• Identify a range of pests, diseases and disorders, and</li> <li>• Beneficial organisms</li> <li>• Assess damage or threat to plants</li> <li>• Prepare and calibrate equipment</li> <li>• Apply a range of pest and disease control methods and keep records</li> <li>• Monitor the effectiveness of controls.</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Describe the principles of IPM</li> <li>• Describe the methods of pest management</li> <li>• Explain the role of IPM in modern agriculture.</li> <li>• Explain IPM in different crop ecosystems</li> <li>• Explain cultural practices in IPM</li> <li>• Explain principles of various cultural practices help in reducing pest incidence</li> <li>• Pests and disease recognition</li> <li>• Chemical, biological and cultural control methods and treatments available to the enterprise within the parameters of an IPM program</li> </ul>

	<ul style="list-style-type: none"> <li>• Range and use of tools, equipment and machinery available to the enterprise for implementing the control measures</li> <li>• Choice of plant pest and disease methods with site limitations, environmental implications or environmental objectives for the site</li> <li>• Occupational health and safety responsibilities for employees and employers</li> <li>• Correct use and maintenance of personal protective equipment.</li> <li>• OHS and environmental legislative requirements including hazardous substances regulations.</li> </ul>
Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>• Recognize a range of pests, diseases and beneficial organisms within a particular enterprise</li> <li>• Communicate with work team members, supervisors, contractors and consultants</li> <li>• Understand IPM symbols and information</li> <li>• Apply test results, and calculate the quantities and application rates of control materials</li> <li>• Coordinate work groups, contractors and own activities to sequentially and effectively complete activities in a timely and cost effective manner</li> <li>• Use interpersonal skills to work with and relate to people from a range of cultural, social and religious backgrounds and with a range of physical and mental abilities.</li> </ul>
Resource Implication	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• Specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• Questioning or interview on underpinning knowledge</li> <li>• Project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<p>Competency requires the application of work practices under work conditions. Selection and use of resources for some worksites may differ due to the regional or enterprise</p>



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<b>Occupational Standard: Small Scale Irrigation Development Level II</b>	
<b>Unit Title</b>	<b>Assist in Identifying and Selection of Irrigation Methods</b>
<b>Unit Code</b>	<b><u>AGR SSI2 14 0816</u></b>
<b>Unit Descriptor</b>	This competency standard covers the process of awareness creation, gathering of relevant information, reading contour map and identifying proper irrigation method. It requires the ability to collect and analyze information, identify selection requirements, compare costing, and preparing document outcomes under close supervision. Selecting irrigation method requires knowledge of soil, communication, irrigation methods, their advantages & disadvantages, applicability and cost, developments in related technology, basic knowledge of indigenous practices and economic analysis, environmental issues, and environmental protection agency regulations.

<b>Element</b>	<b>Performance criteria</b>
1. Create awareness	<p>1.1. <b>Information</b> on <b>indigenous practice</b> irrigation methods is gathered based on standard survey technique.</p> <p>1.2. Chosen method is compared with indigenous method in light of productivity.</p> <p>1.3. Discussion is made with target group in a participatory approach.</p>
2. Gather relevant information	<p>2.1. Data on soil type is collected &amp; collated using standard guide lines.</p> <p>2.2. Crop type is identified based on land use capability of the area.</p> <p>2.3. Water source potential is identified in agreement with water resource utilization policy.</p> <p>2.4. Land gradient of the command area is determined using contour map.</p>

<b>Variable</b>	<b>Range</b>
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>
Indigenous practices	<ul style="list-style-type: none"> <li>• Includes local or traditional activities.</li> </ul>
Occupational Health & Safety	Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust.
Tools and equipments	Tape meter, line level, chaining pins, ranging pole, staff, clinometers, GPS, compass, Auger, core sampler, spatula,

	oven, pressure apparatus, sensitive balance, sieve, soil grinder, hydro meter, shaker and measuring cylinder, thermometer, stop watch, flasks..
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<b>Evidence Guide</b>	
Critical Aspects of competence	<p>A candidate must demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• Describe irrigation methods, their advantages and disadvantages, applicability</li> <li>• Select appropriate irrigation methods</li> <li>• Undertake community awareness creation activities</li> <li>• Identify soil type, crop type, water source potential</li> <li>• Read topographic map</li> </ul>
Underpinning Knowledge and Attitudes	<p>knowledge of :</p> <ul style="list-style-type: none"> <li>• Basic knowledge of indigenous practices</li> <li>• Communication</li> <li>• Irrigation methods, their advantages &amp; disadvantages, applicability and cost</li> <li>• Developments in related technology</li> <li>• Environmental issues.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Select appropriate irrigation methods</li> <li>• Determine capital and operating expense budgets for the system designed</li> <li>• Undertake economic analysis at farmers level</li> <li>• Read topographic map</li> </ul>
Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Assist Irrigation Construction Work
Unit Code	<a href="#">AGR SSI2 15 0816</a>
Unit Descriptor	This unit covers assisting irrigation construction work and defines the standard required to identify operational requirements from design specification ; develop strategies and plan procedures for installation and construction; develop a project plan with tasks, responsibilities, timelines and costs

Element	Performance Criteria
1. Understand design drawing and specification.	<p>1.1 Copy of irrigation design drawing and specification is obtained.</p> <p>1.2 Specification is reviewed for any unusual aspects of construction and use of materials.</p> <p>1.3 Availability of skilled and semi-skilled man power is ascertained and selected to suit job requirements.</p> <p>1.4 Availability of materials is checked with suppliers.</p> <p>1.5 Site access limitations are assessed.</p> <p>1.6 Relevant authorities controlling construction work are advised of commencement date for project as required.</p>
2. Develop methods for implementing the construction operations	<p>2.1. Procedures are established for controlling and recording site deliveries.</p> <p>2.2. Procedures are established for recording the construction progress.</p> <p>2.3. Quality control method is followed</p> <p>2.4. Occupational Health and Safety (OHS) procedures are established, including hazard/risk management.</p> <p>2.5. Procedures are established for dealing with environmental issues associated with <b>irrigation construction</b> work.</p>
3. Prepare project schedule for irrigation installation and construction	<p>3.1. Construction operations are prepared in sequence.</p> <p>3.2. Operations are entered into a manually prepared schedule or computer based software package.</p> <p>3.3. Timeframe is adjusted to take account of anticipated delays.</p>
4. Determine all the required resources for project	<p>4.1. Temporary services and site is determined as required.</p> <p>4.2. Input requirements and dates are selected and accessed.</p> <p>4.3. On site labor requirements are determined.</p>
5. Prepare completion and dilapidation report	<p>5.1. Records are made of the condition of completed and dilapidated structures.</p>

	5.2. Copies of reports are submitted to supervisor.
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Variable	Range
Irrigation construction related to:	work both gravity fed and pressurized irrigation systems.
Performance data recorded	may include: <ul style="list-style-type: none"> <li>• Daily progress</li> <li>• Construction materials</li> <li>• Man power deployed</li> <li>• Machine and equipment</li> <li>• Data may be recorded on standard formats, graphs and charts, on paper and/or electronically.</li> </ul>
OHS requirements	may include: <ul style="list-style-type: none"> <li>• systems and procedures for outdoor work including: protection from solar radiation,</li> <li>• dust and noise,</li> <li>• the operation of machinery and equipment,</li> <li>• selection and use of relevant personal protective clothing and equipment,</li> <li>• Protection against chemical residues including that in/on foliage, water, soil and other items.</li> </ul>

Evidence Guide	
Critical Aspects of Competence	The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy holistically all of the requirements of the performance criteria and required skills and knowledge and include achievement of the following: <ul style="list-style-type: none"> <li>• identify operational requirements from working drawing and specification</li> <li>• develop strategies and plan procedures for installation and construction</li> <li>• develop a project plan with tasks, responsibilities, timelines</li> </ul>
Underpinning Knowledge and Attitudes	Knowledge include : <ul style="list-style-type: none"> <li>• installation and construction processes for on-site irrigation systems</li> <li>• logical construction sequence for the system</li> <li>• analysis of the required project resources</li> <li>• environmental impacts of irrigation construction</li> <li>• relevant enterprise OHS and environmental procedures</li> </ul>
Underpinning Skills	include the ability to: <ul style="list-style-type: none"> <li>• analyze construction conditions</li> <li>• develop strategies</li> <li>• schedule projects</li> <li>• determine resources</li> <li>• identify adverse environmental impacts of irrigation activities and appropriate remedial/preventative action</li> <li>• incorporate legislative and enterprise OHS and environmental procedures into planning</li> </ul>

	<ul style="list-style-type: none"> <li>• use drawing reading skills, interpret and follow construction procedures, develop sequenced written instructions, record accurately and legibly information collected and select and apply procedures to a range of tasks</li> <li>• use oral communication skills/language competence to fulfill the job role as specified by the organization including questioning, active listening, asking for clarification, negotiating solutions and responding to a range of views</li> <li>• use numeracy skills to estimate, calculate and record routine and more complex workplace measures and data</li> <li>• Use interpersonal skills to work with others and relate to people from a range of cultural, social and religious backgrounds and with a range of physical and mental abilities.</li> </ul>
Resources Implication	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> <li>• Access to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</li> <li>• documentation and resources normally used in the workplace</li> </ul>
Methods of Assessment	<p>Competence may be accessed through:</p> <ul style="list-style-type: none"> <li>• Interview/Written Test</li> <li>• Observation/Demonstration (Simulation)</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting. This competence standard could be assessed on its own or in combination with other competencies relevant to the job function</p>

<b>Occupational Standard: Small Scale Irrigation Development Level II</b>	
<b>Unit Title</b>	<b>Assist Construction of Water Harvesting Structures</b>
<b>Unit Code</b>	<b><a href="#">AGR SSI2 16 0816</a></b>
<b>Unit Descriptor</b>	This unit competence covers the process of assisting construction of water harvesting structures under routine supervision. It requires the ability to select suitable site, apply hydrological principles in relation with water harvesting technology, construction of different structures, identify the soil types in catchments and cultivation area, select crop types, determine water holding/storage capacity of the structures, proper handling of water harvesting materials, undertake water harvesting activities, store and stockpile materials, and clean up on completion of work. Work requires knowledge of safe work practices.

<b>Element</b>	<b>Performance criteria</b>
1. Collect and organize all required data	1.1. Data is collected from metrological station. 1.2 .Rain fall data is used to estimated runoff based on site requirements.
2. Identify soil requirement in catchments & cultivated areas	2.1. Soil sampling is done based on soil sampling techniques. 2.2 Sampled soil is organized and analyzed based on the required information. 2.3 Soil is selected for catchments and cultivation area based on basic requirements.
3. Select crop type for water harvesting	3.1. Crop species is identified based on the water requirements. 3.2 Identified crops are practiced according to the area condition.
4. Assist design of water storage capacities	4.1. Capacity of structures are designed based on the water requirements/demand. 4.2. Water is stored based on the demand.
5. Assist with design and construction of micro catchments techniques	5.1. Different <b>micro catchments types</b> are identified based on required information. 5.2 .Identified micro catchments are designed based on necessary information. 5.3 .Designed structures are constructed based on technical procedures.
6. Assist with design and construction of macro catchments techniques	6.1. Different <b>macro catchments types</b> are identified based on required information. 6.2 Identified macro catchments are designed based on necessary information. 6.3 Designed structures are constructed based on technical procedures.

7. Assist with design and construction flood water harvesting techniques	<p>7.1. Different <b>flood water harvesting types</b> are identified based on required information.</p> <p>7.2. Identified flood water harvesting are designed based on necessary information.</p> <p>7.3. Designed structures are constructed based on technical procedures.</p>
8. Identify construction material	<p>8.1. <b>Construction materials</b> are identified based on structure to be constructed.</p> <p>8.2. Materials are used for construction in accordance with area and types of structure.</p>
9. Assist construction of roof top water harvesting structures	<p>9.1. Site is selected based on technical guidelines.</p> <p>9.2. Required materials are prepared based on requirement.</p> <p>9.3. Structure is constructed based on technical procedures.</p> <p>9.4. Water is harvested and supplied based on demand.</p>
10. Assist construction of ground surface catchments, diversion canals & sediment ponds	<p>10.1. Surface catchments, diversion canals and sediment ponds are identified based on work place suitability.</p> <p>10.2. Materials are arranged based on the requirements.</p> <p>10.3. Surface catchments, diversion canals and sediment ponds are constructed according to technical procedures.</p>
11. Assist construction of ground surface water storage structure	<p>11.1. Structures are designed according to the catchments area.</p> <p>11.2. Materials are collected based on the requirements.</p> <p>11.3. Structures are constructed according to technical procedures.</p>

Variable	Range
Micro catchments types	water harvesting structures like negarims, small semi-circular bund, water collection trench, conservation bench terrace, eyebrow basin, contour ridges, etc.
Macro catchments types	water harvesting structures which includes: large semi-circular bund, contour stone bund, trapezoidal bund.
Flood water harvesting types	structures which includes: flood spreading bund, permeable rock dam, and sand dam.
Construction materials	Includes stones, gravel, cement, bricks, chicken mesh wire, bamboo/reeds, corrugated iron sheet, pipes & fittings, etc.
Occupational Health & Safety	<ul style="list-style-type: none"> <li>• OHS hazard identification, risk assessment and control</li> <li>• implement procedures for dealing with hazardous events</li> <li>• Hazards may include disturbance or interruption of services, solar radiation, dust, soil- and water-borne micro-organisms, sharp hand tools and equipment, manual handling, falling objects, and uneven Surfaces.</li> </ul>
Roof top water harvesting structures	Storage structures like: ferro-cement tank , brick tank ,stone masonry tank, gutter , downpipe etc.

Ground surface water storage structure	Storage structures used to store ground surface runoff water such as, hemispherical storage tank, dome cap tank, farm pond, etc.
Tools and equipments	Line level/A-frame, String, Graduated staff, Clinometers, Altimeter, Measuring tape, Digging instruments, watering can, Double-ring infiltrometer, Soil sampler(Auger), Stop-watch, Ranging pole, Strings, Pegs, Water tank /pump, Hooker, Soil texture chart, Compass, GPS, Aerial photographs, Top maps, Automatic level and Gabion Wire box
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines &amp; Recorded documents/logo/history</li> </ul>

### Evidence Guide

Critical Aspects of competence	<p>Assessment requires evidence that the candidate to:</p> <ul style="list-style-type: none"> <li>• collect metrological data</li> <li>• sample soil</li> <li>• select soil for catchments and cultivation area</li> <li>• practice identified crops</li> <li>• determine net socio economic benefits of water</li> <li>• identify and describe different micro catchments water harvesting types</li> <li>• identify and describe different macro catchments water harvesting types</li> <li>• identify different flood water harvesting types</li> <li>• use materials for construction</li> <li>• select site</li> <li>• construct surface catchments, diversion canals and sediment ponds</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Water harvesting technology principles</li> <li>• Principles of hydrology</li> <li>• Site selection techniques</li> <li>• Identify crop type and crop water requirement</li> <li>• Identify and describe design and construction methods</li> <li>• identify and describe components of water harvesting</li> <li>• identify and describe different micro catchments, macro catchment , roof top and flood water harvesting structures</li> <li>• harvested and supplied water</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Identify proper site for water harvesting</li> <li>• Delineate catchment area</li> <li>• Identify catchments areas</li> <li>• Identify different water harvesting techniques</li> <li>• Identify roof top and ground surface water harvesting storage structures</li> </ul>



	<ul style="list-style-type: none"> <li>• Undertake water harvesting activities on site by using appropriate tools and equipment.</li> <li>• Know the health and safety risks and safe systems of work associated with rainwater harvesting</li> <li>• Know the types and layouts of rainwater harvesting system</li> <li>• Know the purpose of components used within rainwater harvesting</li> <li>• Know the fundamental techniques used to select, size and position components for rainwater harvesting</li> <li>• Know the information requirements to enable rainwater harvesting system component selection and sizing</li> </ul>
Resource Implication	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

<b>Occupational Standard: Small Scale Irrigation Development Level II</b>	
<b>Unit Title</b>	<b>Read Technical Drawing</b>
<b>Unit Code</b>	<b><a href="#">AGR SSI2 17 0816</a></b>
<b>Unit Descriptor</b>	<p>This unit of competency is vital for the development, and communication of ideas related to technology, industry, and scientific development. It also used to develop the ability to express ideas and describe objects by means of drawing, to interoperate norms and symbols used in technical drawing and in daily life, to develop skills in lettering and free hand sketching. Technical drawing is an important form of communication.</p> <p>It requires understanding of drafting concepts and the use of the drafting tools, Use and understanding of geometry related to technical drawing and actual production objects, Understanding and practice of orthographic projection drawing (multi-view) as related to practical applications, Use of proper dimensioning and sectioning practices, Understanding and practice of axonometric projection drawings as related to practical applications.</p>

<b>Elements</b>	<b>Performance criteria</b>
1. Identify and select drawing instruments	1.1 Tables and straight edges are selected appropriately. 1.2 Drawing Table and measuring tools are made available to fulfill the requirements. 1.3 Manual and Automated drawing tools (AutoCAD.)
2. Sketching and lettering	2.1 Lines and angles are sketched using standard technique. 2.2 Circular/elliptical objects are sketched using standard technique. 2.3 Measuring devices are graduated. 2.4 Letters are sketched using standard technique.
3. Understand Geometry of technical drawing	3.1 Points and lines are roughly sketched. 3.2 Angles, quadrilaterals and polygons are sketched using standard technique. 3.3 Circles and arcs are sketched using standard technique. 3.4 Bisecting and dividing are sketched using standard technique. 3.5 Perpendiculars and tangents are sketched using standard technique.
4. Overview of Multi view drawing and Sectioning	4.1 Line types are identified appropriately. 4.2 Orientation of views are identified. 4.3 Sketch the Auxiliary views using standard technique. 4.4 Multi view drawing are dimensioned.

	<p>4.5 Full sections are sketched using standard technique.</p> <p>4.6 Half sections sketched using standard technique.</p> <p>4.7 Revolved sections sketched using standard technique.</p>
5. Determine Axonometric projection drawing	<p>5.1 Isometric projections are assessed.</p> <p>5.2 Di metric projection are assessed.</p> <p>5.3 Trimetric projection are assessed.</p>

Variable	Range
Occupational Health & safety	<ul style="list-style-type: none"> <li>Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust, drowning.</li> <li>Glove, safety wear, helmet, eye glass,</li> </ul>
Tools and equipments	<ul style="list-style-type: none"> <li>Ruler, pencil, fixer, protractor, set square, drawing table, raiser, drawing paper, AutoCAD</li> </ul>
Types and Sources of Information	<ul style="list-style-type: none"> <li>Organizational rules, regulation and guidelines</li> <li>Internet, related books and related materials</li> <li>Technical manuals</li> <li>sharing best practice</li> <li>Virtual library</li> <li>Workplace guidelines</li> <li>Recorded documents/logo/history</li> </ul>

Evidence Guide	
Critical Aspects of competence	<ul style="list-style-type: none"> <li>Understand the multi-view and sectioning</li> <li>Geometry of technical drawing</li> <li>Axonometric projection drawing</li> </ul>
Required Knowledge and Attitudes	<p>Knowledge include:</p> <ul style="list-style-type: none"> <li>drafting concepts and the use of the drafting tools.</li> <li>Use and understanding of geometry related to technical drawing and actual production objects.</li> <li>practice of orthographic projection drawing (multi-view) as related to practical applications.</li> <li>Use of proper dimensioning and sectioning practices.</li> <li>practice of axonometric projection drawings as related to practical applications.</li> <li>careers related to technical drawing.</li> </ul>
Required skill	<ul style="list-style-type: none"> <li>numeracy skills to interpret and apply calculations and measurements in technical drawing</li> <li>problem-solving skills to select technical drawing techniques that best suit the purpose and make adjustments as required</li> <li>Skills to complete work within agreed timeframes.</li> </ul>
Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> </ul>

	<ul style="list-style-type: none"> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be accessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> <li>• Observation and question</li> <li>• Theoretical exam</li> <li>• Written exam/test</li> <li>• Portfolio Assessment (E.g. Certificate from training providers)</li> </ul>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

<b>Occupational Standard: Small Scale Irrigation Development Level II</b>	
<b>Unit Title</b>	<b>Assist Estimation of Crop Water Requirements</b>
<b>Unit Code</b>	<b><a href="#">AGR SSI2 18 0816</a></b>
<b>Unit Descriptor</b>	The module aims to provide the learners with the knowledge, skills and right attitudes in determining crop water requirements under close supervision. It requires the ability to collect & collate all required data, identifying type and characteristics of crop & compiling data.

<b>Element</b>	<b>Performance Criteria</b>
1. Collect & Collate all Required Data	1.1. Crop Water Requirements are understood. 1.2. Factors influencing Crop Water Requirement (CWR) are identified. 1.3. Data of climate, crop types are collected and organized. 1.4. Crop water requirement is estimated. 1.5. Proper use and maintenance of tools, materials and equipments are used.
2. Identify type and characteristics of crop	2.1. Economically and agro-ecologically beneficial crop is selected in accordance with preference of enterprise. 2.2. Crop characteristics, crop coefficient, growth stage, period and root depth at different growth stages are identified from official research publication.
3. Compile Data	3.1. Method for estimating crop water requirement is selected based on data preference.

<b>Variable</b>	<b>Range</b>
Occupational Health & Safety	Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust. Glove, safety wear, helmet, eye glass
Tools and equipments	may include Auger, core sampler, Computer and software, spatula, oven, pressure apparatus, sensitive balance, sieve, soil grinder, hydro meter, shaker and measuring cylinder, thermometer, stop watch, flasks.
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>

<b>Evidence Guide</b>	
<b>Critical Aspects of Competence</b>	A candidate must demonstrate the ability to: <ul style="list-style-type: none"> <li>• Collect climatic data</li> <li>• Identify soil type</li> </ul>

	<ul style="list-style-type: none"> <li>• Select crop type</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Soil, crop and climatic data analysis</li> <li>• Soil-plant-water relationship</li> <li>• Computer software models related to irrigation water requirement</li> <li>• Developments in related technology</li> <li>• Environmental issues</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Collect climatic data</li> <li>• Identify soil type</li> <li>• Select crop type</li> </ul>
Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Assist Irrigation Scheduling
Unit Code	<a href="#">AGR SSI2 19 0816</a>
Unit Descriptor	This unit covers the process of determining the timing and amount of each irrigation to meet crop or plant needs and environmental requirements, and defines the standard required to: use and maintain on-field equipment that monitors the plant environment; incorporate data from monitoring sources into scheduling systems; monitor crop/plant water use; assess efficacy of irrigation; record irrigation and scheduling parameters; plan for extremes of weather.

Element	Performance Criteria
1. Monitor crop/plant water use	<p>1.1. Water use is measured or estimated from one or more systems.</p> <p>1.2. Monitor soil water status in the root zone.</p> <p>1.3. The <b><i>crop/plant water requirement</i></b> is defined for each unit.</p>
2. Apply a measured amount of water	<p>2.1. A pre-determined deficit is predicted using a scheduling system(s).</p> <p>2.2. Irrigation is applied partly or fully to replace the deficit.</p> <p>2.3. Where appropriate, water quantities are increased to ensure dilution and transport of toxic solutes below the root zone.</p>
3. Assess efficacy of irrigation and repeat cycles of irrigation	<p>3.1. Effectiveness of irrigation application with in-field equipment is measured.</p> <p>3.2. The estimated soil moisture level in scheduling system is adjusted to match that measured.</p> <p>3.3. Where necessary, the scheduling system(s) is recalibrated.</p> <p>3.4. Cycles of irrigation are repeated until schedule is correctly established.</p>
4. Record irrigation and scheduling parameters	<p>4.1. Each irrigation and significant rainfall event, plus other appropriate parameters used in scheduling system, are recorded.</p> <p>4.3. System performance data is recorded.</p> <p>4.4. Plant or crop environment data is recorded</p> <p>4.5. Water orders and water usage is recorded.</p>
5. Plan for extremes of weather	<p>5.1. Extreme deficits and saturation following heavy rainfall plans are modified.</p> <p>5.2. Shift areas, and where applicable, application rates, are altered to suit appropriate irrigation schedules.</p>

	5.3. Strategies involving prioritizing of plants/crops and intermittent irrigation are implemented at times of extreme heat.
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Variable	Range
Crop/plant water requirement	may include: <ul style="list-style-type: none"> <li>Growth phase, evapo-transpiration, variety, rootstock, plant vigor and stress.</li> </ul>
Measurements to determine water quality	may include: <ul style="list-style-type: none"> <li>Salinity (ground water and surface water), pH level, and nutrient concentration.</li> </ul>
Irrigation systems may range from:	<ul style="list-style-type: none"> <li>Manual operation and monitoring to fully automated with computer control and monitoring.</li> </ul>
External factors affecting irrigation requirements	<p>These may be :</p> <ul style="list-style-type: none"> <li>pests and vermin (tortoises, ants, spiders, snails, rabbits, hares, foxes, wasps, rose weevil, earwigs, snakes, pigs, rats, mice, dogs, parrots),</li> <li>organic (leaves, slime, weeds, algae, sticks, crop residue), weather,</li> <li>channel regulators (if applicable),</li> <li>fire,</li> <li>mechanical damage (if applicable),</li> <li>power failures,</li> <li>storm runoff, or</li> <li>System breakage.</li> </ul>
Chemical characteristics of the soil	<p>Chemical characteristics may include :</p> <ul style="list-style-type: none"> <li>P<sup>H</sup>, salinity and carbonate content.</li> </ul>
Data collection	may include: <ul style="list-style-type: none"> <li>direct methods such as physical appearance/texture and rain gauge,</li> <li>Indirect methods such as tensiometers, neutron probes, laboratory tests, weather reports and forecasts.</li> </ul>
Performance data recorded	may include: <ul style="list-style-type: none"> <li>pressures</li> <li>low rates</li> <li>distribution uniformity,</li> <li>depth of irrigation</li> <li>Data may be recorded on graphs and charts, on paper and/or electronically.</li> </ul>
OHS requirements	may include <ul style="list-style-type: none"> <li>Systems and procedures for outdoor work including: protection from solar radiation,</li> <li>dust and noise,</li> <li>the operation of machinery and equipment,</li> <li>selection and use of relevant personal protective clothing and equipment,</li> <li>Protection against chemical residues including that in/on foliage, water, soil and other items.</li> </ul>



<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy holistically all of the requirements of the performance criteria and required skills and knowledge and include achievement of the following:</p> <ul style="list-style-type: none"> <li>• use and maintain in-field equipment that monitors the plant environment</li> <li>• incorporate data from monitoring sources into scheduling systems</li> <li>• monitor crop/plant water use</li> <li>• assess efficacy of irrigation</li> <li>• record irrigation and scheduling parameters</li> <li>• plan for extremes of weather</li> </ul>
Underpinning Knowledge and Attitudes	<p>Knowledge include :</p> <ul style="list-style-type: none"> <li>• Inter-relationship between plant, soil and the aerial environments in the determination of CWR.</li> <li>• plant/crop response to moisture stress at different stages of growth</li> <li>• possible adverse impacts on the crop and environment from inefficient scheduling or unpredictable weather effects</li> <li>• recognition of moisture stress effects (sometimes desired) on plants</li> <li>• physical soil characteristics such as infiltration rate, water holding capacity and wetted volume in the root zone</li> <li>• in-field irrigation reticulation performance and its capacity limits</li> <li>• water quality monitoring methods and acceptable quality limits</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• use and maintain in-field equipment that monitors the plant environment</li> <li>• incorporate data from monitoring sources (such as in-field equipment and remote sources) into scheduling systems that compute irrigation requirement</li> <li>• monitor crop/plant water use</li> <li>• apply a measured amount of water</li> <li>• assess efficacy of irrigation and repeat cycles of irrigation</li> <li>• record irrigation and scheduling parameters</li> <li>• plan for extremes of weather</li> <li>• use oral communication skills/language competence to fulfill the job role as specified by the organization including questioning, active listening, asking for clarification, negotiating solutions and responding to a range of views</li> <li>• use numeracy skills to estimate, calculate and record routine and more complex workplace measures and data</li> <li>• Use interpersonal skills to work with others and relate to people from a range of cultural, social and religious backgrounds and with a range of physical and mental abilities.</li> </ul>

Resources Implication	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> <li>• Access to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</li> <li>• documentation and resources normally used in the workplace</li> </ul>
Methods of Assessment	<p>Competence may be accessed through:</p> <ul style="list-style-type: none"> <li>• Interview/Written Test</li> <li>• Observation/Demonstration (Simulation)</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting. This competence standard could be assessed on its own or in combination with other competencies relevant to the job function</p>

<b>Occupational Standard: Small Scale Irrigation Development Level II</b>	
<b>Unit Title</b>	<b>Understand and Assess Groundwater</b>
<b>Unit Code</b>	<a href="#"><u>AGR SSI2 20 0816</u></a>
<b>Unit Descriptor</b>	This unit of competence covers the understanding and assessment of groundwater. It requires the ability to identify different ground water sources, wells (shallow and deep), spring, stream; It requires the knowledge hydrologic cycle and ground water hydrology principles, water harvesting principles, catchments area identification. Environmental issues, guidelines and legislations.

<b>Element</b>	<b>Performance criteria</b>
1. Understand groundwater hydrology	1.1. Different components of hydrologic cycle are identified and recognized 1.2. Occurrence and source of groundwater identified 1.3. Different water bearing strata (aquifers) are identified
2. Assessment of groundwater	2.1. <b>Groundwater information</b> are gathered and applied as required. 2.2. Groundwater peiziometric data are collected.

<b>Variable</b>	<b>Range</b>
Groundwater information	May include but not limited to: <ul style="list-style-type: none"> <li>• hydrological information</li> <li>• previous monitoring studies</li> <li>• land use studies</li> <li>• environment management studies</li> </ul>
Materials	May include but not limited to: <ul style="list-style-type: none"> <li>• Historical groundwater information</li> <li>• Organisational procedures</li> <li>• requirements Organisational procedures</li> </ul>
Tools and equipment	May include but not limited to: <ul style="list-style-type: none"> <li>• Office equipments</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	Demonstrates skills and knowledge in: <ul style="list-style-type: none"> <li>• identifying groundwater availability</li> <li>• identifying occurrence and sources of ground water</li> <li>• identify and describe components of hydrologic cycle</li> <li>• Record and report work activities.</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• relevant legislation, including environmental legislation</li> <li>• identifying occurrence and sources of ground water</li> <li>• identify and describe components of hydrologic cycle</li> <li>• OHS procedures</li> <li>• legislative and organizational procedures</li> </ul>

Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> <li>• measuring activities</li> <li>• measure water table levels</li> <li>• produce reports</li> <li>• undertake source inspections</li> <li>• follow standard operating procedures</li> <li>• use safety equipment and personal protective equipment</li> <li>• use literacy skills in regard to verbal and written communication in the workplace</li> <li>• identify potential sources of contamination.</li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test / Oral Questioning</li> <li>• Observation / Demonstration</li> </ul>
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Participate in Workplace Communication
Unit Code	<a href="#">AGR SSI2 21 0816</a>
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

Elements	Performance Criteria
1. Obtain and convey workplace information	<p>1.1 Specific and relevant information is accessed from <b>appropriate sources</b>.</p> <p>1.2 Effective questioning, active listening and speaking skills are used to gather and convey information.</p> <p>1.3 Appropriate <b>medium</b> is used to transfer information and ideas.</p> <p>1.4 Appropriate non- verbal communication is used.</p> <p>1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed.</p> <p>1.6 Defined workplace procedures for the location and <b>storage</b> of information are used.</p> <p>1.7 Personal interaction is carried out clearly and concisely.</p>
2. Participate in workplace meetings and discussions	<p>2.1 Team meetings are attended on time.</p> <p>2.2 Own opinions are clearly expressed and those of others are listened to without interruption.</p> <p>2.3 Meeting inputs are made consistent with the meeting purpose and <b>protocols</b> established.</p> <p>2.4 <b>Workplace interactions</b> are conducted in a courteous manner.</p> <p>2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded.</p> <p>2.6 Meetings outcomes are interpreted and implemented.</p>
3. Complete relevant work related documents	<p>3.1 Range of <b>forms</b> relating to conditions of employment is completed accurately and legibly.</p> <p>3.2 Workplace data is recorded on standard workplace forms and documents.</p> <p>3.3 Basic mathematical processes are used for routine calculations.</p> <p>3.4 Errors in recording information on forms/ documents are identified and properly acted upon.</p> <p>3.5 Reporting requirements to supervisor are completed according to organizational guidelines.</p>

<b>Variable</b>	<b>Range</b>
Appropriate sources	May include but not limited to: <ul style="list-style-type: none"> <li>• Team members</li> <li>• Suppliers</li> <li>• Trade personnel</li> <li>• Local government and Industry bodies</li> </ul>
Medium	May include but not limited to: <ul style="list-style-type: none"> <li>• Memorandum</li> <li>• Circular</li> <li>• Notice</li> <li>• Information discussion</li> <li>• Follow-up or verbal instructions &amp; Face to face communication</li> </ul>
Storage	May include manual filing and computer-based filing systems
Protocols	May include but not limited to: <ul style="list-style-type: none"> <li>• Observing meeting</li> <li>• Compliance with meeting decisions</li> <li>• Obeying meeting instructions</li> </ul>
Workplace interactions	May include but not limited to: <ul style="list-style-type: none"> <li>• Face to face</li> <li>• Telephone</li> <li>• Electronic and two way radio</li> <li>• Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams</li> </ul>
Forms	May include but not limited to: <ul style="list-style-type: none"> <li>• Personnel forms, telephone message forms, safety reports</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competency	Demonstrates skills and knowledge to: <ul style="list-style-type: none"> <li>• Prepare written communication following standard format of the organization</li> <li>• Access information using communication equipment</li> <li>• Make use of relevant terms as an aid to transfer information effectively</li> <li>• Convey information effectively adopting the formal or informal communication</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: <ul style="list-style-type: none"> <li>• Effective communication</li> <li>• Different modes of communication</li> <li>• Written communication</li> <li>• Organizational policies</li> <li>• Communication procedures and systems</li> <li>• Technology relevant to the enterprise and the individual's work responsibilities</li> </ul>
Underpinning Skills	Demonstrate skills to: <ul style="list-style-type: none"> <li>• Follow simple spoken language</li> <li>• Perform routine workplace duties following simple written notices</li> </ul>

	<ul style="list-style-type: none"> <li>• Participate in workplace meetings and discussions</li> <li>• Complete work related documents</li> <li>• Estimate, calculate and record routine workplace measures</li> <li>• Do basic mathematical processes of addition, subtraction, division and multiplication</li> <li>• relate to people of social range in the workplace</li> <li>• Gather and provide information in response to workplace Requirements</li> </ul>
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Work in Team Environment
Unit Code	<a href="#">AGR SSI2 22 0816</a>
Unit Descriptor	This unit covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team.

Elements	Performance Criteria
1. Describe team role and scope	<p>1.1 The <b>role and objective of the team</b> are identified from available <b>sources of information</b>.</p> <p>1.2 Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources.</p>
2. Identify own role and responsibility within team	<p>2.1 Individual role and responsibilities within the team environment are identified.</p> <p>2.2 Roles and responsibility of other team members are identified and recognized.</p> <p>2.3 Reporting relationships within team and external to team are identified.</p>
3. Work as a team member	<p>3.1 Effective and appropriate forms of communications are used and interactions undertaken with team members who contribute to known team activities and objectives.</p> <p>3.2 Effective and appropriate contributions are made to complement team activities and objectives, based on individual skills and competencies and <b>workplace context</b>.</p> <p>3.3 Protocols are observed in reporting using standard operating procedures.</p> <p>3.4 Contribution is made to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members.</p>

Variable	Range
Role and objective of team	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Work activities in a team environment with enterprise or specific sector</li> <li>• Limited discretion, initiative and judgment maybe demonstrated on the job, either individually or in a team environment</li> </ul>
Sources of information	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Standard operating and/or other workplace procedures</li> <li>• Job procedures</li> <li>• Machine/equipment manufacturer's specifications and instructions</li> <li>• Organizational or external personnel</li> <li>• Client/supplier instructions</li> <li>• Quality standards</li> </ul>



	<ul style="list-style-type: none"> <li>• OHS and environmental standards</li> </ul>
Workplace context	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Work procedures and practices</li> <li>• Conditions of work environments</li> <li>• Legislation and industrial agreements</li> <li>• Standard work practice including the storage, safe handling and disposal of chemicals</li> <li>• Safety, environmental, housekeeping and quality guidelines</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>Demonstrates skills and knowledge to:</p> <ul style="list-style-type: none"> <li>• Operate in a team to complete workplace activity</li> <li>• Work effectively with others</li> <li>• Convey information in written or oral form</li> <li>• Select and use appropriate workplace language</li> <li>• Follow designated work plan for the job</li> <li>• Report outcomes</li> </ul>
Underpinning Knowledge and Attitude	<p>Demonstrate knowledge of:</p> <ul style="list-style-type: none"> <li>• Communication process</li> <li>• Team structure</li> <li>• Team roles</li> <li>• Group planning and decision making</li> </ul>
Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>• Communicate appropriately, consistent with the culture of the workplace</li> </ul>
Resource Implications	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>

Occupational Standard: Small Scale Irrigation Development Level II	
Unit Title	Develop Business Practice
Unit Code	<a href="#">AGR SSI2 23 0816</a>
Unit Descriptor	This unit covers knowledge, skills and attitude required to establish a business operation from a planned concept. It includes researching the feasibility of establishing a business operation, planning the setting up of the business, implementing the plan and reviewing operations once commenced, customer handling, developing and maintaining business relationships.

Elements	Performance Criteria
1. Identify business opportunities and business skills	<p>1.1 The concept of paradigm shift and means of divergent thinking are elaborated and strategies to look beyond the boundaries are discussed.</p> <p>1.2 <b>Unusual business opportunities</b> are identified.</p> <p>1.3 Feasibility on <b>business skills and personal attributes</b> is assessed and matched against those perceived as necessary for a particular business opportunity.</p> <p>1.4 New behavior on how problems can be the pivotal source of business opportunity is elaborated and experience taken.</p> <p>1.5 Assistance sought with feasibility study of <b>specialist and relevant parties</b> is discussed, as required.</p> <p>1.6 Impact of emerging or changing technology, including e-commerce, on business operations is evaluated.</p> <p>1.7 Practicability of business opportunity is assessed in line with perceived <b>business risks</b>, returns sought, personal preferences and resources available.</p> <p>1.8 Business plan is revised in accordance with the identified opportunities.</p>
2. Plan for the establishment of business operation	<p>2.1 Organizational structure and operations are determined and documented.</p> <p>2.2 Procedures are developed and documented to guide operations.</p> <p>2.3 Financial backing is secured for business operation.</p> <p>2.4 Business legal and regulatory requirements are identified and compiled.</p> <p>2.5 <b>Human and physical resources</b> required to commence business operation are determined.</p> <p>2.6 Recruitment and procurement strategies are developed.</p>
3. Implement Business Development Plan	<p>3.1 Physical and human resources are obtained to implement business operation.</p>

	<p>3.2 <b>Operational unit</b> is established to support and coordinate business operation.</p> <p>3.3 Simulations on the development plan are well discussed and understood.</p> <p>3.4 Implementation manual is discussed and understood.</p> <p>3.5 Marketing the business operation is undertaken.</p> <p>3.6 Monitoring process is developed and implemented for managing operation.</p> <p>3.7 <b>Legal documents</b> are carefully maintained and relevant records kept and updated to ensure validity and accessibility.</p> <p>3.8 Contractual procurement rights for goods and services including <b>contracts with relevant people</b> are negotiated and secured as required in accordance with the business plan.</p> <p>3.9 Options for leasing/ownership of business premises are identified and contractual arrangements completed in accordance with the business plan.</p>
<p>4. Review implementation process and take corrective measures</p>	<p>4.1 Review process is developed and implemented for implementation of business operation.</p> <p>4.2 Improvements in business operation and associated management process are identified.</p> <p>4.3 Identified improvements are implemented and monitored for effectiveness.</p>
<p>5. Establish contact with customers and clarify needs of customer</p>	<p>5.1 Persuasion strategies are developed and discussed.</p> <p>5.2 Welcoming customer environment is maintained and Customer is greeted warmly according to enterprise policies and procedures.</p> <p>5.3 Information is provided to satisfy customer needs.</p> <p>5.4 Information on customers and service history is gathered for analysis.</p> <p>5.5 Customer data is maintained to ensure database relevance and currency.</p> <p>5.6 Customer needs are accurately assessed against the products/services of the enterprise.</p> <p>5.7 Customer details are documented clearly and accurately in required format.</p> <p>5.8 Negotiations are conducted in a business-like and professional manner.</p> <p>5.9 Benefits for all parties are maximized in the <b>negotiation through use of established techniques</b> and in the context of establishing long term relationships.</p>

	<p>5.10 The results of negotiations are communicated to appropriate colleagues and stakeholders within appropriate timeframes.</p> <p>5.11 <b>Opportunities to maintain regular contact</b> with customers are identified and taken-up.</p>
6. Develop and Maintain Business Relationship	<p>6.1 Features and benefits of products/services provided by the enterprise are described/ recommended to meet customer needs.</p> <p>6.2 Alternative sources of information/advice are discussed with the customer.</p> <p>6.3 Information needed is pro-actively sought, reviewed and acted upon to maintain sound business relationships.</p> <p>6.4 Agreements are honored within the scope of individual responsibility.</p> <p>6.5 Adjustments to agreements are made in consultation with the customer and information shared with appropriate colleagues.</p> <p>6.6 Relationships are nurtured through regular contact and use of effective interpersonal and communication styles.</p>

Variable	Range
Unusual Business opportunities	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Public holidays</li> <li>• Ceremonies</li> <li>• Natural disaster</li> <li>• Campaigns</li> </ul>
Business opportunities	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Expected financial viability</li> <li>• Skills of operator</li> <li>• Amount and types of finance available</li> <li>• Returns expected or required by owners</li> <li>• Likely return on investment</li> <li>• finance required</li> <li>• Lifestyle issues</li> </ul>
Business skills and personal attributes	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Technical and/ or specialist skills</li> <li>• Managerial skills</li> <li>• Entrepreneurial skills</li> <li>• Taking calculated risk skills</li> <li>• Willingness to take calculated risks</li> <li>• Willingness to work under pressure</li> </ul>
Specialist and relevant parties	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Chamber of commerce</li> <li>• Financial planners and financial institution representatives, business planning specialists and marketing specialists</li> <li>• Accountants</li> </ul>

	<ul style="list-style-type: none"> <li>• Lawyers and providers of legal advice</li> <li>• Government agencies</li> <li>• Industry/trade associations</li> <li>• Online gateways</li> <li>• Business brokers/business consultants</li> </ul>
Business risks	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Occupational health and safety</li> <li>• Environmental risks</li> <li>• Relevant legislative requirements</li> <li>• Security of investment</li> <li>• Market competition</li> <li>• Security of premises/location</li> <li>• Supply and demand</li> <li>• Resources available</li> </ul>
Human and physical resources	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Software and hardware</li> <li>• Office premises and equipment</li> <li>• Communications equipment</li> <li>• Specialist services through outsourcing, contracting and consultancy</li> <li>• Staff</li> <li>• Vehicles</li> </ul>
Operational unit	<p>May include but not limited to different departments, sections, teams, divisions, etc. staffed with required personnel and equipped to service and support business</p>
Legal documents	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Partnership agreements, constitution documents, statutory books for companies (register of members, register of directors and minute books), certificate of Incorporation, franchise agreements and financial documentation, appropriate software for financial records</li> <li>• Occupational Health and Safety (OHS)</li> <li>• Recordkeeping including personnel, financial, taxation, and environmental</li> </ul>
Contracts with relevant people	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• business owners, suppliers, employees, agents, land owners, distributors, customers or any person with whom the business has, or seeks to have, a performance-based relationship</li> </ul>
Negotiation techniques	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Identification of goals, limits</li> <li>• Clarification of needs of all parties</li> <li>• Listening and questioning</li> <li>• Non-verbal communication techniques</li> <li>• Appropriate language and situation</li> <li>• Bargaining</li> <li>• Developing options</li> <li>• Appropriate cultural behavior</li> <li>• Confirming agreements</li> </ul>

Opportunities to maintain regular contact	to maintain regular contact with customers may include: <ul style="list-style-type: none"> <li>• Informal social occasions</li> <li>• Ceremonies</li> <li>• Exhibitions</li> <li>• Industry functions</li> <li>• Association membership</li> <li>• Co-operative promotions</li> <li>• Program of regular telephone contact</li> </ul>
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<b>Evidence Guide</b>	
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Critical Aspects of Competence	Demonstrates knowledge and skills in: <ul style="list-style-type: none"> <li>• that a business operation has been planned and implemented from initial research of feasibility of the business and completion of the plan, through implementing the plan and commencing operations</li> <li>• the ability to evaluate the results of research and assess the likely viability and practicability of a business opportunity, taking into account the current business/market climate and resources available</li> <li>• treating customers in a courteous and professional manner</li> <li>• building and maintaining relationships to achieve successful business outcomes</li> </ul>
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Underpinning Knowledge and Attitudes	Demonstrate knowledge of: <ul style="list-style-type: none"> <li>• Paradigm shift</li> <li>• Unusual business opportunities</li> <li>• Feasibility study</li> <li>• Business structure</li> <li>• Federal and regional government legislative requirements affecting business operations, especially in regard to OHS, EEO, industrial relations and anti-discrimination</li> <li>• Procurement and recruitment strategy</li> <li>• Operational unit</li> <li>• Monitoring process</li> <li>• Business systems and operations</li> <li>• Relevant marketing, management, sales and financial concepts</li> <li>• Options for financing</li> <li>• Business premises and ownership</li> <li>• Lease</li> <li>• Methods for researching business opportunities</li> <li>• Methods of identifying relevant specialist services to complement the business</li> <li>• Advertising and promotion</li> <li>• Distribution and logistics</li> <li>• Terms and conditions in contractual agreement</li> <li>• Record keeping duties</li> <li>• Operational factors relating to the business (provision of professional services, products)</li> <li>• Customer need assessment</li> </ul>
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	<ul style="list-style-type: none"> <li>• Source of information</li> <li>• Operational knowledge of enterprise policies and procedures in regard to: <ul style="list-style-type: none"> <li>➤ customer service</li> <li>➤ dealing with difficult customers</li> <li>➤ maintenance of customer databases</li> <li>➤ allocated duties/responsibilities</li> <li>➤ General knowledge of the range of enterprise merchandise and services, location of telephone extensions and departments/sections</li> </ul> </li> <li>• Basic operational knowledge of industry/workplace codes of practice in relation to customer service</li> <li>• negotiation and communication techniques appropriate to negotiations that may be of significant commercial value</li> </ul>
Underpinning Skills	<p>Demonstrate skills of:</p> <ul style="list-style-type: none"> <li>• Hunting and exploiting unusual business opportunities</li> <li>• Interpreting legal requirements, company policies and procedures and immediate, day-to-day demands</li> <li>• Conducting feasibility study</li> <li>• Developing new behavior</li> <li>• Using technology</li> <li>• Marketing skills</li> <li>• Business planning skills</li> <li>• Entrepreneurial skills</li> <li>• Time management skills</li> <li>• Customer handling skills</li> <li>• Communication skills including questioning, clarifying, reporting, and giving and receiving constructive feedback</li> <li>• Technical and analytical skills to interpret business documents, reports and financial statements and projections</li> <li>• Ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities</li> <li>• Problem solving skills to develop contingency plans</li> <li>• Using computers and software packages to record and manage data and to produce reports</li> <li>• Interpreting business information, numeracy skills for data analysis to aid research</li> <li>• Negotiation to conduct business activities</li> <li>• Research to identify a business opportunity and to conduct a feasibility study</li> <li>• Analytical skills to assess personal attributes and to identify business risks</li> <li>• Observation skills for identifying appropriate people, resources and to monitor work</li> <li>• Persuasion and networking skills</li> <li>• Welcoming customers</li> <li>• Information seeking skills to collect, organize and understand information related to collating and analyzing customer information to identify needs</li> </ul>

	<ul style="list-style-type: none"> <li>• Establish diagnostic processes which identify and recommend improvements to customer service</li> </ul>
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.



<b>Occupational Standard: Small Scale Irrigation Development Level II</b>	
<b>Unit Title</b>	<b>Standardize and Sustain 3S</b>
<b>Unit Code</b>	<a href="#"><u>AGR SSI2 24 0816</u></a>
<b>Unit Descriptor</b>	This unit of competence covers the knowledge, skills and attitudes required by worker to standardize and sustain 3S to his/her workplace. It covers responsibility for the day- to-day operations of the workplace and ensuring that continuous improvements of Kaizen elements are initiated and institutionalized.

<b>Elements</b>	<b>Performance Criteria</b>
1. Prepare for work.	<p>1.1 Work instructions are used to determine job requirements, including method, material and equipment.</p> <p>1.2 Job specifications are read and interpreted following working manual.</p> <p>1.3 <b>OHS requirements</b>, including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work.</p> <p>1.4 <b>Safety equipment and tools</b> are identified and checked for safe and effective operation.</p> <p>1.5 <b>Tools and equipment</b> are prepared and used to implement 3S.</p>
2. Standardize 3S.	<p>2.1 Plan is prepared and used to standardize 3S activities.</p> <p>2.2 <b>Tools and techniques</b> to standardize 3S are prepared and implemented based on <b>relevant procedures</b>.</p> <p>2.3 Checklists are followed for standardize activities and <b>reported to relevant personnel</b>.</p> <p>2.4 The workplace is kept to the specified standard.</p> <p>2.5 Problems are avoided by standardizing activities.</p>
3. Sustain 3S.	<p>3.1 Plan is prepared and followed to standardize 3S activities.</p> <p>3.2 <b>Tools and techniques</b> to sustain 3S are discussed, prepared and implemented based on relevant procedures.</p> <p>3.3 Workplace is inspected regularly for compliance to specified standard and sustainability of 3S techniques.</p> <p>3.4 Workplace is cleaned up after completion of job and before commencing next job or end of shift.</p> <p>3.5 Situations are identified where compliance to standards is unlikely and actions specified in procedures are taken.</p> <p>3.6 Improvements are recommended to lift the level of compliance in the workplace.</p> <p>3.7 Checklists are followed to sustain activities and report to relevant personnel.</p> <p>3.8 Problems are avoided by sustaining activities.</p>

Variable	Range
OHS requirements	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Are to be in accordance with legislation/ regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.</li> <li>• Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices.</li> <li>• Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with workplace organization.</li> <li>• Emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation.</li> </ul>
Safety equipment and tools	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• dust masks / goggles</li> <li>• glove</li> <li>• working cloth</li> <li>• first aid and safety shoes</li> </ul>
Tools and equipment	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• paint</li> <li>• hook</li> <li>• sticker</li> <li>• signboard</li> <li>• nails</li> <li>• shelves</li> <li>• chip wood</li> <li>• sponge</li> <li>• broom</li> <li>• pencil</li> <li>• shadow board/ tools board</li> </ul>
Tools and techniques	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• 5S Job Cycle Charts</li> <li>• Visual 5S</li> <li>• The Five Minute 5S</li> <li>• Standardization level checklist</li> <li>• 5S checklist</li> <li>• The five Whys and one How approach(5W1H)</li> <li>• Suspension</li> <li>• Incorporation and Use Elimination</li> </ul>
Relevant procedures	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Assign 3S responsibilities</li> <li>• Integrate 3S duties into regular work duties</li> </ul>

	<ul style="list-style-type: none"> <li>• Check on 3S maintenance level</li> <li>• OHS measures such as signage, symbols / coding and labeling of workplace and equipment</li> <li>• Creating conditions to sustain your plans</li> <li>• Roles in implementation</li> </ul>
Reporting	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• verbal responses</li> <li>• data entry into enterprise database</li> <li>• brief written reports using enterprise report formats</li> </ul>
Relevant personnel	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• supervisors, managers and quality managers</li> <li>• administrative, laboratory and production personnel</li> <li>• internal/external contractors, customers and suppliers</li> </ul>
Tools and techniques	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• 5S slogans</li> <li>• 5S posters</li> <li>• 5S photo exhibits and storyboards</li> <li>• 5S newsletter</li> <li>• 5S maps</li> <li>• 5S pocket manuals</li> <li>• 5S department/benchmarking tours</li> <li>• 5S months</li> <li>• 5S audit</li> <li>• Awarding system</li> <li>• Big cleaning day</li> <li>• Patrolling system may include: <ul style="list-style-type: none"> <li>➢ Top management Patrol</li> <li>➢ 5S Committee members and Promotion office Patrol</li> <li>➢ Mutual patrol</li> <li>➢ Self-patrol</li> <li>➢ Checklist patrol</li> <li>➢ Camera patrol</li> </ul> </li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>Demonstrates skills and knowledge to:</p> <ul style="list-style-type: none"> <li>• Discuss the relationship between Kaizen elements.</li> <li>• Standardize and sustain 3S activities by applying appropriate tools and techniques.</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Elements of Kaizen</li> <li>• Ways to improve Kaizen elements</li> <li>• Benefits of improving kaizen elements</li> <li>• Relationship between Kaizen elements</li> <li>• The fourth pillar of 5S</li> <li>• Benefits of standardizing and sustaining 3S</li> <li>• Procedures for standardizing and sustaining 3S activities</li> <li>• Tools and techniques to sustain 3S</li> <li>• Relevant Occupational Health and Safety (OHS) and environment requirements</li> </ul>

	<ul style="list-style-type: none"> <li>• Plan and report</li> <li>• Method of communication</li> </ul>
Underpinning Skills	<p>Demonstrates skills of:</p> <ul style="list-style-type: none"> <li>• improving Kaizen elements by applying 5S</li> <li>• standardizing and sustaining procedures and techniques to avoid problems</li> <li>• technical drawing</li> <li>• procedures to standardizing 3S activities</li> <li>• analyzing and preparing shop layout of the workplace</li> <li>• standardizing and sustaining checklists</li> <li>• preparing and implementing tools and techniques to sustain 3S</li> <li>• working with others</li> <li>• reading and interpreting documents</li> <li>• observing situations</li> <li>• solving problems by applying 5S</li> <li>• communication skills</li> <li>• preparing labels, slogans, etc.</li> <li>• gathering evidence by using different means</li> <li>• using Kaizen board properly in accordance the procedure</li> <li>• reporting activities and results using report formats</li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

# NTQF Level III

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Measure and Apply Irrigation Water
Unit Code	<a href="#">AGR SSI3 01 0816</a>
Unit Descriptor	This competency standard covers the process of measuring and applying irrigation water. This includes identifying Irrigation Measuring device & Techniques, Computing the water to be applied, applying a measured water and determination of soil intake rate. It requires the ability to use irrigation water measuring devices, soil moisture computation techniques, determining soil moisture deficit and intake rate, estimating evapotranspiration rate, use computers for recording and reporting system data, applying water and implement and follow relevant enterprise OHS and environmental policies and procedures. Measuring irrigation water requires knowledge of measuring soil moisture content, water holding capacity and amount of water to be applied, determining crop growth stage and growing period

Element	Performance Criteria
1. Compute the water to be Applied	<p>1.1 <b>Soil moisture deficit</b> is measured using standard technique.</p> <p>1.2 Area to be irrigated is measured using standard technique.</p> <p>1.3 Amount of water to be applied is decided based on crop growth stage.</p>
2. Apply a measured amount of water	<p>2.1 A pre-determined deficit is predicted using a scheduling system(s).</p> <p>2.2 Irrigation is applied to partly or fully replace the deficit.</p> <p>2.3 Where appropriate, water quantities are increased to ensure dilution and transport of toxic solutes below the root zone.</p>
3. Determine soil intake Rate	<p>3.1. Method for intake rate determination is selected appropriately.</p> <p>3.2. <b>Tools and equipments</b> are made available to fulfill the requirements.</p> <p>3.3. Soil moisture holding capacity is determined using standard technique</p>
4. Identify Irrigation Measuring device & Techniques	<p>4.1 Type of irrigation method is identified to fit the need of the organization.</p> <p>4.2 Operation feasibility is identified based on local conditions.</p> <p>4.3 Site of measurement is identified using standard technique.</p>

Variable	Range
Soil moisture deficit	<ul style="list-style-type: none"> <li>Includes the amount of water required to bring soil moisture content of the soil to field capacity.</li> </ul>

Tools and equipments	<ul style="list-style-type: none"> <li>• Ring infiltrometer, Siphon, flumes, Auger, Core sampler, Spatula, Sensitive balance, computer software, oven, Cylinder and hose, Stop watch, Tensiometer, Current meter, Pressure apparatus</li> </ul>
Occupational Health & safety	<ul style="list-style-type: none"> <li>• Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust, drowning.</li> <li>• Glove, safety wear, helmet, eye glass,</li> </ul>
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• Measure soil moisture content,</li> <li>• Measure water holding capacity and amount of water to be applied,</li> <li>• Determine crop growth stage and growing period.</li> <li>• Developments in related technology</li> <li>• How to apply a measured water</li> <li>• Basic knowledge of indigenous practices</li> <li>• Identify irrigation measuring device &amp; techniques</li> </ul>
Underpinning Knowledge and Attitude	<p>Measuring irrigation water requires knowledge of:</p> <ul style="list-style-type: none"> <li>• Measuring soil moisture content,</li> <li>• Water holding capacity and amount of water to be applied,</li> <li>• Determining crop growth stage and growing period.</li> <li>• developments in related technology</li> <li>• How to apply a measured water</li> <li>• Basic knowledge of indigenous practices</li> <li>• Economic analysis</li> <li>• Environmental issues</li> <li>• Environmental protection agency regulations</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Decide amount of water to be applied</li> <li>• Identify irrigation measuring device &amp; techniques</li> <li>• Measure soil moisture content</li> <li>• Measure Water holding capacity Determining crop growth stage and growing period.</li> <li>• Apply measured Irrigation Water</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> </ul>

	<ul style="list-style-type: none"> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor’s panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential Underpinning Knowledge and Attitude</li> </ul>
Context of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential</li> </ul>



Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Operate and Process Fertigation Equipment
Unit Code	<a href="#">AGR SSI3 02 0816</a>
Unit Descriptor	This competency standard covers the process of operating fertigation equipment to deliver fertilizers via the irrigation system. It requires the ability to include calculating and preparing fertigation materials, connecting, calibrating and operating the equipment, and monitoring and adjusting the delivery of fertilizers. Shut down, cleaning of equipment and disposal of waste are also included. Operating fertigation equipment requires knowledge of injection equipment, chemical handling procedures, cleaning procedures, environmental impacts of delivering fertilizers via the irrigation system, and OHS issues.

Element	Performance Criteria
1. Prepare materials and equipment for operation	<p>1.1 Materials and services are confirmed as available and ready for operation.</p> <p>1.2 <b>Materials</b> are prepared to meet fertigation requirements.</p> <p>1.3 <b>Injection or fertigation equipment</b> is connected, as directed, and calibrated according to manufacturers' specifications.</p> <p>1.4 Fertilizer concentration is calculated and the solution thoroughly mixed according to enterprise, <b>OHS</b> and environmental requirements.</p> <p>1.5 Equipment is set to meet fertigation requirements.</p>
2. Operate the fertigation process	<p>2.1 Start up sequence is implemented according to operations manual and enterprise procedures.</p> <p>2.2 Fertigation process is <b>operated and monitored</b> to ensure delivery is maintained according to enterprise specifications and procedures.</p> <p>2.3 Fertigation equipment is monitored to ensure no adverse environmental impact is caused by faulty operation.</p> <p>2.4 Corrections to the process and equipment adjustments are implemented as necessary.</p>
3. Shut down fertigation equipment	<p>3.1 Injection equipment is flushed out according to enterprise standards prior to shut down.</p> <p>3.2 Equipment is cleaned according to enterprise procedures.</p> <p>3.3 Waste generated by both the fertigation process and cleaning procedures is managed according to environmental protection requirements and enterprise OHS procedures.</p> <p>3.4 Fertigation activities are reported and recorded according to regulatory requirements and enterprise procedures.</p>

<b>Variable</b>	<b>Range</b>
Materials may be:	wet or dry, and may include fertilizers, chlorine, acid and cleaning agents.
Injection or fertigation equipment may include:	Injection, injection point and chemical holding tank. The irrigation system may range from manual operation and monitoring to fully automated with computer control and monitoring.
OHS may include:	hazards identification and risk assessment, systems and procedures for the safe operation and maintenance of machinery and equipment, selection, use and maintenance of relevant personal protective clothing and equipment, and safe systems and procedures for handling, transporting and storing chemicals and hazardous substances taking into account toxicity levels and environmental effects.
Operation and monitoring Functions	Operation and monitoring may be manual or involve the use of a process control system.

<b>Evidence Guide</b>	
Critical Aspects of Competence	A candidate must be able to demonstrate the ability to: <ul style="list-style-type: none"> <li>• calculate and prepare fertigation materials,</li> <li>• connect and calibrate equipment,</li> <li>• operate, monitor and adjust delivery,</li> <li>• shut down and clean equipment, and dispose of waste in an environmentally responsible way.</li> </ul>
Underpinning Knowledge and Attitude	Demonstrates Knowledge of: <ul style="list-style-type: none"> <li>• fertigation injection equipment</li> <li>• chemical handling procedures for fertiliser, chlorine, acid and cleaning agents</li> <li>• cleaning procedures for fertigation equipment</li> <li>• Material Safety Data Sheets (MSDS)</li> <li>• environmental impacts of delivering fertilisers via the irrigation system</li> <li>• OHS issues</li> <li>• Enterprise policies and procedures.</li> </ul>
Underpinning Skills	include the ability to: <ul style="list-style-type: none"> <li>• calculate and prepare fertigation materials</li> <li>• connect, calibrate and operate the equipment, and</li> <li>• monitor and adjust the delivery of fertilizers</li> <li>• shut down, clean equipment and dispose of waste</li> <li>• use personal protective equipment</li> <li>• identify adverse environmental impacts of fertigation activities and appropriate remedial action</li> <li>• implement enterprise, OHS and environmental policies and procedures.</li> </ul>
Resources Implication	The following resources MUST be provided: <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> </ul>

	<ul style="list-style-type: none"> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be accessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential Underpinning Knowledge and Attitude</li> </ul>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</p>

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Install Drainage Systems
Unit Code	<a href="#">AGR SSI3 03 0816</a>
Unit Descriptor	This competency standard covers the process of installing surface and/or subsurface drainage systems. It requires the ability to interpret site specifications and drainage system plans, set out drainage system works, measure materials, and level and aligns earthworks, and use relevant equipment, tools and machinery. Installing surface and/or subsurface drainage systems requires knowledge of the purposes of drainage systems and the application of drainage system plans to the physical situation, drain types, components and installation techniques, soil characteristics, and enterprise OHS procedures.

Element	Performance Criteria
1. Prepare for drainage system installation activities	<p>1.1 The construction site for the <b>drainage system</b> and construction method is identified according to the site and drainage system plans and <b>enterprise work procedures</b>.</p> <p>1.2 <b>Materials, tools, equipment and machinery</b> are selected according to drainage system design requirements and enterprise work procedures.</p> <p>1.3 Pre-operational and safety checks are carried out on tools, equipment and machinery according to manufacturers specifications and enterprise work procedures.</p> <p>1.4 <b>OHS hazards</b> are identified, risks assessed, controls implemented and reported to the supervisor.</p> <p>1.5 Suitable safety and <b>Personal Protective Equipment (PPE)</b> are selected, used and maintained.</p>
2. Co-ordinate installation work	<p>2.1 Enterprise work team, contractors and design consultants are identified and work tasks are coordinated in a sequential, timely and effective manner in consultation with the supervisor.</p> <p>2.2 Installation of the drainage system is undertaken according to <b>OHS requirements</b> and with due consideration of the <b>environmental implications</b> and relevant legislation and regulations.</p> <p>2.3 A <b>clean and safe work area is maintained</b> throughout and on completion of work.</p>
3. Prepare the site for installation of drainage system	<p>3.1 Symbols and terminology are interpreted to ensure the concept of the drainage system plan is clearly understood according to industry practice.</p> <p>3.2 Layout of <b>services</b> is identified, depths checked against the site or drainage system plan and discrepancies are reported to the supervisor and the relevant authority.</p>

	3.3 Survey, measurement and marking out of the site and confirmation of soil characteristics relevant to the planned drainage system are completed according to plan specifications and enterprise work procedures.
4. Undertake installation of drainage system	<p>4.1 Excavations are completed without damage to services, facilities, features and established plants according to plan specifications and enterprise work procedures.</p> <p>4.2 The drainage system is installed according to the drainage system plan and enterprise work procedures.</p> <p>4.3 The drainage system is tested for configuration, flow rates and capacity consistent with the drainage system plan and according to enterprise work procedures.</p> <p>4.4 The supervisor is consulted and remedial action is taken when the drainage system operation does not meet the plan specifications.</p>
5. Complete installation of drainage system	<p>5.1 Earthworks are finished off to the plan specifications and enterprise work procedures.</p> <p>5.2 The site is restored and <b>waste material</b> is removed from the site and disposed of in an environmentally aware and safe manner according to enterprise work procedures.</p> <p>5.3 Tools, equipment and machinery are cleaned, maintained and stored according to enterprise work procedures.</p> <p>5.4 Work outcomes are recorded or reported to the supervisor according to enterprise work procedures.</p>

Variable	Range
Drainage systems may include:	Surface drains, culverts, mole drains, sand slit, sub-surface traps, pit and trap systems, dune and swale systems, reed beds, water-recycling pumps and baffles.
Enterprise work procedures may include:	supervisors oral or written instructions, installation program, enterprise Standard Operating Procedures (SOPs), specifications, routine maintenance schedules, work notes, product labels and Material Safety Data Sheets (MSDS), manufacturers service specifications and operators manuals, waste disposal, recycling and re-use guidelines, and OHS procedures.
Materials may include:	Drainage system components, glues, welds, construction materials for drain surfaces and slopes, and backfill materials.
Tools, equipment and machinery may include:	surveying and leveling equipment such as automatic level, dumpy level, staff, boning rods, pegs, notebook, pencil and calculator; hand tools such as rakes, shovels, spades, rollers, wheelbarrows, hoses and hose fittings; machinery such as bobcats, ditch witches, backhoes, front-end loaders, graders, mechanical rollers, trucks, hydraulic trailers, and tractors and 3-point linkage equipment; pumps and pump fittings; and fitting and welding tools appropriate to the drainage system.

OHS hazards may include:	disturbance or interruption of services, solar radiation, dust, noise, soil and waterborne micro-organisms, chemicals and hazardous substances, manual handling, moving vehicles, machinery and machinery parts, uneven surfaces and flying and falling objects. Safety equipment may include signage and barriers.
PPE may include:	Hat, boots, overalls, gloves, goggles, respirator or face mask, face guard, hearing protection, sunscreen lotion and hard hat.
OHS requirements may include:	Identifying hazards, assessing risks and implementing controls, cleaning, maintaining and storing tools, equipment and machinery, appropriate use of PPE including sun protection; safe operation of tools, equipment and machinery, safe handling, use and storage of chemicals and hazardous substances, correct manual handling, basic first aid, personal hygiene and reporting problems to supervisors.
Environmental implications	Restructuring and creation of slopes for drainage purposes may affect the run-off and flow rates of storm water and excess irrigation water from the site, which may have beneficial or adverse impacts on the external environment. Drainage systems may also enable the enterprise to store and recycle storm and grey water for re-use within the enterprise, thereby reducing detrimental impacts on the external environment such as salinisation, water logging and erosion.
Maintaining clean and safe work area	Tasks may include disabling unused tools, equipment and machinery and storing neatly out of the way of installation activities; safely storing materials on site; using signage and safety barriers during construction and removing them after activities are completed, and swiftly and efficiently removing and processing debris and waste from the work area.
Services may include:	Water supply, gas, power (electricity), telecommunications, irrigation, storm water and drainage.
Waste material may include:	<ul style="list-style-type: none"> <li>• Unused construction and excavated materials, and plant debris, litter and broken components.</li> <li>• Plant-based material may be mulched or composted, plastic, metal, paper-based materials may be recycled, re-used, returned to the manufacturer or disposed of according to enterprise work procedures.</li> <li>• Waste may be removed to designated areas for recycling, reuse and return to the manufacturer or disposal.</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	A candidate must be able to demonstrate the ability to: <ul style="list-style-type: none"> <li>• Describe purpose , types and application of drainage</li> <li>• prepare for installation activities,</li> <li>• set out, survey, test and excavate the installation site,</li> <li>• install and test the drainage system,</li> <li>• Clean up the installation site.</li> </ul>
Underpinning Knowledge and Attitude	Demonstrates Knowledge of: <ul style="list-style-type: none"> <li>• the purposes of drainage systems and the application of drainage system plans to the physical situation</li> </ul>

	<ul style="list-style-type: none"> <li>• drain types, components and installation techniques</li> <li>• environmental impacts of irrigation and drainage systems</li> <li>• soil characteristics</li> <li>• Enterprise OHS procedures</li> <li>• work value and ethics</li> <li>• accountable to work</li> <li>• loyalty and honest to the work he/she being doing</li> <li>• Dedication and commitment</li> <li>• Respect and follow organizational rules and regulation</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• communicate with work team members, supervisors, contractors and consultants</li> <li>• interpret site specifications and drainage system plans</li> <li>• set out surface drainage system works</li> <li>• measure materials</li> <li>• level and align earthworks</li> <li>• use equipment, tools and machinery</li> <li>• implement and follow relevant enterprise OHS and environmental policies and procedures</li> <li>• Communicate ideas and information in written, oral and telecommunication of ideas and information with the work group, supervisor, contractors or consultants, relating to installation activities and problems.</li> <li>• Collect, analyze and organize information on Enterprise work procedures and site and drainage system plans</li> <li>• Plan, organize and co-ordinate activities for the work group, contractors and self, prior to and during the installation program.</li> <li>• Facilitate and lead work group members to complete the installation to specification.</li> <li>• Use mathematical ideas and techniques in measuring materials and interpreting specifications for the drainage installation.</li> <li>• Solve problems by dealing with problems imposed by site characteristics or when the system operation doesn't meet specifications.</li> <li>• Use technology in applying design specifications, communicating and keeping records.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> </ul>

	<ul style="list-style-type: none"> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential Underpinning Knowledge and Attitude</li> </ul>
Context of Assessment	<ul style="list-style-type: none"> <li>• This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</li> <li>• The skills and knowledge required to install a drainage system must be transferable to a different work environment. For example, this could include different types of drainage systems, soil types and enterprises.</li> </ul>



Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Measure Drainage System Performance
Unit Code	<a href="#">AGR SSI3 04 0816</a>
Unit Descriptor	This competency standard covers the process of measuring the performance and efficiency of drainage system. This includes identifying and correcting system problems, measuring, recording and reporting soil moisture, salinity and water table depth to determine system performance and efficiency. It requires the ability to apply measuring and testing techniques, record and report system performance, use computers for recording and reporting drainage system data and implement and follow relevant enterprise OHS and environmental policies and procedures.

Element	Performance Criteria
1. Assess drainage and collection systems	<p>1.1 A visual <b>inspection</b> is undertaken to determine damaged or broken components and results are recorded in accordance with OHS and enterprise policy and procedures.</p> <p>1.2 Areas being drained are inspected for signs of water pooling and problems are recorded in accordance with OHS and enterprise policy and <b>procedures</b>.</p> <p>1.3 Measurements are taken with appropriate <b>equipment</b> to determine drainage performance.</p> <p>1.4 Drainage/tail water quality is measured in accordance with OHS and enterprise policy and procedures.</p> <p>1.5 Water table depth is measured where required in accordance with OHS and enterprise policy and procedures.</p> <p>1.6 Soil salinity is measured where required in accordance with OHS and enterprise policy and procedures.</p> <p>1.7 <b>Factors external to the system</b>, which may cause interference, are identified and recorded in accordance with OHS and enterprise policy and procedures.</p>
2. Monitor supply of equipment and spare parts	<p>2.1 Supply and part usage are recorded in accordance with enterprise policy and procedures.</p> <p>2.2 Purchases of spare parts and materials are within budget constraints.</p> <p>2.3 Parts requirements outside of budget constraints are reported.</p> <p>2.4 Purchases and orders are recorded in accordance with enterprise procedures and systems.</p>
3. Monitor quality of work	<p>3.1. Instructions against relevant organizational standards of work are interpreted and checked.</p>

	<p>3.2 Required clarification of work instructions is obtained.</p> <p>3.3 Work according to requirements for job quality, customer service, public responsibility and resources used are monitored and adjusted.</p>
4. Record and report system performance status	<p>4.1 <b>Water quality</b> is recorded in accordance with enterprise procedures.</p> <p>4.2 Water table depth, <b>soil moisture</b> and salinity are recorded in accordance with enterprise procedures.</p> <p>4.3 Strategies that minimize the negative environmental impacts and maximize the positive impacts of the drainage system, are documented.</p>

Variable	Range
Inspection may reveal:	Surface pooling, water logging (soil moisture), water table depth, testing of surface and subsurface infiltration rates, and symptoms associated with excessive lactates and nutrients.
Procedures may include:	safe systems and procedures for outdoor work, including protection from solar radiation, dust and noise, protection against chemical residues, including that in/on foliage, water, soil and other items, and the selection, use and maintenance of relevant personal protective clothing and equipment.
Measuring equipment may include:	Tensiometers, probe tubes, flow meter, catch cans and pressure gauge, test wells and fault meter.
Factors external to the system that cause interference may include:	pests and vermin (tortoises, ants, spiders, snails, rabbits, hares, foxes, wasps, rose weevil, earwigs, snakes, carp, pigs, wallabies, eels, rats, mice, kangaroos, dogs, cats, parrots), organic (leaves, slime, weeds, algae, sticks, crop residue), weather, channel regulators (if applicable), fire, mechanical damage (if applicable), power spikes, power failures, storm runoff/system breakage, thatch, runoff from adjacent areas and rising water tables.
Water quality may include:	Salinity and electro conductivity, pH, Sodicity, chloride, calcium carbonate, iron, turbidity, nutrients and pesticides.
Soil moisture may include:	Subjective measurement, gypsum blocks, tensiometers, enviroscan, neutron probe TDR (Time Domain Reflectometer).
Drainage system parts may Include:	According to brand and supplier and injectors, pumps, and tensiometers, probe tubes, flow meter, computer and/or other scheduling devices, recycle equipment and spray equipment.
Drainage systems may include:	Surface drains, culverts, mole drains, sand slit, sub-surface traps, pit and trap systems, dune and swale systems, reed beds, water-recycling pumps and baffles.

Evidence Guide	
Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• identify and correct system problems,</li> <li>• measure, record and report soil moisture, salinity and water table depth</li> <li>• Determine system performance and efficiency.</li> </ul>

Underpinning Knowledge and Attitude	<p>Demonstrates Knowledge of:</p> <ul style="list-style-type: none"> <li>• OHS guidelines</li> <li>• measuring and monitoring procedures for factors contributing to drainage system performance</li> <li>• positive and negative environmental impacts of drainage systems</li> <li>• water table and salinity measures</li> <li>• water quality monitoring methods and techniques</li> <li>• soil moisture measurement procedures</li> <li>• water authority standards and procedures</li> <li>• Enterprise policies and procedures.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• apply measuring and testing techniques</li> <li>• record and report system performance</li> <li>• identify adverse environmental impacts of drainage systems and appropriate remedial action</li> <li>• use computers for recording and reporting drainage system data</li> <li>• Implement and follow relevant enterprise OHS and environmental policies and procedures.</li> <li>• Communicate ideas and information on reporting drainage system performance status.</li> <li>• Collect, analyze and organize information drainage system performance data.</li> <li>• Plan and organize activities, supply of equipment and spare parts.</li> <li>• Use mathematical ideas and techniques in manipulating data and calculating variations and compound measures.</li> <li>• Solving problems in identifying deviations in system performance.</li> <li>• Use measuring instruments and computers for recording data.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be accessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> </ul>

	<ul style="list-style-type: none"> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential Underpinning Knowledge and Attitude</p>
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Analyze and Interpret Irrigation Related Data
Unit Code	<a href="#">AGR SSI3 05 0816</a>
Unit Descriptor	This competency standard covers the process of analyzing and interpreting irrigation data. It requires the ability to collect and organize, analyze, interpret and present data. Analyzing and interpreting data requires knowledge of the relevant legislation, industry and enterprise codes of practice, enterprise record keeping and recording practices, methods to collect and analyze production data, business equipment and principles of report writing and data presentation.

Elements	Performance Criteria
1. Identify and categorize irrigation data	<p>1.1 Suitable formats are developed in accordance with data type.</p> <p>1.2 Data is identified, organized and categorized for analysis and interpretation</p> <p>1.3 Data held by the unit is assessed for quality, accuracy and relevance.</p> <p>1.4 Methods of collecting data are reliable and make efficient use of resources in accordance with <b>organizational requirements</b>.</p> <p>1.5 Data is updated, modified, maintained and stored in accordance with organizational requirements.</p>
2. Analyze and interpret data with descriptive statistics	<p>2.1 Objectives of analysis are clearly defined and made consistent.</p> <p>2.2 <b>Methods of data analysis</b> are reliable and suitable to research purposes.</p> <p>2.3 Assumptions used in analyses are clear, justified and consistent.</p> <p>2.4 Conclusions are supported by evidence and contribute to the achievement of business objectives.</p> <p>2.5 Descriptive statistics are used to conclude the result.</p>
3. Present data	<p>3.1 Data are prepared in an appropriate format, style and structure using suitable business technology.</p> <p>3.2 Structure and format of reports are clear and conform.</p> <p>3.3 Findings are reported.</p> <p>3.4 Feedback and comments on suitability and sufficiency of findings is obtained in accordance.</p>

Variable	Range
Organizational requirements may be:	Quality assurance and/or procedures manuals, biosecurity requirements, animal welfare, procedures for updating records, OHS policies, procedures and programs, production plans,

	systems and processes, and defined resource parameters.
Methods of data analysis may be:	Feedback on results, review of previous data and production figures, peer review, data sampling and statistical analysis.
Business equipment may be:	Photocopier, computer (including handheld electronic loggers), email, internet, software programs, answering machine, fax machine, telephone and radio communication systems.

<b>Evidence Guide</b>	
Critical Aspects of Competence	Assessment must confirm one's ability to: <ul style="list-style-type: none"> <li>• Identify, organize and categorize irrigation data</li> <li>• Describe methods to collect and analyze data</li> <li>• analyze and interpret data</li> <li>• Present data.</li> <li>• Describe data management systems and methods</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• Data management</li> <li>• Data analysis</li> <li>• Data collection tool</li> <li>• principles of report writing and data presentation.</li> </ul>
Underpinning Skills	include the ability to: <ul style="list-style-type: none"> <li>• Identify, organize and categorize irrigation data</li> <li>• analyze and interpret data</li> <li>• Present data.</li> </ul>
Resources Implication	The following resources MUST be provided: <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Operate Pressurized Irrigation Systems
Unit Code	<a href="#">AGR SSI3 06 0816</a>
Unit Descriptor	This competency standard covers the process of operating pressurized irrigation systems including the use of pre-start checks, start-up, operation and inspection of the system, and shut down in response to irrigation indicators. It requires the ability to read and follow operations manual and irrigation schedules, measure and interpret flow rates and pressures, identify adverse environmental impacts of irrigation activities and take appropriate remedial action, and implement and follow relevant OHS and environmental policies and procedures. Operating pressurized irrigation systems requires knowledge of main components of pressurized irrigation systems, pump types and their operation, environmental impacts of irrigation, soil/plant/water relationships, and water requirements of plants/crops.

Element	Performance Criteria		
1. Perform pre-start checks for pressurized irrigation system	<p>1.1 Checks of water, power, fuel and lubricants ensure that all are made available and the control system is operational.</p> <p>1.2 Pumps are primed, if necessary, and valves and controls are open or closed as directed.</p> <p>1.3 Pressure and flow testing equipment are calibrated and available as required.</p> <p>1.4 Other pre-start system checks are carried out in accordance with manufacturers, OHS and enterprise <b>procedures</b>.</p>		
2. Start up and inspect system	<p>2.1 Start up sequence is implemented in accordance with operations manual.</p> <p>2.2 All malfunctions, leaks and blockages are corrected or repaired immediately and reported in accordance with OHS and enterprise procedures.</p> <p>2.3 Pressure at the head works and control valves is within design specifications indicating efficient filter operation, and water is distributed evenly to the targeted areas with minimal wastage and run-off.</p>		
3. Shut down system based upon irrigation indicators	<p>3.1 Water is applied for sufficient time to allow amount of water necessary to achieve required soil moisture levels in accordance with irrigation schedule, <b>environmental considerations</b> and allowing for weather conditions.</p> <p>3.2 <b>System components</b> are shut down and drained in sequence in accordance with manufacturers, OHS and enterprise procedures.</p> <p>3.3 Drainage and treatment systems are checked in accordance with enterprise procedures.</p>		
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	3.4 Irrigation activities are <b>recorded</b> and in reported accordance with regulatory requirements and enterprise procedures.
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Variable	Range
OHS procedures may include:	systems and procedures for the safe operation of irrigation equipment and to ensure protection against injury when working with pressurized equipment, the prevention of electrical type injury, manual handling and procedures for working outdoors, including protection from solar radiation, dust and noise.
Environmental considerations may include:	efficient operation of the system to conserve water by identifying and repairing leaks, avoidance of over watering, and even distribution of water to targeted areas with minimal wastage and run-off.
System components	These may vary according to brand and supplier and may Include pumps, tensiometers, probe tubes, flow meter, catch cans, pressure gauge, computer and/or other scheduling devices, recycling equipment and spray equipment.
Irrigation activities recorded may include:	water used, time of shutdown, malfunctions, blockages, leaks and other faults requiring repair.
Pressurized irrigation systems	may include micro-irrigation systems and spray irrigation systems. Micro-irrigation systems may be mains pressure, low pressure, below or above ground, sprays systems, drip emitter trickle, t-tape, mini-sprinklers, and capillary. Spray irrigation systems may be traveling irrigators (soft hose, hard hose boom type), centre pivot, linear move, powered side roll hand shift permanent (installed), and bike shift/easy shift. Irrigation systems may range from manual operation and monitoring to fully automated with computer control and monitoring.
Need to be inspected	This may include water flow, water quality and pressures at delivery points, lines for leaks and blocks, and drainage flow.
Irrigation indicators	These may include soil moisture and plant/crop condition.

Evidence Guide	
Critical Aspects of Competence	A candidate must be able to demonstrate the ability to: <ul style="list-style-type: none"> <li>• Perform pre-start checks, start, operate and inspect the system, and shut down in response to irrigation indicators.</li> <li>• Apply OHS, environmental and enterprise policies and procedures relating to the operation of pressurized irrigation systems.</li> <li>• Read and interpret flow rates and recording irrigation activities.</li> <li>• Plan and organize activities</li> <li>• Use mathematical ideas and techniques in measuring and interpreting pressure and flow rates.</li> </ul>
Underpinning Knowledge and Attitude	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• general irrigation methods for pressurized systems</li> </ul>



	<ul style="list-style-type: none"> <li>• main components of pressurized irrigation systems</li> <li>• pump types used in pressurized irrigation systems and their operation</li> <li>• environmental impacts of irrigation using water from any ground or underground source</li> <li>• soil/plant/water relationships</li> <li>• water requirements of plants/crops consistent with sound environmental management</li> <li>• shutdown sequence</li> <li>• OHS, environmental and enterprise policies and procedures relating to the operation of pressurized irrigation systems.</li> <li>• work value and ethics</li> <li>• accountable to work</li> <li>• loyalty and honest to the work he/she being doing</li> <li>• Dedication and commitment</li> <li>• Respect and follow organizational rules and regulation</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• read and follow operations manual and irrigation schedules</li> <li>• measure and interpret flow rates and pressures</li> <li>• identify adverse environmental impacts of irrigation activities and appropriate remedial action</li> <li>• implement and follow relevant OHS and environmental policies and procedures relating to the operation pressurized irrigation systems.</li> <li>• Collect, analyze, organize and communicate ideas and information</li> <li>• Read and interpret flow rates and recording irrigation activities.</li> <li>• Plan and organize activities</li> <li>• Perform shut down sequence</li> <li>• Use mathematical ideas and techniques in measuring and interpreting pressure and flow rates.</li> <li>• Solve problems in identifying and correcting malfunctions, leaks and blockages</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> </ul>

	<ul style="list-style-type: none"> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential Underpinning Knowledge and Attitude</li> </ul>
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Operate Gravity Fed Irrigation Systems
Unit Code	<a href="#">AGR SSI3 07 0816</a>
Unit Descriptor	This competency standard covers the process of operating gravity fed (flood) irrigation systems including the use of pre-start checks, start-up, operation and inspection of the system, and shut down in response to irrigation indicators.

Element	Performance Criteria
1. Perform pre-start checks for gravity fed irrigation system.	<p>1.1 Checks of water, power, fuel and lubricants ensure that all are available and the control system is operational.</p> <p>1.2 Pumps are primed, if necessary, and gates and controls are open or closed in accordance with enterprise procedures.</p> <p>1.3 Pipes, system equipment and <b>outlets</b> are positioned and set up in accordance with enterprise standards and <b>OHS requirements</b>.</p>
2. Start up and inspect system.	<p>2.1 Siphons and other delivery mechanisms are primed and started in accordance with enterprise procedures.</p> <p>2.2 Start up sequence is implemented in accordance with operations manual and water levels, and pressure built up slowly as directed.</p> <p>2.3 Pressure at the head works and control valves is within design specifications indicating efficient filter operation, and water is <b>distributed evenly</b> to the targeted areas with minimal wastage and run-off.</p> <p>2.4 All malfunctions, leaks, damage to water courses and blockages are corrected or repaired immediately and reported in accordance with OHS and enterprise procedures.</p> <p>2.5 Head water levels are monitored and maintained.</p> <p>2.6 If used, pumps are monitored during operation, rubbish is cleared from outlets, and pump is back flushed in accordance with enterprise procedures.</p> <p>2.7 Irrigation changes are implemented in accordance with enterprise procedures.</p> <p>2.8 Water <b>reuse systems</b> are checked for clearance and freedom from <b>weeds</b>.</p>
3. Shut down system based upon irrigation indicators.	<p>3.1 Area is irrigated in accordance with enterprise procedures, and time lag between shut down and end of watering is observed to minimize run-off and deep percolation.</p> <p>3.2 System components are shut down in sequence in accordance with manufacturers and enterprise procedures.</p>

	<p>3.3 Drainage and treatment systems are checked in accordance with enterprise procedures.</p> <p>3.4 Tail water control systems are implemented in accordance with statutory requirements and enterprise standards.</p> <p>3.5 Irrigation activities are reported and recorded in accordance with regulatory requirements and enterprise procedures.</p>
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Variable	Range
Outlets in the system may include:	Siphons, cups and fluming, pipes and gates/slides/doors.
OHS requirements may include:	systems and procedures for the safe operation of irrigation equipment, and to ensure protection against injury when working with pumps, outlets and other system equipment, the prevention of electrical type injury, manual handling and procedures for working outdoors, including protection from solar radiation, dust and noise.
Even distribution	Even distribution of water depends on channel levels (if applicable), time, number and position of siphons running (if applicable), time, number and position of outlets running, water pressure, no leaks/blocks in system, wind (weather conditions), flow rates and times.
Reuse systems may include:	Disinfestations and filtering equipment.
Weeds may be:	Controlled by mechanical methods or chemical methods (refer to regulatory bodies).
Gravity fed irrigation systems may be:	<ul style="list-style-type: none"> <li>• Flood irrigation systems may include border check, contour irrigation, furrow irrigation, hillside flooding, and basin irrigation.</li> <li>• Border check systems may be either permanent or temporary earth, plastic or concrete devices for insertion in a drain for reticulating water, contour banks used to collect and distribute water along the perimeter of an irrigation plot, contour banks within a plot to collect/distribute water, or larger scale systems to stop water exiting one area to another.</li> <li>• Gravity fed systems may range from manual operation and monitoring to fully automated with computer control and monitoring.</li> </ul>
Inspection may include:	This may include water flow, water quality at delivery points, water courses for leaks and blocks, and drainage flow.
Irrigation indicators may include:	Soil moisture, weather reports and information, and plant/crop condition.

Evidence Guide	
Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• Perform pre-start checks, start, operate</li> <li>• Inspect the system, and shut down in response to</li> </ul>

	<p>irrigation indicators.</p> <ul style="list-style-type: none"> <li>• OHS, environmental and enterprise policies and procedures relating to the operation of gravity fed irrigation systems</li> </ul>
Underpinning Knowledge and Attitude	<p>Demonstrates Knowledge of:</p> <ul style="list-style-type: none"> <li>• General irrigation methods for gravity fed irrigation systems</li> <li>• Main components of gravity fed irrigation systems</li> <li>• Pump types used in gravity fed irrigation systems and their operation</li> <li>• Environmental impacts of irrigation, using water from any ground or underground source</li> <li>• Inspection procedures</li> <li>• Soil/plant/water relationships</li> <li>• Water requirements of plants/crops consistent with sound environmental management</li> <li>• Shutdown sequence</li> <li>• OHS, environmental and enterprise policies and procedures relating to the operation of gravity fed irrigation systems.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Read and follow operations manual and irrigation schedules</li> <li>• Check pressure at the head works and control valves</li> <li>• Carry out running repairs on irrigation delivery and drainage systems</li> <li>• Identify adverse environmental impacts of irrigation activities and appropriate remedial action</li> <li>• Implement and follow relevant OHS and environmental policies and procedures relating to the operation of gravity fed irrigation systems.</li> <li>• Communicate ideas and information</li> <li>• Collect analyze and organize information</li> <li>• Check pressure and flow rates, and recording irrigation activities.</li> <li>• Plan and organize activities</li> <li>• Perform shut down sequence</li> <li>• Report irrigation activities, malfunctions, leaks, damage to water courses and blockages.</li> <li>• Use mathematical ideas and techniques in measuring and interpreting pressure and flow rates.</li> <li>• Solve problems in identifying and correcting malfunctions, leaks and blockages.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> </ul>

	<ul style="list-style-type: none"> <li>• Certified assessor /Assessor's pan</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential Underpinning Knowledge and Attitude</li> </ul>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competency may be assessed in the work place or in a simulated work place setting</li> <li>• This competency standard could be assessed on its own or in combination with other competencies relevant to the job function</li> </ul>

<b>Occupational Standard: Small Scale Irrigation Development Level III</b>	
<b>Unit Title</b>	<b>Implement Soil Fertility Management</b>
<b>Unit Code</b>	<a href="#"><b>AGR SSI3 08 0816</b></a>
<b>Unit Descriptor</b>	It required improving and soiling fertility management. The unit involves taking samples of soil and plant tissue and analyzing results. It also requires improving soil fertility in response to sample testing by modifying cultivation practices. Competency in this unit requires knowledge of the processes of soil formation and interactions between the soil, plants and animals. This unit of competency applies to people working on a farm that is managed according to the principles of organic agriculture.

<b>Element</b>	<b>Performance Criteria</b>
1. Monitor indicators of soil fertility	<p>1.1 Work is undertaken in an environmentally appropriate manner and according to workplace information, principles of organic agriculture, occupational health and safety requirements and enterprise guidelines.</p> <p>1.2 <b>Soil</b> testing is conducted at reference sites according to <b>enterprise procedures</b> and organic industry standards.</p> <p>1.3 Soil acidity or alkalinity (pH), mineral balances and organic matter levels are assessed and recorded.</p> <p>1.4 Soil texture, structure, salinity and Sodicity are assessed and recorded.</p> <p>1.5 Results are analyzed to identify trends and areas for improvement.</p> <p>1.6 Common nutrient deficiency and toxicity problems in plants are identified using visual inspection.</p> <p>1.7 The supervisor and/or nutritional specialist are consulted, as required, to determine causes of nutritional or toxicity problems.</p>
2. Assess soil-related factors for selected plants	<p>2.1 Nutritional requirements of selected plant species are identified.</p> <p>2.2 Soil analyses to be conducted and suitable testing facilities are selected.</p> <p>2.3 Soil and plant tissue sample collection is conducted according to enterprise procedures and requirements of testing facility.</p> <p>2.4 Results of soil and tissue testing are analysed in relation to requirements of the farming system.</p> <p>2.5 Soil condition is assessed for drainage, compaction, aeration and water infiltration in relation to requirements for desired plant growth for selected species.</p> <p>2.6 Soil biological activity is assessed by identifying and evaluating presence of organisms.</p>

	2.7 Soil health is assessed by identifying and evaluating plant species present the achievement of business objectives.
3. Select and implement appropriate agronomy and fertility techniques	<p>3.1 Range of allowable inputs is identified according to requirements of the National Standard for Organic and Biodynamic Produce.</p> <p>3.2 Suitable nutrient cycling techniques are identified and evaluated.</p> <p>3.3 Appropriate inputs are calculated, based on soil/plant analyses, crop removal and plant/animal observations.</p> <p>3.4 Cover crop and pasture systems are selected and managed.</p> <p>3.5 Mulching and composting systems are developed, applied and monitored.</p> <p>3.6 Rotations to optimize soil fertility are designed and implemented.</p> <p>3.7 Cultural practices to enhance soil fertility are selected and implemented.</p> <p>3.8 <b>Soil ameliorants</b> to improve soil fertility are identified, compared, selected and sourced according to enterprise work procedures</p>

Variable	Range
Soil may include:	<ul style="list-style-type: none"> <li>Over all command area and growing media.</li> </ul>
Enterprise procedures may include:	<ul style="list-style-type: none"> <li>supervisors oral or written instructions, plant nutrition program, enterprise Standard Operating Procedures (SOPs), specifications, routine maintenance schedules, work notes; product labels and Material Safety Data Sheets (MSDS); manufacturers service specifications and operators manuals; waste disposal, recycling and re-use guidelines; and OHS procedures</li> </ul>
Soil ameliorants may include:	<ul style="list-style-type: none"> <li>Cover crops, animal manures, gypsum and lime.</li> </ul>
Materials may include:	<ul style="list-style-type: none"> <li>Those to modify soil pH, soil ameliorants to improve soil fertility, and fertilizers to meet the nutritional requirements of plants.</li> </ul>
Services may include:	<ul style="list-style-type: none"> <li>Water supply, gas, power (electricity), telecommunications, irrigation, storm water and drainage.</li> </ul>
OHS hazards may include:	<ul style="list-style-type: none"> <li>disturbance or interruption of services, solar radiation, dust, noise, soil-, air- and water-borne micro-organisms, chemicals and hazardous substances, sharp hand tools and equipment, manual handling, moving vehicles, machinery and machinery parts, flying objects and uneven surfaces.</li> </ul>
PPE may include:	<ul style="list-style-type: none"> <li>Hat, boots, overalls, gloves, goggles, respirator or face mask, face guard, spray clothing, hearing protection, sunscreen lotion and hard hat.</li> </ul>



Products useful in changing soil pH may include:	<ul style="list-style-type: none"> <li>• Lime such as ground limestone, dolomite, and a range of fertilizers.</li> </ul>
Application methods may include:	<ul style="list-style-type: none"> <li>• Banding, broadcasting, ripping, spraying and fertigation.</li> </ul>
Environmental implications may be:	<ul style="list-style-type: none"> <li>• Over-spraying or run-off into the external environment may result in nutrient overload or excess water to native plants, natural waterways, water tables and ecosystems, water erosion, water logging and Stalinization.</li> <li>• Responsible fertilization and watering practices may, however, help to reverse previous environmental degradation by allowing natural recovery and regeneration of native ecosystems</li> </ul>
Fertilizers may include:	<ul style="list-style-type: none"> <li>• Solids, liquids or gases, which are artificial, organic, applied directly to the soil or to the plant via foliar sprays.</li> </ul>
Fertilizer application methods may include:	<ul style="list-style-type: none"> <li>• Banding, broadcasting, ripping, spraying and fertigation.</li> </ul>
Tools, equipment and machinery may be:	<ul style="list-style-type: none"> <li>• Monitoring equipment may include a pH test kit, electronic pH testing device, hand held salinity or EC meter, tape measure, sample bags, plastic overlays, aerial photographs, charts and tables of soil characteristics and plant soil parameters, as well as charts and illustrations of the symptoms of plant nutrient deficiencies and toxicities.</li> <li>• Application equipment and machinery may include backpack spray equipment, tractors and trailed or 3 point linkage spreaders, seeders, rippers and spray equipment, pumps and pump fittings, and irrigation systems set up for fertigation.</li> </ul>

### Evidence Guide

Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• assess the nutritional health of plants grown by the enterprise,</li> <li>• Access and apply appropriate products to plants and soils to meet the goals and objectives of the plant nutrition program.</li> <li>• Describe the relationship between soil characteristics and the availability of nutrients, including macro and micro elements, to plants</li> <li>• Explain the environmental implications for the external environment of soil ameliorant and fertilizer use, which may include over-spraying, run-off, nutrient overload, erosion, toxicity, noise and dust.</li> <li>• communicate with work team members, supervisors, and suppliers,</li> <li>• interpret manufacturers and plant nutrition program specifications, utilize preformed reporting, analysis and work procedure documents, and understand labels and symbols</li> </ul>
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	<ul style="list-style-type: none"> <li>estimate treatment and product requirements, material sizes and quantities, interpret specifications, and calculate areas, ratios, proportions and application rates</li> </ul>
Underpinning Knowledge and Attitude	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>the relationship between soil characteristics and the availability of nutrients, including macro and micro elements, to plants</li> <li>Nutrient cycling and its practical relevance to the specific plants and soils used in the enterprise.</li> <li>methods of nutrient uptake by plants</li> <li>nutrients required by plants grown within the enterprise and the affects of nutrient deficiency and toxicity on individual plant species and varieties, including visual symptoms</li> <li>soil ameliorants commonly required to treat the soil problems experienced by the enterprise</li> <li>the main simple and compound fertilizer products available to the enterprise including analysis, solubility, salt index, application rates and costs</li> <li>the environmental implications for the external environment of soil ameliorant and fertilizer use, which may include over-spraying, run-off, nutrient overload, erosion, toxicity, noise and dust.</li> </ul>
Underpinning Skills	<p>Include the ability to:</p> <ul style="list-style-type: none"> <li>communicate with work team members, supervisors, and suppliers,</li> <li>interpret manufacturers and plant nutrition program specifications, utilize preformed reporting, analysis and work procedure documents, and understand labels and symbols</li> <li>estimate treatment and product requirements, material sizes and quantities, interpret specifications, and calculate areas, ratios, proportions and application rates</li> <li>co-ordinate own activities with the requirements and schedules of the work group to sequentially and effectively implement the plant nutrition program in a timely and cost effective manner</li> <li>Communicate of ideas and information in written, oral and telecommunication of ideas and information relating to the plant nutrition program, with the work group, supervisor, contractors and suppliers.</li> <li>collect, analyze and organize information on enterprise work procedures, plant nutrition program specifications and site plans should be consulted, interpreted and applied to co-ordinate plant nutrition activities, with further clarification sought from the supervisor when necessary.</li> <li>Plan and organize work activities for the work group, and self prior to and adjusted during the plant nutrition program.</li> </ul>

	<ul style="list-style-type: none"> <li>• Facilitate and leading members of a team to complete the program on time and budget.</li> <li>• Use of mathematical ideas and techniques to calculate and apply the spatial and logistical requirements of the plant nutrition program.</li> <li>• Apply problem-solving skills on nutritional deficiencies and toxicities, the selection and sourcing of treatment products, co-ordination with the work group and work activities.</li> <li>• Use of technology to access and apply program specifications, undertake plant nutrition activities, communicate, report and keep records.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be accessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential Underpinning Knowledge and Attitude</p>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competency may be assessed in the work place or in a simulated work place setting</li> <li>• The skills and knowledge required to implement a plant nutrition program must be transferable to a different work environment. For example, this could include different plant species, nutrition programs and enterprise situations.</li> </ul>

Occupational Standard: Small Scale Irrigation Techniques Level III	
Unit Title	Estimate of Costing Irrigation Work
Unit Code	<a href="#">AGR SSI3 09 0816</a>
Unit Descriptor	This unit of competency specifies the outcomes required to estimate materials, labor and time requirements and to establish costs for provision of services or products. The unit covers the gaining of information, the estimation of materials, labor and time, the calculation of costs and the associated documentation.

Element	Performance Criteria
1. Gather information	<p>1.1. Details of customer requirements are obtained through discussion with customer or from information supplied.</p> <p>1.2. Plans and specifications are accessed and site is inspected.</p> <p>1.3. Details of products and services to be provided are developed.</p> <p>1.4. Delivery point and methods of transportation are determined where necessary.</p> <p>1.5. Details are recorded in accordance with workplace procedures.</p>
2. Estimate materials, labor and time.	<p>2.1. Work, including preparatory tasks, is planned and sequenced.</p> <p>2.2. Types and quantities of materials required for product work are <b>estimated</b>.</p> <p>2.3. Labour requirements to perform work are estimated.</p> <p>2.4. Time requirements to perform work are estimated.</p>
3. Calculate costs	<p>3.1. Total materials, labor and overhead costs are calculated in accordance with workplace procedures using appropriate <b>equipment</b>.</p> <p>3.2. Total work cost is calculated, including overheads and mark-up percentages.</p> <p>3.3. Final cost for work is calculated.</p>
4. Document and verify details.	<p>4.1. Details of costs and charges are documented in accordance with workplace procedures.</p> <p>4.2. Costs, calculations and other details are verified in accordance with workplace procedures.</p> <p>4.3. Customer quotation and tender are prepared.</p> <p>4.4. Details are documented for future reference in accordance with workplace procedures and using relevant <b>information</b>.</p>

<b>Variable</b>	<b>Range</b>
Factors for estimation and costing include:	<ul style="list-style-type: none"> <li>• Labor,</li> <li>• Materials, and</li> <li>• Overheads</li> </ul>
Equipment may include:	<ul style="list-style-type: none"> <li>• Calculators,</li> <li>• Computers running appropriate software to estimate and calculate necessary details,</li> <li>• Measuring equipment appropriate to work, and</li> <li>• Stationery.</li> </ul>
Information may include:	<ul style="list-style-type: none"> <li>• Charts and hand drawings,</li> <li>• Diagrams or sketches,</li> <li>• Instructions issued by authorized organizational or external personnel</li> <li>• Job drawings</li> <li>• Manufacturer specifications and instructions</li> <li>• Material Safety Data Sheets (MSDS)</li> <li>• Memos</li> <li>• Organization work specifications and requirements</li> <li>• Regulatory and legislative requirements, particularly those pertaining to: <ul style="list-style-type: none"> <li>➢ Building codes</li> <li>➢ OHS and environmental requirements</li> <li>➢ Irrigation work regulations</li> <li>➢ relevant Ethiopian standards</li> <li>➢ Safe work procedures relating to estimating and costing work</li> <li>➢ Signage</li> <li>➢ Verbal, written and graphical instructions</li> <li>➢ Work bulletins</li> <li>➢ Work schedules, plans and specifications.</li> </ul> </li> </ul>
Work procedures may include:	Supervisor's oral or written instructions, estimation and costing irrigation work program, enterprise Standard Operating Procedures (SOPs), specifications, work notes, waste disposal, recycling and re-use guidelines.
Maintaining clean and safe work area	Tasks may include disabling unused tools, equipment and storing neatly out of the way of activities, safely storing materials on site, using signage and safety barriers during and removing after estimation and costing activities are completed, and swiftly and efficiently removing and processing debris and waste from the work area.
Waste material may include:	<ul style="list-style-type: none"> <li>• Unused costing and estimation materials, and plant debris, litter and broken components.</li> <li>• Waste may be removed to designated areas for recycling, reuse, and return to the manufacturer or disposal.</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>A person who demonstrates competency in:</p> <ul style="list-style-type: none"> <li>• Locating, interpreting and applying relevant information, standards and specifications to the estimation and costing of work</li> </ul>

	<ul style="list-style-type: none"> <li>• Applying safety requirements throughout the work sequence, including the use of personal protective clothing and equipment</li> <li>• Estimating quantities of material required</li> <li>• Determining types and amount of labor required to complete the work</li> <li>• Estimating time required to complete the work</li> <li>• Estimating overheads associated with the job</li> <li>• Providing a written quotation and tender for each of the work requirements</li> <li>• Communicating and working effectively and safely with others.</li> </ul>
Underpinning Knowledge and Attitudes	<p>Required knowledge for this unit is:</p> <ul style="list-style-type: none"> <li>• Accessing information and the processes for calculating material requirements</li> <li>• Estimating and calculating processes</li> <li>• Impact of time on wages and other costs</li> <li>• Job safety analysis (JSA) and Safe Work Method Statements (SWMS)</li> <li>• Process for estimating and costing work</li> <li>• Relevant statutory and authority requirements related to estimating and costing work</li> <li>• SI system of measurements</li> <li>• Standards applicable to the work to be undertaken</li> <li>• Tendering and contracting processes</li> <li>• Workplace and equipment safety requirements.</li> </ul>
Underpinning Skills	<p>of this unit are:</p> <ul style="list-style-type: none"> <li>• Communication skills to: <ul style="list-style-type: none"> <li>➢ Complete workplace documentation</li> <li>➢ Enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand</li> <li>➢ Identify customer requirements</li> <li>➢ Prepare quotes and tenders</li> <li>➢ Record details, including costs and charges</li> <li>➢ Use language and concepts appropriate to cultural differences</li> <li>➢ Use and interpret non-verbal communication, such as hand signals</li> </ul> </li> <li>• Estimating materials and labor required for a work activity</li> <li>• Determining costs for the provision of a quotation or tender in the plumbing and services industry</li> <li>• Numeracy skills to apply calculations.</li> </ul>
Resources Implication	<p>Resource implications for assessment include:</p> <ul style="list-style-type: none"> <li>• An induction procedure and requirement</li> <li>• Realistic tasks or simulated tasks covering the minimum task requirements</li> <li>• Relevant specifications and work instructions</li> <li>• Tools and equipment appropriate to applying safe work practices</li> </ul>

	<ul style="list-style-type: none"> <li>• Support materials appropriate to activity</li> <li>• Workplace instructions relating to safe working practices and addressing hazards and emergencies</li> <li>• Material safety data sheets</li> <li>• Research resources, including industry related systems information.</li> </ul>
Methods of Assessment	<p>Assessment methods must:</p> <ul style="list-style-type: none"> <li>• Satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package</li> <li>• Include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application</li> <li>• Reinforce the integration of employability skills with workplace tasks and job roles</li> <li>• Confirm that competency is verified and able to be transferred to other circumstances and environments.</li> <li>• Validity and sufficiency of evidence requires that:</li> <li>• Competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace</li> <li>• Where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice, with a decision on competency only taken at the point when the assessor has complete confidence in the person's demonstrated ability and applied knowledge</li> <li>• All assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.</li> </ul> <p>Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.</p> <p>Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.</p>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting and on its own or in combination with other competencies relevant to the job function.</p>

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Determine Crop Water Requirement
Unit Code	<a href="#">AGR SSI3 10 0816</a>
Unit Descriptor	This unit of competence covers collecting, collating, identifying, compiling and analyzing Climatic, crop and Soil data. It requires the ability to collect and analyze information, identify data requirements, compare costing and prepare document outcomes, Determine Crop Water Requirement. It requires knowledge of soil, crop and climatic data analysis, statistical models, soil-plant-water relationship, to irrigation requirement, developments in related technology, environmental issues and economic analysis.

Elements	Performance criteria
1. Collect & Collate all Required Data	<p>1.1. Rainfall, wind speed, sunshine hour, minimum &amp; maximum temperature and humidity mean monthly values are collected and collated from a qualified meteorological station.</p> <p>1.2. Soil data is collected following standard procedures of soil survey.</p> <p>1.3. Available water amount is known.</p>
2. Identify type and characteristics of crop	<p>2.1. Economically and <b>agro-ecologically</b> beneficial crop is selected in accordance with preference of project owner.</p> <p>2.2. Data on crop characteristics, <b>crop coefficient</b>, growth stage, and period and root depth at different growth stages is identified from official research publication.</p>
3. Monitor irrigation system process	<p>3.1 Frequency of irrigation is recorded.</p> <p>3.2 Water usage is measured and recorded and does not exceed water allocation for a given period.</p> <p>3.3 Differences between estimated water use and actual water used are calculated.</p> <p>3.4 <b>Water quality</b> is measured according to enterprise <b>Occupational Health &amp; Safety (OHS)</b> policy and procedures.</p> <p>3.5 Plant or crop growth and water use efficiency is assessed.</p> <p>3.6 Soil <b>chemical characteristics</b> are measured and soil moisture is assessed.</p> <p>3.7 Labor performance is measured.</p> <p>3.8 Climate and weather conditions are recorded.</p>
4. Record, Compile & analyze Data	<p>4.1 Plant or crop environment data is recorded.</p> <p>4.2 Water orders and water usage is recorded.</p> <p>4.3 Irrigation shifts are recorded.</p> <p>4.4 System process data are recorded</p>



	<p>4.5 Soil data is analyzed for physical properties following standard laboratory procedure.</p> <p>4.6 Data consistency is checked using standard statistical package.</p> <p>4.7 Method for computing crop water requirement is chosen based on data preference and performance.</p> <p>4.8 Appropriate computer software model is selected.</p>
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Variable	Range
Agro-ecology	<ul style="list-style-type: none"> <li>consider rain fall temperature, altitude to decide the suitability of growing crop and irrigation methods</li> </ul>
Crop coefficient	<ul style="list-style-type: none"> <li>Consider crop factor which depends on the growing stages of crop.</li> </ul>
Water quality	May include physical, microbiological and chemical irrigation water parameters
OHS	<ul style="list-style-type: none"> <li>Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and</li> <li>Insect bites, solar radiation and dust.</li> <li>Glove, safety wear, helmet, eye glass,</li> </ul>
Chemical characteristics	salts, ( total concentration of soluble salts and residual sodium carbonate), hardness, PH, fluoride, chloride, metals nutrients, organics
Tools and equipment's	may include Auger, core sampler, Computer and software spatula, oven, pressure apparatus, sensitive balance, sieve, soil grinder, hydro meter, shaker and measuring cylinder, thermometer, stop watch, flasks.
Types and Sources of Information	<p>Organizational rules, regulation and guidelines</p> <ul style="list-style-type: none"> <li>Internet, related books and related materials</li> <li>Technical manuals</li> <li>sharing best practice</li> <li>Virtual library</li> <li>Workplace guidelines</li> <li>Recorded documents/logo/history</li> </ul>

Evidence Guide	
Critical Aspects of competence	<ul style="list-style-type: none"> <li>This unit of competence covers collection and collation of data to analysis and generation of crop water requirement and irrigation scheduling to optimize irrigation water application to irrigated field.</li> </ul>
Underpinning Knowledge and Attitude	<p>It requires knowledge of:</p> <ul style="list-style-type: none"> <li>Soil, crop and climatic data analysis</li> <li>Principles of statistical models</li> <li>Soil-plant-water relationship</li> <li>Computer software models related to irrigation requirement</li> <li>Developments in related technology</li> <li>Environmental issues and</li> <li>Economic analysis</li> </ul>

	<ul style="list-style-type: none"> <li>• Work value and ethics</li> <li>• Accountable to work</li> <li>• Loyalty and honest to the work he/she is doing</li> <li>• Dedication and commitment</li> <li>• Respect and follow organizational rules and regulation</li> </ul>
Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>• Collect climatic data</li> <li>• Identify soil type</li> <li>• Select crop type</li> </ul>
Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> <li>• Observation and question</li> <li>• Theoretical exam</li> <li>• Written exam/test</li> <li>• Portfolio Assessment (E.g. Certificate from training providers)</li> </ul>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Troubleshoot Irrigation and Drainage Systems
Unit Code	<a href="#">AGR SSI3 11 0816</a>
Unit Descriptor	This competency standard covers the process of troubleshooting faults and blockages in irrigation and drainage systems. It requires the ability to read and apply system specifications, technical manuals and supply/spare parts inventories, operate, maintain and repair irrigation systems, and record and report maintenance activities. Troubleshooting faults and blockages in irrigation systems requires knowledge of characteristics and operation of replaceable components of irrigation systems, system malfunctions and their likely causes, isolation procedures and OHS and environmental guidelines.

Element	Performance Criteria
1. Plan job	<p>1.1 Equipment is selected and checked for safe operation.</p> <p>1.2 Appropriate personal protective equipment and tools are selected and used according to <b>OHS requirements</b>.</p>
2. Determine access to irrigation and drainage lines	<p>2.1 Plan of plumbing system is determined and access points located.</p> <p>2.2 Digging is carried out without unnecessary damage to structures, site, environment or existing fixtures/fittings.</p>
3. Locate and identify faulty components and blockages	<p>3.1 <b>Irrigation system</b> and <b>component</b> function is determined by reference to system specifications and technical manuals.</p> <p>3.2 Monitoring and maintenance records are checked and reviewed.</p> <p>3.3 <b>Operational tests</b> are carried out in accordance with system specifications, technical manuals and <b>OHS</b> requirements.</p> <p>3.4 Faulty components and blockages are identified and documented according to enterprise policy and procedures.</p>
4. Inspect site	<p>4.1 Site is inspected to locate blocked section of <b>irrigation and drainage lines</b>.</p> <p>4.2 Work requirements and responsibility for repair is determined and appropriate authorities/persons notified of the intention to commence work.</p> <p>4.3 Repair activities are reported and recorded according to enterprise policy and procedures</p>
5. Shut down/isolate Component	<p>5.1 Shut down sequence and isolation procedures are applied as required according to system specifications and technical manuals.</p>

	<p>5.2 Safe shut down or isolation is verified.</p> <p>5.3 Safety/security lock off devices and signage is installed according to enterprise policy and procedures.</p>
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<b>Variable</b>	<b>Range</b>
OHS Requirements may include:	Manual handling, outdoor work (including protection from solar radiation, dust and noise), selection, use and maintenance of relevant personal protective clothing and equipment, selection, care and safe use of hand tools and safe systems for the prevention of electrical injury.
Irrigation systems might be:	<p>These may be pressurized irrigation systems such as micro-irrigation, spray irrigation or gravity fed irrigation Systems.</p> <p>Micro-irrigation systems include mains pressure, low pressure, below or above ground, spray systems, drip emitter trickle, t-tape, mini-sprinklers, and capillary, ebb and flow, and flood systems.</p> <p>Spray irrigation systems include travelling irrigators (soft hose, hard hose boom type) centre pivot, linear move, powered side roll hand shift permanent (installed), and bike shift/easy shift.</p> <p>Gravity fed irrigation systems include border check, contour Irrigation, furrow irrigation, hillside flooding and basin irrigation.</p> <p>Border check systems may be either permanent or temporary earth, plastic or concrete devices for insertion in a drain for reticulating water, contour banks used to collect and distribute water along the perimeter of an irrigation plot, contour banks within a plot to collect/distribute water or larger scale systems to stop water exiting one area to another.</p> <p>Irrigation systems may range from manual operation and monitoring to fully automated with computer control and Monitoring.</p>
Faulty components or system parts	These may vary according to brand and supplier and may include, but not be limited to, injectors, pumps, tensiometers, probe tubes, flow meter, pressure gauge, controllers, solenoid valves, wiring, Quick Coupling Valves (QCV), computer and/or other scheduling devices, pipes, jets, micro jets, laterals, sprinklers, emitters, integrated drip line "thin wall", seals, outlets and gears.
Operational tests of the system may include:	Pressures, flow rates, sprinkler performance, calculation of co-efficient of uniformity and distribution uniformity.
Irrigation and drainage lines	Include irrigation system and drainage system (surface and subsurface)
Decision how to clear a blockage	This may include access points, availability of equipment, surrounding structure, type of blockage and possibility of combustion, OHS considerations, and type of material
Disposal of faulty components	Disposal of faulty components must occur in an environmentally responsible way. For example, metal and plastic components may be recycled, returned to the

	manufacturer, or disposed of in accordance with enterprise procedures.
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<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• Describe causes of system malfunctions and their likely remedy</li> <li>• locate, isolate and replace faulty components and blockages</li> <li>• Return the system to normal operating status.</li> <li>• operate, maintain and repair irrigation systems</li> <li>• Implement and follow relevant enterprise OHS and environmental policies and procedures.</li> <li>• Identify and describe types, operational parameters of drains and components used in drainage systems</li> <li>• inspect the site to determine access to lines, locate and clear blockages,</li> <li>• Test the system and clean up afterwards. application of</li> <li>• comply OHS procedures when locating and clearing line blockages,</li> </ul>
Underpinning Knowledge and Attitude	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• identification, characteristics and operation of replaceable components of irrigation systems</li> <li>• system malfunctions and their likely causes</li> <li>• environmental impacts of irrigation, using water from any ground or underground source</li> <li>• purchasing procedures</li> <li>• isolation procedures</li> <li>• enterprise policies and procedures</li> <li>• Irrigation OHS and environmental guidelines.</li> <li>• types and operational parameters of drains</li> <li>• components used in drainage systems</li> <li>• isolation processes and procedures</li> <li>• leveling and alignment processes</li> <li>• regulatory requirements, codes of practice and relevant enterprise service standards relating to blockage removal, disconnection and reconnection activities</li> <li>• application of OHS procedures when locating and clearing line blockages,</li> <li>• Use of personal protective equipment and materials handling.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• read and apply system specifications, technical manuals and supply/spare parts inventories</li> <li>• record and report maintenance activities</li> <li>• identify adverse environmental impacts of irrigation activities and appropriate remedial action</li> <li>• operate, maintain and repair irrigation systems</li> </ul>

	<ul style="list-style-type: none"> <li>• Implement and follow relevant enterprise OHS and environmental policies and procedures.</li> <li>• Communicate ideas and information</li> <li>• Order replaceable components from suppliers.</li> <li>• Collect, analyze and organize information</li> <li>• Plan and organize activities</li> <li>• Organize shut down and repair activities.</li> <li>• Work with others and in teams</li> <li>• Check and review monitoring and maintenance records completed by others.</li> <li>• Use mathematical ideas and techniques in interpreting system performance data and purchasing parts within budget.</li> <li>• Solve problems in identifying and replacing faulty components.</li> <li>• interpret plans, specifications and service manuals</li> <li>• isolate appliances/fixtures/fittings and related assemblies (where required)</li> <li>• repair or remove blockages</li> <li>• use manual and mechanical drain cleaning equipment</li> <li>• level and align site</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be accessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential Underpinning Knowledge and Attitude</p>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</p>

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Carry out Surveying and Leveling
Unit Code	<a href="#">AGR SSI3 12 0816</a>
Unit Descriptor	This unit specifies the competency required to carry out basic surveying and leveling including the establishment of earthwork alignment and the transfer of heights from the survey control. It includes planning and preparation for work, establishment of alignment, set up and use of leveling devices and the recording of outcomes.

Elements	Performance Criteria
1. Plan and prepare work	<p>1.1 Work instructions, including plans, specifications, quality requirements and operational detail are obtained, confirmed and applied to the allotted task.</p> <p>1.2 Safety requirements are obtained from the site safety plan and organizational policies and procedures, confirmed and applied to the allotted task.</p> <p>1.3 Signage requirements are identified and obtained from the project traffic management plan and observed.</p> <p>1.4 Tools and equipment selected to carry out tasks are consistent with the requirements of the job, checked for serviceability and any faults are rectified or reported.</p> <p>1.5 <b>Leveling equipment</b> is checked for serviceability, within specified tolerances and any faults are reported.</p> <p>1.6 Environmental protection requirements are identified from the project environmental management plan, confirmed and applied to the allotted task.</p>
2. Perform survey techniques	<p>2.1 Different surveying methods are identified according to required information.</p> <p>2.2 Work procedures are prepared to perform surveying techniques.</p> <p>2.3 Surveying techniques are applied according to work place procedures/</p>
3. Establish offsets for civil works	<p>2.1 Offset and recovery pegs are established from survey controls to plans and drawings to meet project requirements/</p> <p>2.2 Earthwork and pavement control lines are re-established from offsets and/or recovery pegs in accordance with plans, drawings and specifications.</p> <p>2.3 Drainage offsets are established from survey control in accordance with plans, drawings and specifications.</p>
4. Set up and use leveling device	<p>3.1 <b>Heights</b> to be transferred/established are identified from project plans or instructions.</p>

	<p>3.2 <b>Leveling instruments</b> are set-up and correctly used in accordance with standard operating procedures and manufacturers' guidelines.</p> <p>3.3 Heights are transferred from the known to the required.</p> <p>3.4 Results of leveling procedure are documented and closed out to organisational requirements</p>
5. Clean up	<p>4.1 Work area is cleared and materials disposed of or recycled in accordance with project environmental management plan.</p> <p>4.2 Tools and equipment are cleaned, checked, maintained and stored in accordance with manufacturers' recommendations and standard work practices.</p>

Variable	Range
Leveling equipment/device tolerance checks	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• A two peg test for automatic level and reverse</li> <li>• readings for spirit level</li> </ul>
Heights or levels	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• drawing/sketch,</li> <li>• verbal or written instructions,</li> <li>• datum/survey peg,</li> <li>• chalk or nail mark and mark on vertical surface</li> </ul>
Leveling procedures	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Open or closed traverse</li> <li>• utilizing height of instrument or rise and fall methods of reduction</li> </ul>
Operator maintenance	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Cleaning authorised servicing and the monitoring,</li> <li>• Recording and reporting of faults.</li> <li>• It may also include the conduct of authorised minor replacements</li> </ul>
Personal protective equipment	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• That prescribed under legislation, regulation and workplace policies and practices</li> </ul>
Safe operating procedures	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Underground and overhead services,</li> <li>• other machines, personnel, restricted access barriers,</li> <li>• traffic control,</li> <li>• working in proximity to others,</li> <li>• worksite visitors and the public</li> </ul>
Hazards and risks	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Uneven/unstable terrain,</li> <li>• trees,</li> <li>• fires,</li> <li>• overhead and underground services,</li> <li>• bridges,</li> <li>• buildings,</li> </ul>



	<ul style="list-style-type: none"> <li>• structures,</li> <li>• hazardous materials,</li> <li>• confined space,</li> <li>• plant and traffic</li> </ul>
Quality requirements	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Dimensions,</li> <li>• tolerances,</li> <li>• standards of work and material standards as detailed in the project drawings,</li> <li>• specifications and project documentation to meet client satisfaction</li> </ul>
Communications	<p>May include but not limited to verbal instructions and fault reporting and may include:</p> <ul style="list-style-type: none"> <li>• two way radio,</li> <li>• hand signals,</li> <li>• mobile phone,</li> <li>• site specific instructions,</li> <li>• written instructions or instructions related to job/task</li> </ul>
Information sources	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Verbal or written and graphical instructions,</li> <li>• signage,</li> <li>• work schedules/plans/specifications,</li> <li>• charts and hand drawings,</li> <li>• memos,</li> <li>• maps and diagrams or sketches</li> </ul>
Materials	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Verbal or written and graphical instructions,</li> <li>• signage,</li> <li>• work schedules/plans/specifications,</li> <li>• charts and hand drawings,</li> <li>• memos, maps and diagrams or sketches</li> </ul>
Tools and equipment	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• leveling devices, wooded/steel pegs, straight edges, hammers and chalk line</li> <li>• Leveling devices are to include spirit levels, laser levels, string lines, tape measures, automatic levels, survey pegs, leveling staffs and plumb bobs</li> <li>• Leveling devices may include optical square, clinometers, batter pegs/boards</li> <li>• All work place documents, procedures associated with the use of tools and equipment shall comply with establishment procedures and manufacturer's instructions</li> <li>• Leveling devices may include profile board, String and line level, ranging pole, tape measure, and pegs.</li> </ul>

### Evidence Guide

Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• measure distance and angles</li> <li>• apply surveying techniques</li> </ul>
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	<ul style="list-style-type: none"> <li>• Locate, interpret and apply of relevant information, standards and specifications</li> <li>• Comply with site safety plan, OH&amp;S regulations and legislation applicable to workplace operations</li> <li>• Comply with organizational policies and procedures including quality requirements</li> <li>• conduct of a minimum of three different leveling tasks, at least one utilizing an automatic level. One of the tasks must include closed traverse utilizing either the height of instrument or rise and fall method of reduction</li> <li>• conduct of a two peg test with an automatic level, to confirm instrument meets manufacturers' tolerances</li> <li>• record of the results of each leveling procedure to organizational requirements</li> <li>• Communicate and working effectively and safely with others</li> </ul>
Underpinning Knowledge and Attitude	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• site safety plan, OHS regulations and legislation applicable to workplace operations</li> <li>• organizational policies and procedures including quality requirements</li> <li>• Locating, interpreting and application of relevant information, standards and specifications</li> <li>• Calculators and calculations</li> <li>• Company procedures</li> <li>• communication devices</li> <li>• Processes for care of measuring equipment</li> <li>• Surveying terminology</li> <li>• Site and equipment safety requirements</li> <li>• Communicating effectively</li> <li>• computing volume, area and linear measurements</li> <li>• work values and Ethics</li> <li>• accountable to work,</li> <li>• loyalty and honest to the work he/she being doing</li> <li>• dedication and commitment</li> <li>• respect and follow organizational rules and regulations</li> </ul>
Underpinning skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> <li>• Plan and prepare Work instructions....</li> <li>• Measure distance with linear measuring instruments.</li> <li>• computing volume, area and linear measurements</li> <li>• Set up and use theodolite device</li> <li>• Measure distances with stadia &amp; Sub tense bar</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>

Assessment Methods	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential Underpinning Knowledge and Attitude</li> </ul>
Context of Assessment	Competency may be assessed in the work place or in simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Implement Soil and Water Conservation Measures
Unit Code	<a href="#">AGR SSI3 13 0816</a>
Unit Descriptor	It requires the ability to organize the process of constructing excess water draining structures, micro catchments water harvesting structures and implementation of the designed physical, biological soil and water conservation practices, construct micro-catchment water harvesting structures and flood water harvesting structures.

Elements	Performance criteria
1. Implement physical and biological soil and water conservation measures	<p>1.1. <b>Indigenous soil and water conservation measures</b> are assessed.</p> <p>1.2. <b>Physical and biological soil and water conservation measures</b> are prioritized considering cost, severity and adaptability using standard technique.</p> <p>1.3. Community awareness and participation are enhanced using standard technique.</p> <p>1.4. Types and species of trees are identified using standard technique.</p> <p>1.5. Design criteria and specification are set for physical soil and water conservation practice considering soil type, slope and construction materials.</p> <p>1.6. Physical and biological soil and water conservation structures are set up in accordance with OHS requirements.</p>
2. Construct micro-catchment's water harvesting structures	<p>2.1. Adaptability of different <b>micro-catchment's water harvesting structures</b> are assessed based on topography and crop type.</p> <p>2.2. Community awareness and participation is enhanced using standard technique.</p> <p>2.3. Design criteria and specification are set for the chosen micro-catchment's water harvesting structure considering soil type, slope and crop type.</p>
3. Construct macro-catchment's water harvesting structures	<p>3.1. Adaptability of different <b>macro-catchment's water harvesting structures</b> are assessed based on topography and crop type.</p> <p>3.2. Community awareness and participation are enhanced using standard technique.</p> <p>3.3. Design criteria and specification are set for the chosen macro-catchment's water harvesting structure considering soil type, slope and crop type.</p>
4. Construct excess water draining structure	<p>4.1. Area of the land irrigated &amp; amount of excess water is estimated and design discharge identified considering irrigation method used and local rainfall.</p>

	<p>4.2. General and cross slope of field is examined to decide excess water draining channel and alignment.</p> <p>4.3. Size and cross-sections of channel is determined using standard technique.</p> <p>4.4. All <b>tools and equipments</b> are organized using standard technique.</p> <p>4.5. <b>Excess water reuse and disposal</b> point is planned using standard technique.</p>
5. Construct flood water harvesting structures	<p>5.1. Adaptability of different <b>flood water harvesting</b> structures assessed based on topography and crop type.</p> <p>5.2. Community awareness and participation is enhanced using standard technique.</p> <p>5.3. Design criteria and specification are set for the flood water harvesting structure considering soil type, slope and crop type.</p>

Variable	Range
Indigenous soil and water conservation measures may include:	Trash lines, bench terrace, traditional ditches (field cut off drains), pit cultivation
Physical and biological soil and water conservation measures	Nitrogen fixation, mulching, terrace, bund construction, check dam, retention reservoirs, grassed water ways, cut off drain
Micro-catchment water harvesting	Small planting pits, micro-basins(negarims, semicircular bunds, eyebrow basins)
Macro-catchment water harvesting	Hill side run off/conduit, foothill reclamation structures, large semicircular/trapezoidal bunds, road run off collecting structures, gully plugging, cut off drain, natural depressions, surface dams small earth and stone dams, ponds for ground water
Tools and equipments	<ul style="list-style-type: none"> <li>• Auger, core sampler, Computer and software, spatula, oven, pressure apparatus, sensitive balance, sieve, soil grinder, hydro meter, shaker and measuring cylinder, thermometer, stop watch, flasks, pin, clinometers, topographic map Planimeter, tape meter, line level, theodolite(stadia), chaining pins, ranging pole, staff, clinometers, Global positioning system, compass set, compass, shovel, spade, pick axe, hoe, wheel barrow, sand cement, wood, gravel, stone, elephant grass, tree species.</li> </ul>
Excess water reuse and disposal may include:	Water way, cut off drain, dikes and tail water reuse, ground water recharge techniques
Flood water harvesting	Spate irrigation, flood water spreading structures
Occupational Health & Safety	<ul style="list-style-type: none"> <li>• Hazards may include: chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust.</li> <li>• Glove, safety wear, helmet and eye glass</li> </ul>

Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• Sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>
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<b>Evidence Guide</b>	
Critical Aspects of competence	<ul style="list-style-type: none"> <li>• Examine general and cross slope of field to decide excess water draining channel and alignment,</li> <li>• Plan excess water reuse and disposal point,</li> <li>• Assess indigenous soil and water conservation techniques,</li> <li>• Prioritize physical and biological soil and water conservation technique considering cost, severity and adaptability,</li> <li>• Identify types and species of trees for biological measures,</li> <li>• Set design criteria and specification for physical soil and water conservation practice,</li> <li>• Construct physical soil and water conservation structures,</li> <li>• Construct Micro-catchment's water harvesting structures,</li> <li>• Construct macro-water harvesting structures, and</li> <li>• Construct flood water harvesting structures.</li> </ul>
Under pinning knowledge	<p>Practicing on implementing soil and water conservation measure knowledge of:</p> <ul style="list-style-type: none"> <li>• Different type of soil and water conservation structures, micro and macro, and flood water harvesting structures,</li> <li>• Understanding erosivity and erodability of project site,</li> <li>• Soil loss estimation method,</li> <li>• Soil moisture determination technique,</li> <li>• Engineering survey technique,</li> <li>• Drawing and interpreting sketch of soil and water conservation structure</li> </ul>
Under pinning skill	<p>includes the ability to:</p> <ul style="list-style-type: none"> <li>• Estimate over land flow,</li> <li>• Design, make lay out and construct micro, macro catchment and flood water harvesting structure</li> </ul>
Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> </ul>

	<ul style="list-style-type: none"> <li>• Observation and question</li> <li>• Theoretical exam</li> <li>• Written exam/test</li> <li>• Portfolio Assessment (E.g. Certificate from training providers)</li> </ul>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

<b>Occupational Standard: Small Scale Irrigation Development Level III</b>	
<b>Unit Title</b>	<b>Construct Water Harvesting Structures</b>
<b>Unit Code</b>	<b><u>AGR SSI3 14 0816</u></b>
<b>Unit Descriptor</b>	This unit of competence covers the process of planning and development of spring, surface and subsurface reservoirs and floodways. It requires the ability to plan & design water harvesting structures and constructs recommended structures. It requires the knowledge of surface and ground water hydrology, water harvesting design principles, catchments area delineation, forestry development, bill of quantity preparation, surveying techniques, engineering drawing, environmental issues, guidelines and legislations.

<b>Elements</b>	<b>Performance criteria</b>
1. Plan water harvesting structures	<p>1.1. Potential areas are identified using standard technique.</p> <p>1.2. Water contributors are identified &amp; maintained using standard technique.</p> <p>1.3. Soil moisture status &amp; level of ground water are assessed using standard technique.</p> <p>1.4. Best practices are identified to recharge underground water table.</p>
2. Design water harvesting structures	<p>2.1. Catchment area is delineated and characterized for climatic variables.</p> <p>2.2. Seasonal water ways are identified and characterized for flood water level using flood water routing techniques.</p> <p>2.3. Proper site for water harvesting is identified using standard technique.</p> <p>2.4. Appropriate water harvesting technique is chosen based on applicability &amp; adaptability.</p> <p>2.5. Design principles for the chosen water harvesting technique are selected.</p> <p>2.6. Design drawings are prepared for different structures &amp; lay outs using standard technique.</p> <p>2.7. Silt trap is designed to settle and clear off sediments before entering storage structures.</p>
3. Construct water harvesting structures	<p>3.1. Type of construction materials and equipment are identified considering criteria: such as availability, cost and applicability.</p> <p>3.2. Man power requirements are determined.</p> <p>3.3. All service and running cost are determined for the project life time.</p> <p>3.4. Bill of quantity is prepared following standard procedures.</p> <p>3.5. Land leveling activities are conducted using construction equipment.</p>



	<p>3.6. Lay out drawings and construction specifications are interpreted using chosen surveying techniques in to physical marks on project site.</p> <p>3.7. Appropriate shade &amp; lining materials are selected to reduce evaporation &amp; seepage loss respectively.</p>
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Variable	Range
Water harvesting structures includes:	Micro and macro water harvesting structure, spring development, floodways, surface and subsurface storage underground recharge
Occupational Health & safety	Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust.
Tools, equipments and machinery	Planimeter, Tape meter, line level, theodolite, chaining pins, ranging pole, staff, clinometers, Global positioning system, compass, Auger, core sampler, spatula, oven, pressure apparatus, sensitive balance, sieve, soil grinder, hydro meter, shaker and measuring cylinder, thermometer, stop watch, flasks, shovel, rakes, spades, rope, plumb bob, hoe, mixer, tracing paper, pencil, graph paper, fixer, topographic map, drawing compass set.
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>

Evidence Guide	
Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• Plan water harvesting structures</li> <li>• Identify proper site for water harvesting</li> <li>• Chose appropriate water harvesting technique based on applicability &amp; adaptability</li> <li>• Identify type of construction materials and equipment considering criteria: such as availability, cost and applicability</li> <li>• Interpret lay out drawings and construction specifications using chosen surveying techniques in to physical marks on project site.</li> <li>• Selected appropriate shade &amp; lining materials to reduce evaporation &amp; seepage loss respectively</li> </ul>
Underpinning Knowledge and attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Surface and ground water hydrology,</li> <li>• Water harvesting design principles,</li> <li>• Catchment area delineation,</li> <li>• Bill of quantity preparation,</li> <li>• Basic Surveying techniques,</li> </ul>

	<ul style="list-style-type: none"> <li>• Engineering drawing related to the level,</li> <li>• Environmental issues, guidelines and legislation</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Plan water harvesting structures</li> <li>• Design water harvesting structures</li> <li>• Construct water harvesting structures</li> <li>• Interpret drawings and symbols</li> </ul>
Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Measure Water Flow In-pipes and Open Channels
Unit Code	<a href="#">AGR SSI3 15 0816</a>
Unit Descriptor	This unit describes the competencies required to measure water flow in-pipes and open channels and to calculate theoretical flows. An understanding of the processes required to collect data accurately, interpret data, verify data and apply theoretical techniques to produce flow data are essential to performance.

Element	Performance Criteria
1. Calculate energy losses and energy gradients in pipe flow	1.1 Review measurements and compare against expected trends. 1.2 Use standard processes to identify, estimate, adjust and justify data and review inconsistent data on <b>flow conditions</b> . 1.3 Prepare pipeline design <b>charts</b> using standard formulae. 1.4 Identify the limitations of formulae. 1.5 Identify variations in <b>roughness coefficients</b> . 1.6 Calculate the pipe discharge from reservoirs.
2 Calculate flow in open channels.	2.1 Identify the <b>methods used for measuring flows</b> in open channels. 2.2 Use the <b>formulae for calculating flows</b> in open channels. 2.3 Distinguish the <b>characteristics of open channels</b> . 2.4 Distinguish the uses of different measuring instruments and devices used in open channels 2.5 Assess the hydraulic principles which apply to different <b>meters</b> . 2.6 Identify the limitations of the meters.
3 Calculate flows through notches and weirs.	3.1 Identify the methods used for measuring flows in notches and weirs. 3.2 Use the formulae for calculating flows in notches and weirs. 3.3 Distinguish the applications and <b>characteristics of notches and weirs</b> . 3.4 Distinguish the uses of different measuring instruments and devices used for notches and weirs. 3.5 Assess the hydraulic principles which apply to different meters. 3.6 Identify the limitations of the meters.

4 Calculate proportions for an economic section.	<p>4.1 Calculate the proportions of rectangular, trapezoidal and circular channels for maximum discharge.</p> <p>4.2 Use a partial flow chart to identify the depth of flow for maximum discharge and maximum velocity.</p>
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<b>Variable</b>	<b>Range</b>
Flow conditions will include:	<ul style="list-style-type: none"> <li>• laminar flow</li> <li>• turbulent flow</li> <li>• smooth and rough pipe and channel surfaces</li> <li>• full pipe flow</li> <li>• submerged flow conditions</li> <li>• backwater</li> <li>• critical flow, sub critical and supercritical</li> <li>• uniform flow</li> <li>• rapidly changing flow</li> <li>• Weir and flumes behavior under various flow conditions.</li> </ul>
Charts include:	<ul style="list-style-type: none"> <li>• Colebrook-White charts</li> <li>• Hazen and Williams charts</li> <li>• Manning charts.</li> </ul>
Roughness coefficients include:	<ul style="list-style-type: none"> <li>• biological growths and other obstructions</li> <li>• slime deposits</li> <li>• incrustations</li> <li>• general debris</li> <li>• deterioration of unlined ferrous surfaces, because the bore may be diminished by oxide formations</li> <li>• irregularities at joints: <ul style="list-style-type: none"> <li>• eccentricity</li> <li>• abrupt decrease of diameter</li> <li>• protrusions of mortar or other jointing materials</li> </ul> </li> <li>• inadequate closure, especially if this has permitted tree roots to enter</li> <li>• amount and size of solids being transported</li> <li>• Disturbances by flow from branch lines especially in sewers.</li> </ul>
Methods used for measuring flows include:	<ul style="list-style-type: none"> <li>• container method</li> <li>• tilt tank method</li> <li>• trajectory method</li> </ul>
Formulae for calculating flows	<ul style="list-style-type: none"> <li>• Chezy equation</li> <li>• Colebrook-White</li> <li>• Hazen and Williams</li> <li>• Darcy-Weisbach</li> <li>• Manning equation.</li> </ul>
Characteristics of open channels include:	<ul style="list-style-type: none"> <li>• types of open channel</li> <li>• steadiness</li> <li>• uniformity</li> <li>• state of open channel flow</li> <li>• laminar, transitional and turbulent flow</li> <li>• Critical, subcritical, and supercritical flow.</li> </ul>

Meters include:	<ul style="list-style-type: none"> <li>• mechanical meters such as: <ul style="list-style-type: none"> <li>➤ the displacement type</li> <li>➤ The inferential type.</li> </ul> </li> <li>• pressure meters such as: <ul style="list-style-type: none"> <li>➤ pitot tube</li> <li>➤ orifice plate</li> <li>➤ Venturi meter.</li> </ul> </li> </ul>
Characteristics of notches and weirs will include:	<ul style="list-style-type: none"> <li>• type of the crest</li> <li>• shape of the notch</li> <li>• Crest and conditions.</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>The candidate should demonstrate the ability to use a range of hydraulics principles and calculations of theoretical flows including:</p> <ul style="list-style-type: none"> <li>• calculating energy in pipe flows</li> <li>• calculating hydraulic and energy gradient for pipelines</li> <li>• calculating flow in open channels</li> <li>• calculating flows through notches and weirs</li> <li>• Calculating proportions for an economic section.</li> </ul>
Underpinning Knowledge and Attitudes	<ul style="list-style-type: none"> <li>• principles of fluid statics, fluid dynamics and hydraulic mechanics</li> <li>• Pascal's Law and hydrostatic effect on submerged surfaces</li> <li>• distinction between laminar and turbulent flow</li> <li>• Darcy-Weisbach equation</li> <li>• Bernoulli's equation</li> <li>• Super critical flow</li> <li>• Critical flow</li> <li>• Sub-critical flow</li> <li>• Uniform flow and steady flow</li> <li>• the effect of velocity variation on velocity head</li> <li>• equations for calculating the approximate value of the friction factor</li> <li>• smooth and rough wall turbulent flow</li> <li>• minimize pipeline losses</li> </ul>
Underpinning Skills	<ul style="list-style-type: none"> <li>• draw velocity distribution curves for fluids in pipes or channels with both laminar flow and turbulent flow</li> <li>• use data to determine the value of roughness</li> <li>• use simple equations for determining pipe friction with their appropriate application</li> <li>• calculate head losses in non-circular pipes</li> <li>• calculate minor energy losses associated with enlargements, contractions, valves, fittings and bends</li> <li>• calculate the flow in a pipe using data regarding minor energy losses</li> <li>• apply flow formulae to different open channel cross-sections in developing the proportions for an economic section</li> </ul>

	<ul style="list-style-type: none"> <li>• calculate the flow in pipelines</li> <li>• calculate the gradual varied flow profiles in uniform channels when the discharge is known</li> <li>• use analytical tools and formulae</li> <li>• interpret and apply technical documentation to the collection, analysis and reporting of hydrometric data</li> <li>• identify potential or actual operational problems</li> <li>• use computer systems</li> <li>• Use recording and reporting systems.</li> </ul>
Resources Implication	<p>Access to the workplace and resources including:</p> <ul style="list-style-type: none"> <li>• documentation that should normally be available in a water industry organization</li> <li>• Relevant codes, standards, and government regulations.</li> <li>• Where applicable, physical resources should include equipment modified for people with disabilities.</li> </ul>
Methods of Assessment	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>• Access must be provided to appropriate learning and/or assessment support when required.</li> <li>• Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.</li> <li>• Validity and sufficiency of evidence requires that:</li> <li>• competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace</li> <li>• where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice</li> <li>• a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts</li> <li>• all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence</li> </ul> <p>Assessment methods should closely reflect workplace demands (e.g. literacy) and the needs of particular groups (e.g. people with disabilities, and people who may have literacy or numeracy difficulties, such as speakers of languages other than English, remote communities and those with interrupted schooling).</p>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting. This competence standard could be assessed on its own or in combination with other competencies relevant to the job function</p>

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Maintain Pressurized Irrigation Systems
Unit Code	<a href="#">AGR SSI3 16 0816</a>
Unit Descriptor	This competency standard covers the process of maintaining pressurized irrigation systems, including the repair and replacement of basic, simple components under routine supervision. It requires the ability to read and follow an operators manual and manufacturers specifications for pressurized irrigation systems, maintain selected irrigation system components, and record and report maintenance observations and activities. Maintaining pressurized irrigation systems requires knowledge of major components of a pressurized irrigation delivery system, maintenance requirements and procedures for system components, and environmentally safe disposal procedures for chemicals.

Element	Performance Criteria
1. Carry out pre- and post-season maintenance	<p>1.1 Equipment is prepared pre-season for effective operation in accordance with design specifications and enterprise standards.</p> <p>1.2 System is flushed, cleaned, closed down and maintained post-season in accordance with design specifications and <b>enterprise standards</b>.</p> <p>1.3 Equipment requiring storage is dismantled, loaded, transported and stored without damage according to enterprise standards and <b>safe working practices</b>.</p>
2. Carry out routine maintenance activities	<p>2.1 All maintenance activities are carried out according to the maintenance program and the manufacturers specifications.</p> <p>2.2 <b>Mechanical equipment</b> is serviced in accordance with the operators manual or as directed.</p> <p>2.3 Supply and distribution systems are flushed and cleaned with sprinklers, emitters and/or drip line tapes replaced as directed.</p> <p>2.4 Outlets, strainers, pump screens and filters are cleaned and replaced as directed.</p> <p>2.5 System is visually inspected for leaks, operating faults and dry areas, and observations recorded in the maintenance book.</p> <p>2.6 Operation area is maintained in a clean and safe condition, and <b>OHS procedures</b> are followed.</p>
3. Maintain system components	<p>3.1 System maintenance is carried out at scheduled times using equipment and <b>materials</b> in accordance with enterprise standards and manufacturers specifications.</p> <p>3.2 <b>Parts</b> are inspected for wear or blockage and reported or replaced according to enterprise guidelines.</p>

	<p>3.3 <b>Outlets are removed and cleaned</b> and damaged ones are reassembled and replaced according to manufacturer's specifications.</p> <p>3.4 Operation area is maintained in a clean and safe condition, and OHS procedures are followed.</p>
4. Record and report maintenance activities	<p>4.1 All damage and blockage caused by pests and vermin is recorded by damage type, location and the section of the system affected.</p> <p>4.2 Damage or faulty pumps, valves, electrical components and computer systems are recorded and reported, and action taken to effect repairs.</p> <p>4.3 All routine maintenance activities are recorded and reported in accordance with enterprise standards.</p>

Variable	Range
Enterprise standards for flushing and cleaning the system may include:	<ul style="list-style-type: none"> <li>environmental considerations such as the</li> <li>identification of the impacts of pumping water from any ground or underground source and appropriate remedial action, and procedures for dealing with cleaning agents and waste water</li> </ul>
Safe working practices may include:	safe procedures for manual handling, and the operation of machinery and equipment.
Servicing of mechanical equipment may include:	<ul style="list-style-type: none"> <li>Periodical maintenance for pumping unit may include changing engine oil, replacing the oil filter, replacing the air cleaner, checking battery water level, pre-cleaner, gear box oil, cooling system/water, fuel, battery charge and fuel tank, greasing the pump jack shaft and bearings, and flushing (de-silting) the pump.</li> <li>Centre control tower maintenance may include greasing head of pivot and all gearboxes, checking tyre pressure, and cleaning electrical controls of authorized components.</li> <li>There may be environmental considerations relating to the servicing of mechanical equipment such as disposal of oils/grease and used parts.</li> </ul>
OHS procedures may include:	<ul style="list-style-type: none"> <li>prevention of electrical injury, protection against cleansing agents including acids, and safe systems and procedures for protection against risks of slips and falls.</li> </ul>
Materials may include:	<ul style="list-style-type: none"> <li>gland packing, rubber rings, belts and pulleys, hazardous substances, or chemicals.</li> </ul>
Parts /replaceable system components may include:	<ul style="list-style-type: none"> <li>pipes, jets, microjets, laterals, sprinklers, emitters, integrated dripline "thin wall", seals and outlets.</li> </ul>
Outlets removed and cleaned may include:	<ul style="list-style-type: none"> <li>Outlets drip lines, cups and fluming, pipes, risers, valves, sprinklers and emitters.</li> </ul>
Pre-season maintenance	may include weed control, motor servicing, flushing and supply distribution, descaling and equipment service



Post-season maintenance may include:	disconnecting electrics, motor servicing, reports of equipment and machinery damage, flushing and draining, protection from environmental damage, and servicing equipment.
Pressurized irrigation systems	<ul style="list-style-type: none"> <li>• Irrigation systems may range from manual operation and monitoring to fully automated with computer control and monitoring.</li> <li>• They may include micro-irrigation systems and spray irrigation systems.</li> <li>• Micro-irrigation systems may be mains pressure, low pressure, below or above ground, sprays systems, drip emitter trickle, t-tape, mini-sprinklers, and capillary. Spray irrigation systems may be travelling irrigators (soft hose, hard hose boom type) centre pivot, linear move, powered side roll hand shift permanent (installed), and bike shift/easy shift.</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>A candidate must demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• inspect and replace worn parts,</li> <li>• follow procedures to carry out routine maintenance with only routine supervision.</li> </ul>
Underpinning Knowledge and Attitude	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• enterprise and OHS procedures relating to pressurized irrigation system maintenance</li> <li>• major components of a pressurized irrigation delivery system</li> <li>• maintenance requirements and procedures for system components</li> <li>• environmentally safe disposal procedures for chemical containers and residues, oils/grease and used parts.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• read and follow an operators manual and manufacturers specifications for pressurized irrigation systems</li> <li>• maintain selected irrigation system components</li> <li>• record and report maintenance observations and activities.</li> <li>• carry out pre- and post-season maintenance</li> <li>• carry out routine maintenance activities on pressurized irrigation delivery systems</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> </ul>

	<ul style="list-style-type: none"> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> <li>• Assessment methods must confirm the ability to access and correctly interpret and apply the essential Underpinning Knowledge and Attitude</li> </ul>
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Implement Post-harvest Principles
Unit Code	<a href="#">AGR SSI3 17 0816</a>
Unit Descriptor	<p>This competency standard covers the process of implementing post-harvest program for horticultural crops including grading, treating, packing and storing harvested produce.</p> <p>Implementing a post-harvest program is likely to be carried out under limited supervision from others with checking only related to overall progress. The work requires the application of extensive horticultural knowledge and a broad range of horticultural skills. The post-harvest program usually follows established routines, methods and procedures where some discretion and judgment is required. This includes selection of equipment and materials, organization of work, services, actions and the achievement of outcomes within time and budgetary constraints.</p>

Element	Performance Criteria
1. Prepare for implementation of post-harvest operations	<p>1.1 <b>Post-harvest operations</b> to be performed are identified according to <b>enterprise work procedures</b>, the <b>marketing plan</b> and industry guidelines and confirmed with the supervisor.</p> <p>1.2 <b>Materials, tools, equipment and machinery</b> are selected according to enterprise work procedures.</p> <p>1.3 Pre-operational and safety checks are carried out on tools, equipment and machinery according to manufacturers specifications and enterprise work procedures.</p> <p>1.4 <b>OHS hazards</b> are identified, risks assessed, controls implemented and reported to the supervisor.</p> <p>1.5 Suitable safety and <b>Personal Protective Equipment (PPE)</b> are selected, used and maintained.</p>
2. Co-ordinate post-harvest work	<p>2.1 Enterprise work team is identified and tasks are co-ordinated in a sequential, timely and effective manner in consultation with the supervisor.</p> <p>2.2 Post-harvest operations are undertaken according to <b>OHS requirements</b> and with due consideration of the <b>environmental implications</b>.</p> <p>2.3 A <b>clean, safe and hygienic work area</b> is maintained throughout and on completion of work.</p>
3. Implement post-harvest treatments	<p>3.1 Harvested produce is graded and labeled according to the marketing plan and enterprise work procedures.</p> <p>3.2 Produce that does not meet specifications and enterprise standards is identified and disposed of according to <b>enterprise environmental procedures</b>.</p>

	<p>3.3 <b>Post-harvest treatments</b> are selected according to harvested produce requirements, the enterprise integrated pest management strategy and the marketing plan.</p> <p>3.4 Timing, rate, application method, environmental requirements and handling techniques conform to the requirements of the harvested produce, enterprise work procedures and industry best practice.</p> <p>3.5 <b>Post-harvest practices</b> are economical, methodical, meet established work schedules and minimize damage to produce.</p> <p>3.6 Tools, equipment and machinery are cleaned and maintained according to enterprise work procedures.</p>
4. Implement hazardous waste disposal guidelines	<p>4.1 Waste disposal requirements of the enterprise are reviewed and operational tasks determined.</p> <p>4.2 Collection of waste and disposal are monitored with variation from enterprise environmental procedures addressed promptly.</p> <p>4.3 Conditions likely to impact on business viability are reported promptly to the supervisor.</p>
5. Implement packing and presentation requirements of produce	<p>5.1 <b>Packing and presentation requirements</b> specified in the marketing plan and enterprise work procedures are reviewed and operational tasks determined.</p> <p>5.2 Packing and presentation of produce conform to the requirements of the harvested produce, the marketing plan and industry best practice.</p> <p>5.3 Packing and presentation processes are monitored and remedial action taken where necessary.</p> <p>5.4 Packing and presentation processes are recorded according to enterprise work procedures.</p>
6. Implement storage requirements of produce	<p>6.1 <b>Storage requirements</b> specified in the marketing plan and enterprise work procedures are reviewed and operational tasks determined.</p> <p>6.2 Storage and handling of produce conform to the requirements of the harvested produce, the marketing plan and industry best practice.</p> <p>6.3 Storage processes and facilities are monitored and remedial action taken where necessary.</p> <p>6.4 Storage processes and conditions are recorded according to enterprise work procedures.</p>

Variable	Range
Post-harvest operations may include:	Transporting harvested produce from the field to post-harvest processing or storage facilities, grading, applying treatments, and packing, labeling and storing harvested produce.

Enterprise work procedures	Work procedures will be based on sound horticultural principles and practices and may include supervisors oral or written instructions, post-harvest program or production schedule, marketing plan, enterprise standard operating procedures(SOPs), specifications, routine maintenance schedules, work notes; industry best practice guidelines on quality, food safety and hygiene; product labels and Material Safety Data Sheets (MSDS), manufacturers service specifications and operators manuals, waste disposal, recycling and re-use guidelines, and OHS procedures.
Marketing plan	The marketing plan will address client specifications that may include quality of plant produce (and various grades) such as variety, shape, size, weight, length, color, maturity, moisture content, ripeness, texture, skin condition, blemishes, bud count and health which are subject to seasonal and market forces. Client preferences may also specify packaging materials, containers, filling techniques, labeling and storage requirements from field to client such as the cool chain concept.
Materials , tools, equipment and machinery	Materials may include preservatives, chemicals, gases, cleaning agents, packaging materials and containers, labels, adhesives. Tools, equipment and machinery may include tractors, trailers, light trucks, forklifts, snips, knives, gloves, containers, grading machinery, washers, brushes, dryers, chemical applicators, gassing chambers, labeling devices, packing tools, scales, pallets, hand trolleys and lifting aids, cool-rooms and dedicated storage facilities.
OHS hazards may include:	a wet working environment including electricity, solar radiation, dust, pollen, soil-borne micro-organisms, noise, chemicals and hazardous substances, confined spaces, sharp hand tools and equipment, manual handling, slippery or uneven surfaces, and moving equipment, machinery and vehicles.
PPE may include:	Signage and barriers, and operational safety exits from cool-rooms and gassing chambers.4hat, boots, overalls, gloves, apron, waterproof clothing, spray clothing, goggles, respirator or face mask, face guard, self-contained breathing apparatus, hearing protection, sunscreen lotion and hard hat.
What OHS requirements may include:	identifying hazards, assessing and reporting risks, cleaning, maintaining and storing tools, equipment and machinery; appropriate use of PPE, safe operation of tools, equipment and machinery, ensuring operational safety exits from cool rooms and gassing chambers, confined spaces policy and procedures, safe handling, use and storage of chemicals and hazardous substances, correct manual handling, basic first aid, personal hygiene and reporting problems to supervisors.
Environmental implications associated with the implementation of a post-harvest	Detrimental environmental impacts may arise where post-harvest activities produce excess noise, dust or water run-off, disposal of unwanted or waste plant material that produces odor and attracts pests, and risks infecting healthy crops, or

program	on- and off-site ground water or soils that are contaminated from solids, debris, nutrients, chemicals and water run-off.
Maintaining clean, safe and hygienic work area be:	Tasks may include disabling unused tools, equipment and machinery and storing neatly out of the way of post-harvest activities, safely storing materials including chemicals on-site, using signage and safety barriers during and removing after post-harvest activities are completed, cleaning, fumigating or sterilizing post-harvest equipment and storage facilities, and swiftly and efficiently removing and processing debris and waste from the work area.
Enterprise environmental procedures may include:	procedures for the disposal of out-of-standard produce, waste material such as chemicals and hazardous substances used in post-harvest treatments, their containers, plant debris, litter, processing and cleaning water run-off, and broken components and packaging. Waste may be removed to designated areas for recycling, reuse, and return to the manufacturer or disposal.
Post-harvest treatments may include:	removal of dirt and foreign material, stripping excess leaves and/or trimming, brushing, washing/hydration, drying, applying preservatives, applying fungicides and insecticides by spraying or dipping, waxing and polishing, ripening or de-greening with ethylene gas, observing quarantine requirements and storing in a controlled environment.
Post -harvest practices employed	Field handling practices may include observing the fill level of containers, lifting rather than dragging containers to avoid contact with dirt, correctly stacking containers on transport to reduce the risk of bruising, squashing or damaging the produce, and smoothly transporting the harvested produce to the post-harvest processing or storage facility. Harvested crops may need to be stored in the shade, in water-filled or covered containers in the field. In the shed storage may occur in a temperature-controlled environment such as a cool-room. These may include forced air cool-rooms for table grapes, hydro cool-rooms for stone fruit and vacuum cool-rooms for mushrooms. Produce damage may be minimized by wearing gloves, maintaining sharp tools, placing rather than dropping produce into containers, cutting fingernails, observing fill heights, arrangement of produce and packing instructions for containers, and correctly stacking containers on transport.
Packing and presentation requirements	Packing and presentation requirements for specific produce and clients may include specifications for packaging materials and containers, filling techniques and arrangement of produce within the container, and for labeling.
Storage requirements	Storage requirements for specific produce and clients may include specifications for storage facilities, environmental conditions such as temperature, humidity and light, length of storage, position in the storage facility and cleaning processes to ensure a level of hygiene that protects the quality and health status of the stored produce.

<b>Evidence Guide</b>			
Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• co-ordinate post-harvest operations;</li> <li>• Implement post-harvest treatments, hazardous waste disposal guidelines, and packing, presentation and storage requirements according to industry best practice and market specifications.</li> </ul>		
Underpinning Knowledge and Attitude	<p>Demonstrates Knowledge of:</p> <ul style="list-style-type: none"> <li>• the attributes of produce in relation to the desired quality of produce to be presented to the client,</li> <li>• Integrated Pest Management principles and enterprise policy,</li> <li>• the importance of maintaining the quality of produce including handling and cooling requirements,</li> <li>• the relationship between the quality attributes of produce and packing techniques and packaging,</li> <li>• industry standards for packaging,</li> <li>• cool chain principles and practices,</li> <li>• characteristics and procedures for the use of cool-rooms,</li> <li>• storage methods for a range of produce,</li> <li>• the correct storage temperatures for a range of produce</li> <li>• humidity levels and their effect on the quality of produce</li> <li>• hygiene issues in the handling and storage of plant produce</li> <li>• environmental effects of post-harvest treatments and hazardous waste disposal methodologies, application and purpose</li> <li>• Enterprise confined spaces policy and safety procedures.</li> </ul>		
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• communicate orally and in writing with team members and supervisors</li> <li>• interpret and confirm chemical labels, MSDS, work instructions and enterprise work procedures</li> <li>• record information about work activities on proformas</li> <li>• participate in teams and contribute to team objectives</li> <li>• count and calculate quantities, treatment application rates and storage requirements</li> <li>• correctly dispose of chemical substances, their containers and other waste materials to minimize environmental impact</li> <li>• Implement enterprise OHS policy and procedures.</li> <li>• Communicate ideas and information relating to post-harvest activities and problems</li> <li>• Collect, analyze and organize information-Enterprise work procedures and client specifications in the marketing plan</li> <li>• Plan and organize activities for the work group and self</li> <li>• Using mathematical ideas and techniques to calculate and apply the spatial and logistical requirements of the post-harvest program.</li> </ul>		
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	<ul style="list-style-type: none"> <li>• Solve problems in produce quality issues, the selection and sourcing of treatments and products,</li> <li>• co-ordination with the work group and work activities</li> <li>• Use technology to access and apply program specifications, undertake post-harvest activities, communicate, report and keep records.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test / Oral Questioning</li> <li>• Observation / Demonstration</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting</p>



Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Apply Watershed Management Principles
Unit Code	<a href="#">AGR SSI3 18 0816</a>
Unit Descriptor	This competency standard covers the process of applying core principles of watershed management and complies with the requirements often associated across a broad range of watershed management approaches. Watershed management approaches are evolving and are being used to address watersheds that have multiple problems. It requires the ability to understand basic watershed processes and their interrelated nature, the principles of long-term watershed management, the elements of successful watershed management frameworks, and the benefits of the watershed management approach. Applying Watershed Management Principles requires knowledge of watershed, Soil and Water Conservation, water harvesting, forestry, materials cartage, pollution control, sequence of working and timing, occupational health and safety issues relating to the site, equipment used, implementation techniques and specifications and standards. It ranges from understanding basic watershed processes and their interrelated nature, the principles of long-term watershed management, the elements of successful watershed management frameworks, and the benefits of the watershed management approach.

Element	Performance criteria
1. Understand basic watershed processes and their interrelated nature	<p>1.1 Critical and micro/sub watersheds are delineated with the consent of the communities and other concerned parties involved</p> <p>1.2 <b>Natural Processes</b> at Work in the Watershed are identified and described fully</p> <p>1.3 Human Factors at Work in the Watershed are identified and described in depth</p> <p>1.4 Size of the watershed, population, current land uses by percentages, Kebeles the watershed, etc are enumerated and described</p> <p>1.5 Materials are selected to complete proposed works.</p>
2. Consider the principles of long-term watershed management	<p>2.1 Multi-disciplinary activities over a management cycle are coordinated to address continuous watershed management needs</p> <p>2.2 Appropriate data for watershed planning is <b>gathered</b> and analyzed)</p> <p>2.4 Major constraints and possible solutions are <b>prioritized and targeted</b></p> <p>2.5 A workable watershed development <b>plan is developed.</b></p>

	2.6 Conditions for <b>implementation</b> , monitoring and evaluation are sorted out.
3. Outline the elements of successful watershed management framework	3.1 A strong watershed results framework conditions, facilitates for communication and partnerships is designed
4. Design appropriate benefit sharing mechanisms among stakeholders	4.1. Expected benefits of the watershed management is listed. 4.2. Dynamic and continually re-adjustable benefit sharing mechanism that allows accommodating changes is designed.

Variable	Range
Natural Processes may include:	<ul style="list-style-type: none"> <li>Knowing your watershed means coming to learn the natural processes working within the watershed boundaries</li> <li>These natural forces help shape the watershed landscape, its water quality, and--in turn--our lives.</li> <li>Climate, geology, hydrology, soils, and vegetation shaping the landscape, with waterways often cutting down steep slopes</li> <li>Working with your watershed also means understanding how most human activities in the watershed can occur in harmony with natural processes. Communities located along streams and rivers, for example, are faced with very basic choices: they can learn how the river functions and learn to draw benefits from it while staying out of harm's way -- or, they can try to significantly change the river's behavior in order to accomplish their plans.</li> </ul>
Data gathering	Scoping and data gathering from a given watershed can be done by but not limited to: <ul style="list-style-type: none"> <li>Planners</li> <li>Scientist</li> <li>Community</li> <li>Experts and Stakeholders</li> </ul>
Prioritization and Targeting	Can be undertaken by but not limited to: <ul style="list-style-type: none"> <li>Stakeholders, officials, planners, scientist</li> </ul>
Plan development	Can be undertaken by planners, stakeholders, officials, scientist, Engineers
Implementation	Can be undertaken by stakeholders, regulators, Technical support, Experts

Evidence Guide	
Critical Aspects of Competence	<p>Assessment requires evidence that the candidate</p> <ul style="list-style-type: none"> <li>Apply watershed management principles according to enterprise guidelines and industry best practice</li> <li>Apply watershed management principles to a range of work environments and contexts</li> </ul>

Underpinning Knowledge and Attitude	<p>The knowledge requirements include:</p> <ul style="list-style-type: none"> <li>• Watershed management</li> <li>• Soil and Water Conservation</li> <li>• Water harvesting</li> <li>• Forestry</li> <li>• Materials cartage &amp; pollution control</li> <li>• Sequence of working and timing/duration</li> <li>• Occupational health &amp; safety issues relating to the site</li> <li>• Equipment used</li> <li>• Construction/installation techniques for all measures on the plan</li> <li>• Basic watershed processes and their interrelated nature</li> <li>• The principles of long-term watershed management</li> <li>• The elements of successful watershed management frameworks</li> <li>• The benefits of the watershed management approach</li> </ul>
Underpinning skills	<p>include the ability to understand:</p> <ul style="list-style-type: none"> <li>• Understand basic watershed processes and their interrelated nature</li> <li>• Consider the principles of long-term watershed management</li> <li>• Outline the elements of successful watershed management framework</li> <li>• Design appropriate benefit sharing mechanisms among stakeholders</li> </ul>
Resource Implication	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> <li>• Access to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on Underpinning Knowledge and Attitude</li> <li>• questioning or interview on Underpinning Knowledge and Attitude</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential Underpinning Knowledge and Attitude</p>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting</p>

<b>Occupational Standard: Small Scale Irrigation Development Level III</b>	
<b>Unit Title</b>	<b>Establish Irrigation Related Environmental Impact Assessment Program</b>
<b>Unit Code</b>	<b><a href="#">AGR SSI3 19 0816</a></b>
<b>Unit Descriptor</b>	This competency standard covers the process of determining and documenting responsibilities and procedures to reduce the impacts of irrigation and drainage systems on the environment, to minimize the risk of environmental pollution events, and reduce the impact of such events when they occur. It requires the ability to develop procedures, apply and comply with environmental requirements, identify adverse environmental impacts of irrigation activities and appropriate remedial action, use technology to draft documents, develop environmental information, and audit data bases. Establishing and maintaining an irrigation-related environmental protection program requires knowledge of environmental legislation, regulations and guidelines, external factors that may affect the system, and enterprise policies and procedures.

<b>Elements</b>	<b>Performance Criteria</b>
1. Establish and maintain an irrigation and drainage environmental protection program	<p>1.1 An irrigation and drainage environmental plan is developed in consultation with property owner or manager.</p> <p>1.2 Environmental responsibilities for the property are clearly defined and included in the duties of all personnel.</p> <p>1.3 Financial and human resources are made available to implement the environmental plan in a timely and consistent manner.</p> <p>1.4 Environmental records are established and maintained according to relevant codes of practice, legislation and regulations.</p>
2. Establish and maintain arrangements to ensure the involvement of all personnel in the environmental program	<p>2.1 Procedures and processes that allow and encourage all personnel at all levels to have input into environmental issues are developed.</p> <p>2.2 Issues rose through involvement and consultations with personnel are addressed promptly.</p>
3. Establish and maintain risk management procedures to protect the environment from irrigation practices and related activities	<p>3.1 Procedures for identifying and assessing existing and potential risks to the environment arising from irrigation practices and related activities are established and maintained according to relevant environmental standards.</p> <p>3.2 Work processes and procedures are designed to reduce or eliminate risks and hazards to the environment.</p>

	<p>3.3 Organizational and administrative systems are established and maintained to control risks to the environment arising from irrigation practices and related activities.</p> <p>3.4 Procedures to monitor risks to the environment and compliance with relevant legislation and regulations are established and maintained.</p>
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Variable	Range
Occupational Health & Safety	<ul style="list-style-type: none"> <li>• Use personal protective equipments</li> <li>• Apply environmental care procedures</li> </ul>
Tools and equipments	<ul style="list-style-type: none"> <li>• Stationary materials</li> <li>• Manuals</li> <li>• Personal protective equipments</li> </ul>
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>

Evidence Guide	
Critical Aspects of Competence	<ul style="list-style-type: none"> <li>• Established and maintained irrigation and drainage environmental protection program</li> <li>• Established and maintained arrangements to ensure the involvement of all personnel in the environmental program</li> <li>• Establish and maintain risk management procedures to protect the</li> <li>• Environment from irrigation practices and related activities</li> </ul>
Required Knowledge and Attitude	<ul style="list-style-type: none"> <li>• Environmental legislation</li> <li>• Regulations and guidelines</li> <li>• External factors that may affect the system</li> <li>• Enterprise policies and procedures.</li> </ul>
Underpinning skill	<ul style="list-style-type: none"> <li>• Establish and maintain Procedures for identifying and assessing existing and potential risks to the environment arising from irrigation practices and related activities according to relevant environmental standards.</li> <li>• Develop irrigation and drainage environmental plan in consultation with property owner or manager.</li> <li>• Develop Procedures and processes that allow and encourage all personnel at all levels to have input into environmental issues.</li> </ul>
Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>

Method of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> <li>• Observation and question</li> <li>• Theoretical exam</li> <li>• Written exam/test</li> <li>• Portfolio Assessment (E.g. Certificate from training providers)</li> </ul>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Monitor Implementation of Work Plan/Activities
Unit Code	<a href="#">AGR SSI3 20 0816</a>
Unit Descriptor	This unit covers competence required to oversee and monitor the quality of work operations within an enterprise. This unit may be carried out by team leaders or supervisors.

Elements	Performance Criteria
1. Monitor and improve workplace operations	<p>1.1 Efficiency and service levels are monitored on an ongoing basis.</p> <p>1.2 Operations in the workplace have been supported overall enterprise goals and quality assurance initiatives.</p> <p>1.3 Quality <b>problems</b> and issues are promptly identified and adjustments made accordingly.</p> <p>1.4 Procedures and systems are changed in consultation with colleagues to improve efficiency and effectiveness.</p> <p>1.5 Colleagues are consulted about ways to improve efficiency and service levels.</p>
2. Plan and organise workflow	<p>2.1 Current workload of colleagues is accurately assessed.</p> <p>2.2 Work is scheduled in a manner which enhances efficiency and customer service quality.</p> <p>2.3 Work is delegated to appropriate people in accordance with principles of delegation.</p> <p>2.4 Workflow is assessed against agreed objectives and timelines and colleagues are assisted in prioritisation of workload.</p> <p>2.5 Input regarding staffing needs is provided to appropriate management.</p>
3. Maintain workplace records	<p>3.1 <b>Workplace records</b> are accurately completed and submitted within required timeframes.</p> <p>3.2 Where appropriate, completion of records is delegated and monitored prior to submission.</p>
4. Solve problems and make decisions	<p>4.1 Workplace problems are promptly identified and considered from an operational and customer service perspective.</p> <p>4.2 Short term action is initiated to resolve the immediate problem where appropriate.</p> <p>4.3 Problems are analysed for any long term impact and potential solutions assessed and actioned in consultation with relevant colleagues.</p> <p>4.4 Where problem is raised by a team member, they are encouraged to participate in solving the problem.</p> <p>4.5 Follow up action is taken to monitor the effectiveness of solutions in the workplace.</p>

<b>Variables</b>	<b>Range</b>
Problems	May include but not limited to: <ul style="list-style-type: none"> <li>• difficult customer service situations</li> <li>• equipment breakdown/technical failure</li> <li>• delays and time difficulties</li> <li>• competence</li> </ul>
Workplace records	May include but is not limited to: <ul style="list-style-type: none"> <li>• staff records and regular performance reports</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	Demonstrates skills and knowledge in: <ul style="list-style-type: none"> <li>• ability to effectively monitor and respond to a range of common operational and service issues in the workplace</li> <li>• the role of staff involved in workplace monitoring</li> <li>• quality assurance, principles of workflow planning, delegation and problem solving</li> </ul>
Underpinning Knowledge and Attitude	Demonstrate knowledge of: <ul style="list-style-type: none"> <li>• roles and responsibilities in monitoring work operations</li> <li>• overview of leadership and management responsibilities</li> <li>• principles of work planning and principles of delegation</li> <li>• typical work organization methods appropriate to the sector</li> <li>• quality assurance principles and time management</li> <li>• problem solving and decision making processes</li> <li>• industrial and/or legislative issues which affect short term work organization as appropriate to industry sector</li> </ul>
Underpinning Skills	Demonstrate skills to: <ul style="list-style-type: none"> <li>• monitor and improve workplace operations</li> <li>• plan and organize workflow</li> <li>• maintain workplace records</li> </ul>
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.



Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Apply Quality Control
Unit Code	<a href="#">AGR SSI3 21 0816</a>
Unit Descriptor	This unit covers the knowledge, attitudes and skills required in applying quality control in the workplace.

Elements	Performance Criteria
1. Implement quality standards	<p>1.1 Agreed quality standard and procedures are acquired and confirmed.</p> <p>1.2 Standard procedures are introduced to organizational staff/personnel.</p> <p>1.3 Quality standard and procedures documents are provided to employees in accordance with the organization policy.</p> <p>1.4 Standard procedures are revised / updated when necessary.</p>
2. Assess quality of service delivered	<p>2.4 Services delivered are <b>quality checked</b> against organization <b>quality standards</b> and specifications.</p> <p>2.5 Service delivered are evaluated using the appropriate evaluation <b>quality parameters</b> and in accordance with organization standards.</p> <p>2.6 Causes of any identified faults are identified and corrective actions taken in accordance with organization policies and procedures.</p>
3. Record information	<p>3.3 Basic information on the quality performance is recorded in accordance with organization procedures.</p> <p>3.4 Records of work quality are maintained according to the requirements of the organization.</p>
4. Study causes of quality deviations	<p>4.3 Causes of deviations from final outputs or services are investigated and reported in accordance with organization procedures.</p> <p>4.4 Suitable preventive action is recommended based on organization quality standards and identified causes of deviation from specified quality standards of final service or output.</p>
5. Complete documentation	<p>5.3 Information on quality and other indicators of service performance is recorded.</p> <p>5.4 All service processes and outcomes are recorded.</p>

Variable	Range
Quality check	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Check against design / specifications</li> <li>• Visual and Physical inspection</li> </ul>
Quality standards	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Materials</li> </ul>

	<ul style="list-style-type: none"> <li>• Components</li> <li>• Process</li> <li>• Procedures</li> </ul>
Quality parameters	May include but not limited to: <ul style="list-style-type: none"> <li>• Standard Design / Specifications</li> <li>• Material Specification</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	Demonstrates skills and knowledge to: <ul style="list-style-type: none"> <li>• Check completed work continuously against organization standard</li> <li>• Identify and isolate faulty or poor service</li> <li>• Check service delivered against organization standards</li> <li>• Identify and apply corrective actions on the causes of identified faults or error</li> <li>• Record basic information regarding quality performance</li> <li>• Investigate causes of deviations of services against standard</li> <li>• Recommend suitable preventive actions</li> </ul>
Underpinning Knowledge and Attitude	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• Relevant quality standards, policies and procedures</li> <li>• Characteristics of services</li> <li>• Safety environment aspects of service processes</li> <li>• Evaluation techniques and quality checking procedures</li> <li>• Workplace procedures and reporting procedures</li> </ul>
Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> <li>• interpret work instructions, specifications and standards appropriate to the required work or service</li> <li>• carry out relevant performance evaluation</li> <li>• maintain accurate work records</li> <li>• meet work specifications and requirements</li> <li>• communicate effectively within defined workplace procedures</li> </ul>
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

<b>Occupational Standard: Small Scale Irrigation Development Level III</b>	
<b>Unit Title</b>	<b>Lead Workplace Communication</b>
<b>Unit Code</b>	<a href="#"><b>AGR SSI3 22 0816</b></a>
<b>Unit Descriptor</b>	This unit covers the knowledge, attitudes and skills needed to lead in the dissemination and discussion of information and issues in the workplace.

<b>Elements</b>	<b>Performance Criteria</b>
1. Communicate information about workplace processes	1.1 Appropriate <b>communication method</b> is selected. 1.2 Multiple operations involving several topics areas are communicated accordingly. 1.3 Questions are used to gain extra information. 1.4 Correct sources of information are identified. 1.5 Information is selected and organized correctly. 1.6 Verbal and written reporting is undertaken when required. 1.7 Communication skills are maintained in all situations.
2. Lead workplace discussion	2.1 Response to workplace issues is sought. 2.2 Response to workplace issues are provided immediately. 2.3 Constructive contributions are made to workplace discussions on such issues as production, quality and safety. 2.4 Goals/objectives and action plan undertaken in the workplace are communicated.
3. Identify and communicate issues arising in the workplace	3.1 Issues and problems are identified as they arise. 3.2 Information regarding problems and issues are organized coherently to ensure clear and effective communication. 3.3 Dialogue is initiated with appropriate staff/personnel. 3.4 Communication problems and issues are raised as they arise.

<b>Variable</b>	<b>Range</b>
Methods of communication	May include but not limited to: <ul style="list-style-type: none"> <li>• Non-verbal gestures</li> <li>• Verbal</li> <li>• Face to face</li> <li>• Two-way radio</li> <li>• Speaking to groups</li> <li>• Using telephone</li> <li>• Written</li> <li>• Using Internet</li> <li>• Cell phone</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	Demonstrates skills and knowledge to: <ul style="list-style-type: none"> <li>• Deal with a range of communication/information at one time</li> <li>• Make constructive contributions in workplace issues</li> <li>• Seek workplace issues effectively</li> <li>• Respond to workplace issues promptly</li> <li>• Present information clearly and effectively written form</li> <li>• Use appropriate sources of information</li> <li>• Ask appropriate questions</li> <li>• Provide accurate information</li> </ul>
Underpinning Knowledge and Attitude	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• Organization requirements for written and electronic communication methods</li> <li>• Effective verbal communication methods</li> </ul>
Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> <li>• Organize information</li> <li>• Understand and convey intended meaning</li> <li>• Participate in variety of workplace discussions</li> <li>• Comply with organization requirements for the use of written and electronic communication methods</li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Lead Small Teams
Unit Code	<a href="#">AGR SSI3 23 0816</a>
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to determine individual and team development needs and facilitate the development of the work group.

Elements	Performance Criteria
1. Provide team leadership	<p>1.1 <b>Learning and development needs</b> are systematically identified and implemented in line with <b>organizational requirements</b>.</p> <p>1.2 Learning plan is collaboratively developed and implemented to meet individual and group training and developmental needs.</p> <p>1.3 Individuals are encouraged to self-evaluate performance and areas identified for improvement.</p> <p>1.4 <b>Feedback on performance</b> of team members is collected from relevant sources and compared with established team learning process.</p>
2. Foster individual and organizational growth	<p>2.1 Learning and development program goals and objectives are identified to match the specific knowledge and skills requirements of competence standards.</p> <p>2.2 <b>Learning delivery methods</b> are made appropriate to the learning goals, the learning style of participants and availability of equipment and resources.</p> <p>2.3 Workplace learning opportunities and coaching/ mentoring assistance are provided to facilitate individual and team achievement of competencies.</p> <p>2.4 Resources and timelines required for learning activities are identified and approved in accordance with organizational requirements.</p>
3. Monitor and evaluate workplace learning	<p>3.1 Feedback from individuals or teams is used to identify and implement improvements in future learning arrangements.</p> <p>3.2 Outcomes and performance of individuals/teams are assessed and recorded to determine the effectiveness of development programs and the extent of additional support.</p> <p>3.3 Modifications to learning plans are negotiated to improve the efficiency and effectiveness of learning.</p> <p>3.4 Records and reports of competence are maintained within organizational requirement.</p>
4. Develop team commitment and cooperation	<p>4.1 Open communication processes are used by team to obtain and share information.</p> <p>4.2 Decisions are reached by the team in accordance with its agreed roles and responsibilities.</p>

	4.3 Mutual concern and camaraderie are developed in the team.
5. Facilitate accomplishment of organizational goals	<p>5.1 Team members are made actively participatory in team activities and communication processes.</p> <p>5.2 Individual and joint responsibility has been developed teams members for their actions.</p> <p>5.3 Collaborative efforts are sustained to attain organizational goals.</p>

Variable	Range
Learning and development needs	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Coaching, mentoring and/or supervision</li> <li>• Formal/informal learning program</li> <li>• Internal/external training provision</li> <li>• Work experience/exchange/opportunities</li> <li>• Personal study</li> <li>• Career planning/development</li> <li>• Performance appraisals</li> <li>• Workplace skills assessment &amp; Recognition of prior learning</li> </ul>
Organizational requirements	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Quality assurance and/or procedures manuals</li> <li>• Goals, objectives, plans, systems and processes</li> <li>• Legal and organizational policy/guidelines and requirements</li> <li>• Safety policies, procedures and programs</li> <li>• Confidentiality and security requirements</li> <li>• Business and performance plans</li> <li>• Ethical standards</li> <li>• Quality and continuous improvement processes and standards</li> </ul>
Feedback on performance	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Formal/informal performance appraisals</li> <li>• Obtaining feedback from supervisors and colleagues</li> <li>• Obtaining feedback from clients</li> <li>• Personal and reflective behavior strategies</li> <li>• Routine and organizational methods for monitoring service delivery</li> </ul>
Learning delivery methods may include but not limited to:	<ul style="list-style-type: none"> <li>• On the job coaching or mentoring</li> <li>• Problem solving</li> <li>• Presentation/demonstration</li> <li>• Formal course participation</li> <li>• Work experience and Involvement in professional networks</li> <li>• Conference/seminar attendance and induction</li> </ul>

Evidence Guide	
Critical Aspects of Competence	<p>Demonstrates skills and knowledge to:</p> <ul style="list-style-type: none"> <li>• identify and implement learning opportunities for others</li> </ul>

	<ul style="list-style-type: none"> <li>• give and receive feedback constructively</li> <li>• facilitate participation of individuals in the work of the team</li> <li>• negotiate learning plans to improve the effectiveness of learning</li> <li>• prepare learning plans to match skill needs</li> <li>• access and designate learning opportunities</li> </ul>
Underpinning Knowledge and Attitude and Attitude	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• coaching and mentoring principles</li> <li>• how to work effectively with team members who have diverse work styles, aspirations, cultures and perspective</li> <li>• how to facilitate team development and improvement</li> <li>• methods and techniques for eliciting and interpreting feedback</li> <li>• methods for identifying and prioritizing personal development opportunities and options</li> <li>• career paths and competence standards in the industry</li> </ul>
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> <li>• read and understand a variety of texts, prepare general information and documents according to target audience; spell with accuracy; use grammar and punctuation effective relationships and conflict management</li> <li>• receive feedback and report, maintain effective relationships and conflict management</li> <li>• organize required resources and equipment to meet learning needs</li> <li>• provide support to colleagues</li> <li>• organize information; assess information for relevance and accuracy; identify and elaborate on learning outcomes</li> <li>• facilitation skills to conduct small group training sessions</li> <li>• relate to people from a range of social, cultural, physical and mental backgrounds</li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written exam</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the workplace or in a simulated workplace setting

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Improve Business Practice
Unit Code	<a href="#">AGR SSI3 24 0816</a>
Unit Descriptor	This unit covers the knowledge, skills and attitudes required in promoting, improving and growing business operations.

Elements	Performance Criteria
1. Diagnose the business	<p>1.1 <b>Sources data</b> is identified; <b>data required</b> for diagnosis is determined and acquired based on the business diagnosis toolkit.</p> <p>1.2 Value chain analysis is conducted.</p> <p>1.3 <b>SWOT analysis</b> of the data is undertaken.</p> <p>1.4 <b>Competitive advantage</b> of the business is determined from the data.</p>
2. Benchmark the business	<p>2.1 Product or service to be benchmarked is identified and selected.</p> <p>2.2 Sources of relevant benchmarking data are identified.</p> <p>2.3 <b>Key indicators</b> are selected for benchmarking in consultation with key stakeholders.</p> <p>2.4 Key indicators of own practice are compared with benchmark indicators.</p> <p>2.5 Areas of improvements are identified.</p>
3. Develop plans to improve business performance	<p>3.1 A consolidated list of required improvements is developed.</p> <p>3.2 Cost-benefit analysis is determined for required improvements.</p> <p>3.3 Work flow changes resulting from proposed improvements are determined.</p> <p>3.4 Proposed improvements are ranked according to agreed criteria.</p> <p>3.5 An action plan is developed and agreed to implement the top ranked improvements.</p> <p>3.6 <b>Organizational structures</b> are checked to ensure they are suitable.</p>
4. Develop marketing plans	<p>4.1 The practice vision statement is reviewed.</p> <p>4.2 Practice <b>objectives</b> are developed/ reviewed.</p> <p>4.3 Market research is conducted and result is obtained.</p> <p>4.4 Target markets are identified/ refined.</p> <p>4.5 <b>Market position</b> is developed/ reviewed.</p> <p>4.6 <b>Practice brand</b> is developed.</p> <p>4.7 <b>Benefits</b> of products or services are identified.</p>



	4.8 <b>Promotion tools</b> are selected and developed.
5. Develop business growth plans	<p>5.1 Plans are developed to increase profitability</p> <p>5.2 Proposed plans are <b>ranked</b> according to agreed criteria.</p> <p>5.3 An action plan is developed and agreed to implement the top ranked plans.</p> <p>5.4 Business work practices are reviewed to ensure they support growth plans.</p>
6. Implement and monitor plans	<p>6.1 Implementation plan is developed in consultation with all <b>relevant stakeholders</b>.</p> <p>6.2 Success indicators of the plan are agreed.</p> <p>6.3 Implementation is monitored against agreed indicators.</p> <p>6.4 Implementation is adjusted as required.</p>

Variable	Range
Data sources	May include primary data and secondary sources
Data required	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Organization capability</li> <li>• Appropriate business structure</li> <li>• Level of client service which can be provided</li> <li>• Internal policies, procedures and practices</li> <li>• Staff levels, capabilities and structure</li> <li>• Market and market definition</li> <li>• Market changes/market segmentation</li> <li>• Market consolidation/fragmentation</li> <li>• Revenue</li> <li>• Level of commercial activity</li> <li>• Expected revenue levels, short and long term</li> <li>• Revenue growth rate</li> <li>• Break even data</li> <li>• Pricing policy</li> <li>• Revenue assumptions</li> <li>• Business environment</li> <li>• Economic conditions</li> <li>• Social factors</li> <li>• Demographic factors</li> <li>• Technological impacts</li> <li>• Political/legislative/regulative impacts</li> <li>• Competitors, competitor pricing and response to pricing</li> <li>• Competitor marketing/branding</li> <li>• Competitor products</li> </ul>
SWOT analysis	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Internal strengths such as staff capability, recognized quality</li> <li>• Internal weaknesses such as poor morale, under-capitalization, poor technology</li> </ul>

	<ul style="list-style-type: none"> <li>• External opportunities such as changing market and economic conditions</li> <li>• External threats such as industry fee structures, strategic alliances, competitor marketing</li> </ul>
Competitive advantage	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Quality</li> <li>• Pricing</li> <li>• Cost</li> <li>• Location</li> <li>• Technology</li> <li>• Delivery</li> <li>• Timeframe</li> <li>• Promotion</li> <li>• Niche marketing</li> <li>• Support from government</li> </ul>
Key indicators	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Staffing</li> <li>• Cost and expenses</li> <li>• Personnel productivity (particularly of principals)</li> <li>• Goodwill</li> <li>• Profitability</li> <li>• Price structure</li> <li>• Customers base</li> <li>• Productivity</li> <li>• Quality</li> <li>• System</li> </ul>
Organizational structures	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Lines of authority and reporting relationship</li> </ul>
Objectives	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Market share growth</li> <li>• Revenue growth</li> <li>• Profitability</li> <li>• Productivity</li> <li>• Innovation</li> </ul>
Market position	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• The goods or service provided</li> <li>• Product mix</li> <li>• The core product - what is bought</li> <li>• The tangible product - what is perceived</li> <li>• The augmented product - total package of consumer</li> <li>• Features/benefits</li> <li>• Product differentiation from competitive products</li> <li>• New/changed products</li> <li>• Price and pricing strategies (cost plus, supply/demand, ability to pay, etc.)</li> <li>• Pricing objectives (profit, market penetration, etc.)</li> <li>• Cost components</li> <li>• Market position</li> <li>• Distribution strategies</li> </ul>

	<ul style="list-style-type: none"> <li>• Marketing channels</li> <li>• Promotion</li> <li>• Target audience</li> <li>• Communication</li> </ul>
Practice brand	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Practice image</li> <li>• Practice logo/letterhead/signage</li> <li>• Phone answering protocol</li> <li>• Facility decor</li> <li>• Slogans</li> <li>• Templates for communication/invoicing</li> <li>• Style guide</li> <li>• Writing style</li> <li>• AIDA (Attention, Interest, Desire and Action)</li> </ul>
Benefits	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Features as perceived by the client</li> <li>• Benefits as perceived by the client</li> </ul>
Promotion tools	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Networking and referrals</li> <li>• Seminars</li> <li>• Sales promotion</li> <li>• Advertising</li> <li>• Personal selling</li> <li>• Press releases</li> <li>• Publicity and sponsorship</li> <li>• Brochures</li> <li>• Newsletters (print and/or electronic)</li> <li>• Websites</li> <li>• Direct mail</li> <li>• Telemarketing/cold calling</li> </ul>
Ranking	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Importance</li> <li>• Urgency</li> <li>• Technology</li> <li>• Resource availability</li> </ul>
Relevant stockholders	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Micro and Small Enterprises development</li> <li>• Non-Government Organizations (NGOs)</li> <li>• Finance institutions</li> <li>• Capital goods leasing enterprise</li> </ul>

### Evidence Guide

Critical Aspects of Competence	<p>Demonstrates skills and knowledge of:</p> <ul style="list-style-type: none"> <li>• Identifying the key indicators of business performance</li> <li>• Identifying the key market data for the business</li> <li>• A wide range of available information sources</li> <li>• Acquiring information not readily available within a business</li> <li>• Analyzing data and determine areas of improvement</li> </ul>
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	<ul style="list-style-type: none"> <li>• Negotiating required improvements to ensure implementation</li> <li>• Evaluating systems against practice requirements</li> <li>• Forming recommendations and/or make recommendations</li> <li>• Assessing the accuracy and relevance of information</li> </ul>		
Underpinning Knowledge and Attitude	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Data gathering and analysis</li> <li>• Value chain analysis</li> <li>• SWOT analysis</li> <li>• Competitive advantage</li> <li>• Cost benefit analysis</li> <li>• Target market</li> <li>• Marketing principles</li> <li>• Organizational structure</li> <li>• Marketing mix</li> <li>• Promotion mix</li> <li>• Market position</li> <li>• Branding</li> </ul> <p>Profitability demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Data gathering and analysis</li> <li>• Value chain analysis</li> <li>• SWOT analysis</li> <li>• Competitive advantage</li> <li>• Cost benefit analysis</li> <li>• Target market</li> <li>• Marketing principles</li> <li>• Organizational structure</li> <li>• Marketing mix</li> <li>• Promotion mix</li> <li>• Market position</li> <li>• Branding</li> <li>• Profitability</li> </ul>		
Underpinning Skills	<p>Demonstrates skill in:</p> <ul style="list-style-type: none"> <li>• Benchmarking skills</li> <li>• Communication skills</li> <li>• Computers skills to manipulate data and present information</li> <li>• Negotiation skills</li> <li>• Preparing action plan</li> <li>• Conducting market research</li> <li>• Identifying target market</li> <li>• Identifying suitable marketing mix</li> <li>• Preparing promotional tools</li> <li>• Problem solving</li> <li>• Planning skills</li> <li>• Monitoring and evaluation</li> <li>• Ability to acquire and interpret relevant data</li> <li>• Use of market intelligence</li> <li>• Development and implementation strategies of promotion and growth plans</li> </ul>		
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	<ul style="list-style-type: none"> <li>• Ability to acquire and interpret required data, current practice systems and structures and sources of relevant benchmarking data</li> <li>• Applying methods of selecting relevant key benchmarking indicators</li> <li>• Communication skills</li> <li>• Working and consulting with others when developing plans for the business</li> <li>• Negotiation skills</li> <li>• Using computers to manipulate, present and distribute information</li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level III	
Unit Title	Prevent and Eliminate MUDA
Unit Code	<a href="#">AGR SSI3 25 0816</a>
Unit Descriptor	This unit of competence covers the knowledge, skills and attitude required by a worker to prevent and eliminate MUDA/wastes in his/her their workplace. It covers responsibility for the day-to-day operation of the work and ensures Kaizen elements are continuously improved and institutionalized.

Elements	Performance Criteria
1. Prepare for work.	<p>1.1 Work instructions are used to determine job requirements, including method, material and equipment.</p> <p>1.2 Job specifications are read and interpreted following working manual.</p> <p>1.3 <b>OHS requirements</b>, including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work.</p> <p>1.4 Appropriate material is selected for work.</p> <p>1.5 <b>Safety equipment and tools</b> are identified and checked for safe and effective operation.</p>
2. Identify MUDA.	<p>2.1 Plan of MUDA identification is prepared and implemented.</p> <p>2.2 Causes and effects of MUDA are discussed.</p> <p>2.3 <b>Tools and techniques</b> are used to draw and analyze current situation of the work place.</p> <p>2.4 Wastes/MUDA are identified and measured based on <b>relevant procedures</b>.</p> <p>2.5 Identified and measured wastes are reported to relevant personnel.</p>
3. Eliminate wastes/MUDA.	<p>3. 1. Plan of MUDA elimination is prepared and implemented.</p> <p>3. 2. Necessary attitude and <b>the ten basic principles for improvement</b> are adopted to eliminate waste/MUDA.</p> <p>3. 3. Tools and techniques are used to eliminate wastes/MUDA based on the procedures and OHS.</p> <p>3. 4. Wastes/MUDA are reduced and eliminated in accordance with OHS and organizational requirements.</p> <p>3. 5. Improvements gained by elimination of waste/MUDA are reported to relevant bodies.</p>
4. Prevent occurrence of wastes/MUDA.	<p>4.1 Plan of MUDA prevention is prepared and implemented.</p> <p>4.2 Standards required for machines, operations, defining normal and abnormal conditions, clerical procedures and procurement are discussed and prepared.</p>

	<p>4.3 Occurrences of wastes/MUDA are prevented by using <b>visual and auditory control methods</b>.</p> <p>4.4 Waste-free workplace is created using <b>5W and 1H</b> sheet.</p> <p>4.5 The completion of required operation is done in accordance with standard procedures and practices.</p> <p>4.6 The updating of standard procedures and practices is facilitated.</p> <p>4.7 The capability of the work team that aligns with the requirements of the procedure is ensured.</p>
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Variable	Range
OHS requirements	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Are to be in accordance with legislation/ regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of firefighting equipment, enterprise first aid, hazard control and hazardous materials and substances.</li> <li>• Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices.</li> <li>• Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with workplace organization.</li> <li>• Emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation.</li> </ul>
Safety equipment and tools	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• dust masks / goggles</li> <li>• glove</li> <li>• working cloth</li> <li>• first aid and safety shoes</li> </ul>
Tools and techniques	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Plant Layout</li> <li>• Process flow</li> <li>• Other Analysis tools</li> <li>• Do time study by work element</li> <li>• Measure Travel distance</li> <li>• Take a photo of workplace</li> <li>• Measure Total steps</li> <li>• Make list of items/products, who produces them and who uses them &amp; those in warehouses, storages etc.</li> <li>• Focal points to Check and find out existing problems</li> <li>• 5S</li> <li>• Layout improvement</li> <li>• Brainstorming</li> </ul>

	<ul style="list-style-type: none"> <li>• Andon</li> <li>• U-line</li> <li>• In-lining</li> <li>• Unification</li> <li>• Multi-process handling &amp; Multi-skilled operators</li> <li>• A.B. control (Two point control)</li> <li>• Cell production line</li> <li>• TPM (Total Productive Maintenance)</li> </ul>
Relevant procedures	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Make waste visible</li> <li>• Be conscious of the waste</li> <li>• Be accountable for the waste.</li> <li>• Measure the waste.</li> </ul>
The ten basic principles for improvement	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Throw out all of your fixed ideas about how to do things.</li> <li>• Think of how the new method will work- not how it won.</li> <li>• Don't accept excuses. Totally deny the status quo.</li> <li>• Don't seek perfection. A 50 percent implementation rate is fine as long as it's done on the spot.</li> <li>• Correct mistakes the moment they are found.</li> <li>• Don't spend a lot of money on improvements.</li> <li>• Problems give you a chance to use your brain.</li> <li>• Ask "why?" At least five times until you find the ultimate cause.</li> <li>• Ten people's ideas are better than one person's.</li> <li>• Improvement knows no limits.</li> </ul>
Visual and auditory control methods	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Red Tagging</li> <li>• Sign boards</li> <li>• Outlining</li> <li>• Andons</li> <li>• Kanban, etc.</li> </ul>
5W and 1H	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Who</li> <li>• What</li> <li>• Where</li> <li>• When</li> <li>• Why</li> <li>• How</li> </ul>

### Evidence Guide

Critical Aspects of Competence	<p>Demonstrates skills and knowledge to:</p> <ul style="list-style-type: none"> <li>• discuss why wastes occur in the workplace</li> <li>• discuss causes and effects of wastes/MUDA in the workplace</li> <li>• analyze the current situation of the workplace by using appropriate tools and techniques</li> <li>• identify, measure, eliminate and prevent occurrence of wastes by using appropriate tools and techniques</li> </ul>
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	<ul style="list-style-type: none"> <li>• use 5W and 1H sheet to prevent</li> </ul>
Underpinning Knowledge and Attitude	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Targets of customers and manufacturer/service provider</li> <li>• Traditional and kaizen thinking of price setting</li> <li>• Kaizen thinking in relation to targets of manufacturer/service provider and customer</li> <li>• value</li> <li>• The three categories of operations</li> <li>• the 3“MU”</li> <li>• waste/MUDA</li> <li>• wastes occur in the workplace</li> <li>• The 7 types of MUDA</li> <li>• The Benefits of identifying and eliminating waste</li> <li>• Causes and effects of 7 MUDA</li> <li>• Procedures to identify MUDA</li> <li>• Necessary attitude and the ten basic principles for improvement</li> <li>• Procedures to eliminate MUDA</li> <li>• Prevention of wastes</li> <li>• Methods of waste prevention</li> <li>• Definition and purpose of standardization</li> <li>• Standards required for machines, operations, defining normal and abnormal conditions, clerical procedures and procurement</li> <li>• Methods of visual and auditory control</li> <li>• TPM concept and its pillars.</li> <li>• Relevant OHS and environment requirements</li> <li>• Plan and report</li> <li>• Method of communication</li> </ul>
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> <li>• draw &amp; analyze current situation of the work place</li> <li>• use measurement apparatus (stop watch, tape, etc.)</li> <li>• calculate volume and area</li> <li>• use and follow checklists to identify, measure and eliminate wastes/MUDA</li> <li>• identify and measure wastes/MUDA in accordance with OHS and procedures</li> <li>• use tools and techniques to eliminate wastes/MUDA in accordance with OHS procedure</li> <li>• apply 5W and 1H sheet</li> <li>• update and use standard procedures for completion of required operation</li> <li>• work with others</li> <li>• read and interpret documents</li> <li>• observe situations</li> <li>• solve problems</li> <li>• communicate</li> <li>• gather evidence by using different means</li> <li>• report activities and results using report formats</li> </ul>

Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

# NTQF Level IV

Occupational Standard: Small Scale Irrigation Development Level IV	
Unit Title	Plan Irrigation Project
Unit Code	<a href="#">AGR SSI4 01 0816</a>
Unit Descriptor	This competency standard covers the process of planning irrigation project. It requires the ability of site selection, preparation of contour maps, deciding cropping pattern and conducting socio-economic study, compiling and analyzing relevant information, interpreting statistical data and measurements and developing reports. Planning irrigation scheme requires knowledge of Conducting reconnaissance survey, assessing water resource proximity, delineating command area, preparing contour maps, identification of crops, carrying out economic analysis and environmental issues.

Elements	Performance Criteria
1. Select site	<p>1.1. Conduct <b>reconnaissance survey</b> about existing land use.</p> <p>1.2. Water resource proximity is assessed based on economic considerations.</p> <p>1.3 Command area is delineated based on land use map of the area.</p>
2. Prepare contour map and use topographic map	<p>2.1. <b>Tools and equipment</b> are made available.</p> <p>2.2. Detail of work is chosen according to the design requirements.</p> <p>2.3. Natural contour lines are identified in-line with detail of work.</p> <p>2.4. Contour map of the project area is developed in-line with detail of work.</p>
3. Decide cropping pattern	<p>3.1. Types of crops are identified based on preference of project owner, land use suitability and economic importance.</p> <p>3.2. Selected crops in terms of water requirement, growing season, growth stage and sowing system using research publication.</p> <p>3.3. Selected crops that can be grown together are identified based on their agro ecological zones.</p>
4. Carry out socio-economic Studies	<p>4.1. Collaboration with different disciplines &amp; stakeholders is made.</p> <p>4.2. Cultural values of local community are identified involving the community representatives.</p> <p>4.3. Labor availability is assessed in accordance with market labor demand possibilities.</p> <p>4.4. Major economic advantages are identified.</p>

	<p>4.5. Community awareness is surveyed using standard techniques.</p> <p>4.6. Environmental considerations are made using standard technique.</p> <p>4.7. Cost benefit ratio &amp; project life time are quantified using compatible economic analysis.</p>
5. Standardize the project Plan	<p>5.1 Project cycle management.</p> <p>5.2 Follow SMART planning principles.</p>

Variable	Range
Reconnaissance survey	<ul style="list-style-type: none"> <li>The study which includes the existing land use, proximity of water source and peoples attitude.</li> </ul>
Tools and equipment	<ul style="list-style-type: none"> <li>Tape meter, line level, theodolite (automatic level), tripod, chaining pins, ranging pole, staff, clinometers, Global positioning system, compass, Auger, core sampler, spatula, oven, pressure apparatus, sensitive balance, sieve, soil grinder, hydro meter, shaker and measuring cylinder, thermometer, stop watch, flasks</li> </ul>
Occupational Health & Safety	<ul style="list-style-type: none"> <li>Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust.</li> </ul>
Types and Sources of Information	<ul style="list-style-type: none"> <li>Organizational rules, regulation and guidelines</li> <li>Internet, related books and related materials</li> <li>Technical manuals</li> <li>sharing best practice</li> <li>Virtual library</li> <li>Workplace guidelines</li> <li>Recorded documents/logo/history</li> </ul>

Evidence Guide	
Critical Aspects of Competence	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>Conduct reconnaissance surveying</li> <li>Prepare contour map</li> <li>Identify type of crop</li> <li>Analyze cost benefit ratio</li> <li>Conduct socio-economic study</li> <li>plan irrigation project</li> </ul>
Underpinning Knowledge and Attitudes	<p>Planning irrigation scheme requires knowledge of:</p> <ul style="list-style-type: none"> <li>Conducting reconnaissance survey</li> <li>Assessing water resource proximity</li> <li>Topographic map and aerial photo interpretation</li> <li>Preparing contour maps</li> <li>Identification and characterization of crops</li> <li>carrying out economic analysis</li> <li>Environmental issues.</li> <li>Values and Ethics</li> </ul>

	<ul style="list-style-type: none"> <li>• Accountable to work loyalty and honest to the work he/she being doing</li> <li>• Dedication and commitment</li> <li>• Respect and follow organizational rules and regulations</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• selecting site</li> <li>• preparing contour maps</li> <li>• deciding cropping pattern</li> <li>• conducting socio-economic study</li> <li>• interpreting statistical data and measurements</li> <li>• developing reports</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> <li>• Observation and question</li> <li>• Theoretical exam</li> <li>• Written exam/test</li> </ul> <p>Portfolio Assessment (E.g. Certificate from training providers)Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</p>

Occupational Standard: Small Scale Irrigation Development Level IV	
Unit Title	Supervise Irrigation System
Unit Code	<a href="#">AGR SSI4 02 0816</a>
Unit Descriptor	This unit of competence standard covers the process of supervising irrigation operating system: irrigation facilities, water management and crop management. It requires irrigation engineering, drainage, flow measurement, soil-plant-water relationship and agronomy knowledge. Understand OHS procedure and system performance criterion, understand extension and participatory approach.

Elements	Performance Criteria
1. Plan Supervision of irrigation system	1.1 Inventory of irrigation systems. 1.2 Develop supervision items and indicators. 1.3 Develop supervision schedule.
2. Perform supervision of irrigation systems	2.1. Conduct the supervision of the irrigation system. 2.2 Organize and categorize the supervision result in thematic. 2.3 Conduct simple analysis and recommendation.
3. Record and document the result	3.1 Internal and external reporting procedures are identified and implemented as required. 3.2 Supervision data, analysis and recommendation records are accurately and legibly maintained and stored securely in a form accessible for reporting purposes. 3.3 <b>Information/records</b> are monitored to identify trends that may require remedial action, and used to promote continuous improvement.

Variable	Range
Types and Sources of Information/records	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>
Occupational Health & Safety	<ul style="list-style-type: none"> <li>• Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and insect bites, solar radiation and dust.</li> <li>• Glove, safety wear, helmet and eye glass</li> </ul>
Irrigation Facilities	<ul style="list-style-type: none"> <li>• Head work, pump and parts, drip and sprinkler sets, conveyance and distribution structures, regulating and other irrigation farm structures</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<ul style="list-style-type: none"> <li>• Supervision procedures</li> <li>• Supervision items and indicators</li> <li>• Irrigation facilities</li> <li>• Water management</li> <li>• Crop management</li> </ul>
Underpinning Knowledge and Attitudes	<p>Supervision of irrigation system requires knowledge of:</p> <ul style="list-style-type: none"> <li>• Supervision procedures</li> <li>• Supervision items and indicators</li> <li>• Irrigation facilities</li> <li>• Water management</li> <li>• Crop management</li> <li>• Work values and Ethics</li> <li>• Accountable to work loyalty and honest to the work he/she being doing</li> <li>• Dedication and commitment</li> <li>• Respect and follow organizational rules and regulations</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• operation of irrigation facility</li> <li>• water management operation</li> <li>• crop management</li> <li>• communication</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> <li>• Observation and question</li> <li>• Theoretical exam</li> <li>• Written exam/test</li> </ul>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</p>



<b>Occupational Standard: Small Scale Irrigation Development Level IV</b>	
<b>Unit Title</b>	<b>Identify Potential Water Sources for Irrigation Development</b>
<b>Unit Code</b>	<a href="#"><u>AGR SSI4 03 0816</u></a>
<b>Unit Descriptor</b>	This unit of competence covers the process of planning and development of spring, well and floodways. It requires the ability to plan spring and well development, design water harvesting structures and construct recommended structures. It requires the knowledge of surface and ground water hydrology water harvesting design principles, catchments area delineation, soil and water conservation and forestry development, bill of quantity preparation, surveying techniques, drawing techniques environmental issues, guidelines and legislations.

<b>Elements</b>	<b>Performance Criteria</b>
1. Plan spring and well development	<p>1.1. Potential areas are identified using standard technique.</p> <p>1.2. Water contributors are identified &amp; maintained using standard technique.</p> <p>1.3. Soil moisture status &amp; level of ground water are assessed using standard technique.</p> <p>1.4. Best type and species of trees for afforestation purpose of degraded land are planned to improve soil intake characteristics.</p> <p>1.5. Soil and water conservation and water harvesting practices are identified to recharge underground water table.</p>
2. Design water harvesting structures	<p>2.1. Catchment area is delineated and characterized for climatic variables.</p> <p>2.2. Seasonal water ways are identified and characterized for flood water level using flood water routing techniques.</p> <p>2.3. Proper site for water harvesting is identified using standard technique.</p> <p>2.4. Appropriate water harvesting technique is chosen based on applicability &amp; adaptability.</p> <p>2.5. Design principles for the chosen water harvesting techniques are selected.</p> <p>2.6. Design drawings are prepared for different structures &amp; lay outs using standard technique.</p> <p>2.7. Silt trap is designed to settle and clear off sediments before entering storage structures.</p>
3. Construct water harvesting structures	<p>3.1. Type of construction materials and equipment are identified considering criteria: such as availability, cost and applicability.</p>

	<p>3.2. Man power requirements are determined.</p> <p>3.3. All service and running cost are determined for the project life time.</p> <p>3.4. Bill of quantity is prepared following standard procedures.</p> <p>3.5. Land leveling activities are conducted using construction equipment.</p> <p>3.6. Lay out drawings and construction specifications are interpreted using chosen surveying techniques in to physical marks on project site.</p> <p>3.7. Appropriate shade &amp; lining materials are selected to reduce evaporation &amp; seepage loss respectively.</p>
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Variable	Range
Occupational Health & safety	<ul style="list-style-type: none"> <li>• Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust.</li> </ul>
Tools and equipment	<ul style="list-style-type: none"> <li>• Planimeter, Tape meter, line level, theodolite, chaining pins, ranging pole, staff, clinometers, Global positioning system, compass, Auger, core sampler, spatula, oven, pressure apparatus, sensitive balance, sieve, soil grinder, hydro meter, shaker and measuring cylinder, thermometer, stop watch, flasks, shovel, rakes, spades, rope, plumb bob, hoe, tracing paper, pencil, graph paper, fixer, topographic map, drawing compass set.</li> </ul>
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>

Evidence Guide	
Critical Aspects of Competence	<p>Demonstrate ability to:</p> <ul style="list-style-type: none"> <li>• Plan spring and well development</li> <li>• Identify proper site for water harvesting</li> <li>• Chose appropriate water harvesting technique based on applicability &amp; adaptability</li> <li>• Identify type of construction materials and equipment considering criteria: such as availability, cost and applicability</li> <li>• Interpret lay out drawings and construction specifications using chosen surveying techniques in to physical marks on project site.</li> <li>• Select appropriate shade &amp; lining materials to reduce evaporation &amp; seepage loss respectively</li> </ul>

Underpinning Knowledge and Attitudes	<p>It requires the knowledge of:</p> <ul style="list-style-type: none"> <li>• Surface and ground water hydrology,</li> <li>• Water harvesting design principles,</li> <li>• Catchment area delineation,</li> <li>• SWC and afforestation techniques,</li> <li>• Bill of quantity preparation,</li> <li>• Surveying techniques,</li> <li>• Principle of Drawing,</li> <li>• Environmental issues, guidelines and legislation</li> <li>• Work values and Ethics</li> <li>• Accountable to work loyalty and honest to the work he/she being doing</li> <li>• Dedication and commitment</li> <li>• Respect and follow organizational rules and regulations</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Drawing technique</li> <li>• planning spring and well development</li> <li>• designing water harvesting structures</li> <li>• Design, construct and maintain moisture harvesting technologies.</li> <li>• Undertake water harvesting activities on site by using appropriate tools and equipment with active participation of local community.</li> <li>• Integrate water harvesting techniques and making improvements in working techniques where necessary.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> <li>• Observation and question</li> <li>• Theoretical exam</li> <li>• Written exam/test</li> <li>• Portfolio Assessment (E.g. Certificate from training providers)</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>

<b>Occupational Standard: Small Scale Irrigation Development Level IV</b>	
<b>Unit Title</b>	<b>Manage and Improve Irrigation Practices and Develop Value Chains</b>
<b>Unit Code</b>	<a href="#"><u>AGR SSI4 04 0816</u></a>
<b>Unit Descriptor</b>	This Unit covers the process of managing improved irrigation practices and developing value chains and defines the standard required to: manage and promote Innovative irrigation practices; monitor water distribution plan; outline Irrigation patterns and future price rise; and build value addition producer groups' entrepreneurial and business planning capacities.

<b>Elements</b>	<b>Performance Criteria</b>
1. Promote Innovative irrigation practices	<p>1.1. Identify practical limitations of water-efficient irrigation technology.</p> <p>1.2. Set Improvements in irrigation practices by considering knowledge of farmers' on current practices in relation to actual and potential crop water use.</p> <p>1.3. Design service-oriented irrigation schemes, so that farmers can flexibly obtain water at their convenience.</p> <p>1.4. Use <b>eco-efficiency indicators</b> to evaluate potential innovative practices including technology adoption and assess these processes and to avoid their adverse environmental impacts to deep percolation of pollutants from intensive farming activities.</p>
2. Monitor water distribution plan	<p>2.1 Monitoring system and performance evaluation of working team are agreed upon.</p> <p>2.2 Environmental and community factors affecting water distribution are considered in the plan in accordance to organizational protocols.</p> <p>2.3 Feedback mechanism is determined and agreed upon.</p> <p>2.4 Water distribution plan is prepared by incorporating all the necessary information and considerations.</p> <p>2.5 Water distribution plan is presented for approval.</p> <p>2.6 Changes are identified and evaluated to the plan.</p> <p>2.7 Water distribution plan is modified and finalized.</p>
3. Outline irrigation patterns and future price rise	<p>3.1. Sustainable use of shared water resources are assessed and monitored.</p> <p>3.2. Water prices are differentiated according to the pressure heads provided at farm-gate delivery.</p> <p>3.3. Expert scientific knowledge of crops' water needs, their yield-response to water and the actual on-farm versus attainable efficiency.</p>

	<p>3.4. Links between farmers' perspectives, innovative practices and their income benefits are analyzed.</p> <p>3.5. Funds and earnings to lower resource burdens from inputs and pollutants are considered.</p>
4. Build value addition producer groups' entrepreneurial and business planning capacities	<p>4.1. Training in the communication and delivery of entrepreneurial skills that is geared to cultivating the entrepreneurial spirit of business-oriented processors are engaged.</p> <p>4.2. Building capacities in business planning, administration, accounting, work organization, and human resource management are continued.</p> <p>4.3. Groups in the implementation of their business plans throughout the project to include regular coaching sessions and mentoring are assisted.</p> <p>4.4. Targeted value adding producer groups to existing finance schemes to access innovative financing facilities and services are linked.</p>

Variable	Range
Eco-efficiency indicators	<ul style="list-style-type: none"> <li>Manufacturing products without environment harm: the ability to manufacture goods efficiently and at competitive prices without harming the environment</li> </ul>
Value addition may include:	<ul style="list-style-type: none"> <li>Increase in product value: the amount by which the value of a product increases as it proceeds through the various stages of its manufacture and distribution</li> </ul>
Value chains	<ul style="list-style-type: none"> <li>supply chain analysis: a supply chain analyzed in terms of how much value is added during the various stages from, e.g. purchase of raw materials to sale of finished product</li> </ul>
Irrigation patterns may include:	<ul style="list-style-type: none"> <li>Furrow arrangement</li> <li>Drip arrangement</li> </ul> <p>It is responsible for all the sequential steps along the agriculture water supply chain, i.e. abstraction, conveyance, storage, distribution and final water delivery to farm gates</p>
Types and Sources of Information	<ul style="list-style-type: none"> <li>Organizational rules, regulation and guidelines</li> <li>Internet, related books and related materials</li> <li>Technical manuals</li> <li>sharing best practice</li> <li>Virtual library</li> <li>Workplace guidelines</li> <li>Recorded documents/logo/history</li> </ul>

Evidence Guide	
Critical Aspects of Competence	<p>Demonstrate ability to:</p> <ul style="list-style-type: none"> <li>Identify improved irrigation practices</li> <li>Set water distribution plan</li> <li>Outline Irrigation patterns and future price rise</li> <li>Build value addition producer groups' entrepreneurial and business planning capacities</li> </ul>

Underpinning Knowledge and Attitudes	<p>Requires knowledge of:</p> <ul style="list-style-type: none"> <li>• monitoring procedures for factors contributing to improved irrigation practices and value chains</li> <li>• positive and negative environmental impacts of improved irrigation practices and value chains</li> <li>• irrigation practices and value chain measures</li> <li>• water quality monitoring methods and techniques</li> <li>• Water authority standards and procedures enterprise policies and procedures</li> <li>• working values and Ethics</li> <li>• accountable to work loyalty and honest to the work he/she being doing</li> <li>• dedication and commitment</li> <li>• respecting and following organizational rules and regulations</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• identify hazards and implement safe work procedures</li> <li>• build targeted value added producer groups in irrigation</li> <li>• identify adverse environmental impacts of irrigation systems and appropriate remedial action</li> <li>• implement and follow relevant enterprise OHS and environmental policies and procedures</li> <li>• use oral communication skills/language</li> <li>• use numeracy skills to estimate, calculate and record routine workplace measures</li> <li>• use interpersonal skills to work with and relate to people from a range of cultural, social and religious backgrounds and with a range</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> <li>• Observation and question</li> <li>• Theoretical exam</li> <li>• Written exam/test</li> </ul> <p>Portfolio Assessment (E.g. Certificate from training providers)</p>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

<b>Occupational Standard: Small Scale Irrigation Development Level IV</b>	
<b>Unit Title</b>	<b>Manage Salinity of Irrigated Land</b>
<b>Unit Code</b>	<b><u>AGR SSI4 05 0816</u></b>
<b>Unit Descriptor</b>	This unit of competence covers the prevention and management of salinity of irrigated lands through investigating salinity prone areas, practicing salinity prevention techniques and managing salt affected irrigated lands. It requires the ability to collect, organize and analyze information and plan prevention and management techniques. It requires the knowledge of statistics, principles of soil and water quality analysis, drainage, irrigation scheduling, agro-forestry practices, laboratory techniques, operation of computer software models and environmental issues, guide lines and legislations.

<b>Elements</b>	<b>Performance criteria</b>
1. Investigate salinity prone areas	<p>1.1. Soils are checked for primary salinity following standard soil survey techniques.</p> <p>1.2. Quality of water source for irrigation is checked using guidelines.</p> <p>1.3. Ground water level of project area is investigated and salt content checked using appropriate methods or techniques.</p>
2. Practice salinity prevention techniques	<p>2.1 Ground water rise is periodically monitored and controlled using standard technique.</p> <p>2.2 Application of water is optimized based on crop, soil and application time.</p> <p>2.3 Irrigation water quality is assessed based on published guidelines using standard technique.</p> <p>2.4 Appropriate field water distribution is planned to avoid field water detentions.</p> <p>2.5 Periodical soil test for salinity is performed using standard technique.</p> <p>2.6 Deep rooted perennial crops are intercropped using standard technique.</p> <p>2.7 Excess seepage from canals is avoided using standard technique.</p>
3. Practice techniques for management of salt affected irrigated lands.	<p>3.1 Leaching requirement is estimated and excess salt is leached from root zone.</p> <p>3.2 Appropriate drainage facility is planned and installed using standard technique.</p> <p>3.3 Irrigation scheduling for crops on the saline land is determined using standard technique.</p> <p>3.4 Salt loving crops identified and cropped using standard technique.</p>

	<p>3.5. Chemical amendment is recommended for sodic, saline and saline- sodic soils</p> <p>3.6 Optimal soil and water management practices are needed</p>
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<b>Variables</b>	<b>Range</b>
Occupational Health & safety	<p>Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust.</p> <p>Glove, safety wear, helmet and eye glass</p>
Tools and equipment	<p>may include:</p> <ul style="list-style-type: none"> <li>• Auger, core sampler, Computer and software, spatula, oven, pressure apparatus, sensitive balance, sieve, soil grinder, hydro meter, shaker and measuring cylinder, thermometer, stop watch, flasks, electrical conductivity meter, pH meter, litmus paper, universal indicator.</li> </ul>
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>Demonstrate ability to:</p> <ul style="list-style-type: none"> <li>• Monitor ground water level</li> <li>• Check irrigation water quality</li> <li>• Check soil salt content</li> <li>• Determine irrigation scheduling for crops on the saline land</li> <li>• Crop salt loving crops identified and cropped.</li> <li>• recommend Chemical amendment for sodic, saline and saline- sodic soils</li> <li>• Install and plan appropriate drainage facility</li> </ul>
Underpinning Knowledge and Attitudes	<p>It requires the knowledge of:</p> <ul style="list-style-type: none"> <li>• Statistics,</li> <li>• Principles of soil and water quality analysis,</li> <li>• Drainage,</li> <li>• Irrigation scheduling,</li> <li>• Environmental issues, guide lines and legislations,</li> <li>• Agro-forestry practices,</li> <li>• Laboratory techniques</li> <li>• work values and Ethics</li> <li>• accountable to work loyalty and honest to the work he/she being doing</li> <li>• dedication and commitment</li> <li>• respect and follow organizational rules and regulations</li> </ul>
Underpinning skills	<p>It requires the skill of:</p> <ul style="list-style-type: none"> <li>• Collecting, organizing and analyzing information</li> </ul>



	<ul style="list-style-type: none"> <li>• Planning prevention and management techniques.</li> <li>• Test soil and water quality</li> </ul>
Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> <li>• Observation and question</li> <li>• Theoretical exam</li> <li>• Written exam/test</li> <li>• Portfolio Assessment (E.g. Certificate from training providers)</li> </ul>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

<b>Occupational Standard: Small Scale Irrigation Development Level IV</b>	
<b>Unit Title</b>	<b>Implement Onsite Irrigation Installation Work</b>
<b>Unit Code</b>	<b><a href="#">AGR SSI4 06 0816</a></b>
<b>Unit Descriptor</b>	This competency standard covers the process of supervising on-site irrigation installation work, which includes organizing the supply and installation of materials and equipment, supervising on-site operations, and administering progress claims/payments. Effective communication with on-site labour, suppliers and the client, and the implementation and monitoring of relevant OHS and risk management procedures are also required.

<b>Elements</b>	<b>Performance Criteria</b>
1. Implement effective communication	<p>1.1 <b>Site instructions</b> for <b>irrigation installation work</b> are recorded to comply with quality management requirements.</p> <p>1.2 Dates, times and personnel to attend site meetings are organized.</p>
2. Implement and monitor OHS and risk management procedures	<p>2.1 First aid facilities are established as necessary.</p> <p>2.2 Plant and equipment requiring certificated operators are identified to comply with <b>risk management procedures</b>.</p> <p>2.3 Likely hazards are identified and precautions taken.</p> <p>2.5 Documentation for safety reporting is instigated.</p>
3. Organize the supply and installation of materials and equipment	<p>3.1 Material orders are placed according to appropriate schedule.</p> <p>3.2 Equipment is prepared according to planned schedule.</p> <p>3.3 Maintenance procedures are established for equipment.</p>
4. Supervise on-site operations	<p>4.1 Operations are implemented according to appropriate schedule and contract.</p> <p>4.2 Problems and delays are addressed as they arise and action recorded.</p> <p>4.3 Industrial relations are monitored continuously and issues resolved to minimize impact on job progress.</p> <p>4.4 Revisions are made to project schedule, when required, and variations documented to comply with quality management procedures.</p> <p>4.5 Quality management procedures are applied continuously as per adopted standards for job.</p> <p>4.6 Safety procedures are monitored continuously, reports analyzed and procedures reviewed as required.</p> <p>4.7 Reports on current project status are prepared for management.</p> <p>4.8 Supervision of multiple projects is planned.</p>

5.Administer progress claims/payments	5.1 Summary records are prepared for progress claims. 5.2 Actual expenditure and earnings are checked against scheduled projected costs.
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Variable	Range
Site instructions	Instructions may be recorded using a diary, telephone log and/or memos.
Irrigation installation work related to	<ul style="list-style-type: none"> <li>• These may include gravity and pressurized systems</li> </ul>
Risk management procedures may include:	<p>identification and reporting of:</p> <ul style="list-style-type: none"> <li>• hazards to health and safety, risk assessment procedures and</li> <li>• implementation of risk control measures, safe operation of</li> <li>• machinery and equipment, safe manual handling procedures,</li> <li>• selection, use and maintenance of relevant personal protective</li> <li>• clothing and equipment, safe procedures for working at heights and for outdoor work, including protection from solar radiation,</li> <li>• Dust and noise.</li> </ul>

Evidence Guide	
Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• organize the supply and installation of materials and equipment, supervise on-site operations,</li> <li>• Administer progress claims/payments.</li> <li>• communicate effectively with on-site labour, suppliers and the client,</li> <li>• Implement and monitor relevant OHS and risk management procedures.</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• communication procedures for onsite labour and authorities</li> <li>• safety procedures and quality assurance programs</li> <li>• local government regulations</li> <li>• on-site contract provisions</li> <li>• projected costs</li> <li>• environmental impacts of irrigation system installation</li> <li>• using water from any ground or underground source</li> <li>• Relevant enterprise OHS procedures.</li> <li>• work value and ethics</li> <li>• accountable to work</li> <li>• loyalty and honest to the work he/she being doing</li> <li>• Dedication and commitment</li> <li>• Respect and follow organizational rules and regulation</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• communicate effectively on site</li> <li>• read plans and specifications</li> </ul>

	<ul style="list-style-type: none"> <li>• order materials and equipment to meet schedule</li> <li>• administer the contract, claims/payments on site</li> <li>• supervise installation operations in the most efficient sequence</li> <li>• identify adverse environmental impacts of irrigation installation activities and take appropriate remedial action</li> <li>• comply with statutory requirements</li> <li>• Implement and monitor OHS and risk management procedures Organize the supply and installation of materials and equipment Supervise on-site operations</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</p>

Occupational Standard: Small Scale Irrigation Development Level IV	
Unit Title	Audit Irrigation System
Unit Code	<a href="#">AGR SSI4 07 0816</a>
Unit Descriptor	This competency standard covers the process of collating and assessing system performance data, and compiling a system evaluation report including recommendations for improvements. It requires the ability to analyze and organize data, solve performance problems and recommend solutions, identify adverse environmental impacts of irrigation system activities and recommend appropriate remedial action, and use available auditing tools for irrigation auditing. Auditing irrigation systems requires knowledge of evaluation procedures, irrigation system performance indicators, descriptive statistical data analysis procedures, and environmental impacts of irrigation systems using water from any ground or underground source.

Elements	Performance Criteria
1. Collect and collate all available data	<p>1.1 Data on system performance is collated using standard technique.</p> <p>1.2 Data on environmental and <b>Occupational Health &amp; Safety (OHS)</b> issues is collated using standard technique.</p> <p>1.3 Data on equipment supply and usage is collated using standard technique.</p> <p>1.4 Data on crop production is collated using standard technique.</p> <p>1.5 Data on water use and quality is collated using standard technique.</p> <p>1.6 Data on climatic trends is collated using standard technique.</p> <p>1.7 Data on physical and chemical properties of soil is collated.</p>
2. Assess actual data against benchmarks, specifications and predictions	<p>2.1 System performance is compared to system specifications and performance predictions.</p> <p>2.2 Supply and stock use is compared to previous and estimated usage and costs.</p> <p>2.3 Crop production is compared to previous and predicted production.</p> <p>2.4 Water usage and quality is compared to past and predicted usage and quality.</p> <p>2.5 <b>Climatic information</b> is compared to predicted trends using standard technique.</p> <p>2.6 Soil properties are compared to previous and predicted properties using standard technique.</p>

	<p>2.7 Production costs related to irrigation systems are compared to previous and predicted costs.</p> <p>2.8 Net profits are compared to past and predicted profits using standard technique.</p>
3. Compile a report of system evaluation	<p>3.1 Report includes discussion of results of data analysis are isolated using standard technique.</p> <p>3.2 Indicators of good performance are isolated and discussed using standard technique.</p> <p>3.3 Indicators of poor performance are isolated and discussed using standard technique.</p> <p>3.4 Causes of deviations from performance specifications and requirements are examined.</p> <p>3.5 Conclusions about irrigation system performance in relation to crop production and business performance are clearly stated.</p> <p>3.6 Conclusions are supported by the data using standard technique.</p>

Variable	Range
OHS	<p>may include:</p> <ul style="list-style-type: none"> <li>• identification and reporting of hazards to health and safety, risk assessment procedures and implementation of risk control measures, safe operation of machinery and equipment, safe manual handling procedures, selection, use and maintenance of relevant personal protective clothing and equipment, safe procedures for working at heights and for outdoor work, including protection from solar radiation, dust and noise.</li> </ul>
Types and Sources of climatic Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>

Evidence Guide	
Critical Aspects of Competence	<p>Demonstrate ability to:</p> <ul style="list-style-type: none"> <li>• Collect and collate data</li> <li>• Assess actual data against benchmarks, specifications and predictions</li> <li>• compile a report of system evaluation</li> <li>• Recommend alterations to irrigation system to achieve performance improvement</li> </ul>
Underpinning Knowledge and Attitudes	<p>Auditing irrigation systems requires knowledge of:</p> <ul style="list-style-type: none"> <li>• Evaluation procedures</li> <li>• Irrigation system performance indicators</li> </ul>

	<ul style="list-style-type: none"> <li>• Statistical data analysis procedures</li> <li>• Environmental impacts of irrigation systems using water from any source</li> <li>• Work values and ethics</li> <li>• Accountable to work loyalty and honest to the work he/she being doing</li> <li>• Dedication and commitment respect and follow organizational rules and regulations</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• analyzing and organizing data</li> <li>• Solving performance problems and recommend solutions</li> <li>• Identifying adverse environmental impacts of irrigation system activities and recommend appropriate remedial action</li> <li>• Using basic computer skills for irrigation auditing.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>The following resources MUST be provided.:</p> <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

Occupational Standard: Small Scale Irrigation Development Level IV	
Unit Title	Manage Construction of Irrigation Schemes
Unit Code	<a href="#">AGR SSI4 08 0816</a>
Unit Descriptor	This unit of competence covers the process of managing and conducting land surveying and leveling, preparing quantity surveying, bill of quantity and managing construction site activities. It requires the ability to manage and interpret lay out drawing and conduct land leveling activities, prepare bill of quantity and budget and allocate resources. Construction of irrigation scheme requires knowledge of operating GPS, surveying technique, technical drawing, communication developments in related technology, indigenous practices and economic analysis, environmental issues, and environmental protection agency regulations.

Elements	Performance Criteria
1. Conduct land surveying	<p>1.1. All required <b>tools and equipment</b> are selected and organized using standard technique</p> <p>1.2. Bench mark is located using standard geo positioning tool.</p> <p>1.3. Lay out drawings is interpreted using chosen surveying technique in to physical marks on project site.</p>
2. Prepare quantity surveying bill of quantity and interpret specifications	<p>2.1. Type of construction material and equipment are identified considering criterion; such as availability, cost and applicability.</p> <p>2.2. Construction specification are interpreted using standard technique</p> <p>2.3. Man power requirement are determined using standard technique.</p> <p>2.4. All service and running cost are determined for the project life time.</p> <p>2.5. <b>Bill of quantity</b> is prepared following standard procedure.</p>
3. Manage construction site activities	<p>3.1. Availability and workability of all machinery and equipment are checked throughout construction period.</p> <p>3.2. Resources are allocated and budgeted considering time schedule and work load.</p> <p>3.3. Practical challenges and difficulties are solved during construction processes.</p> <p>3.4. Smooth working environment is created.</p>

Variable	Range
Tools and equipment	<ul style="list-style-type: none"> <li>• Glove, safety wear, helmet, eye glass,</li> <li>• Planimeter, Tape meter, line level, theodolite (stadia),</li> </ul>



	chaining pins, ranging pole, staff, clinometers, Global positioning system, compass, Auger, core sampler, spatula, oven, pressure apparatus, sensitive balance, sieve, soil grinder, hydro meter, shaker and measuring cylinder, thermometer, stop watch, flasks, shovel, rakes, spades, rope, plumb bob, hoe, tracing paper, pencil, graph paper, fixer
Bill of quantity	<ul style="list-style-type: none"> <li>• includes assessment materials and labor requirements to accomplish the irrigation project</li> </ul>
Occupational Health & Safety	Hazards may include chemicals, slippery or uneven surfaces, moving machinery and vehicles, snake, spider and Insect bites, solar radiation and dust.
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>
Quantity surveying	<ul style="list-style-type: none"> <li>• includes assessment materials, labor ,time and cost requirements to accomplish the irrigation project</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	Demonstrate ability to: <ul style="list-style-type: none"> <li>• Conduct land surveying</li> <li>• Prepare quantity surveying bill of quantity and interpreted specifications</li> <li>• Check availability and workability of all machinery and equipment throughout construction period.</li> <li>• manage construction site</li> </ul>
Underpinning Knowledge and Attitudes	Construction of irrigation scheme requires Knowledge of: <ul style="list-style-type: none"> <li>• Operating surveying materials,</li> <li>• Surveying technique, technical drawing,</li> <li>• Quantity survey,</li> <li>• Communication, developments in related technology,</li> <li>• Indigenous practices and economic analysis,</li> <li>• Environmental issues and environmental protection agency regulations</li> <li>• Work values and Ethics</li> <li>• Accountable to work loyalty and honest to the work he/she being doing</li> <li>• Dedication and commitment</li> <li>• Respect and follow organizational rules and regulations</li> </ul>
Underpinning Skills	Construction of irrigation scheme requires skill of: <ul style="list-style-type: none"> <li>• interpreting lay out drawing</li> <li>• Operating surveying materials</li> <li>• Preparing bill of quantity and budget</li> <li>• Allocating resources.</li> </ul>
Resources Implication	The following resources MUST be provided: <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with</li> </ul>

	<p>necessary tools and equipment as well as consumable materials</p> <ul style="list-style-type: none"> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> <li>• Observation and question</li> <li>• Theoretical exam</li> <li>• Written exam/test</li> </ul> <p>Portfolio Assessment (E.g. Certificate from training providers)Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

Occupational Standard: Small Scale Irrigation Development Level IV	
Unit Title	Coordinate Work Site Activities
Unit Code	<a href="#">AGR SSI4 09 0816</a>
Unit Descriptor	This competency standard covers the process of coordinating work site activities for small-scale projects. Responsibility may be for the basic direction and coordination of small groups working on a site remote from the main enterprise, small projects or parts of projects, or small areas within the enterprise. The coordination of work site activities is likely to be under limited supervision with checking only related to overall progress. Work site coordination requires the application of extensive agricultural, horticultural and/or conservation and land management knowledge, and a broad range of relevant skills. The work is usually done within routines, methods and procedures where some discretion and judgment is required in the selection of equipment, work organisation, services, actions, and achieving outcomes within time constraints.

Elements	Performance Criteria
1. Prepare for work site activities	<p>1.1 <b>Resource requirements</b> of the work are clarified.</p> <p>1.2 Personnel, equipment and material requirements are identified.</p> <p>1.3 Order of <b>activities</b> and time allocation is identified, documented and presented.</p> <p>1.4 The <b>environmental implications</b> of the proposed work site activities are identified and the likely outcomes assessed and reported.</p> <p>1.5 <b>OHS hazards</b> are identified, risks assessed and reported to the supervisor.</p> <p>1.6 <b>Personal Protective Equipment (PPE)</b> is selected, used, maintained and stored according to the type of work site activities to be undertaken.</p>
2. Organize resources	<p>2.1 <b>Materials</b> are purchased and/or <b>equipment/machinery</b> is leased.</p> <p>2.2 <b>External agency permits</b> are gained in the correct order.</p> <p>2.4 Delivery of materials and equipment/machinery to site is organized.</p> <p>2.5 Personnel are organized.</p>
3. Coordinate and report on activities	<p>3.1 All resources are coordinated and timed to suit the scope of the project and order of activities.</p> <p>3.2 Personnel are directed in activities for each period of work.</p> <p>3.3 Personnel, activities, timelines and resource usage are monitored and documented according to enterprise guidelines.</p>

	<p>3.4 <b>Contingency situations</b> are recognized and reported to the supervisor, and corrective actions taken.</p> <p>3.5 <b>Work site report</b> is written to inform management of work site activities undertaken and completed.</p>
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Variable	Range
Resource requirements may include:	<ul style="list-style-type: none"> <li>• Materials may include goods that will be consumed by the project such as fertilizers, plants, stakes and mulch in a Planting program.</li> <li>• Equipment and machinery may include hand tools, tractors, vehicles, watering equipment and personal protective equipment.</li> <li>• Personnel may include those obtained from within an enterprise, staff "borrowed" from another enterprise, hired from a contracting firm, or hired for the project from outside the industry.</li> </ul>
Activities to be documented:	<ul style="list-style-type: none"> <li>• may allow you to determine if the work is on track, provide progress reports to supervisors, and plan for delivery and storage of materials and hiring of equipment to minimize costs and time wasting for the enterprise.</li> </ul>
Environmental implications may include:	<ul style="list-style-type: none"> <li>• Threats to flora and fauna; risk of contamination of soils, water or adjoining property through fertilizers and chemicals flowing into drains and water sources. Land used for a planting program for example may include chemical residues in the soil, spray drift, contaminated run-off water, and run off from over-watering, diseased plant material, waste plant material, and physical damage such as soil compaction from machinery.</li> <li>• Where new sites are established the interruption of native corridors and degradation of the ecosystem edge may compromise existing native ecosystems.</li> <li>• If the project involves construction activities, this may impact on the environment due to excess noise, dust or water.</li> <li>• Compliance with legislation may be required if removing trees for example.</li> <li>• Legislation may address management requirements for water, natural heritage, vegetation clearance and waste.</li> </ul>
OHS hazards may include:	disturbance of services, solar radiation, dust, noise, through traffic, uneven surfaces and holes, moving machinery and machinery parts, powered equipment and hand tools, confined spaces, hazards from use of hired equipment (untrained staff), and overhead hazards including power lines.
PPE	will be determined by the type of activity being undertaken and may include work boots, gloves, overalls, sun hat and sunscreen lotion, safety harness, hard hat, hearing or eye protection, respirator or face mask.
Materials may be:	<ul style="list-style-type: none"> <li>• Materials to be consumed by the activity may be available through the enterprise as a stockpile or stored goods, or it</li> </ul>

	<ul style="list-style-type: none"> <li>• May be purchased for the job. Materials are often available through supply companies. The enterprise may have purchasing policies and procedures and existing accounts with some suppliers.</li> </ul>
Equipment /machinery	<ul style="list-style-type: none"> <li>• Equipment and machinery to be used for the activity may be available through the enterprise, or hired or "borrowed" for the job. There are many commercial places that hire machinery on a daily charge out rate, or some enterprises may lend specialist equipment or machinery as part of a reciprocating arrangement.</li> </ul>
External agency permits	<p>Some typical activities that may need a permit include:</p> <ul style="list-style-type: none"> <li>• pruning or removal of large trees, connecting to water systems, application and disposal of chemicals and polluted waters, operating specialised machinery (e.g., chainsaws, skid steer loaders, forklifts), working outside normal hours, setting up traffic and pedestrian barriers and digging near services (phone, gas, power, water, sewerage and drains).</li> </ul>
Contingency situations may include:	<ul style="list-style-type: none"> <li>• the delay in delivery and/or breakdowns with equipment and machinery, poor weather conditions, poor quality materials and unforeseen soil problems. A coordinator of work site activities may need to be prepared for such situations and provide other work on the project until the problem is fixed, provide other work away from the site, or delay the project if possible.</li> </ul>
Work site report may include:	<ul style="list-style-type: none"> <li>• the project name, authors name and date, project description, progress of activities, major issues, OHS issues, expenditure and any future activities that may need to be planned.</li> </ul>
Parties to be Notified:	<ul style="list-style-type: none"> <li>• Neighbours may need to be notified if the activities involve high levels of noise, dust or chemical use. Often the local council requires notices to be sent out in advance of such work.</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>A candidate must be able to demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• Prepare and plan for activities, organize all resources required, and monitor and report on activities undertaken.</li> <li>• Work schedule programming.</li> <li>• Calculate material and resource requirements.</li> <li>• Coordinate a team to achieve optimum performance.</li> <li>• Communicate with personnel at all levels.</li> <li>• Document results clearly and concisely.</li> <li>• Perform an OHS risk assessment.</li> <li>• Communicate ideas and information</li> <li>• Collect, analyze and organize information</li> <li>• Plan and organize activities</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• Environmental awareness associated with undertaking project works to ensure the impact on the environment is minimal.</li> </ul>

	<ul style="list-style-type: none"> <li>• Work schedule programming.</li> <li>• Hiring and subcontracting of labour.</li> <li>• Possible causes of disruption to work activities and their effect on quality and time schedules.</li> <li>• Responsibilities and requirements for obtaining agency permits as necessary.</li> <li>• The range, use and availability of materials, equipment and machinery that may be required for the project.</li> <li>• OHS issues, legislative requirements and Codes of Practice.</li> </ul>
Underpinning Skills	<p>include the ability to:</p> <ul style="list-style-type: none"> <li>• Read and interpret documentation associated with work site activities.</li> <li>• Calculate material and resource requirements.</li> <li>• Coordinate a team to achieve optimum performance.</li> <li>• Communicate with personnel at all levels.</li> <li>• Document results clearly and concisely.</li> <li>• Perform an OHS risk assessment.</li> <li>• Communicate ideas and information</li> <li>• Collect, analyze and organize information</li> <li>• Plan and organize activities</li> <li>• Use mathematical ideas and techniques</li> <li>• Solve problems on site contingencies, personnel difficulties, timeline failures, and assessing hazards and identifying controls may require problem-solving skills.</li> </ul>
Resources Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Access is required to real or appropriately simulated situations, including work areas, materials and equipment,</li> <li>• Documentation and information on workplace practices and OHS practices.</li> <li>• specifications and work instructions</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment by direct observation of tasks through simulation/Role-plays</li> <li>• Written exam/test on underpinning knowledge</li> <li>• questioning or interview on underpinning knowledge</li> <li>• project-related conditions (real or simulated) and require evidence of process</li> <li>• Portfolio Assessment (e.g. Certificate from training providers or employers)</li> </ul> <p>Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge</p>
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting. This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</p>

Occupational Standard: Small Scale Irrigation Development Level IV	
Unit Title	Monitor Environmental Policies Implementation
Unit Code	<a href="#">AGR SSI4 10 0816</a>
Unit Descriptor	This unit covers the implementation and monitoring of the organization's environmental policies and procedures as an integral part of the organization's business program. Those who work or who expect to work in a supervisory capacity would be advised to undertake this unit. It could also be useful for small business.

Elements	Performance Criteria
1. Provide information to the work team	<p>1.1 <b>Information</b> provided to the work team is explained in a clear and concise manner and is readily accessible by all employees.</p> <p>1.2 Organization's <b>activities/performance</b> in regard to <b>environmental management and business sustainability</b> are conveyed to work team where required.</p> <p>1.3 Links between environmental, financial, safety and other risk areas and how these are integrated in organizational policies and practices are explained.</p> <p>1.4 Information on environmental systems and procedures and other risk areas within the area of management responsibility is provided.</p>
2. Implement and monitor operational procedures	<p>2.1 Existing and potential <b>environmental risks</b> are identified and assessed.</p> <p>2.2 Prioritized recommendations from the assessments are carried out as part of the organization's operational procedures.</p> <p>2.3 Organizational environmental policies and procedures are implemented</p> <p>2.4 Tasks are allocated and outcomes are monitored in accordance with organizational policies and targets.</p> <p>2.5 Contingency plan is implemented promptly when incidents occur.</p>
3. Implement and monitor change and continuous improvement	<p>3.1 <b>Environmental improvement plans</b> are implemented for own work group and integrated with other operational activities.</p> <p>3.2 <b>Best practice approaches</b> to improving environmental performance by reducing environmental risk and waste are identified, implemented and monitored.</p> <p>3.3 Suggestions and ideas about environmental management are sought from the work team and acted upon where appropriate.</p>

4. Implement and monitor recording procedures	<p>4.1 Internal and external reporting procedures are identified and implemented as required.</p> <p>4.2 Environmental records are accurately and legibly maintained and stored securely in a form accessible for reporting purposes.</p> <p>4.3 Information/records are monitored to identify trends that may require remedial action, and used to promote continuous improvement of environment performance.</p>
5. Implement and monitor an environmental management training program	<p>5.1 <b>Environmental training</b> needs are identified based on specified gaps.</p> <p>5.2 Arrangements are made for fulfilling identified training needs.</p>

<b>Variable</b>	<b>Range</b>
Information	<p>may be include:</p> <ul style="list-style-type: none"> <li>• organizational policies and procedures</li> <li>• relevant environmental legislation requirements</li> <li>• voluntary environmental agreements entered into with external organizations</li> <li>• continuous improvement policies and processes for the organization</li> <li>• environmental data</li> </ul>
Activities/performance	<p>may be include a measure of an organization's impact on the environment and of their ability to manage that impact</p>
Environmental management and business sustainability	<p>may be include:</p> <ul style="list-style-type: none"> <li>• environmental load reduction and waste minimization</li> <li>• tenders for the provision of goods and services that specify environmentally preferred selection criteria</li> <li>• protection of land and habitat</li> <li>• environmentally sustainable work practices</li> <li>• continuous improvement policies</li> </ul>
Environmental risks	<p>may be include:</p> <ul style="list-style-type: none"> <li>• actual and potential sources of waste</li> <li>• poll hazardous waste</li> <li>• planned or unplanned emissions or any aspect of the business operation which may have an impact on environmental performance and may be assessed: <ul style="list-style-type: none"> <li>➤ on an ongoing basis</li> <li>➤ with regard to probability, scale and likely impact on business and environmental performance</li> </ul> </li> </ul>
Environmental improvement plans may include:	<p>may be include:</p> <ul style="list-style-type: none"> <li>• measuring, monitoring and recording environmental performance, and continually setting targets for measurable improvements</li> <li>• all aspects of environmental performance including energy use, waste minimization, recycling, transport use etc.</li> </ul>
Best practice	<p>may be include:</p>



approaches to improve environmental performance may include but are not restricted to:	<ul style="list-style-type: none"> <li>• preventing and minimizing the production of pollution (e.g. discharges to air, land and water, hazardous waste)</li> <li>• improving housekeeping (e.g. using a broom instead of a hose, using old rags for cleaning instead of toxic cleaners or water)</li> <li>• substituting materials (e.g. replacing toxic solvent based coatings with water based ones)</li> <li>• changing processes (e.g. mechanical cleaning, re-design of products/ procedures so that materials are used more efficiently)</li> </ul>
Environmental training needs should be:	<p>may be include:</p> <ul style="list-style-type: none"> <li>• integrated into the organization's existing training</li> <li>• arrangements</li> </ul>
Expert assistance and/or advice	<p>may be include:</p> <ul style="list-style-type: none"> <li>• internal or external sources/specialists</li> <li>• consultants or other experts or specialists</li> </ul>
Supply chain can be:	<p>may be include:</p> <ul style="list-style-type: none"> <li>• a key determinant of environmental performance</li> <li>• a source of positive input and advice to enhance environmental performance</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>Assessment must confirm one's ability to:</p> <ul style="list-style-type: none"> <li>• Screening</li> <li>• describe relevant legislation from all levels of government that affects business operation</li> <li>• communicate with others to ensure information</li> <li>• comprehend documentation</li> <li>• plan and organize activities</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• relevant legislation from all levels of government that affects business operation,</li> <li>• Occupational Health and Safety and environmental issues,</li> <li>• relevant environmental systems and procedures</li> <li>• knowledge of best practice approaches relevant to own work area</li> <li>• strategies to maximize opportunities and minimize impacts relevant to own work area issues especially in regard to water catchments, air, noise, ecosystems, habitat, waste minimization relevant to own work area</li> <li>• work values and ethics</li> <li>• accountable to work loyalty and honest to the work he/she being doing</li> <li>• dedication and commitment</li> <li>• respect and follow organizational rules and regulations</li> </ul>
Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>• communication skills to ensure information is supplied to the work team</li> <li>• consultation skills to assist in workplace negotiations</li> </ul>

	<ul style="list-style-type: none"> <li>• literacy skills for comprehending documentation and interpreting environment requirements</li> <li>• ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities</li> <li>• Collect, analyze and organize information to provide information and advice</li> <li>• Communicate ideas and information to resolve environmental issues with the work team and external contacts</li> <li>• Plan and organize activities to plan training and to implement change and improvement</li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level IV	
<b>Unit Title</b>	<b>Monitor and Control Irrigation Drainage Systems</b>
<b>Unit Code</b>	<a href="#">AGR SSI4 11 0816</a>
<b>Unit Descriptor</b>	This Unit covers the process of monitoring and controlling the performance and efficiency of an irrigation drainage system and defines the standard required to: identify and correcting system problems; measure, record and report soil moisture, salinity and water table depth; apply measuring and testing techniques; regulate drainage flows and clear blockages; record and report system performance.

Elements	Performance criteria
1. Assess irrigation drainage and collection systems	<p>1.1 Measurements are taken with appropriate equipment to determine drainage performance.</p> <p>1.2 Drainage/tail water quality is measured in accordance with OHS and enterprise policy and procedures.</p> <p>1.3 Water table depth is measured where required in accordance with OHS and enterprise policy and procedures.</p> <p>1.4 Soil salinity is measured where required in accordance with OHS and enterprise policy and procedures.</p> <p>1.5 Factors external to the system, which may cause interference, are identified and recorded in accordance with OHS and enterprise policy and procedures.</p> <p>1.6 <b>Drainage system</b> data is analyzed and compared to the performance specified in the irrigation drainage plan.</p>
2. Regulate flows	<p>2.1 Flow regulating systems are inspected and apply adjustments are applied necessary to achieve discharge requirements specified.</p> <p>2.2 Discharge flows are monitored and diversions applied to facilitate repair or emergency.</p>
3. Control and operate drainage system structures and processes	<p>3.1 Processes are controlled to maintain performance specified in the irrigation drainage plan.</p> <p>3.2 Maintenance procedures for drainage system structures are developed and implemented.</p> <p>3.3 Operational conditions of the drainage system are identified, addressed and reported according to organizational requirements.</p> <p>3.4 Processes are integrated to improve drainage network performance.</p>
5. Record and report system performance status	<p>5.1 Water quality is recorded in accordance with enterprise procedures.</p> <p>5.2 Water table depth, soil moisture and salinity are recorded in accordance with enterprise procedures.</p>

	5.3 Strategies that minimize the negative environmental impacts and maximize the positive impacts of the drainage system, are documented.
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Variable	Range
Drainage system structures may include:	<ul style="list-style-type: none"> <li>• surface drains</li> <li>• culverts</li> <li>• mole drains</li> <li>• sand slit</li> <li>• sub-surface traps</li> <li>• pit and trap systems</li> <li>• dune and swale systems</li> <li>• reed beds</li> <li>• Water-recycling pumps and baffles.</li> </ul>
Irrigation drainage systems may include:	Both surface and sub-surface drainage installed to handle water which is excess to plant requirements in an irrigated area.
Types and Sources of Information	<ul style="list-style-type: none"> <li>• Organizational rules, regulation and guidelines</li> <li>• Internet, related books and related materials</li> <li>• Technical manuals</li> <li>• sharing best practice</li> <li>• Virtual library</li> <li>• Workplace guidelines</li> <li>• Recorded documents/logo/history</li> </ul>

Evidence Guide	
Critical Aspects of competence	Demonstrate ability to: <ul style="list-style-type: none"> <li>• identify and correcting system problems</li> <li>• measure, record and report soil moisture, salinity and water table depth</li> <li>• apply measuring and testing techniques</li> <li>• regulate drainage flows and clear blockages</li> <li>• record and report system performance.</li> </ul>
Underpinning Knowledge	Requires knowledge of : <ul style="list-style-type: none"> <li>• measuring and monitoring procedures for factors contributing to drainage system performance</li> <li>• water table and salinity measures</li> <li>• water quality monitoring methods and techniques</li> <li>• soil moisture measurement procedures</li> <li>• Environmental role of drainage systems.</li> <li>• drainage appliances/fixtures/fittings and related</li> <li>• level and align site</li> <li>• types and operational parameters of drains</li> <li>• components used in drainage systems</li> <li>• isolation processes and procedures</li> <li>• levelling and alignment processes</li> <li>• work values and Ethics</li> <li>• accountable to work loyalty and honest to the work he/she being doing</li> </ul>

	<ul style="list-style-type: none"> <li>• dedication and commitment</li> <li>• respect and follow organizational rules and regulations</li> </ul>
Underpinning skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>• identify hazards and implement safe work procedures</li> <li>• apply soil moisture testing techniques</li> <li>• calculate water volumes from rate and depth</li> <li>• measure water table depth, soil moisture and salinity</li> <li>• clear and refill drainage lines</li> <li>• isolate drainage lines</li> <li>• clear blockages from drainage systems</li> <li>• identify adverse environmental impacts of drainage systems and appropriate remedial action</li> <li>• implement and follow relevant enterprise OHS and environmental policies and procedures</li> <li>• use oral communication skills/language competence to fulfill the job role as specified by the organization, including questioning techniques, active listening, clarifying information and consulting with supervisors as required</li> <li>• use numeracy skills to estimate, calculate and record routine workplace measures</li> <li>• Use interpersonal skills to work with and relate to people from a range of cultural, social and religious backgrounds and with a range of physical and mental abilities.</li> </ul>
Resource Implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> <li>• Workplace or fully equipped assessment location with necessary tools and equipment as well as consumable materials</li> <li>• Documented organizational requirements</li> <li>• Approved assessment tools</li> <li>• Certified assessor /Assessor's panel</li> </ul>
Method of Assessment	<p>Competence may be accessed through:</p> <ul style="list-style-type: none"> <li>• Practical assessment</li> <li>• Interview</li> <li>• Simulation/Role-plays</li> <li>• Observation and question</li> <li>• Theoretical exam</li> <li>• Written exam/test</li> <li>• Portfolio Assessment (E.g. Certificate from training providers)</li> </ul>
Context of Assessment	<ul style="list-style-type: none"> <li>• Competence may be assessed in the work place or in a simulated work place setting</li> <li>• The unit of competence should be assessed in conjunction with other relevant units in this occupation</li> </ul>

Occupational Standard: Small Scale Irrigation Development Level IV	
Unit Title	Plan and Organize Work
Unit Code	<a href="#">AGR SSI4 12 0816</a>
Unit Descriptor	This unit covers the knowledge, skills and attitude required in planning and organizing work activities in a production application. It may be applied to a small independent operation or to a section of a large organization.

Elements	Performance Criteria
1. Set objectives	<p>1.1 <b>Objectives</b> are planned consistent with and linked to work activities in accordance with organizational aims.</p> <p>1.2 Objectives are stated as measurable targets with clear time frames.</p> <p>1.3 Support and commitment of team members are reflected in the objectives.</p> <p>1.4 Realistic and attainable objectives are identified.</p>
2. Plan and schedule work activities	<p>2.1 Tasks/work activities to be completed are identified and prioritized as directed.</p> <p>2.2 Tasks/work activities are broken down into steps in accordance with set time frames and achievable components.</p> <p>2.3 Task/work activities are assigned to appropriate team or individuals in accordance with agreed functions.</p> <p>2.4 <b>Resources</b> are allocated as per requirements of the activity.</p> <p>2.5 <b>Schedule of work activities</b> is coordinated with personnel concerned.</p>
3. Implement work plans	<p>3.1 <b>Work methods and practices</b> are identified in consultation with personnel concerned.</p> <p>3.2 <b>Work plans</b> are implemented in accordance with set time frames, resources and <b>standards</b>.</p>
4. Monitor work activities	<p>4.1 Work activities are monitored and compared with set objectives.</p> <p>4.2 Work performance is monitored.</p> <p>4.3 Deviations from work activities are reported and recommendations are coordinated with appropriate personnel and in accordance with set standards.</p> <p>4.4 Reporting requirements are complied with in accordance with recommended format.</p> <p>4.5 Timeliness of report is observed.</p> <p>4.6 Files are established and maintained in accordance with standard operating procedures.</p>

5. Review and evaluate work plans and activities	<p>5.1 Work plans, strategies and implementation are reviewed based on accurate, relevant and current information.</p> <p>5.2 Review is done based on comprehensive consultation with appropriate personnel on outcomes of work plans and reliable feedback.</p> <p>5.3 Results of review are provided to concerned parties and formed as the basis for adjustments/simplifications to be made to policies, processes and activities.</p> <p>5.4 Performance appraisal is conducted in accordance with organization rules and regulations.</p> <p>5.5 Performance appraisal report is prepared and documented regularly as per organization requirements.</p> <p>5.6 Recommendations are prepared and presented to <b>appropriate personnel/authorities</b>.</p> <p>5.7 <b>Feedback mechanisms</b> are implemented in line with organization policies.</p>
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Variable	Range
Objectives	May include but not limited to: <ul style="list-style-type: none"> <li>• Specific</li> <li>• General</li> </ul>
Resources	May include but not limited to: <ul style="list-style-type: none"> <li>• Personnel</li> <li>• Equipment and technology</li> <li>• Services</li> <li>• Supplies and materials</li> <li>• Sources for accessing specialist advice</li> <li>• Budget</li> </ul>
Schedule of work activities	May include but not limited to: <ul style="list-style-type: none"> <li>• Daily</li> <li>• Work-based</li> <li>• Contractual</li> <li>• Regular</li> </ul>
Work methods and practices	May include but not limited to: <ul style="list-style-type: none"> <li>• Legislated regulations and codes of practice</li> <li>• Industry regulations and codes of practice</li> <li>• Occupational health and safety practices</li> </ul>
Work plans	May include but not limited to: <ul style="list-style-type: none"> <li>• Daily work plans</li> <li>• Project plans</li> <li>• Program plans</li> <li>• Resource plans</li> <li>• Skills development plans</li> <li>• Management strategies and objectives</li> </ul>
Standards	May include but not limited to: <ul style="list-style-type: none"> <li>• Performance targets</li> <li>• Performance management and evaluation systems</li> </ul>

	<ul style="list-style-type: none"> <li>• Occupational standards</li> <li>• Employment contracts</li> <li>• Client contracts</li> <li>• Discipline procedures</li> <li>• Workplace assessment guidelines</li> <li>• Internal quality assurance</li> <li>• Internal and external accountability and auditing requirements</li> <li>• Training Regulation Standards and Safety Standards</li> </ul>
Appropriate personnel/ authorities	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Appropriate personnel include:</li> <li>• Management and Line Staff</li> </ul>
Feedback mechanisms	<p>May include but not limited to:</p> <ul style="list-style-type: none"> <li>• Verbal feedback</li> <li>• Informal feedback</li> <li>• Formal feedback</li> <li>• Questionnaire</li> <li>• Survey and Group discussion</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	<p>Demonstrates skills and knowledge to:</p> <ul style="list-style-type: none"> <li>• set objectives</li> <li>• plan and schedule work activities</li> <li>• implement work plans</li> <li>• monitor work activities</li> <li>• review and evaluate work plans and activities</li> </ul>
Underpinning Knowledge and Attitudes	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• organization's strategic plan, policies rules and regulations, laws and objectives for work unit activities and priorities</li> <li>• organizations policies, strategic plans, guidelines related to the role of the work unit</li> <li>• team work and consultation strategies</li> </ul>
Underpinning Skills	<p>Demonstrates skill to:</p> <ul style="list-style-type: none"> <li>• plan</li> <li>• lead</li> <li>• organize</li> <li>• coordinate</li> <li>• communicate</li> <li>• inter-and intra-person/motivation skills</li> <li>• present</li> </ul>
Resource Implications	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>



Occupational Standard: Small Scale Irrigation Development Level IV	
Unit Title	Migrate to New Technology
Unit Code	<a href="#">AGR SSI4 13 0816</a>
Unit Descriptor	This unit defines the competence required to apply skills and knowledge in using new or upgraded technology. The rationale behind this unit emphasizes the importance of constantly reviewing work processes, skills and techniques in order to ensure that the quality of the entire business process is maintained at the highest level possible through the appropriate application of new technology. To this end, the person is typically engaged in on-going review and research in order to discover and apply new technology or techniques to improve aspects of the organization's activities.

Elements	Performance Criteria
1. Apply existing knowledge and techniques to technology and transfer	<p>1.1 Situations are identified where existing knowledge can be used as the basis for developing new skills.</p> <p>1.2 New or upgraded technology skills are acquired and used to enhance learning.</p> <p>1.3 New or upgraded equipment are identified, classified and used where appropriate, for the benefit of the organization.</p>
2. Apply functions of technology to assist in solving organizational problems	<p>2.1 Testing of new or upgraded equipment is conducted according to the specification manual.</p> <p>2.2 Features of new or upgraded equipment are applied within the organization.</p> <p>2.3 Features and functions of new or upgraded equipment are used for solving organizational problems.</p> <p>2.4 Sources of information relating to new or upgraded equipment are accessed and used.</p>
3. Evaluate new or upgraded technology performance	<p>3.1 New or upgraded equipment is evaluated for performance, usability and against OHS standards.</p> <p>3.2 <b>Environmental considerations</b> are determined from new or upgraded equipment.</p> <p>3.3 <b>Feedback</b> is sought from users where appropriate.</p>

Variables	Range
Environmental Considerations	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>recycling, safe disposal of packaging (e.g. cardboard, polystyrene, paper, plastic) and correct disposal of waste materials by an authorized body</li> </ul>
Feedback	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>surveys,</li> <li>questionnaires,</li> <li>interviews and meetings</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	Competence must confirm the ability to transfer the application of existing skills and knowledge to new technology
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: <ul style="list-style-type: none"> <li>• Broad awareness of current technology trends and directions in the industry (e.g. systems/procedures, services, new developments, new protocols)</li> <li>• Vendor product directions</li> <li>• Ability to locate appropriate sources of information regarding metal manufacturing and new technologies</li> <li>• Current industry products/services, procedures and techniques with knowledge of general features</li> <li>• Information gathering techniques</li> </ul>
Underpinning Skills	Demonstrate skills of: <ul style="list-style-type: none"> <li>• Research skills for identifying broad features of new technologies</li> <li>• Ability to assist in the decision making process</li> <li>• Literacy skills in regard to interpretation of technical manuals</li> <li>• Ability to solve known problems in a variety of situations and locations</li> <li>• Evaluate and apply new technology to assist in solving organizational problems</li> <li>• General analytical skills in relation to known problems</li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

<b>Occupational Standard: Small Scale Irrigation Development Level IV</b>	
<b>Unit Title</b>	<b>Establish Quality Standards</b>
<b>Unit Code</b>	<a href="#"><u>AGR SSI4 14 0816</u></a>
<b>Unit Descriptor</b>	This unit covers the knowledge, skills and attitudes required to establish quality specifications for work outcomes and work performance. It includes monitoring and participation in maintaining and improving quality, identifying critical control points in the production of quality output and assisting in planning and implementing of quality assurance procedures.

<b>Elements</b>	<b>Performance Criteria</b>
1. Establish quality specifications for product	<p>1.1 Market specifications are <b>sourced</b> and <b>legislated requirements</b> identified.</p> <p>1.2 Quality specifications are developed and agreed upon.</p> <p>1.3 Quality specifications are documented and introduced to organization staff / personnel in accordance with the organization policy.</p> <p>1.4 Quality specifications are updated when necessary.</p>
2. Identify hazards and critical control points	<p>2.1 Critical control points impacting on quality are identified.</p> <p>2.2 Degree of risk for each hazard is determined.</p> <p>2.3 Necessary documentation is accomplished in accordance with organization quality procedures</p>
3. Assist in planning of quality assurance procedures	<p>3.1 Procedures for each identified control point are developed to ensure optimum quality.</p> <p>3.2 Hazards and risks are minimized through application of appropriate controls.</p> <p>3.3 Processes are developed to monitor the effectiveness of quality assurance procedures.</p>
4. Implement quality assurance procedures	<p>4.1 Responsibilities for carrying out procedures are allocated to staff and contractors.</p> <p>4.2 Instructions are prepared in accordance with the enterprise's quality assurance program.</p> <p>4.3 Staff and contractors are given induction training on the quality assurance policy.</p> <p>4.4 Staff and contractors are given in-service training relevant to their allocated <b>safety procedures</b>.</p>
5. Monitor quality of work outcome	<p>5.1 Quality requirements are identified.</p> <p>5.2 Inputs are inspected to confirm capability to meet quality requirements.</p> <p>5.3 Work is conducted to produce required outcomes.</p> <p>5.4 Work processes are monitored to confirm quality of output and/or service.</p>

	5.5 Processes are adjusted to maintain outputs within specification.
6. Participate in maintaining and improving quality at work	<p>6.1 Work area, materials, processes and product are routinely monitored to ensure compliance with quality requirements.</p> <p>6.2 Non-conformance in inputs, process, product and/or service is identified and reported according to workplace reporting requirements.</p> <p>6.3 Corrective action is taken within level of responsibility, to maintain quality standards.</p> <p>6.4 Quality issues are raised with designated personnel.</p>
7. Report problems that affect quality	<p>7.1 Potential or existing quality problems are recognized.</p> <p>7.2 Instances of variation in quality are identified from specifications or work instructions.</p> <p>7.3 Variation and potential problems are reported to supervisor/manager according to enterprise guidelines.</p>

Variable	Range
Sourced	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• End-users</li> <li>• Customers or stakeholders</li> </ul>
Legislated requirements	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Verification of product quality as part of consumer legislation or specific legislation related to product content or composition.</li> </ul>
Safety procedures.	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Use of tools and equipment for fabrication/production/manufacturing works</li> <li>• Workplace environment and handling of material safety,</li> <li>• Following occupational health and safety procedures designated for the task</li> <li>• Respect the policies, regulations, legislations, rule and procedures for manufacturing/production/fabrication works</li> </ul>

Evidence Guide	
Critical Aspect of Competence	<p>Demonstrates skills and knowledge to:</p> <ul style="list-style-type: none"> <li>• Monitor quality of work</li> <li>• Establish quality specifications for product</li> <li>• Participate in maintaining and improving quality at work</li> <li>• Identify hazards and critical control points in the production of quality product</li> <li>• Assist in planning of quality assurance procedures</li> <li>• Report problems that affect quality</li> <li>• Implement quality assurance procedures</li> </ul>
Underpinning Knowledge	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• work and product quality specifications</li> <li>• quality policies and procedures</li> </ul>

	<ul style="list-style-type: none"> <li>• improving quality at work</li> <li>• hazards and critical points of operation</li> <li>• obtaining and using information</li> <li>• applying federal and regional legislation within day-today work activities</li> <li>• accessing and using management systems to keep and maintain accurate records</li> <li>• requirements for correct preparation and operation</li> <li>• technical writing</li> </ul>
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> <li>• monitor quality of work</li> <li>• establish quality specifications for product</li> <li>• participate in maintaining and improving quality at work</li> <li>• identify hazards and critical control points in the production of quality product</li> <li>• assist in planning of quality assurance procedures</li> <li>• report problems that affect quality</li> <li>• implement quality assurance procedures</li> </ul>
Resource Implications	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	<p>Competence may be assessed in the work place or in a simulated work place setting.</p>

<b>Occupational Standard: Small Scale Irrigation Development Level IV</b>	
<b>Unit Title</b>	<b>Develop Individuals and Team</b>
<b>Unit Code</b>	<a href="#"><u>AGR SSI4 15 0816</u></a>
<b>Unit Descriptor</b>	This unit covers the knowledge, skills and attitudes required to determine individual and team development needs and facilitate the development of the workgroup.

<b>Elements</b>	<b>Performance Criteria</b>
1. Provide team leadership	<p>1.1 <b>Learning and development needs</b> are systematically identified and implemented in line with <b>organizational requirements</b>.</p> <p>1.2 Learning plan to meet individual and group training and developmental needs is collaboratively developed and implemented.</p> <p>1.3 Individuals are encouraged to self-evaluate performance and identify areas for improvement.</p> <p>1.4 <b>Feedback on performance</b> of team members is collected from relevant sources and compared with established team learning process.</p>
2. Foster individual and organizational growth	<p>2.1 Learning and development program goals and objectives are identified to match the specific knowledge and skills requirements of Competence standards.</p> <p>2.2 <b>Learning delivery methods</b> are made appropriate to the learning goals, the learning style of participants and availability of equipment and resources.</p> <p>2.3 Workplace learning opportunities and coaching/ mentoring assistance are provided to facilitate individual and team achievement of competencies.</p> <p>2.4 Resources and timelines required for learning activities are identified and approved in accordance with organizational requirements.</p>
3. Monitor and evaluate workplace learning	<p>3.1 Feedback from individuals or teams is used to identify and implement improvements in future learning arrangements.</p> <p>3.2 Outcomes and performance of individuals/teams are assessed and recorded to determine the effectiveness of development programs and the extent of additional support.</p> <p>3.3 Modifications to learning plans are negotiated to improve the efficiency and effectiveness of learning.</p> <p>3.4 Records and reports of competence are maintained within organizational requirement.</p>
4. Develop team commitment and cooperation	<p>4.1 Open communication processes to obtain and share information is used by team.</p> <p>4.2 Decisions are reached by the team in accordance with its agreed roles and responsibilities.</p>

	4.3 Mutual concern and camaraderie are developed in the team.
5. Facilitate accomplishment of organizational goals	<p>5.1 Team members are actively participated in team activities and communication processes.</p> <p>5.2 Individual and joint responsibility is developed by team's members for their actions.</p> <p>5.3 Collaborative efforts are sustained to attain organizational goals.</p>

Variable	Range
Learning and development needs	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Coaching, monitoring and/or supervision</li> <li>• Formal/informal learning program</li> <li>• Internal/external training provision</li> <li>• Work experience/exchange/opportunities</li> <li>• Personal study</li> <li>• Career planning/development</li> <li>• Performance evaluation</li> <li>• Workplace skills assessment</li> <li>• Recognition of prior learning</li> </ul>
Organizational requirements	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Quality assurance and/or procedures manuals</li> <li>• Goals, objectives, plans, systems and processes</li> <li>• Legal and organizational policy/guidelines and requirements</li> <li>• Safety policies, procedures and programs</li> <li>• Confidentiality and security requirements</li> <li>• Business and performance plans</li> <li>• Ethical standards</li> <li>• Quality and continuous improvement processes and standards</li> </ul>
Feedback on performance	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Formal/informal performance evaluation</li> <li>• Obtaining feedback from supervisors and colleagues</li> <li>• Obtaining feedback from clients</li> <li>• Personal and reflective behavior strategies</li> <li>• Routine and organizational methods for monitoring service delivery</li> </ul>
Learning delivery methods	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• On the job coaching or monitoring</li> <li>• Problem solving</li> <li>• Presentation/demonstration</li> <li>• Formal course participation</li> <li>• Work experience and involvement in professional networks</li> <li>• Conference and seminar attendance</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	Demonstrates skills and knowledge to: <ul style="list-style-type: none"> <li>• identify and implement learning opportunities for others</li> <li>• give and receive feedback constructively</li> <li>• facilitate participation of individuals in the work of the team</li> <li>• negotiate plans to improve the effectiveness of learning</li> <li>• prepare learning plans to match skill needs</li> <li>• access and designate learning opportunities</li> </ul>
Underpinning Knowledge and Attitude	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• coaching and monitoring principles</li> <li>• how to work effectively with team members who have diverse work styles, aspirations, cultures and perspective</li> <li>• how to facilitate team development and improvement</li> <li>• methods and techniques to obtain and interpreting feedback</li> <li>• methods for identifying and prioritizing personal development opportunities and options</li> <li>• career paths and competence standards in the industry</li> </ul>
Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> <li>• read and understand a variety of texts, preparing general information and documents according to target audience; spell with accuracy; use grammar and punctuation effective relationships and conflict management</li> <li>• communicate including receiving feedback and reporting, maintaining effective relationships and conflict management</li> <li>• plan and organize required resources and equipment to meet learning needs</li> <li>• coach and mentor skills to provide support to colleagues</li> <li>• report to organize information; assess information for relevance and accuracy; identify and elaborate on learning outcomes</li> <li>• facilitate and conduct small group training sessions</li> <li>• relate to people from a range of social, cultural, physical and mental backgrounds</li> </ul>
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.



Occupational Standard: Small Scale Irrigation Development Level IV	
Unit Title	Utilize Specialized Communication Skills
Unit Code	<a href="#">AGR SSI4 16 0816</a>
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to use specialized communication skills to meet specific needs of internal and external clients, conduct interviews, facilitate group discussions, and contribute to the development of communication strategies.

Elements	Performance Criteria
1. Meet common and specific communication needs of clients and colleagues	<p>1.1 Specific communication needs of clients and colleagues are identified and met.</p> <p>1.2 Different approaches are used to meet communication needs of clients and colleagues.</p> <p>1.3 Conflict is addressed promptly and in a timely way and in a manner which does not compromise the standing of the organization.</p>
2. Contribute to the development of communication strategies	<p>2.1 <b>Strategies</b> for internal and external dissemination of information are developed, promoted, implemented and reviewed as required.</p> <p>2.2 Channels of communication are established and reviewed regularly.</p> <p>2.3 Coaching in effective communication is provided</p> <p>2.4 Work related network and relationship are maintained as necessary.</p> <p>2.5 Negotiation and conflict resolution strategies are used where required.</p> <p>2.6 Communication with clients and colleagues is appropriate to individual needs and organizational objectives.</p>
3. Represent the organization	<p>3.1 When participating in internal or external fora, presentation is relevant, appropriately researched and presented in a manner to promote the organization.</p> <p>3.2 Presentation is made clear and sequential and delivered within a predetermined time.</p> <p>3.3 Appropriate media is utilized to enhance presentation.</p> <p>3.4 Differences in views are respected.</p> <p>3.5 Written communication is made consistent with organizational standards.</p> <p>3.6 Inquiries are responded in a manner consistent with organizational standard.</p>
4. Facilitate group discussion	4.1 Mechanisms which enhance <b>effective group interaction</b> are defined and implemented.

	<p>4.2 Strategies which encourage all group members to participate are used routinely.</p> <p>4.3 Objectives and agenda are routinely set and followed for meetings and discussions.</p> <p>4.4 Relevant information are provided to group to facilitate outcomes.</p> <p>4.5 Evaluation of group communication strategies is undertaken to promote participation of all parties.</p> <p>4.6 Specific communication needs of individuals are identified and addressed.</p>
5. Conduct interview	<p>5.1 A range of appropriate communication strategies are employed in <b>interview situations</b>.</p> <p>5.2 Different <b>types of interview</b> is conducted in accordance with the organizational procedures.</p> <p>5.3 Records of interviews are made and maintained in accordance with organizational procedures.</p> <p>5.4 Effective questioning, listening and nonverbal communication techniques are used to ensure that required message is communicated.</p>

Variable	Range
Strategies	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Recognizing own limitations</li> <li>• Utilizing techniques and aids</li> <li>• Providing written drafts</li> <li>• Verbal and non verbal communication</li> </ul>
Effective group interaction	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Identifying and evaluating what is occurring within an interaction in a non-judgmental way</li> <li>• Using active listening</li> <li>• Making decision about appropriate words, behavior</li> <li>• Putting together response which is culturally appropriate</li> <li>• Expressing an individual perspective</li> <li>• Expressing own philosophy, ideology and background and exploring impact with relevance to communication</li> </ul>
Interview situations	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Establish rapport</li> <li>• obtain facts and information</li> <li>• Facilitate resolution of issues</li> <li>• Develop action plans</li> <li>• Diffuse potentially difficult situation</li> </ul>
Types of Interview	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Related to staff issues</li> <li>• Routine</li> <li>• Confidential</li> <li>• Evidential</li> </ul>

	<ul style="list-style-type: none"> <li>• Non-disclosure</li> <li>• Disclosure</li> </ul>
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<b>Evidence Guide</b>	
Critical Aspects of Competence	Demonstrates skills and knowledge to: <ul style="list-style-type: none"> <li>• Demonstrate effective communication skills with clients and work colleagues accessing service</li> <li>• Adopt relevant communication techniques and strategies to meet client particular needs and difficulties</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: <ul style="list-style-type: none"> <li>• communication process</li> <li>• dynamics of groups and different styles of group leadership</li> <li>• communication skills relevant to client groups</li> </ul>
Underpinning Skills	Demonstrates skills to: <ul style="list-style-type: none"> <li>• full range of communication techniques including:               <ul style="list-style-type: none"> <li>➢ active listening</li> <li>➢ feedback</li> <li>➢ interpretation</li> <li>➢ role boundaries setting</li> <li>➢ negotiation</li> <li>➢ establishing empathy</li> <li>➢ communication strategies</li> </ul> </li> <li>• communicate to fulfill job roles as specified by the organization</li> </ul>
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Small Scale Irrigation Development Level IV	
Unit Title	Manage Micro, Small and Medium Enterprises (MSMEs)
Unit Code	<a href="#">AGR SSI4 17 0816</a>
Unit Descriptor	This unit covers knowledge, skills and attitude required in running Micro, Small and Medium enterprises. The strategies involve developing, monitoring and managing work activities and financial information, developing effective work habits, and adjusting work schedules as needed.

Elements	Performance Criteria
1. Develop and communicate Strategic work plan	<p>1.1 The importance of planning is sensitized before acting and about the importance of plans to reduce risks and to inhibit impulsive actions and discussed.</p> <p>1.2 The basics of planning and beginning with goal setting are communicated.</p> <p>1.3 The achievement of measurable and realistic short-term business objective is addressed.</p> <p>1.4 How to develop realistic activities plans and schedule is discussed.</p> <p>1.5 <b>Major components of work plan</b> are introduced and understood.</p> <p>1.6 The importance of constant reviewing their plans is understood by monitoring the results.</p>
2. Identify daily work requirements and Develop effective work habits	<p>2.1 Basic concept about effect working culture is discussed and understood.</p> <p>2.2 Different approaches to work culture are developed and understood.</p> <p>2.3 Work requirements are identified for a given time period by taking into consideration of <b>resources</b> and constraints.</p> <p>2.4 Work activities are prioritized based on business needs, requirements and deadlines.</p> <p>2.5 If appropriate, work is allocated to relevant staff or contractors to optimize efficiency.</p> <p>2.6 Work and personal priorities are identified and a balance is achieved between competing priorities using appropriate <b>time management strategies</b>.</p> <p>2.7 Input is sought from <b>internal and external sources</b> and used to develop and refine new ideas and approaches.</p> <p>2.8 Business or inquiries is/are responded to promptly and effectively.</p> <p>2.9 Information is presented in a format appropriate to the industry and audience.</p>
3. Manage Marketing of MSMEs	<p>3.1 Information on market and business needs is analyzed and market opportunities identified.</p>

	<p>3.2 Marketing mix and components are evaluated.</p> <p>3.3 Marketing mix for specific target market is determined.</p> <p>3.4 Marketing mix is monitored and continual adjusted against marketing performance.</p>
4. Manage Human Resources	<p>4.1 <b>Human resource rules, regulations law and procedures</b> are identified and determined.</p> <p>4.2 The existing human resource is audited, and gaps are identified.</p> <p>4.3 Recruitment and selection are conducted based on the organizational requirements.</p> <p>4.4 Selected candidates are oriented and placed for the appropriate position.</p> <p>4.5 Appraisal of employees' performance is conducted.</p> <p>4.6 Appraisal result is used for training and development, promotion, compensation, disciplinary measures and other purposes as required.</p> <p>4.7 <b>Employee relations</b> are maintained.</p>
5. Manage production and Operation	<p>5.1 Production /operation plan is developed and implemented.</p> <p>5.2 Required inputs are purchased and adequate inventories maintained.</p> <p>5.3 Production /operation process is checked and controlled.</p> <p>5.4 Quality control is applied and maintained.</p>
6. Maintain financial records and use for decision making	<p>6.1 The objective and benefits of financial records are discussed and understood.</p> <p>6.2 Asset, liabilities and capital are identified and recorded.</p> <p>6.3 Balance sheet and different journals are discussed.</p> <p>6.4 Business transactions are discussed, analyzed, classified and recorded.</p> <p>6.5 Daily financial records are maintained correctly in accordance with legal and accounting requirements.</p> <p>6.6 Invoices and payments are prepared and distributed in timely manner and in accordance with legal requirements.</p> <p>6.7 Outstanding accounts are collected or followed-up.</p> <p>6.8 Revenue, expense and costs are identified and discussed.</p> <p>6.9 Different ledgers and subsidiary ledgers are discussed and maintained.</p> <p>6.10 Profit and loss report is prepared.</p> <p>6.11 Financial interpretation is conducted with assistant from the appropriate person.</p>

	6.12 Financial manual is prepared.
7. Monitor, Manage and Evaluate work performance	<p>7.1 People, resources and/or equipment are coordinated to provide optimum results.</p> <p>7.2 Staff, clients and/or contractors are communicated within a clear and regular manner, to monitor work in relation to <b>business goals</b> or timelines.</p> <p>7.3 <b>Problem solving techniques</b> are applied to work situations to overcome difficulties and achieve positive outcomes.</p> <p>7.4 Opportunities for improvements are monitored according to business demands.</p> <p>7.5 Work schedules are adjusted to incorporate necessary modifications to existing work and routines or changing needs and requirements.</p> <p>7.6 Proposed changes are clearly communicated and recorded to aid in future planning and evaluation.</p> <p>7.7 Relevant codes of practice are used to guide an ethical approach to workplace practices and decisions.</p>

Variable	Range
Major components of work plan	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Objective</li> <li>• Responsibilities</li> <li>• Resources (human, materials, finance, time, etc)</li> <li>• Activities</li> </ul>
Resources	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Human resource</li> <li>• Money</li> <li>• Time</li> <li>• Machines</li> <li>• Equipment</li> <li>• Space</li> </ul>
Time management strategies	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Prioritizing and anticipating</li> <li>• Short term and long term planning and scheduling</li> <li>• Creating a positive and organized work environment</li> <li>• Clear timelines and goal setting that is regularly reviewed and adjusted as necessary</li> <li>• Breaking large tasks into smaller tasks</li> <li>• Getting additional support if identified and necessary</li> </ul>
Internal and external sources	<p>May include but is not limited to:</p> <ul style="list-style-type: none"> <li>• Staff and colleagues</li> <li>• Management, supervisors, advisors or head office</li> <li>• Relevant professionals such as lawyers, accountants, management consultants</li> <li>• Professional associations</li> </ul>

Human resource rules , regulations law and procedures	May include but is not limited to: <ul style="list-style-type: none"> <li>• Recruitment and selection</li> <li>• Orientation and placement</li> <li>• Training and development</li> <li>• Performance appraisal and reward system</li> <li>• Disciplinary procedures</li> <li>• Movement and separation</li> <li>• Industrial relation</li> </ul>
Employee relations	May include but is not limited to: <ul style="list-style-type: none"> <li>• Relationship within employees</li> <li>• Relationship among employees and management and labor union</li> <li>• Relationship between labor union and government</li> </ul>
Business goals	May include but is not limited to: <ul style="list-style-type: none"> <li>• Sales targets</li> <li>• Budgetary targets</li> <li>• Team and individual goals</li> <li>• Production targets</li> <li>• Reporting deadlines</li> </ul>
Problem solving techniques	May include but is not limited to: <ul style="list-style-type: none"> <li>• Brainstorming</li> <li>• Fish bone</li> <li>• Focus group discussion</li> <li>• Problem tree</li> </ul>

<b>Evidence Guide</b>	
Critical Aspects of Competence	A person must be able to demonstrate: <ul style="list-style-type: none"> <li>• Ability to identify daily work requirements and allocate work appropriately</li> <li>• Ability to interpret financial documents in accordance with legal requirements</li> <li>• The ability to prepare strategic plan</li> <li>• The ability to develop effective work habit</li> <li>• The ability to manage marketing of MSEs</li> <li>• The ability to manage human resources of MSEs</li> <li>• the ability to manage production/operation of MSEs</li> <li>• The ability to maintain financial records of MSEs</li> <li>• The ability to manage, monitor and evaluate work performance of MSMEs</li> </ul>
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: <ul style="list-style-type: none"> <li>• Strategic plan</li> <li>• Working culture</li> <li>• Time management strategy</li> <li>• Marketing Mix</li> <li>• Relevant marketing, operation/production, human resource and financial management</li> <li>• Human resource functions</li> <li>• Production/operation functions</li> <li>• Monitoring and evaluation</li> </ul>

	<ul style="list-style-type: none"> <li>• Problem solving techniques</li> <li>• Federal and Local Government legislative requirements affecting business operations, especially in regard to Occupational Health and Safety (OHS), equal employment opportunity, industrial relations and anti-discrimination</li> <li>• Relevant industry code of practice</li> <li>• Planning techniques to establish realistic timelines and priorities</li> <li>• Identification of relevant performance measures</li> <li>• Quality assurance principles and methods</li> </ul>
Underpinning Skills	<p>Demonstrate skills to:</p> <ul style="list-style-type: none"> <li>• Technical or specialist skills relevant to the business operation</li> <li>• Interpret legal requirements, company policies and procedures and immediate, day-to-day demands</li> <li>• Strategic planning skills</li> <li>• Human relation skills</li> <li>• Communicate using questioning, clarifying, reporting, and giving and receiving constructive feedback</li> <li>• Numeracy skills for performance information, setting targets and interpreting financial documents and reports</li> <li>• Technical skills to interpret business document, reports and financial statements and projections</li> <li>• Relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities</li> <li>• Solve problem and develop contingency plans</li> <li>• Using computers and software packages to record and manage data and to produce reports</li> <li>• Evaluate using assessment work and outcomes</li> <li>• Observe for identifying appropriate people, resources and to monitor work</li> </ul>
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.



Occupational Standard: Small Scale Irrigation Development Level IV	
Unit Title	Apply Problem Solving Techniques and Tools
Unit Code	<a href="#">AGR SSI4 18 0816</a>
Unit Descriptor	This unit of competency covers the knowledge, skills and attitude required to apply scientific problem solving techniques and tools to enhance quality, productivity and other kaizen elements on continual basis.

Elements	Performance criteria
1. Identify and select theme/problem.	<p>1.1 <b>Safety requirements</b> are followed in accordance with safety plans and procedures.</p> <p>1.2 All possible problems related to the process /Kaizen elements are listed using <b>statistical tools and techniques</b>.</p> <p>1.3 All possible problems related to kaizen elements are identified and listed on Visual Management Board/Kaizen Board.</p> <p>1.4 Problems are classified based on obviousness of cause and action.</p> <p>1.5 Critical factors like the number of customers affected, Potentials for bottlenecks, and number of complaints etc... is selected.</p> <p>1.6 Problems related to priorities of <b>Kaizen Elements</b> are given due emphasis and selected.</p>
2. Grasp current status and set goal.	<p>2.1 The extent of the problem is defined.</p> <p>2.2 Appropriate and achievable goal is set.</p>
3. Establish activity plan.	<p>3.1 The problem is confirmed.</p> <p>3.2 High priority problem is selected.</p> <p>3.3 The extent of the problem is defined.</p> <p>3.4 Activity plan is established as per <b>5W1H</b>.</p>
4. Analyze causes of a problem.	<p>4.1 All possible causes of a problem are listed.</p> <p>4.2 Cause relationships are analyzed using <b>4M1E</b>.</p> <p>4.3 Causes of the problems are identified.</p> <p>4.4 Root causes are selected.</p> <p>4.5 The root cause which is most directly related to the problem is selected.</p> <p>4.6 All possible ways are listed using <b>creative idea generation</b> to eliminate the most critical root cause.</p> <p>4.7 The suggested solutions are carefully tested and evaluated for potential complications.</p> <p>4.8 Detailed summaries of the action plan are prepared to implement the suggested solution.</p>

5. Examine countermeasures and their implementation.	5.1 Action plan is implemented by <b>medium KPT</b> members. 5.2 Implementation is monitored according to the agreed procedure and activities are checked with preset plan.
6. Assess effectiveness of the solution.	6.1 <b>Tangible and intangible results</b> are identified. 6.2 The results are verified over time. 6.3 Tangible results are compared with targets using <b>various types of diagram</b> .
7. Standardize and sustain operation.	7.1 If the goal is achieved, the new procedures are standardized and made part of daily activities. 7.2 All employees are trained on the new <b>Standard Operating Procedures (SOPs)</b> . 7.3 SOP is verified and followed by all employees. 7.4 The next problem is selected to be tackled by the team.

Variables	Range
Safety requirements	may include but not limited to: <ul style="list-style-type: none"> <li>• OHS requirements include legislation, material safety, managements system, hazardous substances and dangerous goods code and local safe operating procedures</li> <li>• Work is carried out in accordance with legislative obligations, environmental legislations, relevant health regulation, manual handling procedure and organization insurance requirements</li> </ul>
Statistical tools and techniques	may include but not limited to: <ul style="list-style-type: none"> <li>• 7 QC tools may include: <ul style="list-style-type: none"> <li>➢ Stratification</li> <li>➢ Pareto Diagram</li> <li>➢ Cause and Effect Diagram</li> <li>➢ Check Sheet</li> <li>➢ Control Chart/Graph</li> <li>➢ Histogram</li> <li>➢ Scatter Diagram</li> </ul> </li> <li>• QC techniques may include: <ul style="list-style-type: none"> <li>➢ Brain storming</li> <li>➢ Why analysis</li> <li>➢ What if analysis</li> <li>➢ 5W1H</li> </ul> </li> </ul>
Kaizen Elements	may include but not limited to: <ul style="list-style-type: none"> <li>• Quality</li> <li>• Cost</li> <li>• Productivity</li> <li>• Delivery</li> <li>• Safety</li> <li>• Moral</li> <li>• Environment and Gender equality</li> </ul>

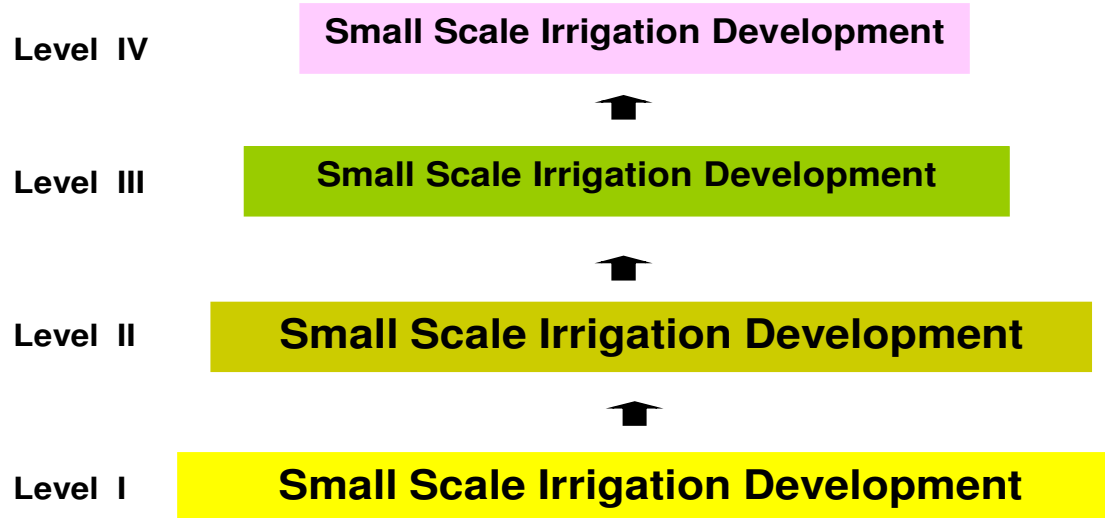
5W1H	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• Who: person in charge</li> <li>• Why: objective</li> <li>• What: item to be implemented</li> <li>• Where: location</li> <li>• When: time frame</li> <li>• How: method</li> </ul>
4M1E	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• Man</li> <li>• Machine</li> <li>• Method</li> <li>• Material and</li> <li>• Environment</li> </ul>
Creative idea generation	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• Brainstorming</li> <li>• Exploring and examining ideas in varied ways</li> <li>• Elaborating and extrapolating</li> <li>• Conceptualizing</li> </ul>
Medium KPT	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• 5S</li> <li>• 4M (machine, method, material and man)</li> <li>• 4P (Policy, procedures, People and Plant)</li> <li>• PDCA cycle</li> <li>• Basics of IE tools and techniques</li> </ul>
Tangible and intangible results	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• Tangible result may include: <ul style="list-style-type: none"> <li>➢ Quantifiable data</li> </ul> </li> <li>• Intangible result may include: <ul style="list-style-type: none"> <li>➢ Qualitative data</li> </ul> </li> </ul>
Various types of diagram	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• Line graph</li> <li>• Bar graph</li> <li>• Pie-chart</li> <li>• Scatter diagram</li> <li>• Affinity diagram</li> </ul>
Standard Operating Procedures (SOPs)	<p>may include but not limited to:</p> <ul style="list-style-type: none"> <li>• The customer demand</li> <li>• The most efficient work routine (steps)</li> <li>• The cycle times required to complete work elements</li> <li>• All process quality checks required to minimize defects/errors</li> <li>• The exact amount of work in process required</li> </ul>

### Evidence Guide

Critical Aspects of Assessment	<p>Demonstrates skills and knowledge competencies to:</p> <ul style="list-style-type: none"> <li>• Apply all relevant procedures and regulatory requirements to ensure quality and productivity of an organization.</li> <li>• Detect non-conforming products/services in the work area</li> <li>• Apply effective problem solving approaches/strategies.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Implement and monitor improved practices and procedures</li> <li>• Apply statistical quality control tools and techniques.</li> </ul>
Underpinning Knowledge and Attitude	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> <li>• QC story/PDCA cycle/</li> <li>• QC story/ Problem solving steps</li> <li>• QCC techniques</li> <li>• 7 QC tools</li> <li>• Basic IE tools and techniques.</li> <li>• SOP</li> <li>• Quality requirements associated with the individual's job function and/or work area</li> <li>• Workplace procedures associated with the candidate's regular technical duties</li> <li>• Relevant health, safety and environment requirements</li> <li>• organizational structure of the enterprise</li> <li>• Lines of communication</li> <li>• Methods of making/recommending improvements.</li> <li>• Reporting procedures</li> </ul>
Underpinning Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> <li>• Apply problem solving techniques and tools</li> <li>• Apply statistical analysis tools</li> <li>• Apply Visual Management Board/Kaizen Board.</li> <li>• Detect non-conforming products or services in the work area</li> <li>• Document and report information about quality, productivity and other kaizen elements.</li> <li>• Contribute effectively within a team to recognize and recommend improvements in quality, productivity and other kaizen elements.</li> <li>• Implement and monitor improved practices and procedures.</li> <li>• Organize and prioritize activities and items.</li> <li>• Read and interpret documents describing procedures</li> <li>• Record activities and results against templates and other prescribed formats.</li> </ul>
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> <li>• Interview / Written Test</li> <li>• Observation / Demonstration with Oral Questioning</li> </ul>
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

**Sector: AGRICULTURE**  
**Subsector: Small Scale Irrigation**  
**Development**



## Acknowledgement

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