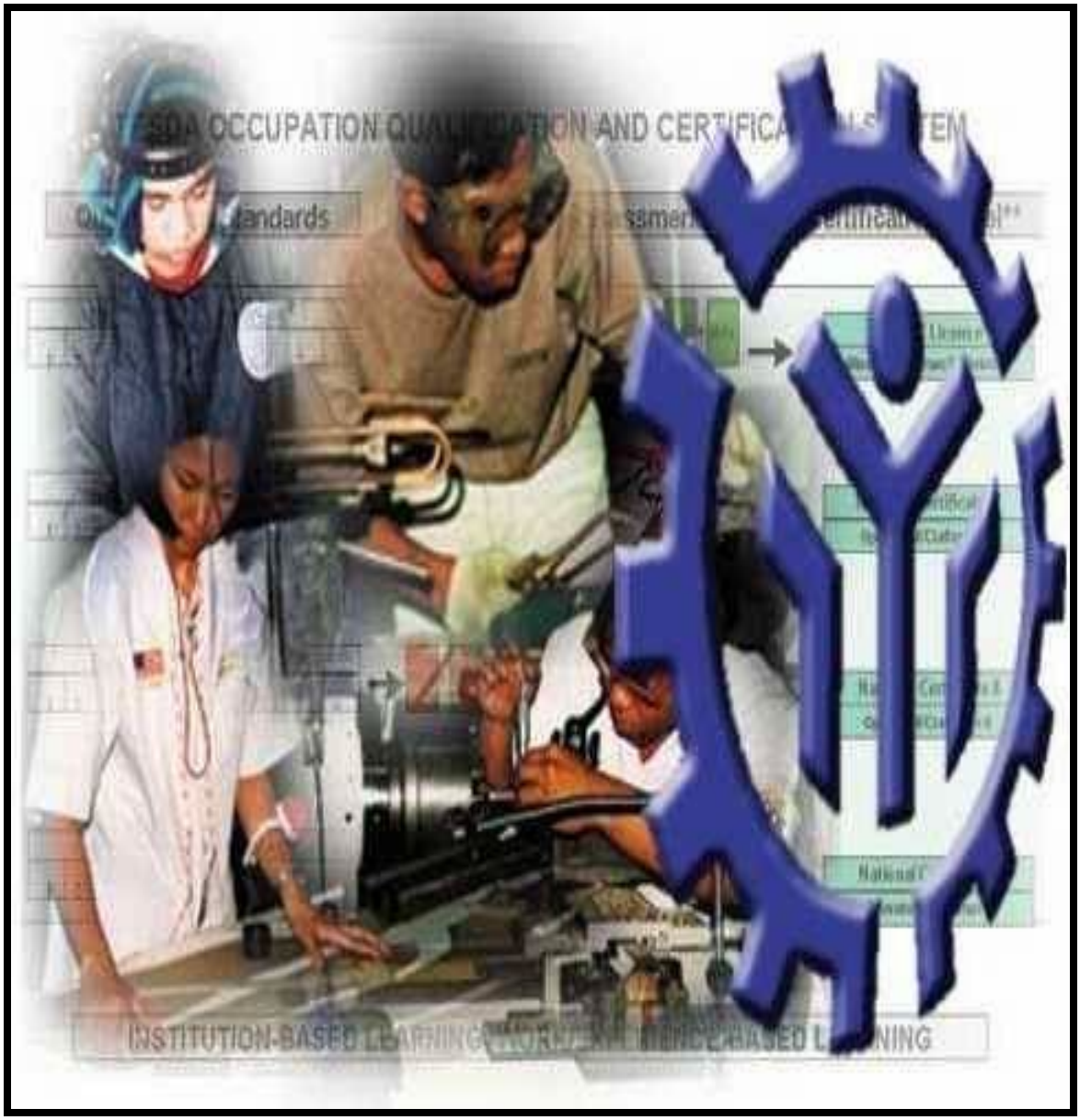
TRAINING REGULATIONS

AGRICULTURAL CROPS PRODUCTION NC III



AGRICULTURE AND FISHERIES SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
East Service Road, South Superhighway, Taguig City, Metro Manila

Technical Education and Skills Development Act of 1994
(Republic Act No. 7796)

Section 22, "Establishment and Administration of the National Trade Skills Standards" of RA 7796 known as the TESDA Act of 1994 mandates TESDA to establish national occupational skill standards. The Authority shall develop and implement a certification and accreditation program in which private industry groups and trade associations are accredited to conduct approved trade tests, and the local government units to promote such trade testing activities in their respective areas in accordance with the guidelines to be set by the Authority.

The Training Regulations (TR) serve as basis for the:

1. Competency assessment and certification;
2. Registration and delivery of training programs; and
3. Development of curriculum and assessment instruments.

Each TR has four sections:

Section 1 Definition of Qualification - refers to the group of competencies that describes the different functions of the qualification.

Section 2 Competency Standards - gives the specifications of competencies required for effective work performance.

Section 3 Training Standards - contains information and requirements in designing training program for the Qualification. It includes curriculum design, training delivery; trainee entry requirements; tools, equipment and materials; training facilities; trainer's qualification and institutional assessment.

Section 4 National Assessment and Certification Arrangements - describes the policies governing assessment and certification procedures.

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AGRICULTURAL CROPS PRODUCTION NC III

TRAINING REGULATIONS FOR
AGRICULTURAL CROPS PRODUCTION NC III

SECTION 1 Agricultural Crops Production National Certificate III

The Agricultural Crops Production NC III consists of competencies that a person must achieve in managing small farm. Specifically it involves competencies in making decision and carrying out competencies in relation to establishment, maintenance and harvesting of agronomic crops such as ***coarse grains, grain legumes, coffee, coconuts, cotton, soya beans, peanuts and sugar cane***. Workers at this level would be working autonomously and likely to own a small enterprise or work within a cooperative structure.

This Qualification is packaged from the competency map of the Agriculture and Fisheries Sector as shown in Annex A.

These units of competency comprising this qualification include the following:

Code	BASIC COMPETENCIES
500311109	Lead workplace communication
500311110	Lead small teams
500311111	Develop and practice negotiation skills
500311112	Solve problems related to work activities
500311113	Use mathematical concepts and techniques
500311114	Use relevant technologies

Code	COMMON COMPETENCIES
AGR321201	Apply safety measures in farm operations
AGR321202	Use farm tools and equipment
AGR321203	Perform estimation and calculations

Code	CORE COMPETENCIES
AGR611310	Prepare land for agricultural crop production
AGR611311	Implement post-harvest program
AGR611312	Implement plant nutrition program
AGR611313	Control weeds
AGR611314	Prepare and apply chemicals
AGR611320	Establish agronomic crops
AGR611321	Undertake agronomic crop maintenance activities
AGR611322	Undertake agronomic crop harvesting activities
AGR611323	Save, prepare and store agricultural seed
AGR611324	Implement vertebrate pest control program

Code	ELECTIVE COMPETENCIES
AGR611325	Follow site quarantine procedures
AGR611326	Collect samples for a rural production or horticultural monitoring program
AGR611327	Handle bulk materials in storage area
AGR611328	Prepare grain storage
AGR611329	Comply with industry quality assurance requirements
AGR611330	Maintain and monitor environmental work practices
AGR611331	Keep records for farm business
AGR611332	Perform specialized machinery maintenance
AGR611333	Install irrigation systems

A person who has achieved this Qualification is competent to be:

- ❑ **Independent Farmer (Owner / Operator in a smaller operation**
- ❑ **Leading hand**

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in AGRICULTURAL CROPS PRODUCTION NC III

BASIC COMPETENCIES

UNIT OF COMPETENCY : **LEAD WORKPLACE COMMUNICATION**

UNIT CODE : **500311109**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to lead in the dissemination and discussion of ideas, information and issues in the workplace.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Communicate information about workplace processes	1.1 Appropriate ***communication method*** 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 discussions	2.1 Response to workplace issues are 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 personnel 3.4 Communication problems and issues are raised as they arise

RANGE OF VARIABLES

VARIABLE	RANGE
1. Methods of communication	1.1 Non-verbal gestures 1.2 Verbal 1.3 Face to face 1.4 Two-way radio 1.5 Speaking to groups 1.6 Using telephone 1.7 Written 1.8 Internet

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Dealt with a range of communication/information at one time 1.2 Made constructive contributions in workplace issues 1.3 Sought workplace issues effectively 1.4 Responded to workplace issues promptly 1.5 Presented information clearly and effectively written form 1.6 Used appropriate sources of information 1.7 Asked appropriate questions 1.8 Provided accurate information
2. Underpinning knowledge	2.1 Organization requirements for written and electronic communication methods 2.2 Effective verbal communication methods
3. Underpinning Skills	3.1 Organize information 3.2 Understand and convey intended meaning 3.3 Participate in variety of workplace discussions 3.4 Comply with organization requirements for the use of written and electronic communication methods
4. Resource Implications	The following resources **MUST** be provided: 4.1 Variety of Information 4.2 Communication tools 4.3 Simulated workplace
5. Methods of Assessment	Competency in this unit must be assessed through 5.2 Direct Observation 5.3 Interview
6. Context of Assessment	6.1 Competency may be assessed in the workplace or in simulated workplace environment 6.2 Assessment shall be observed while task are being undertaken whether individually or in-group

UNIT OF COMPETENCY : **LEAD SMALL TEAMS**

UNIT CODE : **500311110**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes to lead small teams including setting and maintaining team and individual performance standards.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Provide team leadership	1.1 ***Work requirements*** are identified and presented to team members 1.2 Reasons for instructions and requirements are communicated to team members 1.3 ***Team members' queries and concerns*** are recognized, discussed and dealt with
2. Assign responsibilities	2.1 Duties, and responsibilities are allocated having regard to the skills, knowledge and aptitude required to properly undertake the assigned task and according to company policy 2.2 Duties are allocated having regard to individual preference, domestic and personal considerations, whenever possible
3. Set performance expectations for team members	3.1 Performance expectations are established based on client needs and according to assignment requirements 3.2 Performance expectations are based on individual team members duties and area of responsibility 3.3 Performance expectations are discussed and disseminated to individual team members
4. Supervised team performance	4.1 ***Monitoring of performance*** takes place against defined performance criteria and/or assignment instructions and corrective action taken if required 4.2 Team members are provided with ***feedback***, positive support and advice on strategies to overcome any deficiencies 4.3 ***Performance issues*** which cannot be rectified or addressed within the team are referenced to appropriate personnel according to employer policy 4.4 Team members are kept informed of any changes in the priority allocated to assignments or tasks which might impact on client/customer needs and satisfaction 4.5 Team operations are monitored to ensure that employer/client needs and requirements are met 4.6 Follow-up communication is provided on all issues affecting the team 4.7 All relevant documentation is completed in accordance with company procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Work requirements	1.1 Client Profile 1.2 Assignment instructions
2. Team member's concerns	2.1 Roster/shift details
3. Monitor performance	3.1 Formal process 3.2 Informal process
4. Feedback	4.1 Formal process 4.2 Informal process
5. Performance issues	5.1 Work output 5.2 Work quality 5.3 Team participation 5.4 Compliance with workplace protocols 5.5 Safety 5.6 Customer service

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Maintained or improved individuals and/or team performance given a variety of possible scenario 1.2 Assessed and monitored team and individual performance against set criteria 1.3 Represented concerns of a team and individual to next level of management or appropriate specialist and to negotiate on their behalf 1.4 Allocated duties and responsibilities, having regard to individual's knowledge, skills and aptitude and the needs of the tasks to be performed 1.5 Set and communicated performance expectations for a range of tasks and duties within the team and provided feedback to team members
2. Underpinning Knowledge	2.1 Company policies and procedures 2.2 Relevant legal requirements 2.3 How performance expectations are set 2.4 Methods of Monitoring Performance 2.5 Client expectations 2.6 Team member's duties and responsibilities
3. Underpinning Skills	3.1 Communication skills required for leading teams 3.2 Informal performance counselling skills 3.3 Team building skills 3.4 Negotiating skills
4. Resource Implications	The following resources **MUST** be provided: 4.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 4.2 Materials relevant to the proposed activity or task
5. Methods of Assessment	Competency may be assessed through: 5.1 Direct observations of work activities of the individual member in relation to the work activities of the group 5.2 Observation of simulation and/or role play involving the participation of individual member to the attainment of organizational goal 5.3 Case studies and scenarios as a basis for discussion of issues and strategies in teamwork
6. Context of Assessment	6.1 Competency assessment may occur in workplace or any appropriately simulated environment 6.2 Assessment shall be observed while task are being undertaken whether individually or in-group

UNIT OF COMPETENCY : **DEVELOP AND PRACTICE NEGOTIATION SKILLS**

UNIT CODE : **500311111**

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes required to collect information in order to negotiate to a desired outcome and participate in the negotiation.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Plan negotiations	1.1 Information on ***preparing for negotiation*** is identified and included in the plan 1.2 Information on creating ***non verbal environments*** for positive negotiating is identified and included in the plan 1.3 Information on ***active listening*** is identified and included in the plan 1.4 Information on different ***questioning techniques*** is identified and included in the plan 1.5 Information is checked to ensure it is correct and up-to-date
2. Participate in negotiations	2.1 Criteria for successful outcome are agreed upon by all parties 2.2 Desired outcome of all parties are considered 2.3 Appropriate language is used throughout the negotiation 2.4 A variety of questioning techniques are used 2.5 The issues and processes are documented and agreed upon by all parties 2.6 Possible solutions are discussed and their viability assessed 2.7 Areas for agreement are confirmed and recorded 2.8 Follow-up action is agreed upon by all parties

RANGE OF VARIABLES

VARIABLE	RANGE
1. Preparing for negotiation	1.1 Background information on other parties to the negotiation 1.2 Good understanding of topic to be negotiated 1.3 Clear understanding of desired outcome/s 1.4 Personal attributes 1.4.1 self awareness 1.4.2 self esteem 1.4.3 objectivity 1.4.4 empathy 1.4.5 respect for others 1.5 Interpersonal skills 1.5.1 listening/reflecting 1.5.2 non verbal communication 1.5.3 assertiveness 1.5.4 behavior labeling 1.5.5 testing understanding 1.5.6 seeking information 1.5.7 self disclosing 1.6 Analytic skills 1.6.1 observing differences between content and process 1.6.2 identifying bargaining information 1.6.3 applying strategies to manage process 1.6.4 applying steps in negotiating process 1.6.5 strategies to manage conflict 1.6.6 steps in negotiating process 1.6.7 options within organization and externally for resolving conflict
2. Non verbal environments	2.1 Friendly reception 2.2 Warm and welcoming room 2.3 Refreshments offered 2.4 Lead in conversation before negotiation begins
3. Active listening	3.1 Attentive 3.2 Don't interrupt 3.3 Good posture 3.4 Maintain eye contact 3.5 Reflective listening
4. Questioning techniques	4.1 Direct 4.2 Indirect 4.3 Open-ended

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Demonstrated sufficient knowledge of the factors influencing negotiation to achieve agreed outcome 1.2 Participated in negotiation with at least one person to achieve an agreed outcome
2. Underpinning Knowledge and Attitude	2.1 Codes of practice and guidelines for the organization 2.2 Organizations policy and procedures for negotiations 2.3 Decision making and conflict resolution strategies procedures 2.4 Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation 2.5 Flexibility 2.6 Empathy
3. Underpinning Skills	3.1 Interpersonal skills to develop rapport with other parties 3.2 Communication skills (verbal and listening) 3.3 Observation skills 3.4 Negotiation skills
4. Resource Implications	The following resources **MUST** be provided: 4.1 Room with facilities necessary for the negotiation process 4.2 Human resources (negotiators)
5. Methods of Assessment	Competency may be assessed through: 5.1 Observation/demonstration and questioning 5.2 Portfolio assessment 5.3 Oral and written questioning 5.4 Third party report
6. Context of Assessment	6.1 Competency to be assessed in real work environment or in a simulated workplace setting.

UNIT OF COMPETENCY : **SOLVE PROBLEMS RELATED TO WORK ACTIVITIES**

UNIT CODE : **500311112**

UNIT DESCRIPTOR : This unit of covers the knowledge, skills and attitudes required to solve problems in the workplace including the application of problem solving techniques and to determine and resolve the root cause of problems.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Identify the problem	1.1 Variances are identified from normal operating parameters; and product quality 1.2 Extent, cause and nature are of the problem are defined through observation, investigation and ***analytical techniques*** 1.3 ***Problems*** are clearly stated and specified
2. Determine fundamental causes of the problem	2.1 Possible causes are identified based on experience and the use of problem solving tools / analytical techniques. 2.2 Possible cause statements are developed based on findings 2.3 Fundamental causes are identified per results of investigation conducted
3. Determine corrective action	3.1 All possible options are considered for resolution of the problem 3.2 Strengths and weaknesses of possible options are considered 3.3 Corrective actions are determined to resolve the problem and possible future causes 3.4 **Action *plans*** are developed identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures
4. Provide recommendation/s to manager	4.1 Report on recommendations are prepared 4.2 Recommendations are presented to appropriate personnel. 4.3 Recommendations are followed-up, if required

RANGE OF VARIABLES

VARIABLE	RANGE
1. Analytical techniques	1.1 Brainstorming 1.2 Intuitions/Logic 1.3 Cause and effect diagrams 1.4 Pareto analysis 1.5 SWOT analysis 1.6 Gant chart, Pert CPM and graphs 1.7 Scattergrams
2. Problem	2.1 Non-routine process and quality problems 2.2 Equipment selection, availability and failure 2.3. Teamwork and work allocation problem 2.4 Safety and emergency situations and incidents
3. Action plans	3.1 Priority requirements 3.2 Measurable objectives 3.3 Resource requirements 3.4 Timelines 3.5 Co-ordination and feedback requirements 3.6 Safety requirements 3.7 Risk assessment 3.8 Environmental requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1. Identified the problem 1.2. Determined the fundamental causes of the problem 1.3. Determined the correct / preventive action 1.4. Provided recommendation to manager These aspects may be best assessed using a range of scenarios / case studies / what ifs as a stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.
2. Underpinning Knowledge	2.1 Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations 2.2 Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations 2.2.1 Relevant equipment and operational processes 2.2.2 Enterprise goals, targets and measures 2.2.3 Enterprise quality, OHS and environmental requirement 2.2.4 Principles of decision making strategies and techniques 2.2.5 Enterprise information systems and data collation 2.2.6 Industry codes and standards
3. Underpinning Skills	3.1 Using range of formal problem solving techniques 3.2 Identifying and clarifying the nature of the problem 3.3 Devising the best solution 3.4 Evaluating the solution 3.5 Implementation of a developed plan to rectify the problem
4. Resource Implications	4.1 Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios / case studies / what ifs will be required as well as bank of questions which will be used to probe the reason behind the observable action.
5. Methods of Assessment	Competency may be assessed through: 5.1 Case studies on solving problems in the workplace 5.2 Observation The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.
6. Context of Assessment	6.1 In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.

UNIT OF COMPETENCY : **USE MATHEMATICAL CONCEPTS AND TECHNIQUES**

UNIT CODE : **500311113**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required in the application of mathematical concepts and techniques.

ELEMENT	Performance Criteria ***Italicized terms*** are elaborated in the Range of Variables
1. Identify mathematical tools and techniques to solve problem	1.1 Problem areas are identified based on given condition 1.2 ***Mathematical techniques*** are selected based on the given problem
2. Apply mathematical procedure/solution	2.1 Mathematical techniques are applied based on the problem identified 2.2 Mathematical computations are performed to the level of accuracy required for the problem 2.3 Results of mathematical computation is determined and verified based on job requirements
3. Analyze results	3.1 Result of application is reviewed based on expected and required specifications and outcome 3.2 ***Appropriate action*** is applied in case of error

RANGE OF VARIABLES

VARIABLE	RANGE
1. Mathematical techniques	May include but are not limited to: 1.1 Four fundamental operations Measurements 1.2 Use/Conversion of units of measurements 1.3 Use of standard formulas
2. Appropriate action	2.1 Review in the use of mathematical techniques (e.g. recalculation, re-modeling) 2.2 Report error to immediate superior for proper action

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified, applied and reviewed the use of mathematical concepts and techniques to workplace problems
2. Underpinning Knowledge	2.1 Fundamental operation (addition, subtraction, division, multiplication) 2.2 Measurement system 2.3 Precision and accuracy 2.4 Basic measuring tools/devices
3. Underpinning Skills	3.1 Applying mathematical computations 3.2 Using calculator 3.3 Using different measuring tools
4. Resource Implications	The following resources **MUST** be provided: 4.1 Calculator 4.2 Basic measuring tools 4.3 Case Problems
5. Methods of Assessment	Competency may be assessed through: 5.1 Authenticated portfolio 5.2 Written Test 5.3 Interview/Oral Questioning 5.4 Demonstration
6. Context of Assessment	6.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : **USE RELEVANT TECHNOLOGIES**

UNIT CODE : **500311114**

UNIT DESCRIPTOR : This unit of competency covers the knowledge, skills, and attitude required in selecting, sourcing and applying appropriate and affordable technologies in the workplace.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Study/select appropriate technology	1.1 Usage of different ***technologies*** is determined based on job requirements 1.2 Appropriate technology is selected as per work specification
2. Apply relevant technology	2.1 Relevant technology is effectively used in carrying out function 2.2 Applicable software and hardware are used as per task requirement 2.3 ***Management concepts*** are observed and practiced as per established industry practices
3. Maintain/enhance ~~of~~ relevant technology	3.1 Maintenance of technology is applied in accordance with the ***industry standard operating procedure***, ***manufacturer's operating guidelines*** and ***occupational health and safety procedure*** to ensure its operative ability 3.2 Updating of technology is maintained through continuing education or training in accordance with job requirement 3.3 Technology failure/ defect is immediately reported to the concern/responsible person or section for ***appropriate action***

RANGE OF VARIABLES

VARIABLE	RANGE
1. Technology	May include but are not limited to: 1.1 Office technology 1.2 Industrial technology 1.3 System technology 1.4 Information technology 1.5 Training technology
2. Management concepts	May include but not limited to: 2.1 Real Time Management 2.2 KAIZEN or continuous improvement 2.3 5 S 2.4 Total Quality Management 2.5 Other management/productivity tools
3. Industry standard operating procedure	3.1 Written guidelines relative to the usage of office technology/equipment 3.2 Verbal advise/instruction from the co-worker
4. Manufacturer's operating guidelines/ instructions	4.1 Written instruction/manuals of specific technology/equipment 4.2 General instruction manual 4.3 Verbal advise from manufacturer relative to the operation of equipment
5. Occupational health and safety procedure	5.1 Relevant statutes on OHS 5.2 Company guidelines in using technology/equipment
6. Appropriate action	6.1 Implementing preventive maintenance schedule 6.2 Coordinating with manufacturer's technician

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Studied and selected appropriate technology consistent with work requirements 1.2 Applied relevant technology 1.3 Maintained and enhanced operative ability of relevant technology
2. Underpinning Knowledge	2.1 Awareness on technology and its function 2.2 Repair and maintenance procedure 2.3 Operating instructions 2.4 Applicable software 2.5 Communication techniques 2.6 Health and safety procedure 2.7 Company policy in relation to relevant technology 2.8 Different management concepts 2.9 Technology adaptability
3. Underpinning Skills	3.1 Relevant technology application/implementation 3.2 Basic communication skills 3.3 Software applications skills 3.4 Basic troubleshooting skills
4. Resource Implications	The following resources **MUST** be provided: 4.1 Relevant technology 4.2 Interview and demonstration questionnaires 4.3 Assessment packages
5. Methods of Assessment	Competency must be assessed through: 5.1 Interview 5.2 Actual demonstration 5.3 Authenticated portfolio (related certificates of training/seminar)
6. Context of Assessment	6.1 Competency may be assessed in actual workplace or simulated environment

COMMON COMPETENCIES

UNIT OF COMPETENCY : **APPLY SAFETY MEASURES IN FARM OPERATIONS**

UNIT CODE : **AGR321201**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to perform safety measures effectively and efficiently. It includes identifying areas, tools, materials, time and place in performing safety measures.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Determine areas of concern for safety measures	1.1 ***Work tasks*** are identified in line with farm operations 1.2 ***Place*** for safety measures are determined in line with farm operations 1.3 ***Time*** for safety measures are determined in line with farm operations 1.4 Appropriate ***tools, materials and outfits*** are prepared in line with job requirements
2. Apply appropriate safety measures	2.1 Tools and materials are used according to specifications and procedures 2.2 Outfits are worn according to farm requirements 2.3 Effectivity/shelf life/expiration of materials are strictly observed 2.4 ***Emergency procedures*** are known and followed to ensure a safework requirement 2.5 ***Hazards*** in the workplace are identified and reported in line with farm guidelines
3. Safekeep/dispose of tools, materials and outfit	3.1 Used tools and outfit are cleaned after use and stored in designated areas 3.2 Unused materials are properly labeled and stored according to manufacturers recommendation and farm requirements 3.3 ***Waste materials*** are disposed according to manufacturers, government and farm requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Work tasks	Work task may be selected from any of the following sectors: 1.1 Aquaculture 1.2 Animal Production 1.3 Crop Production 1.4 Post-harvest 1.5 Agri-marketing 1.6 Farm Equipment
2. Place	2.1 Animal pens, cages, barns 2.2 Fish ponds, cages 2.3 Stock room/storage areas/warehouse 2.4 Field/farm/orchard
3. Time	3.1 Vaccination and medication period 3.2 Fertilizer and pesticides application 3.3 Feed mixing and feeding 3.4 Harvesting and hauling 3.5 Cleaning, sanitizing and disinfecting 3.6 Dressing, butchering and castration
4. Tools, materials and outfits	4.1 Tools 4.1.1 Wrenches 4.1.2 Screw driver 4.1.3 Pliers 4.2 Materials 4.2.1 Bottles 4.2.2 Plastic 4.2.3 Bags 4.2.4 Syringe 4.3 Outfit 4.3.1 Masks 4.3.2 Gloves 4.3.3 Boots 4.3.4 Overall coats 4.3.5 Hat 4.3.6 Eye goggles
5. Emergency procedures	5.1 Location of first aid kit 5.2 Evacuation 5.3 Agencies contract 5.4 Farm emergency procedures
6. Waste materials	6.1 Animal manure 6.2 Waste water 6.3 Syringes 6.4 Unused farm chemicals e.g. pesticides, chemicals, fertilizers 6.5 Expired reagents 6.6 Dead animals
7. Hazards	7.1 Chemical 7.2 Electrical 7.3 Falls

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Determined areas of concern for safety measures 1.2 Applied appropriate safety measures according to industry requirements 1.3 Prepared tools, materials and outfit needed 1.4 Performed proper disposal of used materials 1.5 Safekeep/cleaned tools, materials and outfit in designated facilities
2. Underpinning Knowledge and Attitudes	2.1 Safety Practices 2.1.1 Implementation of regulatory controls and policies relative to treatment of area and application of chemicals 2.1.2 Proper disposal of waste materials 2.2 Codes and Regulations 2.2.1 Compliance with health program of DOH and DENR 2.2.2 Hazard identification 2.2.3 Emergency procedures 2.3 Tools & Equipment: Uses and Specification 2.3.1 Masks, gloves, boots, overall coats for health protection 2.4 Maintenance 2.4.1 Regular check-up and repair of tools, materials and outfit before and after use
3. Underpinning Skills	3.1 Ability to recognize effective tools, materials and outfit 3.2 Ready skills required to read labels, manuals and other basic safety information
4. Method of Assessment	Competency in this unit must be assessed through: 4.1 Practical demonstration with oral questioning 4.2 Third-party report
5. Resource Implications	5.1 Farm location 5.2 Tools, equipment and outfits appropriate in applying safety measures
6. Context of Assessment	6.1 Assessment may occur in the workplace or in a simulated workplace or as part of a team under limited supervision

UNIT OF COMPETENCY : **USE FARM TOOLS AND EQUIPMENT**

UNIT CODE : **AGR321202**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to use farm tools and equipment. It includes selection, operation and preventive maintenance of farm tools and equipment.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Select and use farm tools	1.1 Identified appropriate farm tools according to requirement/use 1.2 Farm tools are checked for faults and defective tools reported in accordance with farm procedures 1.3 Appropriate tools and equipment are safely used according to job requirements and manufacturers conditions
2. Select and operate farm equipment	2.1 Identify appropriate ***farm equipment*** 2.2 Instructional manual of the farm tools and equipment are carefully read prior to operation 2.3 ***Pre-operation check-up*** is conducted in line with manufacturers manual 2.4 Faults in farm equipment are identified and reported in line with farm procedures 2.5 Farm equipment used according to its function 2.6 Followed safety procedures
3. Perform preventive maintenance	3.1 Tools and equipment are cleaned immediately after use in line with farm procedures 3.2 Routine check-up and maintenance are performed 3.3 Tools and equipment are stored in designated areas in line with farm procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Farm equipment	1.1 Engine 1.2 Pumps 1.3 Generators 1.4 Sprayers
2. Farm tools	2.1 Sickle 2.2 Cutters 2.3 Weighing scales 2.4 Hand tools 2.5 Measuring tools 2.6 Garden tools
3. Pre-operation check-up	3.1 Tires 3.2 Brake fluid 3.3 Fuel 3.4 Water 3.5 Oil 3.6 Lubricants 3.7 Battery

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Correctly identified appropriate farm tools and equipment 1.2 Operated farm equipment according to manual specification 1.3 Performed preventive maintenance
2. Underpinning Knowledge and Attitudes	2.1 Safety Practices 2.1.1 Ideal good work habits to demonstrate to workers easy and safety standards during operation of farm equipment 2.2 Codes and Regulations 2.2.1 Environmental Compliance Certificate (ECG) 2.2.2 Effective work supervision in the operations of farm equipment 2.3 Tools & Equipment: Uses and Specification 2.3.1 Knowledge in calibrating and use of equipment 2.3.2 Safety keeping of equipments every after use 2.4 Maintenance 2.4.1 Regular upkeep of equipments 2.4.2 Preventive maintenance skills 2.5 Values 2.5.1 Positive outlook towards work 2.5.2 Possesses pre-emptive/anticipatory skills
3. Underpinning Skills	3.1 Ability to recognized defective farm equipment 3.2 Perform proper management practices of safety measures
4. Method of Assessment	Competency in this unit must be assessed through: 4.1 Direct observation with oral questioning 4.2 Practical demonstration with oral questioning 4.3 Third-party report
5. Resource Implications	5.1 Service/operational manual of farm tools and equipment 5.2 Tools and equipment 5.3 Farm implements
6. Context of Assessment	6.1 Assessment may occur in the workplace or in a simulated workplace or as part of a team under limited supervision

UNIT OF COMPETENCY : **PERFORM ESTIMATION AND BASIC CALCULATION**

UNIT CODE : **AGR321203**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to perform basic workplace calculations relating to feeds, fertilizer and related quantities.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Perform estimation	1.1 Job requirements are identified from written or oral communications 1.2 Quantities of materials and resources required to complete a work task are estimated 1.3 The time needed to complete a work activity is estimated 1.4 Accurate estimate for work completion are made 1.5 Estimate of materials and resources are reported to appropriate person
2. Perform basic workplace calculation	2.1 ***Calculations*** to be made are identified according to job requirements 2.2 Correct ***method of calculation*** identified 2.3 ***System and units of measurement*** to be followed are ascertained 2.4 Calculation needed to complete work tasks are performed using the four basic process of addition, division, multiplication and subtraction 2.5 Calculate whole fraction, percentage and mixed when are used to complete the instructions 2.6 Number computed in self checked and completed for alignment

RANGE OF VARIABLES

VARIABLE	RANGE
1. Calculation	1.1 Quantity of feeds 1.2 Amount of fertilizer 1.3 Amount of medicines
2. Method of calculation	2.1 Addition 2.2 Subtraction 2.3 Multiplication 2.4 Division 2.5 Ratio and proportion
3. System of measurement	3.1 English 3.2 Metric
4. Units of measurement	4.1 Area Units 4.2 Volume Units 4.3 Weight Units

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Performed estimation 1.2 Performed basic workplace calculation 1.3 Applied corrective measures as maybe necessary
2. Underpinning Knowledge and Attitudes	2.1 Mathematics 2.1.1 Basic mathematical operations 2.1.2 Percentage and ratios 2.1.3 Unit Conversion 2.1.4 Basic accounting principles and procedures 2.1.4.1 Production cost 2.1.4.2 Sales 2.1.4.3 Accounts receivables/payables 2.2 Systems, Processes and Operations 2.2.1 Knowledge in different management practices and operational procedures 2.3 Values 2.3.1 Safety-consciousness 2.3.2 Time-consciousness and management 2.3.3 Cost-consciousness 2.3.4 Precision
3. Underpinning Skills	3.1 Ability to perform basic calculation 3.2 Communicate effectively
4. Method of Assessment	Competency in this unit must be assessed through: 4.1 Practical demonstration 4.2 Written examination
5. Resource Implications	5.1 Relevant tools and equipment for basic calculation 5.2 Recommended data
6. Context of Assessment	6.1 Assessment may occur in the workplace or in a simulated workplace or as part of a team under limited supervision

CORE COMPETENCIES

UNIT OF COMPETENCY : **PREPARE LAND FOR AGRICULTURAL CROP PRODUCTION**

UNIT CODE : **AGR611310**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to prepare equipment, cultivate the site, apply any pre-planting treatments, and care for the vehicles and equipment on completing the activity. Equipment and machinery may be animal-powered. It includes the completion of documentation and logbooks for the operation. Preparing land for crop production is likely to be carried out under limited supervision from others with checking only related to overall progress. Preparing land for crop production is usually done within established routines, methods and procedures. Some discretion and judgement is required in the selection of equipment and materials, organization of work and services.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1 Prepare for cultivation	1.1 Requirements for the work to be undertaken are interpreted from the ***planting plan*** and confirmed with the manager. 1.2 The method and order of cultivation is identified and interpreted from the planting plan. 1.3 **OHS** hazards are identified, risks assessed and suitable controls are implemented. 1.4 Suitable **personal protective equipment** is selected, used and maintained. 1.5 The **environmental implications** of cultivating the **site** are identified, likely outcomes assessed and, if necessary, responsible action is taken.
2 Prepare the cultivating equipment	2.1 The ***vehicles and equipment*** required for site cultivation are selected according to the planting plan and organization guidelines. 2.2 The vehicles and equipment are serviced, adjusted for the conditions and worn parts are replaced to ensure reliability during cultivation. 2.3 All containers, leftover fluids, waste and debris from the maintenance and servicing work are disposed of safely and appropriately. 2.4 All maintenance and servicing is ***documented*** according to the requirements of the organization's record keeping system.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
3 Cultivate soil	3.1 ***Previous crop or land clearance debris*** is removed, incorporated or burnt according to the organizations guidelines. 3.2 The cultivation plan is followed and completed for each site. 3.3 OHS hazards are identified, risks assessed and suitable controls are implemented. 3.4 Suitable personal protective equipment is selected, used and maintained. 3.5 Vehicles and equipment are ***operated in a safe,*** effective and efficient manner and at speeds to suit the conditions. 3.6 The quality of cultivation is maximized by continually checking and adjusting the vehicles and equipment as necessary. 3.7 All time, resource and quality requirements of the planting plan are met.
4 Prepare site for planting	4.1 The planting layout and ***soil profiles*** are completed as required by the planting plan. 4.2 ***Weed and pest control measures*** are taken as required by the planting plan. 4.3 Fertilizers, ameliorants, and/or other pre-planting **treatments** are applied as required by the planting plan 4.4 The ***environmental implications*** of site preparation are identified, likely outcomes assessed and, if necessary, responsible action is taken.
5 Complete land preparation operations	5.1 Equipment is cleaned in accordance with manufacturers specifications, organizational procedures and regulations. 5.2 Vehicles and equipment are cleaned and stored to minimize damage according to manufacturers specifications, organizational procedures and regulations. 5.3 All containers, leftover fluids, waste and debris from the cleaning and maintenance work are disposed of safely and appropriately. 5.4 All required ***records and documentation*** are completed accurately and promptly according to organizational requirements.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Planting plan	Any crop grown by the organization for production or pasture. 1.1. Cereals 1.2. Legumes 1.3. Pulses 1.4. Oilseeds 1.5. pasture seeds 1.6. cotton 1.7. sugar cane.
2. Occupational Health and Safety (OHS)	The range of actions are both systemic and at an operational level. These are listed below: 2.1 *Systems* should be in place to ensure the safe operation and maintenance of machinery and equipment. Precautions should also be in place to minimize exposure to noise and organic and other dusts, and to external elements, including solar radiation. Systems and procedures for preparing sites for planting, as well as working with and around electricity, should also be in place. Safe systems should be in place for stubble and grass burning, and for storing, handling and transporting hazardous substances. 2.2 *Fixtures* should be in place in all storage sheds, including appropriate access ladders, hand rails and ladder cages. 2.3 *Personal protective equipment* should be selected, used and maintained. 2.4 *Environmental* conditions should be controlled e.g., keeping moisture levels as low as possible will reduce the likelihood of fire. 2.5 *Procedures* should be in place and used for working with moving vehicles and equipment. 2.6 *Record keeping* should ensure that requirements in relation to properly observing and using product labels and MSDS sheets, instruction manuals and written organizational procedures.
3. Personal protective equipment	3.1 Boots 3.2 hat/hard hat 3.3 overalls, gloves 3.4 protective eyewear 3.5 hearing protection 3.6 respirator or face mask 3.7 sun protection (sun hat, sun screen).
4. Environmental implications	4.1 Detrimental environmental impacts may result from excessive noise and exhaust emissions, the incorrect use and disposal of maintenance debris (oils, containers, chemical residues), dust, and hazardous substances (fuel). Impacts may also include run-off flows of water and cleaning agents from servicing, maintenance and cleaning activities.

VARIABLE	RANGE
5. Site conditions	5.1 It might be the site of a previous years crop or have been used for grazing or laid fallow for a period prior to cultivation. It may also be land cleared of virgin forest, low lying land verging on mangroves, sloping high land, existing cleared land, and may have soil or surface water.
6. Vehicles and equipment	6.1 *Vehicles* might include tractors, trucks and four-wheel drive vehicles. Alternatively animal power may be used to pull or tow equipment. 6.2 *Equipment* might be mounted or trailing and may include ploughs, cultivators, scarifiers, fertilizer spreaders, spraying equipment, crop/stick puller, cultivators, buster, disc, lister, ripper, mulcher, tandem or offset discs, or rakes.
7. Documented information	7.1 Record keeping systems used may be either paper-based or digital, and information will be recorded into logbooks or other records.
8. Previous crop or land clearance debris	8.1 The planting plan might require that such debris is removed (or sprayed), incorporated (smashing, cultivating, mulching, slashing), burnt or used for grazing for a period.
9. Equipment is operated safely	9.1 The speeds used should be appropriate for the equipment, ground and the crop conditions, and all pre- and post-start up checks should be undertaken.
10. Soil profile	10.1 Where laser levelling is required, assistance may be required for contractors in surveying and pegging. Also soil testing and analysis may be required.
11. Weed and pest control measures	11.1 Weeds may be controlled by using an integrated pest management program including the application of herbicides and biological control agents, grazing, slashing, burning or hay cutting. . Weeds may be controlled at various times, in the preceding year, pre-sowing, post-sowing, pre-emergent, at various stages of crop and weed growth, as recommended. 11.2 Insect pests may be controlled by using an integrated pest management program including cultural means – cultivation, etc., insecticides, biological control agents, or removal of food supply using weed control techniques.
12. Treatments	12.1 Use of insecticides, fertilizers and physical agents should meet legislative, manufacturers and organization requirements.
13. Environmental impacts	13.1 Detrimental effects such as erosion, loss of moisture, debilitating germination rates, elimination of beneficial and indigenous microbes and polluting water bodies.
14. Documentation	14.1 All chemical usage should be recorded as well as any necessary recording of site size, and vehicle and equipment use. Additionally, any assessment of pests and weeds, OHS hazards, or other observations should be recorded appropriately.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1 Prepared safely land for crop production to the requirements of the organization, and to the needs of the crop. The skills and knowledge required to prepare land for crop production must be **transferable** to a different work environment. For example, this could include different crop types, machinery and equipment, and farm procedures.
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1 methods of cultivating a range of soil types 2.2 environmental issues of cultivating soil for planting, such as drainage and irrigation systems, soil amelioration and waste disposal procedures 2.3 a range of pre-planting treatments, their purpose and method of application 2.4 OHS guidelines, procedures, and principles including manual handling.
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1 interpret production/planting plans, produce standards, quality specifications, work procedure documents 3.2 implement cropping pattern 3.3 measure materials and site plan specifications 3.4 operate, adjust and calibrate cultivation equipment safely 3.5 complete pre- and post-operational checks on tools, vehicles and equipment 3.6 perform routine safety, service and maintenance procedures on tools, harvester and equipment 3.7 read and interpret manufacturers specifications, work and maintenance plans, and Material Safety Data Sheets 3.8 interpret and apply task instructions, communicate with work team and supervisor, and record and report faults, workplace hazards and accidents.
4. Resource Implication	The following resources must be provided: 4.1 workplace with vegetables or fruits that require regulating plant growth, crop yield and/or quality 4.2 workplace information relating to crop regulation 4.3 farm procedures relating to crop regulation
5. Methods of Assessment	Competency should be assessed: 5.1 through direct observation / demonstration 5.2 portfolio assessment.
6. Context of Assessment	6.1 Assessment should be in a workplace or in a simulated workplace. 6.2 Demonstration of competency over time and on a number of occasions.

UNIT OF COMPETENCY : **IMPLEMENT POST-HARVEST PROGRAM**

UNIT CODE : **AGR611311**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required for the process of implementing a post-harvest program for horticultural crops including grading, treating, packing and storing harvested produce.

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.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1 Prepare for implementation of post-harvest operations	1.1 ***Post-harvest operations*** to be performed are identified according to ***farm work procedures,*** *the* ***marketing plan*** and industry guidelines and confirmed with the supervisor. 1.2 ***Materials, tools, equipment and machinery*** are selected according to farm work procedures. 1.3 Pre-operational and safety checks are carried out on tools, equipment and machinery according to manufacturers specifications and farm work procedures. 1.4 ***OHS hazards*** are identified, risks assessed, controls implemented and reported to the supervisor. 1.5 Suitable ***safety*** *and* ***personal protective equipment (PPE)*** are selected, used and maintained.
2 Coordinate post-harvest work	2.1 Farm work team is identified and tasks are co-ordinated in a sequential, timely and effective manner in consultation with the supervisor. 2.2 Post-harvest operations are undertaken according to ***OHS requirements*** and with due consideration of the ***environmental implications****.* 2.3 A ***clean, safe and hygienic work area*** is maintained throughout and on completion of work.

ELEMENT		PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	
3	Implement post-harvest treatments	3.1	Harvested produce is graded and labelled according to the marketing plan and farm work procedures.
		3.2	Produce that does not meet specifications and farm standards is identified and disposed of according to ***farm environmental procedures***.
		3.3	***Post-harvest treatments*** are selected according to harvested produce requirements, the farm integrated pest management strategy and the marketing plan.
		3.4	Timing, rate, application method, environmental requirements and handling techniques conform to the requirements of the harvested produce, farm work procedures and industry best practice.
		3.5	Post-harvest practices are economical, methodical, meet established work schedules and with ***minimum damage to produce***.
		3.6	Tools, equipment and machinery are cleaned and maintained according to farm work procedures.
4	Implement hazardous waste disposal guidelines	4.1	Waste disposal requirements of the farm are reviewed and operational tasks determined.
		4.2	Collection and disposal of waste are monitored according to farm environmental procedures.
		4.3	Conditions likely to impact on business viability are reported promptly to the supervisor.
5	Implement packaging requirements of produce	5.1	***Packaging requirements*** specified in the marketing plan and farm work procedures are reviewed and operational tasks determined.
		5.2	Packaging of produce conform to the requirements of the harvested produce, the marketing plan and industry best practice.
		5.3	Packaging materials are selected based on environmentally sound principles.
		5.4	Packaging processes are recorded according to farm work procedures.
6	Implement storage requirements of produce	6.1	***Storage requirements*** specified in the marketing plan and farm work procedures are reviewed and operational tasks determined.
		6.2	Storage and handling of produce conform to the requirements of the harvested produce, the marketing plan and industry best practice.
		6.3	Storage processes and facilities are monitored and remedial action taken where necessary.
		6.4	Storage processes and conditions are recorded according to farm work procedures.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Post-harvest operations	1.1. Post-harvest operations may include handling and transport of harvested produce from the field to processing or storage facilities, grading, applying treatments, and packing, labelling and storing harvested produce, handling and transport from storage facility to market.
2. Marketing plan	2.1. The marketing plan will address client specifications that may include quality of plant produce (and various grades) such as variety, shape, size, weight, length, colour, maturity, moisture content, ripeness, texture, skin condition, and blemishes which are subject to seasonal and market forces. Client preferences may also specify packaging materials, containers, filling techniques, labelling and storage requirements from field to client such as the cold chain concept.
3. Farm work procedures	3.1. 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, farm 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.
4. Materials, tools, equipment and machinery	4.1. Materials may include preservatives, chemicals, gases, cleaning agents, packaging materials and containers, labels, adhesives and proformas. 4.2. Tools, equipment and machinery may include tractors, trailers, light trucks, forklifts, snips, knives, gloves, containers, grading machinery, washers, brushes, dryers, chemical applicators, gassing chambers, labelling devices, packing tools, scales, pallets, hand trolleys and lifting aids, cold storage rooms and dedicated storage facilities. Machinery and equipment may be animal-powered, modified atmosphere equipments, sealing machine, reefer vans/trucks.
5. OHS hazards	5.1. 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.
6. Safety equipment	6.1. Safety equipment may include signage and barriers, and operational safety exits from cold storage rooms and gassing chambers.
7. Personal protective equipment	7.1. PPE may include hat, 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.

VARIABLE	RANGE
8. OHS requirements	8.1. 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 cold storage 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.
9. Environmental implications	9.1. 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 odour and attracts pests, and risks infecting healthy crops, or on- and off-site ground water or soils that are contaminated from solids, debris, nutrients, chemicals and water run-off, use of CFCs for cooling and propellant and improper disposal of cleansing and toxic agents.
10. Clean, safe and hygienic work area	10.1. 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 sterilising post-harvest equipment and storage facilities, and swiftly and efficiently removing and processing debris and waste from the work area.
11. Farm environmental procedures	11.1. Farm 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. 11.2. Waste may be removed to designated areas for recycling, reuse, return to the manufacturer or disposal.
12. Post-harvest treatments	12.1. 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.
13. Minimize damage to produce	13.1. 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. 13.2. 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

VARIABLE	RANGE
	cold storage room. These may include forced air cold storage rooms for table grapes, hydro cold storage rooms for stone fruit and vacuum cold storage rooms for mushrooms. 13.3. 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.
14. Packaging requirements	14.1. Packaging 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 labelling.
15. Storage requirements	15.1. 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.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. Coordinated post-harvest operations 1.2. implemented post-harvest treatments 1.3. disposed hazardous wastes according to guidelines The skills and knowledge required to implement a post-harvest program must be transferable to a different work environment. For example, this could include different crops, harvesting methods and farms.
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. the attributes of produce in relation to the desired quality of produce to be presented to the client 2.2. Integrated Pest Management principles and farm policy 2.3. the importance of maintaining the quality of produce including handling and cooling requirements 2.4. the relationship between the quality attributes of produce and packing techniques and packaging 2.5. cool chain principles and practices 2.6. characteristics and procedures for the use of cold storage rooms 2.7. the correct storage temperatures for a range of produce 2.8. humidity levels and their effect on the quality of produce 2.9. hygiene issues in the handling and storage of plant produce 2.10. environmental effects of post-harvest treatments and hazardous waste disposal methodologies, application and purpose 2.11. farm confined spaces policy and safety procedures.
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1. communicate orally and in writing with team members and supervisors 3.2. interpret and confirm chemical labels, MSDS, work instructions and farm work procedures 3.3. record information about work activities on proformas 3.4. participate in teams and contribute to team objectives 3.5. count and calculate quantities, treatment application rates and storage requirements 3.6. correctly dispose of chemical substances, their containers and other waste materials to minimize environmental impact 3.7. implement farm OHS policy and procedures.

4. Resource Implication	The following resources must be provided: 4.1. workplace with vegetables or fruits that require regulating plant growth, crop yield and/or quality 4.2. workplace information relating to crop regulation 4.3. farm procedures relating to crop regulation
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace or in a simulated workplace. 6.2. Demonstration of competency over time and on a number of occasions.

UNIT OF COMPETENCY : **IMPLEMENT PLANT NUTRITION PROGRAM**

UNIT CODE : **AGR611312**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to implement a plant nutrition program in the horticultural or agricultural industry. Implementing a plant nutrition program is likely to be under limited supervision from others, with checking only related to overall progress. The work is usually done within a program, routines, methods and procedures where some discretion and judgement is required in the selection of equipment and materials, organization of work, services, actions, and the achievement of outcomes within time and budgetary constraints.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1 Prepare for implementation of the plant nutrition program	1.1 Goals and target site for implementation of the plant nutrition program including **soils**, plant species and varieties are identified according to ***farm work procedures***. 1.2 Area and adjacent lands are analysed for soil composition/nutrients. 1.3 ***Materials*** for soil and plant treatments available to the farm are identified and the storage site or supplier details located. 1.4 ***Services*** are located using site plans and in consultation with the supervisor. 1.5 ***OHS hazards*** are identified, risks assessed, controls implemented and reported to the supervisor. 1.6 Suitable ***personal protective equipment (PPE)*** *i*s selected, used and maintained.
2 Monitor soil pH	2.1 Soil pH in the implementation site is monitored in relation to plant nutrition and according to farm work procedures. 2.2 ***Products useful in changing soil pH*** are identified, compared, selected and sourced according to farm work procedures. 2.3 Product ***application method*****s** are assessed according to product type, soils, farm work procedures, and in due consideration of the ***environmental implications***.
3 Determine nutritional problems in plants	3.1 Common nutrient deficiency and toxicity problems in plants are identified using visual inspection. 3.2 The supervisor and/or nutritional specialist are consulted, as required, to determine causes of nutritional or toxicity problems. 3.3 ***Soil ameliorants*** to improve soil fertility are identified, compared, selected and sourced according to farm work procedures.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
4 Prepare to use fertilizers	4.1 The ***fertilizer*** to be used is selected according to fertilizer type, soils, farm work procedures, in consultation with the supervisor and/or nutritional specialist and in due consideration of the environmental implications. 4.2 ***Fertilizer application methods*** are assessed according to fertilizer type, soils, farm work procedures, and in due consideration of the environmental implications. 4.3 Fertilizers are applied according to the plant growing cycle and the farm fertilizer calendar. 4.4 Fertilizers are handled and stored according to farm work procedures and to minimize detrimental environmental impact.
5 Prepare application equipment	5.1 ***Tools, equipment and machinery*** are selected according to farm work procedures. 5.2 Pre-operational and safety checks are carried out on tools, equipment and machinery according to manufacturers specifications and farm work procedures. 5.3 Tools, equipment and machinery are calibrated and adjusted according to manufacturer's guidelines and farm work procedures.
6 Apply specific products at appropriate rates	6.1 Specific products are selected based on their analysis to meet plant needs according to farm work procedures. 6.2 Product application rates are calculated to optimise plant benefit and minimize environmental impact according to manufacturer's specifications and farm work procedures. 6.3 Specific products are applied at the correct rate, timing and method according to the product type and analysis, manufacturers specifications, farm work procedures, and in due consideration of the environmental implications. 6.4 Product applications are recorded according to farm work procedures. 6.5 Target plant response to the plant nutrition program, as well as any non-target effects such as environmental impact or pest responses are monitored, documented and reported to the supervisor according to farm work procedures.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Soils	1.1. Soils may include field soil sites and specialist growing media.
2. Farm work procedures	2.1. Work procedures may include supervisors oral or written instructions, plant nutrition program, farm 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.
3. Materials	3.1. Materials may include those to modify soil pH, soil ameliorants to improve soil fertility, and fertilizers to meet the nutritional requirements of plants.
4. Services	4.1. Services may include water supply, gas, power (electricity), telecommunications, irrigation, and drainage.
5. OHS hazards	5.1. Hazards may include 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.
6. Personal protective equipment	6.1. PPE may include hat, boots, overalls, gloves, goggles, respirator or face mask, face guard, spray clothing, hearing protection, sunscreen lotion and hard hat.
7. Products useful in changing soil pH	7.1. Products may include lime such as ground limestone, dolomite, and a range of fertilizers.
8. Application methods	8.1. Application methods may include banding, broadcasting, ripping, spraying and fertigation.
9. Environmental implications	9.1. Over-spraying or run-off into the external environment may result in nutrient overload or excess water to native plants, natural waterways, watertables and ecosystems, water erosion, water logging and salinisation. 9.2. Responsible fertilisation and watering practices may, however, help to reverse previous environmental degradation by allowing natural recovery and regeneration of native ecosystems.
10. Soil ameliorants	10.1. Soil ameliorants may include cover crops, animal manures, gypsum and lime.
11. Fertilizers	11.1. Fertilizers may include solids, liquids or gases, which are artificial, organic, applied directly to the soil or to the plant via foliar sprays.
12. Fertilizer application methods	12.1. Fertilizer application methods may include banding, broadcasting, ripping, spraying and fertigation.

VARIABLE	RANGE
13. Tools, equipment and machinery	13.1. 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. 13.2. 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.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. Assessed the nutritional health of plants grown by the farm 1.2. Accessed and applied appropriate products to plants and soils to meet the goals and objectives of the plant nutrition program. 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 farm situations.
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. the relationship between soil characteristics and the availability of nutrients, including macro and micro elements, to plants 2.2. nutrient cycling and its practical relevance to the specific plants and soils used in the farm. 2.3. methods of nutrient uptake by plants 2.4. nutrients required by plants grown within the farm and the affects of nutrient deficiency and toxicity on individual plant species and varieties, including visual symptoms 2.5. soil ameliorants commonly required to treat the soil problems experienced by the farm 2.6. the main simple and compound fertilizer products available to the farm including analysis, solubility, salt index, application rates and costs 2.7. 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.
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1. communicate with work team members, supervisors, contractors and suppliers, interpret manufacturers and plant nutrition program specifications, utilise proforma reporting, analysis and work procedure documents, and understand labels and symbols 3.2. estimate treatment and product requirements, material sizes and quantities, interpret specifications, and calculate areas, ratios, proportions and application rates 3.3. co-ordinate own activities with the requirements and schedules of the work group and contractors to sequentially and effectively implement the plant nutrition program in a timely and cost effective manner

4. Resource Implications	The following resources must be provided: 4.1. workplace with commercial cropping or horticulture 4.2. farm production plan 4.3. workplace production data and records
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace or in a simulated workplace. 6.2. Demonstration of competency over time.

UNIT OF COMPETENCY : **CONTROL WEEDS**

UNIT CODE : **AGR611313**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to control weeds, taking into consideration Integrated Pest Management (IPM) options. Implementation is likely to be under limited supervision from others with checking only related to overall progress. Responsibility for and limited organization of the work of others may be involved. Implementation requires the application of knowledge in areas such as weed recognition, biology and control, and the lifecycles of weed predators and hosts.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Assess weed infestation	1.1 Scope, density and size of the infestation is assessed. 1.2 ***Weeds and beneficial organisms*** are identified and reported or recorded in field notes. 1.3 Levels of weed infestations tolerated by the client, market or environment are identified from the integrated pest management (IPM) strategy. 1.4 Infestation levels, above which plant health or growth objectives are compromised are identified. 1.5 Professional advice is obtained as required according to enterprise guidelines.
2. Plan the implementation of control measures	2.1 ***Control measures*** suitable for the *infestation are selected from IPM strategy.* *2.2* ***Tools, equipment and implements*** are selected for each work activity according to enterprise work procedures. 2.3 ***OHS hazards*** are identified, risks assessed, controls implemented and reported to the supervisor. 2.4 Suitable safety equipment and ***personal protective equipment (PPE)*** are selected, used, maintained and stored. 2.5 Control measures selected need to be in full consideration of ***environmental implications*** 2.6 Control of harmful weeds with the use of cover crops
3. Implement control measures	3.1 Enterprise work team, contractors and IPM product suppliers are coordinated in a sequential, timely and effective manner in consultation with the supervisor. 3.2 Control measures are implemented according to the ***IPM principles*** (e.g. water management for rice). 3.3 Implementation of IPM activities is undertaken according to ***OHS requirements****.* 3.4 A ***clean and safe work area*** is maintained throughout and on completion of each work activity. 3.5 Land is prepared to ensure weed elimination. 3.6 ***Records*** are maintained as required by legislation and enterprise guidelines.
4. Monitor control methods	4.1 Control methods are monitored to identify side effects to other plants, animals or external environment. 4.2 Effectiveness of control methods are assessed in reference to specified industry and enterprise standards. 4.3 Adjustments to IPM control methods are implemented where necessary to meet enterprise specifications.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Weeds	1.1. These may include weeds which present a potential risk for the enterprise, industry or environment.
2. Beneficial organisms	2.1. These may include volunteer or cultivated plants that out-compete the weed, insects and other non-vertebrates, and micro organisms that attack the weed.
3. Control measures	3.1. These may include targeted chemical application, the application of non-chemical controls including organically or naturally ingredient based sprays, controlled release of predatory organisms, or the application of cultural control methods including removal and disposal of weeds.
4. Tools, equipment and implements	4.1. Standard horticultural tools such as gardening implements, mechanised and manually operated spray applicators and cultivators, tractors and trailed equipment may be required. Monitoring equipment for the implementation of an IPM program may include insect traps, soil, fertilizer and plant tissue test kits and sampling equipment.
5. OHS hazards	5.1. Hazards may include chemicals and hazardous substances, manual handling, operating machinery tools and equipment, noise, dust, solar radiation, falls and tripping.
6. Personal protective equipment	6.1. PPE may include hat, boots, overalls, gloves, goggles, respirator or face mask, hearing protection, sunscreen lotion.
7. Environmental implications	7.1. Beneficial environmental impacts may occur where reduced and informed targeting of chemicals, fertilizers and water to the site and recycling within the system, result in minimal escape of contaminants to the external environment. Beneficial impacts may also result from improved production, healthier ecosystems, more efficient water and nutrient utilization and reduced weed numbers. 7.2. Detrimental environmental impacts may arise where IPM activities produce excess noise, dust or water, or the systems do not function effectively because of inadequate implementation techniques.
8. IPM principles	8.1. Standards may include those established by registered industry associations, clients or markets of the enterprise, land management agencies or quality assurance program.
9. OHS requirements	9.1. OHS requirements may include 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, safety procedures for protection of others, personal hygiene, and reporting problems to supervisors.

VARIABLE	RANGE
10. Clean and safe work area	10.1. Tasks may include disabling unused tools, equipment and machinery and storing neatly out of the way of IPM activities, correct storage of personal protective equipment, safely storing materials on site, and swiftly and efficiently removing and processing debris and waste from the work area.
11. Records	11.1. Records may include types of weeds and beneficial organisms present, numbers of weeds and beneficials present, treatments applied, date of application, application rates, success of treatments, economic thresholds.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. planned, implemented and monitored weed control successfully according to enterprise guidelines and industry best practice The skills and knowledge required to control weeds must be transferable to a different work environment. For example, this could include different weed species, enterprise situations and control methods.
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts and to deal with unplanned events. The knowledge requirements for this competency standard are listed below. 2.1. Weed recognition and IPM concepts 2.2. Economic, aesthetic or environmental thresholds for a range of weeds 2.3. Chemical, biological and cultural control methods and treatments available to the enterprise within the parameters of an IPM program 2.4. Range and use of tools, equipment and machinery available to the enterprise for implementing the control measures 2.5. Range of site monitoring and analysis techniques that may be used to implement an IPM program 2.6. Association of IPM methods with site limitations, environmental implications, end market and horticultural objectives for the site 2.7. OHS issues and legislative requirements associated with hazardous substances. regulations and Codes of Practice 2.8. OHS responsibilities of employers and employees 2.9. Correct wearing/fit of personal protective equipment
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1. recognise of a range of weeds and beneficial organisms within a particular enterprise 3.2. communicate with work team members, supervisors, contractors and consultants 3.3. utilize proforma reporting, analysis and work procedure documents 3.4. understand IPM symbols and information 3.5. interpret and apply IPM program spatial and logistical specifications 3.6. correct fitting, cleaning and storage of personal protective equipment 3.7. interpret and apply test results and calculate the quantities and applications rates of control materials

	3.8. coordinate work group, contractors and own activities to sequentially and effectively complete IPM activities in a timely and cost effective manner
4. Resource Implications	The following resources must be provided: 4.1. workplace with a range of weeds 4.2. tools, equipment and materials for controlling weeds 4.3. enterprise procedures, work plans relevant to weed control
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace. or in a simulated workplace 6.2. Demonstration of competency over time and on a number of occasions

UNIT OF COMPETENCY : **PREPARE AND APPLY CHEMICALS**

UNIT CODE : **AGR611314**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to prepare and apply chemicals for the control of weeds, pests and diseases. It requires knowledge of the chemicals related to the workplace, the hazards and risks involved in their use, and the specific safety procedures prescribed for working unsupervised within organizational guidelines. It requires the ability to handle and apply chemicals ensuring minimum risk to self, others and environment and accurately record their use.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Determine the need for chemical use	1.1 Nature and level of the pest, weed infestation or disease is identified. 1.2 Need for action is assessed as per established procedures. 1.3 Requirement for chemical use as an option within an integrated pest management strategy is assessed. 1.4 Hazard and risk analysis of different chemical options is undertaken. 1.5 Requirement for chemical application including coverage by appropriate insurance is identified and confirmed.
2. Prepare appropriate chemical	2.1 Chemical label and Material Safety Data Sheets (MSDS) are read and understood. 2.2 Labels are checked to ensure chemicals meet user requirements and specifications. 2.3 Chemicals are prepared from those registered for the intended purpose, and to suit the organization's chemical use strategy. 2.4 ***Legislation and regulations*** concerning chemical use are identified and followed. 2.5 Occupational Health and Safety ***(OHS) hazards and risks*** *and* ***risk control requirements*** associated with use of the chemical are identified.
3. Prepare to use chemicals according to the label and MSDS	3.1 ***Personal protective equipment*** is selected and checked for use according to the product label and MSDS. 3.2 Requirements for ***pre and post-operative checks*** on equipment are followed. 3.3 Damage, wear or malfunctions of any equipment is identified and reported or repaired. 3.4 Requirements for the selection, preparation and adjustment of ***application equipment and tools*** for the appropriate chemicals are followed. 3.5 Mixing rates are defined and calculated. 3.6 ***Directions, standards*** and legislative requirements for mixing chemicals are followed.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
4. Apply chemicals	4.1 ***Meteorological conditions*** and forecasts are assessed prior to and during application. 4.2 ***Hazards*** of particular chemicals are identified. 4.3 ***Risks*** to others and the environment are assessed and controlled. 4.4 Application equipment calibration procedures are followed. 4.5 Procedures and precautions for the use of the chemicals are interpreted from labels and accreditation requirements. 4.6 Requirements for chemical handling and application are determined from directions, standards and legislative requirements. 4.7 Chemicals are applied safely and effectively according to directions. 4.8 Chemical spills or accident procedures are followed. 4.9 First aid equipment is made available on site.
5. Clean up following chemical application	5.1 ***Tools or equipment*** required to clean up chemicals are selected. 5.2 Requirements for cleaning equipment and sites are defined and followed according to directions and standards. 5.3 Requirements for disposing of unused chemicals, empty containers or spilled material are defined from directions and standards. 5.4 Procedures for reporting chemical spills are followed.
6. Record application details	6.1 Application of chemicals is recorded according to ***organization procedures***, label directions and legislation. 6.2 Details of the specific chemical concerned are recorded correctly in the chemical inventory according to regulations. 6.3 Inventory of personal protective equipment and application equipment is recorded. 6.4 Procedures and requirements for reporting application details to senior management or client are followed. 6.5 Records of injury or poisoning associated with application of chemical are made and provided to the ***appropriate person.***

RANGE OF VARIABLES

VARIABLE	RANGE
1. Chemicals	1.1. Chemicals may include insecticides, fungicides, herbicides, bactericides, algaecides, bio-agents, nematacides, rodenticides, antimicrobial agents, anthelmintics, hormone growth promotants or a range of veterinary chemicals used to treat animals for disease.
2. Legislation and regulations	2.1. Legislation may include 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.
3. OHS hazards and risks	3.1. OHS hazards include exposure of the operators and others in the workplace to the absorption of chemicals through the skin and by inhalation and ingestion. Risks may include acute poisoning, chronic or long-term health effects, and lack of appropriate insurance coverage.
4. OHS risk control requirements	4.1. OHS risk control measures may include safe application techniques, use and maintenance of personal protective equipment, safe wash down procedures, safe procedures for container rinsing and management.
5. Personal protective equipment	5.1. Personal protective equipment may include boots, chemical resistant gloves, aprons, face shields, respirators or hats and protective clothing.
6. Pre-and post-operational checks	6.1. Checks may be made to weather conditions (e.g., wind), nozzles, hoses, regulators/gauges, respirator cartridges, drench and protective clothing and equipment.
7. Application equipment	7.1. Include knapsacks or hand held pneumatic sprayers, drench guns, spot on applicators, CDA and air assisted units, self-propelled sprayers, controllers or power operated equipment like boomsprays, pressure wands, jetting race, shower/plunge dips, hand jetting or air blast sprayer.
8. Directions and standards	8.1. May include the instructions on the chemicals label, in an operator's manual, on a MSDS, in an industry standard, or from Codes of Practice and advisory material explaining legislation relevant to chemical use.
9. Hazards	9.1. Hazards will be listed on labels and the MSDS for the chemical concerned and may include flammability, toxicity, health hazards, damage to non-target organisms, uneven surfaces, trip points, solar radiation, manual handling, faulty equipment, environmental damage or residues in foods.
10. Risks	10.1. Risks that may be assessed include spillage, contact of chemical with skin or eyes, accidental ingestion, incorrect concentrations in mixtures, faulty or inappropriate storage containers, incorrectly calibrated equipment, spray drift, contamination of waterways, incorrect disposal of unused chemicals or faulty equipment
11. Meteorological conditions	11.1. Rain, wind, temperature, relative humidity, inversion or stable air conditions.

VARIABLE	RANGE
12. Tools and equipment	12.1. Include washing soda, chlorine, containers for disposal of chemicals, non-flammable absorbent materials and shovels, booms, sausages and sandbags.
13. Organizational procedures	13.1. Written journal or computer record may be used for recording.
14. Appropriate person	14.1. Include relevant authorities, supervisor, manager, business owner or colleague.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. Prepared the correct chemical for the problem unsupervised 1.2. Applied the chemical according to safe work practice and legislation and ensure minimal effects on the environment and others The skills and knowledge required to prepare and apply chemicals must be transferable to a different work environment. For example, this could include different chemicals, application methods and workplaces.
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts and to deal with unplanned events. The knowledge requirements for this competency standard are listed below. 2.1. Chemical free options for pest control. 2.2. Use, maintenance and storage of equipment to prepare and apply chemicals. 2.3. OHS issues, legislative requirements and Codes of Practice relevant to chemical use and hazardous substances. 2.4. Use, maintenance and storage of personal protective equipment, including how, when and why it should be used. 2.5. Licensing requirements (e.g licensed Pesticide Applicator, licensed Fumigator) and relevant government authorities. 2.6. Modes of chemical absorption and paths of entry associated with risks to bystanders/public and applicators. 2.7. Environmental effects of chemicals. 2.8. Drift management. 2.9. Calibration and adjustments. 2.10. Integrated Pest Management and Integrated Resistance Management principles. 2.11. Cost effective use of chemicals. 2.12. Hazard identification, assessment and control, and emergency response. 2.13. Correct wearing/fit of personal protective equipment. 2.14. Read and follow the label instructions.
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1. communicate orally and in writing. 3.2. read and interpret labels. 3.3. measure quantities, application rates and calibrate equipment. 3.4. report on and record activities. 3.5. use safe and environmentally responsible work practices.

4. Resource Implications	The following resources must be provided: 4.1. workplace 4.2. workplace equipment and storage facilities for chemical mixing and application 4.3. enterprise procedures relating to chemical use.
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace or in a simulated workplace. 6.2. Demonstration of competency over time and on a number of occasions.

UNIT OF COMPETENCY : **ESTABLISH AGRONOMIC CROPS**

UNIT CODE : **AGR611320**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required for establishing agronomic crops. It includes preparing machinery and equipment, ploughing/cultivating, seeding, applying any pre-planting treatments, maintaining machinery and equipment, relevant record keeping, and it requires the application of skills and knowledge to use specialised equipment to carry out seeding and fertilizer operations appropriate to soil and weather conditions. Equipment and machinery may be animal-powered. In addition, it requires an awareness of licensing requirements, safe workplace and positive environmental practices associated with seeding operations including sustainable land management. The work functions in this standard involve the application of some judgement and discretion and are likely to be carried out under minimal supervision within farm guidelines.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Prepare machinery and equipment for use	1.1 ***Machinery and equipment*** is selected and confirmed against the ***work plan*** and ***prepared*** to manufacturers specifications. 1.2 Equipment is securely attached and calibrated for operation to manufacturers specifications. 1.3 Existing and potential ***OHS hazards*** in the workplace are identified, risks assessed and controlled in line with ***farm requirements.***
2. Prepare for agronomic crop establishment	2.1 Soil and weather conditions are monitored for ***optimal seeding conditions.*** 2.2 Soil conservation and sustainable land management practices and procedures are recognized and confirmed in accordance with farm requirements and environmental concerns. 2.3 Seeding, fertilizer, and pest and weed control requirements are confirmed against the work plan and prepared to manufacturers specifications using safe handling procedures. 2.4 Contingency plans are prepared for unusual seasonal conditions and pest/disease outbreaks.
3. Sow the crop	3.1 Suitable ***personal protective clothing and equipment*** is selected, used and maintained in accordance with OHS requirements. 3.2 Seeding and fertilizer applications are carried out in line with the work plan. 3.3 Pest and weed control treatment is co-ordinated with seeding and fertilizer applications as required. 3.4 ***Environmental implications*** associated with sowing operations are identified, assessed and controlled in line with farm requirements.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
4. Complete seeding operations	4.1 Seeding, machinery and equipment operation records are maintained in accordance with farm requirements. 4.2 Machinery and equipment damage, malfunctions or irregular performance are reported in line with farm requirements. 4.3 Machinery and equipment is cleaned, secured and stored in line with manufacturer's specifications and farm requirements.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Machinery and equipment	1.1. Tractors, seed drills, air seeders, plough, harrows, cultivators, scarifiers, trucks, augers and bins. Equipment and machinery may be animal-powered. 1.2. Manual sowing is likely to be used in a number of situations and there would be basic equipment associated with this method of crop establishment.
2. Work plan	2.1. Location, crop type (cereals, legumes, cotton,) and seeding method, soil condition (structure, moisture), seeding practices (sowing time, sowing rate, optimal depth of sowing, seed dressing, tilth to match seed size), fertilizer type and application, pest and weed control type and application, machinery, equipment, resources and materials requirements, supervisors instructions, timeframe for work completion, crop lay-out and crop design and reporting requirements.
3. Preparation of machinery and equipment	3.1. Preparation may include safe transporting, inspection, pre-start and safety checks, routine servicing and maintenance, calibration, checking and monitoring machinery settings.
4. OHS	Systems and procedures for: 4.1. the safe operation and maintenance of machinery and equipment including hydraulics and guarding of exposed moving parts. 4.2. identify hazards, assessing and reporting risks. 4.3. emergency operating procedures. 4.4. safe lifting, carrying and handling techniques. 4.5. manual handling systems and procedures, handling and storage of hazardous substances and grain, and the appropriate use of personal protective clothing and equipment. 4.6. Safe systems and procedures for outdoor work including protection from solar radiation, protection of people in the workplace, protection from hazardous noise, mechanical vibration, organic and other dusts, and protection from fire risk.
5. OHS hazards	5.1. Exposure to loud noise and fumes, solar radiation, dust, ergonomic hazards associated with posture and vibration, hazardous substances, the presence of bystanders, slippery or uneven terrain, potholes, stumps, ditches, gullies, embankments, obstacles (rocks, logs, fences, debris), adverse weather conditions, mechanical malfunctions and exposed moving parts, and other machinery including hydraulics.

VARIABLE	RANGE
6. Farm requirements	6.1. Standard operating procedures (SOPs), industry standards, production schedules, Material Safety Data Sheets (MSDS), work notes, product labels, manufacturers specifications, operators manuals, farm policies and procedures (including waste disposal, recycling and re-use guidelines), OHS procedures, supervisors oral or written instructions, and work plans.
7. Agronomic crops	7.1. Agronomic crops covered by this unit include coarse grains, grain legumes, coffee, coconuts, cotton, soya beans, peanuts and sugar cane.
8. Optimal seeding conditions	8.1. This may be based on the history of seasonal weather providing a reasonable risk for dry seeding, and soil moisture conditions appropriate for grains crop germination.
9. Personal protective clothing and equipment	9.1. Boots, hat/hard hat, overalls, gloves, protective eyewear, hearing protection, respirator or face mask, and sun protection (sun hat, sunscreen).
10. Environmental implications	10.1. Positive environmental impacts may result from the conduct of sustainable land use practices including stubble retention, minimum tillage, and contour sowing to reduce erosion risks. It may also include the use of non-chemical alternatives for pesticides and cleaning agents, effective water re-use systems, and the reduction of noise and exhaust emissions. 10.2. Negative environmental impacts may result from high activity vehicle traffic and over-cultivation practices causing erosion, increased water run-off speeds, soil compaction, soil disturbance and loss, soil degradation, dust, contamination of soil and water through the use of fertilizer and chemicals, spray drift, incorrect use and disposal of chemicals and residues, oils and containers, greases, and detergents used in cleaning and maintenance procedures.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. selected and utilized various features and controls of a range of specialised application equipment to seed and fertilise a grains crop 1.2. prepared and serviced machinery and equipment 1.3. assessed soil and weather conditions and determined appropriate seeding methods 1.4. prepared seeds for planting, seed to plan ensuring optimum range of depth and density 1.5. recognized and controlled hazards 1.6. evaluated seeding operations and maintain records. The skills and knowledge required to establish agronomic crops must be **transferable** to a different work environment. For example this may include different crops, planting techniques, machinery and farms.
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. crop types, preparation of seeds, seeding methods and application techniques 2.2. fertilizer types, rates of application and crop nutrient requirements 2.3. types of herbicides, insecticides and other pesticides, and alternative pest control methods (non-chemical) 2.4. effects of weather conditions (normal and adverse) on seeding and fertilising applications 2.5. operating principles and operating methods for machinery and equipment 2.6. principles of weight distribution with regard to load shifting and vehicle movement 2.7. sustainable land management and soil conservation techniques 2.8. positive environmental practices, negative environmental impacts and minimisation measures associated with seeding operations 2.9. relevant provincial/municipal legislation, regulations and codes of practice with regard to workplace OHS and the use and control of hazardous substances 2.10. relevant provincial/municipal legislation and regulations with regard to licensing requirements and the use and control of machinery and equipment 2.11. personal protective clothing and equipment and when and how it should be used 2.12. procedures for cleaning, securing and storing machinery, equipment and materials

	2.13. farm policies with regard to seeding operations, and recording and reporting routines.
3. Underpinning Skills	To achieve the performance criteria, some complementary skills are required. These include the ability to: 3.1. apply fertilizer, herbicides, insecticides, other pesticides and hazardous substances safely 3.2. identify types of weeds and insects harmful to crops 3.3. identify beneficial insects 3.4. perform pre-operational and safety checks, servicing and maintenance on machinery and equipment 3.5. calibrate, operate machinery and attach/detach equipment 3.6. demonstrate emergency operating procedures in normal and adverse conditions 3.7. recognize and report machinery damage, faults or malfunctions and perform minor repairs 3.8. demonstrate safe, environmentally responsible and sustainable land management practices 3.9. monitor and minimize impacts to the environment associated with sowing operations 3.10. read and interpret manufacturers specifications, work and maintenance plans, and MSDS 3.11. clean, secure and store machinery and equipment 3.12. interpret and apply task instructions, communicate with work team and supervisor, and record and report equipment faults, workplace hazards and accidents 3.13. assess and calculate the application of fertilizer/pesticide requirements and application rates, calibrate equipment and calculate volumes, consumption and servicing requirements.
4. Resource Implications	The following resources must be provided: 4.1. workplace where agronomic crops are to be established 4.2. workplace information relating to crop establishment 4.3. farm procedures relating to crop establishment
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace or a simulated workplace. 6.2. Demonstration of competency over time and on a number of occasions.

UNIT OF COMPETENCY : **UNDERTAKE AGRONOMIC CROP MAINTENANCE ACTIVITIES**

UNIT CODE : **AGR611321**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required for maintaining agronomic crops. It involves the process of assessing crop condition to identify abnormalities caused by pests, weeds, soil nutrient deficiencies and soil conditions, applying pests, disease and plant disorders and weed control measures to maximize crop production and providing crop fertilizer requirements.
Monitoring agronomic crops is likely to be carried out under limited supervision from others with checking only related to overall progress. It is usually done within established routines, methods and procedures where some discretion and judgment is required in the selection of equipment and materials, organization of work, services, actions and the achievement of outcomes within time and budgetary constraints.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Assess agronomic crop condition, growth and requirements	1.1 Crops are monitored to assess their needs and observations are ***recorded*** and reported. 1.2 Pest and disease control ***alternatives*** are identified in line with species and level of infestation present and taking into account consultant advice if obtained. 1.3 Economic threshold data is identified in line with action targets. 1.4 Sites for regular measurement of soil moisture are established in consultation with survey advice. 1.5 Soil probe is used to measure moisture levels and soil water percentage calculated. 1.6 Water requirements are calculated in line with standing crop and forecast weather conditions.
2. Apply fertilizer and amendments	2.1 ***OHS*** hazards are identified, risks assessed and suitable controls are implemented. 2.2 Suitable ***personal protective equipment*** is selected, used and maintained. 2.3 ***Specialist sprays*** are selected and applied to organization standard and taking into account consultant advice if obtained. 2.4 Specialist sprays are ***applied*** according to industry standards for growth stages. 2.5 Chipping or spot spraying is carried out as an integral part of weed control programs. 2.6 Crop growth stages and keys are assessed, recorded and reported. 2.7 Water is applied according to the identified ***need*** and the requirements of the organization. 2.8 All applications are undertaken in the full consideration of adverse ***environmental*** *impacts.*

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
3. Monitor crop condition, growth and requirements	3.1 Crop maturity is monitored and the need for further applications is determined in consultation with the manager. 3.2 The health of the crop is continually monitored and corrections to growing plan are made as and when required. 3.3 The timing of harvest is determined in consultation with contractors and property manager.
4 Complete cleaning and hygiene operations	4.1 ***Equipment*** is cleaned in accordance with manufacturers specifications, organizational procedures and regulations. 4.2 All containers, leftover fluids, waste and debris from the maintenance and servicing work are disposed of safely and appropriately. 4.3 All required records and documentation are completed accurately and promptly in accordance with organizational requirements.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Agronomic crops	1.1. Agronomic crops covered by this unit include coarse grains, grain legumes, coffee, coconuts, cotton, soya beans, peanuts and sugar cane.
2. Recorded	2.1. All chemical usage should be recorded as well as any necessary recording of vehicle and equipment use in logbooks. Additionally, any assessment of pests and weeds, protein levels, quality and yield should be recorded appropriately. Record keeping systems used may be either paper-based or digital, and information will be recorded into logbooks or other records.
3. Alternatives	3.1. Alternatives to such chemical methods may include altering management methods, considering the way that water is supplied to the crop, and using mechanical methods.
4. Fertilizers	4.1. Fertilizers and other amendments used will be dependent on nutrient levels, trace elements, acidity, alkalinity, texture and other physical characteristics of the soil, and the growth stage of the crop.
5. OHS	The range of actions are both systemic and at an operational level. These are listed below. 5.1. *Systems* should be in place to ensure the safe operation and maintenance of machinery and equipment. Precautions should also be in place to minimize exposure to noise and organic and other dusts. Systems and procedures for harvesting and handling crops, as well as working with and around electricity, should also be in place. Health and safety representatives and OHS committees in the larger agronomic organizations will contribute to the maintenance of safe conditions. 5.2. *Fixtures* should be in place in all silos and storage sheds, including appropriate access ladders, hand rails and ladder cages. 5.3. *Personal protective equipment* should be selected, used and maintained. 5.4. *Environmental* conditions should be controlled e.g., keeping moisture levels as low as possible will reduce the likelihood of fire. 5.5. *Procedures* should be in place and used for working on harvesters, working within confined spaces, moving vehicles, and working at height. Special information, induction or training related to the activities contained within this unit. 5.6. *Record keeping* should ensure those requirements in relation to properly observing and using product labels and MSDS sheets, instruction manuals and written organizational procedures.

VARIABLE	RANGE
6. Personal protective equipment	6.1. Boots, hat/hard hat, overalls, gloves, protective eyewear, hearing protection, respirator or facemask, and sun protection (sun hat, sun screen).
7. Specialist sprays	7.1. The specialist sprays may include fertilizers, soil ameliorants, defoliants and insecticides.
8. Sprays applied to the crop	8.1. Chemicals used for invertebrate, disease and weed control will depend on the growth stage of the crop.
9. Needs of crops to be monitored	9.1. They will be monitored using an evaporation pan, rain gauge or other methods.
10. Environmental implications	10.1. Detrimental environmental impacts may result from excessive noise and exhaust emissions, the incorrect use and disposal of maintenance debris (oils, containers, chemical residues), and hazardous substances (fuel). Impacts may also include run-off flows of water and cleaning agents from servicing, maintenance and cleaning activities.
11. Equipment	11.1. 2WD, 4WD and crawlers, appropriate mechanical loader e.g., front-end loader, hydraulic crane, block and tackle, sprayer equipment, fertilizer applicator or spreader, chipping hoe, cultivation equipment, and irrigation equipment.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. applied fertilisers and other chemicals in a sound manner at the right time in the growth cycle for the crop in order that undesirable results and run-off do not occur. The skills and knowledge required to maintain agronomic crops must be transferable to a different work environment for example, over the entire growth cycle of the crop.
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. appropriate legislative requirements, manufacturers instructions and organization procedures/instructions 2.2. potential hazards associated with the operation of basic tools and equipment 2.3. general machine maintenance procedures 2.4. machinery operating principles and operating methods 2.5. recognition of healthy crop condition 2.6. recognition of any potential pests 2.7. environmental impacts associated with the operation of machinery and equipment in a harvesting context 2.8. knowledge in basic agronomy and horticulture 2.9. knowledge in basic plant pathology 2.10. organization recording and reporting procedures 2.11. organization moisture and hygiene requirements for agronomic crops and equipment that comes into contact with the crop 2.12. types and uses of herbicides, insecticides and other pesticides and alternative pest control methods (non-chemical).
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1. detect differences and variations in crop health 3.2. to report/communicate such differences to the supervisor/farm owner 3.3. observe and report on health and growth of the crop 3.4. read and interpret manufacturers specifications, work and maintenance plans, and Material Safety Data Sheets.
4. Resource Implications	The following resources must be provided: 4.1. workplace with agronomic crop maintenance 4.2. workplace information relating to crop maintenance 4.3. enterprise procedures relating to crop maintenance
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace or in a simulated workplace. 6.2. Demonstration of competency over time and on a number of occasions.

UNIT OF COMPETENCY : **UNDERTAKE AGRONOMIC CROP HARVESTING ACTIVITIES**

UNIT CODE : **AGR611322**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required for the process of harvesting agronomic crops. It includes preparing machinery and equipment, supplies and materials needed, harvesting, cleaning and maintaining machinery and equipment and completing workplace records. Harvesting may also be carried out using manually or animal-powered tools and equipment. Harvesting is likely to be carried out under limited supervision. Overall progress may be checked periodically and will usually follow set routines, methods and procedures.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Prepare to harvest agronomic crops	1.1 Requirements for the work to be undertaken, method and order of harvesting is interpreted from the harvest strategy and confirmed with the supervisor. 1.2 ***OHS*** hazards are identified, risks assessed and suitable controls are implemented. 1.3 Suitable ***personal protective equipment*** is selected, used and maintained. 1.4 The ***environmental implications*** of harvesting the crop are identified, likely outcomes assessed and, if necessary, responsible action is taken. 1.5 Windrowing/swathing is completed to the standard required by the harvest strategy. 1.6 Crop is sampled for moisture content against the ***classification standards***. 1.7 The hygiene standards for the crop and the site are identified from the harvest strategy and/or the crop storage plan.
2. Prepare the harvesting equipment	2.1 Harvesting machinery and other equipment are ***cleaned*** of pests and other contaminants to maintain crop and site hygiene standards, as required by the harvest strategy. 2.2 All machinery and equipment are serviced, assessed for reliability, adjusted for harvesting conditions and appropriate parts are replaced to ensure reliability during the harvest. 2.3 All containers, leftover fluids, waste and debris from the maintenance and servicing work are disposed of safely and appropriately. 2.4 All maintenance and servicing is ***documented*** according to the requirements of the organizations record keeping system.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
3. Harvest crops	3.1 The harvest strategy is followed and completed for each site. 3.2 OHS hazards are identified, risks assessed and suitable controls are implemented. 3.3 Suitable personal protective equipment is selected, used and maintained. 3.4 The environmental implications of harvesting are identified, likely outcomes assessed and, if necessary, responsible action is taken. 3.5 Harvesting machinery and ancillary equipment is ***operated in a safe manner*** and at speeds to suit crop conditions. 3.6 The quality of the crop is maximized by maintaining the hygiene of all surfaces that come into contact with the crop. 3.7 The quality of the crop is maximized by continually checking and, where necessary, adjusting the harvester and ancillary equipment, including their height and other settings.
4. Complete harvesting operations	4.1 Equipment is cleaned in accordance with manufacturer's specifications, organizational procedures and regulations. 4.2 Attachments and other ancillary equipment are cleaned and stored to minimize damage and to maximize hygiene according to manufacturer's specifications, organizational procedures and regulations. 4.3 Insecticides are applied as required by the organization and the harvest strategy. 4.4 All containers, leftover fluids, waste and debris from the maintenance and servicing work are disposed of safely and appropriately. 4.5 All required ***records and documentation*** are completed accurately and promptly in accordance with organizational requirements.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Agronomic crops	1.1. Agronomic crops covered by this unit include coarse grains, grain legumes, coffee, coconuts, cotton, soya beans, peanuts and sugar cane.
2. OHS	The range of actions are both systemic and at an operational level. These are listed below. 2.1. *Systems* should be in place to ensure the safe operation and maintenance of machinery and equipment. Precautions should also be in place to minimize exposure to noise and organic and other dusts. Systems and procedures for harvesting and handling the crop, as well as working with and around electricity should also be in place. 2.2. *Fixtures* should be in place in all silos and storage sheds, including appropriate access ladders, handrails and ladder cages. 2.3. *Personal protective equipment* should be selected, used and maintained. 2.4. *Environmental* conditions should be controlled e.g., keeping moisture levels as low as possible will reduce the likelihood of fire. 2.5. *Procedures* should be in place and used for working on harvesters, working with grain mass movement and stability, working within confined working spaces, moving vehicles, and working at height. 2.6. *Record keeping* practices should ensure that requirements are met in relation to properly observing and using product labels and MSDS sheets, instruction manuals and written organizational procedures.
3. Personal protective equipment	3.1. Boots, hat/hard hat, overalls, gloves, protective eyewear, hearing protection, respirator or facemask, and sun protection (sun hat, sun screen).
4. Environmental implications	4.1. Detrimental environmental impacts may result from excessive noise and exhaust emissions, the incorrect use and disposal of maintenance debris (oils, containers, chemical residues), and hazardous substances (fuel). Impacts may also include run-off flows of water and cleaning agents from servicing, maintenance and cleaning activities.
5. Classification standards	5.1. These are the standards for the measurement of moisture in the crop and are produced and available from receival authorities.
6. Equipment	6.1. A range of equipment from grain augers and field and chaser bins to towing vehicles, tarpaulins, fire control equipment, conveyors, communication equipment, and crop treatment equipment.

VARIABLE	RANGE
7. Cleaned in preparation for and subsequent to the harvest	7.1. All surfaces of harvesters, and any equipment that comes into contact with the crop should be cleaned, using one of the following methods: compressed air, water wash, vacuum and water, and/or brush.
8. Documented information	8.1. Record keeping systems used may be either paper-based or digital, and information will be recorded into logbooks or other records.
9. Operated safely equipment	9.1. The speeds used should be appropriate for the equipment, ground and the crop conditions. All pre- and post-start up checks should be undertaken. The machine is positioned and adjusted during use according to the height of the crop and according to weather conditions.
10. Fire prevention measures	10.1. These will be outlined in the harvest strategy. The measures planned for and taken will address fire risks and hazards and will meet legislative requirements.
11. Actions required for documentation	11.1. All chemical usage should be recorded as well as any necessary recording of vehicle and equipment use in logbooks, for example. Additionally, any assessment of pests and weeds, grain protein levels, quality and yield should be recorded appropriately.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. harvested crops safely and efficiently while continually maintaining the highest degree of hygiene and quality possible. The skills and knowledge required to harvest the grain crop must be ***transferable*** to a different work environment. For example, the way in which the harvesting operations will occur will vary depending on the moisture levels of the crop, the crop type, and the equipment available.
2. Underpinning Knowledge	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. appropriate legislative requirements, manufacturers instructions and organization procedures/instructions 2.2. pre-operational and safety checks, servicing and maintenance procedures for tools and equipment 2.3. potential hazards associated with the operation of basic tools and equipment 2.4. general machine maintenance procedures 2.5. machinery operating principles and operating methods 2.6. environmental impacts associated with the operation of machinery and equipment in a harvesting context 2.7. organization recording and reporting procedures 2.8. pests and signs of pest infestation in the crop 2.9. organization moisture and hygiene requirements for the crop and equipment that comes into contact with the crop 2.10. operational procedures and standards for harvesting and ancillary equipment. 2.11. knowledge of crop maturity 2.12. knowledge of post-harvest handling and packaging.
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1. use communication systems 3.2. handle and manoeuvre harvesting equipment 3.3. complete pre- and post-operational checks on tools, harvester and equipment 3.4. perform routine safety, service and maintenance procedures on tools, harvester and equipment 3.5. read and interpret manufacturers specifications, work and maintenance plans, and Material Safety Data Sheets 3.6. interpret and apply task instructions, communicate with work team and supervisor, and record and report faults, workplace hazards and accidents.

4. Resource Implications	The following resources must be provided: 4.1. workplace with agronomic crops coming into harvest time 4.2. workplace information relating to crop harvesting 4.3. enterprise procedures relating to crop harvesting
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace or in a simulated workplace. 6.2. Demonstration of competency over time and on a number of occasions.

UNIT OF COMPETENCY : **SAVE, PREPARE AND STORE AGRICULTURAL SEED**

UNIT CODE : **AGR611323**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required for selecting grain and other seed from agricultural crops for use as seed, to calculate the quantity required, to grade and test it, and subsequently to store the seed for use in the following season. Seed stocks are selected and stored to ensure maximum quality and yield when used.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1 Select seed from agricultural crops	1.1 The quantity of seed required to sow the following season's crop is calculated. 1.2 The area of crop needed to produce the required quantity of seed for the following season's crop is calculated. 1.3 A portion of the crop to be used as seed is selected, based on the calculated requirements and its health, vigour, and grain size. 1.4 The soil type and elevation/climatic conditions in the selected portion of the crop are noted for potential input to management decision-making. 1.5 ***Measures are taken to preserve seed and plant health, vigour and uniformity*** within the selected area. 1.6 The application of any chemicals to the crop is undertaken in full consideration of ***detrimental environmental impacts***. 1.7 All work carried out is done using the appropriate ***personal protective equipment*** and is within ***OHS*** guidelines.
2 Evaluate and grade seed	2.1 After harvest, the grain variety saved is assessed for its suitability for the location, the soil, and the organization's ***current marketing requirements***. 2.2 ***Information regarding new varieties or trial results*** and progress is sourced for input to management decision-making. 2.3 The seed is graded to the required size either on or off-site. 2.4 Fungicidal and insecticidal dressings are applied to the seed where appropriate and according to the organizations production and marketing requirements. 2.5 ***Test*** samples are taken, prepared and forwarded to the ***analyzing body***, according to the guidelines of that body. 2.6 ***Records*** of observations, information gathered, and results of tests and grading are kept, updated, and maintained according to the requirements of the organization and the industry. 2.7 The records kept are forwarded to the ***appropriate person*** for analysis and decision-making.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
3 Store seed	3.1 The storage facilities to be used are selected and hygienically prepared. 3.2 Seed is transferred to the storage facility according to the organizations OHS and hygiene guidelines. 3.3 Seed is stored under conditions that maintain its quality and germination capacity. 3.4 Periodical ***checks*** of seed in long-term storage are conducted for quality factors and viability according to enterprise requirements. 3.5 Seed samples for laboratory testing are taken as required. 3.6 Test samples are taken, prepared and forwarded for analysis according to prescribed guidelines. 3.7 Clear and accurate ***records*** of seed storage, tests and inspections are created, maintained and kept as described in the seed storage program. 3.8 The ***condition of storage facilities*** is monitored using the schedule and methods outlined in the seed storage program. 3.9 Where it is required, appropriate ***corrective action*** is taken to maintain seed quality. 3.10 Activities around the seed storage facilities are undertaken according to *the* ***OHS guidelines*** detailed in the grain storage program.
4 Collect and deliver seed	4.1 Delivery or supply terms are established and applied when collecting or delivering seed. 4.2 Seed sold or purchased conforms to local State and Federal legislation and regulations. 4.3 Regulations relating to the interstate movement of seeds are observed.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Seeds	1.1. They may be from both horticultural and agronomic crops.
2. Agricultural crops	2.1. Agricultural crops covered by this unit include both horticultural and agronomic crops. 2.2. Agronomic crops covered by this unit include coarse grains, grain legumes, coffee, coconuts, cotton, soya beans, peanuts and sugar cane. 2.3. Crops may include fruit, vegetables, herbs, flowers, foliage, bulbs, tubers, nuts, mushrooms, wild harvest plants and oils.
3. Measures may be taken to improve seed	3.1. Measures taken can include removing pests and weeds, as well as enhancing the nutrients of the area. Specifically, this may include roguing of off-types and undesirable weeds, grading out weed seeds and small grains and other impurities, enhancing the nutrient levels with pre-harvest applications, and careful harvesting to prevent cracked and damaged grain.
4. Detrimental environmental impacts	4.1. Persistent application of chemicals to a particular area of soil over time can lead to a change in the soil performance, and any inappropriate disposal of containers or chemicals can contaminate soils, crops and water.
5. Personal protective equipment	5.1. Boots, hat/hard hat, overalls, gloves, protective eyewear, hearing protection, respirator or face mask, and sun protection (sun hat, sunscreen).
6. OHS	6.1. They include safe systems and procedures for storage, handling and transportation of hazardous substances, chemicals selected taking into account toxicity levels and environmental effects, systems and procedures for the safe operation and maintenance of machinery and equipment, including hydraulics and guarding of exposed moving parts, safe manual handling systems and procedures, safe systems and procedures for outdoor work, including protection from solar radiation, selection, use and maintenance of relevant personal protective clothing and equipment, and fire risk.
7. Current marketing	7.1. They can be found in the plan itself, and through discussion with management.
8. Information regarding new varieties or trial results	8.1. This information would generally be sourced informally through discussion with operators in other techno-demo farms & research institutes, seed companies and organizations or through media outlets. Information may also be sourced through recommendations or directly through suppliers.
9. Seed to be tested	9.1. It might be tested for purity, germination, vigour, seed weight, and disease identification.

VARIABLE	RANGE
10. Records	10.1. Information from each season will be useful in building a history for the organization, and for input into subsequent years decision-making. Record keeping is essential. Records of each step along the way should be kept: results of calculations, location of the area used for seed growing, varieties used, soil types used for growing seed, seed improvement methods used, water availability and time of harvest. 10.2. Once harvested, records need to be kept of type, condition, and length of time in storage. Also of where it is to be sown, and the origin of the seed.
11. Appropriate person for analysis and decision-making	11.1. This is the person who will make decisions on the production and operations planning for sowing.
12. Seed history	12.1. Yields of parent crop, trueness to type, age, storage treatments, source and type of parent crop and pathogens in parent crop.
13. Seed quality	13.1. Test weights per thousand grains or similar assessment, even sized grain, and nutrient enhanced grain.
14. Seed storage controls	14.1. Moisture and humidity, temperature, pesticide concentrations, and gas tightness.
15. Seed selection, storage, purchase and treatment procedures	15.1. Maintain high germination rate, minimize disease transmission on farm and between farms, and ensure pest free status of certified seed and should be free from impurities.
16. Conditions that maintain a high germination percentage	16.1. Low moisture levels, appropriate temperatures, and freedom from pests.
17. Seed saved has the following known features	17.1. Trueness to type, pest status, and insect free determine seed to be saved.
18. OHS guidelines	18.1. They might be to alert others in the organization, including workers and family members, of planned presence of transport, putting in place systems and procedures for 18.2. the safe operation and maintenance of machinery and equipment, including hydraulics and guarding of exposed moving parts 18.3. the protection from organic and other dusts 18.4. the safe systems and procedures for handling and storage of grain and seed 18.5. the protection against electrical hazards, especially over head power lines 18.6. storage, handling and transportation of hazardous substances (pesticides) 18.7. the selection, use and maintenance of relevant personal protective clothing and equipment 18.8. lifting and carrying. 18.9. Safe systems and procedures should also be in place for working in confined spaces, at height and on the grain mass.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. saved, prepared, grown and stored seed in a hygienic environment to ensure a successful crop the following year The skills and knowledge required to save, prepare and store seed must be transferable to a different work environment. For example, across the range of grains grown, and in a range of different geographic environments.
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. identification of varieties 2.2. seed treatment and cleaning measures 2.3. sources of purchased seed 2.4. inoculation treatments and seed dressings used within the organization 2.5. records and documentation required for tracking and handling of seed 2.6. storage techniques and requirements for seed and grain 2.7. environmental controls and codes of practice applicable to the enterprise 2.8. relevant legislation and regulations relating to OHS, contractor engagement, chemical use and application, vehicle and plant use, and to the use, handling and sale of seed 2.9. sound management practices and processes to minimize noise, odours, and debris from sowing operations.
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1. select appropriate seed tests 3.2. apply pre and post-harvest treatments for seed 3.3. identify varieties from growth patterns 3.4. identify weed seeds and contaminants 3.5. identify pests in stored grain and initiate control measures 3.6. calculate volumes, capacities, areas, ratios for seed, storages, and chemicals 3.7. keep, update and maintain records relating to test results, provenance, varieties, pest control measures, and other relevant information about the seed 3.8. observe, identify and react appropriately to environmental implications and OHS hazards.
4. Resource Implications	The following resources must be provided: 4.1. workplace with saves, prepares and stores grain. 4.2. workplace information relating to grain storage 4.3. enterprise procedures relating to grain storage
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace or in a simulated workplace. 6.2. Demonstration of competency over time and on a number of occasions at least three (3) different types of crops.

UNIT OF COMPETENCY : **IMPLEMENT VERTEBRATE PEST CONTROL PROGRAM**

UNIT CODE : **AGR611324**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to plan and implement a strategy for the control of vertebrate pests in a rural environment.
It requires the application of knowledge and skills to assess the severity of pest infestation and determine methods and applications for the effective control of vertebrate pests without harm to other species or the environment. Competency requires an awareness of legislative requirements with regard to animal welfare, biosecurity, safety and environmental protection. The work in this standard is likely to be carried out under routine supervision within farm guidelines.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Assess requirements for pest control	1.1 ***Vertebrate pest*** control requirements are assessed and clarified according to farm objectives. 1.2 Inspections are carried out to ascertain type and severity of pest infestations. 1.3 ***Control agents*** *and* ***methods of application*** to prevent, control or manage vertebrate pests are determined. 1.4 ***Control program*** is developed for implementation according to ***farm requirements.***
2. Prepare to implement control program	2.1 Suitable ***personal protective equipment*** is selected, used and maintained according to ***OHS*** requirements. 2.2 Equipment and materials required to support the implementation of control program are arranged. 2.3 Relevant licenses and permits are obtained according to ***legislative requirements*****.** 2.4 ***Safe working practices*** are observed and followed according to OHS and farm requirements.
3. Control vertebrate pests	3.1 Control program is implemented according to OHS, legislative and farm requirements. 3.2 Safeguards are employed to ensure that targeted pests are controlled and all other species remain unharmed. 3.3 ***Integrated health management*** is considered and implemented as required. 3.4 ***Environmental impacts*** are assessed and controlled according to legislative and farm requirements.
4. Complete control program	4.1 Carcasses and control agents are disposed of according to environmental and industry Codes of Practice. 4.2 Control program and outcomes are reviewed and evaluated for future best practice and planning management. 4.3 Equipment and work areas are cleaned and returned to operating order according to OHS and farm requirements. 4.4 ***Relevant information*** is documented and maintained to industry standards and farm requirements.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Vertebrate pests	1.1. Vertebrate pests are those animal species listed in specific regions by governments or municipalities as pest animals and may include animal species such as wild birds, rats and mice, feral casts, feral pigs, foxes. Vertebrate pests to be controlled may also be identified in biosecurity codes of practice.
2. Control agents	2.1. Agents may include herbicides, fungicides, insecticides, mechanical means including shooting, trapping or electric devices, vaccines, antibiotics, medicines, poisons, baits, vector release, biologically active agents and growth regulators.
3. Application methods	3.1. Methods may include by air or ground, by injection, , drench, spray or fumigation. 3.2. It may also include integrated pest management which includes one or more methods in combination: 3.3. cultivation or mechanical means 3.4. biological control 3.5. species selection 3.6. chemical application.
4. Control program	4.1. Information may include the identity of vertebrate pest and severity of infestation, allocated equipment and materials, type of control agent to be used and method of application, timeframe for completion, health and safety measures, procedures for the disposal of carcasses and other waste, and reporting requirements.
5. Farm requirements	5.1. SOP, industry standards, farm quality manual, product labels, manufacturers specifications, MSDS, operators manuals, farm policies and procedures (including waste disposal, recycling and re-use) and reporting requirements.
6. Personal protective equipment	6.1. This may include boots, hat/hard hat, overalls, gloves, protective eyewear, hearing protection, respirator or face mask, and sun protection.
7. OHS	Safe systems and procedures for: 7.1. safe manual handling 7.2. outdoor work including protection from solar radiation 7.3. the handling and storage of firearms 7.4. the handling of explosives 7.5. the handling of hazardous substances including vaccines, poisons and baits 7.6. the use of personal protective equipment.

VARIABLE	RANGE
8. Legislative requirements	This may include relevant Philippine Acts and provincial/municipal regulations with regard to: 8.1. pest control 8.2. use, control and storage of chemicals 8.3. atmospheric contamination 8.4. labelling of hazardous substances 8.5. MSDS information guidance 8.6. transportation of dangerous goods.
9. Safe working practices	9.1. This may include identifying hazards, mixing and applying chemicals, appropriate signage, manual handling and the use of personal protective equipment.
10. Integrated health management	10.1. Considerations may include hygiene, husbandry, quarantine, chemical and biological controls.
11. Environmental impacts	11.1. Negative environmental impacts may result from the unsafe use and disposal of chemicals and any consequent residual chemicals.
12. Relevant information	12.1. This may include details of control agents used and methods of application, location and severity of infestation, carcass numbers and disposal procedures, implementation problems and solutions, any incidents, and evaluated outcomes in terms of meeting farm objectives.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. Used control agents safely and applied appropriate methods to control vertebrate pests 1.2. used and handled hazardous substances safely 1.3. carried out inspections to assess infestations, identify species and nature of vertebrate pest 1.4. determined control methods with due care and humane treatment 1.5. disposed carcasses according to established industry standards. The skills and knowledge required must be **transferable** to another environment. For example, this could include different pests, control treatments, farms and workplaces.
2. Underpinning Knowledge	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. legislative and industry requirements for the disposal of vertebrate pests and control agents 2.2. types of vertebrate pests 2.3. control methods and techniques 2.4. safety signage 2.5. sustainable livestock management 2.6. relevant environmental guidelines including protection of native vegetation with particular attention to potential soil degradation and destruction of flora and fauna 2.7. relevant provisions of OHS legislation and regulations.
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1. use a first aid kit 3.2. select and use agricultural chemicals safely 3.3. communicate effectively in verbal and written form with farm personnel and suppliers 3.4. read and interpret chemical labels, MSDS and safety signage or decals 3.5. calculate vertebrate pest numbers and estimate resources and materials appropriate to implement control program.
4. Resource Implications	The following resources must be provided: 4.1. workplace with vertebrate pest problem 4.2. tools, equipment and materials used controlling vertebrate pests 4.3. farm procedures relating to vertebrate pest control including the use of chemicals
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace or in a simulated workplace. 6.2. Demonstration of competency over time

ELECTIVE COMPETENCIES

UNIT OF COMPETENCY : **FOLLOW SITE QUARANTINE PROCEDURES**

UNIT CODE : **AGR611325**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to follow enterprise site quarantine procedures that are designed to reduce the likelihood of pathogenic organisms entering the site. Site quarantine procedures are followed as a routine part of one's own work and are applied to visitors to the site. Work is performed under supervision and according to established procedures and policies.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1 Prepare to work in quarantine site	1.1 Ensure personal and/or work vehicles are ***decontaminated*** before entering the ***quarantine site.***
	1.2 Contact with ***potential contaminants*** is reported according to enterprise requirements
	1.3 Hands are washed before livestock, feed, plant stock or other products are handled
	1.4 Appropriate clothing and footwear is put on before commencing work and 'street clothing' is securely stored away from livestock, feed or other agricultural produce.
2 Work in quarantine site	2.1 Chemicals for disinfestation and/or medications administered to livestock are handled and stored according to workplace requirements.
	2.2 Different feed mixes, soils and/or growing media and/or other products are kept separately and appropriately marked according to quarantine procedures.
	2.3 Any cases of ***pest*** and ***disease*** incidence are identified and reported to supervisor.
	2.4 Any breaches of quarantine procedures are identified and reported to supervisor.
	2.5 Any OHS hazards are identified and appropriate action is taken according to enterprise policy and OHS legislation and codes.
	2.6 All ***waste products*** are disposed of according to ***SOP***.
	2.7 All deceased livestock, unwanted biological material or damaged/infected plant stock are disposed of according to SOP.
	2.8 Information relating to work in quarantine site is recorded as required in the SOP.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
3 Assist in maintaining site quarantine procedures	3.1 All visitors are informed of the quarantine procedures and are provided with appropriate clothing and footwear, if required by SOP. 3.2 Any observed breaches of quarantine procedures by visitors are noted and reported to supervisor 3.3 Gates and doors are kept locked where required by SOP and supervisor instructions 3.4 Where installed, security fencing is maintained according to supervisors instructions 3.5 Deliveries to site are checked to ensure that established procedures for vehicle decontamination, unloading and receipt and holding or storage of stock and/or supplies are followed
4 Respond to site quarantine breach or problem	4.1 The specific problem and its location is identified and reported to supervisor 4.2 Quarantine site and location of breach is cleaned and disinfected as required according to the specific nature of the problem and SOP 4.4 Livestock, plant stock suspected of being exposed to contaminants are isolated and monitored for evidence of contamination according to SOP. 4.5 Information about the breach or problem is recorded according to SOP

RANGE OF VARIABLES

VARIABLE	RANGE
1. Quarantine site	1.1. The quarantine site may be the whole farm or enterprise premises or part of the premises, such as an isolation area or sick bay. In some cases, the quarantine area may extend beyond the enterprise boundaries.
2. Decontamination	2.1. Vehicle decontamination may require that all vehicles are driven through a dip of treated solution before entering the site.
3. Potential contaminants	3.1. Potential contaminants may include pathogens entering on clothing/footwear, equipment, vehicles or items being delivered to the enterprise. Potential contaminants may also enter in foodstuffs, including food for animal or human consumption, vaccines, water or soil, or be brought on to the site by new livestock or pests.
4. Standard operating procedures (SOP)	4.1. These may include, enterprise quality assurance manual, industry standards and quality assurance programs specific to biosecurity, production schedules, Material Safety Data Sheets, work notes, product labels, manufacturers specifications, operators manuals, enterprise policies and procedures (including waste disposal, recycling and re-use guidelines), OHS procedures, supervisors oral or written instructions, work and routine maintenance plans.
5. Pest	5.1. Pests can include vertebrate and invertebrate pests, wild birds in sheds or housing, dogs, and cats.
6. Diseases	6.1. Diseases can be categorized as fungal, bacterial, viral and parasitical.
7. Waste products	7.1. Waste products might include feed spills, unused/expired vaccine, and biological matter, such as semen, embryos, tissue samples, plant cuttings, infected plants, dead birds and manures.

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidences that the candidate : 1.1. Applied specific quarantine procedures in place in an enterprise and to report any breaches of quarantine to supervisors. The skills and knowledge required to follow site quarantine procedures must be **transferable** to a different work environment. For example, following site quarantine procedures in different types of enterprises or where quarantine is imposed in response to different circumstances on different occasions.
2. Underpinning Knowledge	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. Enterprise site quarantine policy and procedures 2.2. industry quality assurance requirements (where applicable) and documentation required to be kept 2.3. Reporting procedures for alleged breaches of site quarantine procedures 2.4. Consequences of breaching site quarantine procedures
3. Underpinning Skills	To achieve the performance criteria, some complementary skills are required. These skills are: 3.1. Read and/or interpret site quarantine procedures 3.2. Follow procedures 3.3. Communicate with visitors to the enterprise about site quarantine procedures.
4. Resource Implications	The following resources must be provided: 4.1. workplace used for commercial livestock or cropping production, including egg production and milk harvesting, for food purposes 4.2. HACCP plan 4.3. SOP.
5. Methods of Assessment	Competency should be assessed: 5.1. Through direct observation / demonstration 5.2. Portfolio assessment
6. Context of Assessment	Assessment should be in a workplace and carried out in conjunction with assessment of other workplace competencies. 6.1. The assessment condition requires following quality assurance procedures as part of workplace tasks. 6.2. Demonstration of competency over time and on a number of occasions.

UNIT OF COMPETENCY : **COLLECT SAMPLES FOR A RURAL PRODUCTION OR HORTICULTURE MONITORING PROGRAM**

UNIT CODE : **AGR611326**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to collect samples as part of a rural production or horticulture monitoring program or while conducting post-mortem examination of livestock or other animals. It requires the ability to plan for collecting, prepare equipment and resources, carry out collecting, and complete collecting activities. Collecting samples requires knowledge of industry sampling and preserving guidelines and protocols, types of tissue that might be collected, environmental legislation, and sampling and preserving methods.
Samples collected will usually be analyzed by laboratory staff, although collection staff may undertake some tests.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Plan for collection of samples	1.1 Purpose and scope of sample collection activity is confirmed from discussion with supervisor or work instructions. 1.2 Sample collection schedule is read/heard and confirmed with supervisor. 1.3 Sampling site ***location*** is confirmed and, where required, approval obtained for site access following enterprise guidelines. 1.4 ***Samples*** to be collected and preserved are identified in conjunction with supervisor or by reference to enterprise guidelines. 1.5 Range of likely operating conditions, hazards and difficult/sensitive environments are assessed for impact on sampling and testing.
2. Prepare equipment and resources	2.1 ***Equipment*** required for sampling and preserving is sourced according to sampling procedures. 2.2 Equipment is checked for availability and serviceability in accordance with enterprise procedures. 2.3 Data or record sheets/books are collected for use. 2.4 Equipment, data sheets and personnel are moved to sampling sites without injury or damage and readied for use.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
3. Carry out sampling and preserving procedures	3.1 Samples are collected in accordance with sampling plan and enterprise procedures and industry protocols/guidelines. 3.2 Samples are preserved and recorded in accordance with sampling standards and guidelines. 3.3 Samples for external analysis are prepared, packaged and sent to laboratory in accordance with sampling schedule and laboratory standards. 3.4 Hazardous materials are packaged and transported in accordance with ***legislative*** requirements. 3.5 Observations including information on the surrounding area and environmental conditions are made in accordance with monitoring schedule. 3.6 Equipment operation and work practices conform to ***OHS requirements*****.** 3.7 Collection outcomes including presentation of samples are reported and delivered in accordance to enterprise guidelines.
4 Complete sample collection activities	4.1 Equipment and clothing is cleaned, sanitised, repaired and stored in accordance with enterprise procedures. 4.2 Damaged or malfunctioning equipment is repaired on site or sent to manufacturer or specialist. 4.3 Sampling results and observations are accurately recorded on data sheets and forwarded in accordance with enterprise procedures. 4.4 Changes in field conditions and equipment are conveyed to supervisor according to enterprise procedures.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Locations	1.1. Rural production or horticultural sites, such as paddocks, farm buildings, worksites, nurseries, playing fields, dams, etc.
2. Samples	2.1. A very wide variety of items may be sampled for testing, including animal tissue or fluids, plants, moulds, pests, water, soil, effluent, and emissions. Samples will generally be taken as part of an on-going monitoring program, such as an animal health program or as part of a post-mortem examination of livestock.
3. Environmental legislation	3.1. Acts and regulations pertaining to environment, including threatened species.
4. Equipment	4.1. Electronic machines, probes, grabs, nets, dredges, plankton nets, water sample bottles, bailer, still and video cameras, specialised machinery, identification keys and preserving equipment, kick seines, containers for holding and sorting samples, plastic buckets, blood/saliva sampling equipment, hand-held magnifying glasses, tweezers or forceps, small vegetable brushes, wading boots, rubber gloves, thermometer, yardstick, sample record and assessment form, pencils, and clipboard, and relevant field guides.
5. OHS requirements	5.1. Codes of practice, regulations and/or guidance notes, which may apply in a jurisdiction, and enterprise-specific OHS procedures, policies or standards.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. collected and preserved biological samples for a given site according to prescribed enterprise procedures, standards and principles, collecting schedules and industry best practice The skills and knowledge required to collect and preserve samples must be **transferable** to a range of work environments and contexts. For example, this could include different locations, environments, samples and collecting techniques or sample collection for different purposes.
2. Underpinning Knowledge	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this unit are listed below: 2.1. hydrological cycle 2.2. field procedures for sampling and preservation 2.3. collecting equipment and methods 2.4. preservation equipment and processes 2.5. basic habitat assessment 2.6. water quality issues 2.7. fauna and flora recognition relevant to sampling activities 2.8. relevant legislation.
3. Underpinning Skills	To achieve the performance criteria, some complementary skills are required. These skills include the ability to: 3.1. understand and carry out instructions 3.2. use and operate relevant tools and equipment 3.3. prepare and package samples for transport to laboratory
4. Resource Implications	The following resources must be provided: 4.1. workplace with livestock or cropping production 4.2. equipment and materials used collecting and storing samples 4.3. sampling plan 4.4. enterprise procedures relating to sampling procedures.
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace or in a simulated workplace. 6.2. Demonstration of competency over time

UNIT OF COMPETENCY : **HANDLE BULK MATERIALS IN STORAGE AREA**

UNIT CODE : **AGR611327**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required This competency standard covers the process of receiving, moving and sampling bulk materials in a storage area. It includes the use of safety equipment and procedures, and the repair of the facility and equipment used to store the bulk materials. Bulk materials are handled to industry standards in relation to segregation and storage conditions ensuring minimum loss or damage and optimum returns. The handling of bulk materials in storage areas is likely to be carried out under limited supervision. Overall progress may be checked periodically. The handling of bulk materials in storage areas will usually follow set routines, methods and procedures.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Prepare to work in bulk materials storage area	1.1 Work undertaken is interpreted from the work program where necessary, and confirmed with the management. 1.2 ***OHS hazards*** are identified, risks assessed and suitable controls implemented. 1.3 Suitable ***personal protective clothing and equipment*** is selected, used and maintained. 1.4 Tools and equipment suitable for the work to be undertaken are selected, checked, and maintained if necessary. 1.5 Environmental implications of undertaking work in the bulk materials storage area are identified, likely outcomes assessed and if necessary responsible action taken. 1.6 Worker be informed what to do in case this type of emergency or things happen.
2. Sample bulk materials for testing	2.1 Representative samples of bulk materials are ***taken for testing*** in line with the requirements of the bulk materials storage program. 2.2 ***Sampling*** is undertaken safely, following the prescribed guidelines for the activity. 2.3 Representative bulk materials samples are prepared for dispatch, accurately and clearly labelled, and packaged according to the guidelines of the organization and the ***analysing body***. 2.4 Samples are dispatched to the analysing body, according to the requirements of the bulk materials storage program.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
3. Move bulk materials into and out of storage	3.1 Bulk materials for handling and storage are correctly identified from the written or verbal instructions. 3.2 Bulk materials are segregated according to type, variety and quality characteristics according to the requirements of the organization as stated in the bulk materials storage program. 3.3 Measures are taken to minimize insect and weed infestation and ***contamination*** during the movement of the bulk materials. Fumigation. 3.4 Bulk materials are regularly checked for insect infestation and contamination during movement according to enterprise requirements. 3.5 Any ***storage and handling equipment*** that is used is thoroughly cleaned after emptying, and dismantled if necessary, according to the procedures of the organization and the nature of the equipment. 3.6 Bulk materials are ***moved*** into and out of storage according to the procedures of the organization, and following the prescribed OHS procedures. 3.7 Silo types and handling equipment are selected for each bulk material type in relation to their storage characteristics and flow properties and according to the requirements of the bulk materials storage program. 3.8 Suitable measures are implemented to minimize the affect of desiccant dusts on the flow properties of bulk materials. If have dust collector, the better. 3.9 ***Records*** are clearly and accurately updated and stored as and when required by the bulk materials storage program.
4. Repair and maintain storage facility	4.1 The need for repairs to the **facility** is identified through observation or instruction. 4.2 Maintenance and ***repairs*** are conducted according to the requirements of the organization and following the prescribed OHS procedures and taking into account ***environmental considerations***. 4.3 Completed maintenance records and other ***appropriate information*** are ***documented*** in accordance with enterprise requirements. 4.4 Workshop and work areas are cleaned and maintained to OHS and enterprise requirements. 4.5 Maintenance and repairs, damage, malfunctions or irregular performance in machinery, tools and equipment are reported in line with organizational requirements. 4.6 Tools and equipment are cleaned, secured and stored in line with OHS and organizational requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Bulk materials	1.1. These might be any crop harvested in the organization (e.g., cereals, legumes, crops, oilseeds and pasture seeds), animal feed or fertilizers.
2. OHS hazards	2.1. Amongst the risks are operating and maintaining machinery and equipment, including hydraulics and exposed moving parts, noise, organic and other dusts, working with, transporting and storing hazardous substances (such as pesticides), using fumigants, working at heights, and working on the bulk materials mass. 2.2. Potential emergency situations may include: 2.3. inclement weather during operations, machinery breakdowns, storm damage to equipment and site.
3. OHS risk	The range of actions are both systemic and at an operational level. These are listed below. 3.1. *Systems* should be in place to ensure the safe operation and maintenance of machinery and equipment. Precautions should also be in place to minimize exposure to noise and organic and other dusts. Systems and procedures for handling and storing bulk materials, as well as working with and around electricity should also be in place. 3.2. *Fixtures* should be in place in all silos and storage sheds, including appropriate access ladders, handrails and ladder cages. 3.3. *Personal protective equipment* should be selected, used and maintained. 3.4. *Environmental* conditions should be controlled e.g., , keeping moisture levels as low as possible will reduce the likelihood of fire and silo collapse. 3.5. *Procedures* should be in place and used for working on top of stored bulk materials, working with bulk materials mass movement and stability, working within confined working spaces, moving vehicles, working at height. 3.6. *Record keeping practices* should ensure that requirements are met in relation to properly observing and using product labels and MSDS sheets, instruction manuals and written organizational procedures.
4. Personal protective clothing and equipment	4.1. Boots, hat/hard hat, overalls, gloves, protective eyewear, hearing protection, respirator or face mask, and sun protection (sun hat, sun screen).
5. Samples to be taken for testing	5.1. Bulk materials sampling occurs at receipt of bulk materials, regularly throughout the storage process, and immediately before dispatch.

VARIABLE	RANGE
6. Bulk materials storage program	6.1. The program will provide details of the bulk materials to be stored, the timeframes involved, the locations for storage, the recording and documentation requirements, the scheduling of the operation, the responsibility of the various operators to be involved, the method of pest control and the method of sampling and where samples should be sent. Details of the requirements to minimize or eliminate OHS risks, the legislative requirements in relation to all activities undertaken during bulk materials quality maintenance activities, and chemical handling procedures and guidelines would also be covered in the program. 6.2. The bulk materials storage program would also ensure that equipment and personnel arranged for operations are appropriate to the requirements of various legislation and may include equipment for detection of fumigant in atmosphere, confined spaces equipment, pressure testing equipment, fumigant/inert atmosphere pressure bottles, fumigant generation equipment, personal protection.
7. Equipment to be required for sampling	7.1. Equipment such as testing apparatus, sampling, measuring and sieving equipment, operational charts, calibration and identification samples, and enterprise/ client instructions.
8. Testing and analysis	8.1. The bulk materials may be tested for purity, germination, vigour, seed weight, and/or disease identification, it may also be analyzed for moisture, insects (live and dead), weed and other commodity seeds, other foreign matter, cracked bulk materials, weather affected bulk materials, and bulk materials size.
9. Contamination	9.1. These may include moulds, moisture, mites, weeds, foreign seeds, insects, fungal diseases, soil and other foreign material.
10. Storage and handling equipment	10.1. Handling equipment used includes silo conveyors, elevators, chutes, and augers. Other equipment used may include tractors, front-end loaders, computing equipment used by enterprise, two-way radio/ telephone, wall charts and other visual recording methods, warning devices, and ventilation/aeration equipment. Handling equipment may also be manual.
11. Movement	11.1. Bulk materials movements may be for the purposes of receipt, dispatch, aeration, treatment and/or blending of bulk materials grades.
12. Vehicles to be used to move the bulk materials	12.1. Vehicles may be trucks, articulated road vehicles, trailers and appropriate unloading methods applied to each type of vehicle. Vehicles may also be pulled by animal power.
13. Records	13.1. Records kept may include those relating to quantities and grade(s) of materials stored, bulk materials movements and cartage documentation, weigh tally sheets, equipment and operations log sheets, and stock checks.

VARIABLE	RANGE
14. Storage facility	14.1. The storage facility covers all types of temporary and permanent storage.
15. Equipment that require checking and maintenance	15.1. Equipment which includes mechanical units integral to bulk materials handling equipment, e.g., gear boxes, bearings and oil levels.
16. Environmental implications	16.1. Negative environmental impacts may result from excessive noise and exhaust emissions, the incorrect use and disposal of maintenance debris (oils containers, chemical residues), dust, and hazardous substances (e.g., fuel). Impacts may also include run-off flows of water and cleaning agents from servicing, maintenance and cleaning activities.
17. Appropriate information	17.1. Tools, spares and equipment usage, and maintenance and servicing details.
18. Documented information	18.1. Record keeping systems used may be either paper-based or digital, and information will be recorded into logbooks or other records.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. handled bulk materials in the storage area 1.2. minimized contaminants and pests 1.3. moved bulk materials efficiently The skills and knowledge required to handle bulk materials in a storage area must be **transferable** to a different work environment. For example, across a range of pest and contaminant types that may occur in differing geographic locations or with different bulk materials.
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. the client's sampling and classification requirements 2.2. bulk materials types and characteristics 2.3. common bulk materials pests sand problems 2.4. appropriate legislative requirements, manufacturers instructions and enterprise procedures/instructions 2.5. appropriate action in contingency situations 2.6. silo operations and configuration, machinery and operating practices 2.7. organization requirements for protective equipment and safe practices in relation to OHS 2.8. organization and industry guidelines for segregation of bulk materials quality assurance principles 2.9. pre-operational and safety checks, servicing and maintenance procedures for tools and equipment 2.10. potential hazards associated with the operation of basic tools and equipment 2.11. general machine maintenance procedures 2.12. machinery operating principles and operating methods 2.13. machinery storage and protection methods 2.14. relevant Provincial/municipal legislation, regulations and codes of practice with regard to workplace OHS, and the use and control of machinery and equipment 2.15. environmental impacts associated with the operation of machinery and equipment 2.16. personal protective clothing and equipment and when and how it should be used 2.17. cleaning and storage of machinery, equipment and materials 2.18. enterprise recording and reporting procedures.

3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1. record bulk materials stocks and movements 3.2. conduct silo readings 3.3. identify bulk materials pests and damage 3.4. use communication systems 3.5. sample and conduct a simple analysis of bulk materials 3.6. check equipment and storage facilities and identify current or impending faults 3.7. handle and manoeuvre equipment 3.8. test bulk materials for moisture, contamination and quality 3.9. complete pre-operational checks on basic tools and equipment 3.10. perform routine safety, service and maintenance procedures on tools, equipment and machinery 3.11. operate hand and independently powered tools and cleaning equipment to industry standards 3.12. clean, secure and store machinery and equipment 3.13. handle hazardous substances (fuels) safely 3.14. read and interpret manufacturers specifications, work and maintenance plans, and Material Safety Data Sheets 3.15. interpret and apply task instructions, communicate with work team and supervisor, and record and report faults, workplace hazards and accidents
4. Resource Implications	The following resources must be provided: 4.1. workplace with bulk handling facilities for example for storing feeds, harvested crop or fertilizers 4.2. workplace information relating to quality assurance, bulk handling and storage. 4.3. enterprise procedures relating to load shifting, and storage.
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. checking supporting workplace records.
6. Context of Assessment	6.1. Assessment should be in a workplace. 6.2. Demonstration of competency over time and on a number of occasions.

UNIT OF COMPETENCY : **PREPARE GRAIN STORAGES**

UNIT CODE : **AGRA611328**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to safely maintain the site, the storage and equipment for handling, and storage of bulk materials. At the completion of the work described in this standard, storages, surrounding areas and equipment are prepared in readiness for receiving grain at an acceptable level of hygiene.
Work is likely to be under routine supervision with intermittent checking. Responsibility for some roles and co-ordination within a team may be required. Preparing bulk material storages is usually within established routines, methods and procedures. Competency at this level involves the application of knowledge and skills in the maintenance of facilities, tools and equipment.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Prepare to work in bulk material storage area	1.1 Work to be undertaken is understood from work program where necessary, and confirmed with supervisor. 1.2 ***OHS hazards*** are identified, risk assessed and suitable controls implemented. 1.3 Suitable ***personal protective equipment*** is selected, used and maintained. 1.4 ***Tools and equipment*** suitable for the work to be undertaken are selected, checked and maintained, if necessary. 1.5 Environmental implications of undertaking work in the ***bulk material*** storage area are identified, likely outcomes assessed and, if necessary, responsible action taken.
2. Prepare storage area	2.1 Storage site is ***cleaned*** of weeds, dust and spillage to organization requirements. 2.2 Refuse is disposed of according to regulatory requirements. 2.3 Site is ***maintained*** in a clean and tidy condition according to organization requirements. 2.4 Storage site is prepared according to OHS standards.
3. Prepare storages	3.1 Storages are prepared according to OHS standards. 3.2 Bulk material storages are cleaned of all residues according to organization requirements. 3.3 Bulk material storages are checked for structural safety, damage or deterioration, and repaired or reported as required according to organization requirements. 3.4 Temporary storages are prepared and erected to meet the needs of the organization according to OHS standards.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
4. Prepare bulk material handling machinery	4.1 Bulk material handling machinery is cleaned free of contamination and residues according to organization requirements. 4.2 Bulk material handling equipment is adjusted and set according to organization requirements. 4.3 Bulk material handling equipment is prepared ready for use according to manufacturer's instructions and OHS standards.
5. Complete maintenance operations	5.1 ***Workplace information*** is recorded clearly and accurately in the format and at the time required by the organization. 5.2 ***Waste*** is collected and disposed of or recycled to minimise damage to the ***external environment***. 5.3 Tools and equipment are cleaned and stored according to organization work procedures.

RANGE OF VARIABLES

VARIABLE	RANGE
1. OHS hazards	1.1. Among the risks are operating and maintaining machinery and equipment, including hydraulics and exposed moving parts, noise, organic and other dusts, working with, transporting and storing hazardous substances (such as pesticides), using fumigants, working at heights, and working on the bulk material mass.
2. OHS risk	The range of actions are both systemic and at an operational level. These are listed below. 2.1. *Systems* should be in place to ensure the safe operation and maintenance of machinery and equipment. Precautions should also be in place to minimise exposure to noise and organic and other dusts. Systems and procedures for handling and storing bulk material, as well as working with and around electricity, should also be in place. 2.2. *Fixtures* should be in place in all silos and storage sheds, including appropriate access ladders, hand rails and ladder cages and fine control equipment. 2.3. *Environmental* conditions should be controlled. For example, keeping moisture levels as low as possible will reduce the likelihood of fire and silo collapse. 2.4. *Procedures* should be in place and used for working on top of stored bulk material, working with bulk material mass movement and stability, working within confined working spaces, moving vehicles, and working at height. 2.5. *Record keeping* should ensure that requirements in relation to properly observing and using product labels and MSDS sheets, instruction manuals and written organizational procedures.
3. Personal protective clothing and equipment	3.1. Boots, hat/hard hat, overalls, gloves, protective eyewear, hearing protection, respirator or face mask, and sun protection (sun hat, sun screen).
4. Equipment	4.1. Cleaning equipment for hand use, air compressors, vacuum cleaners, mobile load handling plant, mowers/slashers, loading and unloading equipment, tractors, and portable augers, fire suits and hydrants should be in place.
5. Preparation for cleaning and mobile equipment	5.1. Site cleaning and mobile equipment use includes pre-operational checks, start-up, shutdown, and minor servicing to organization requirements.
6. Bulk materials	6.1. Bulk materials stored may include the entire range produced or used by the organization and may include grains (cereals, legumes, pulses, oilseeds, or pasture seeds), animal feed (e.g. meal), flour and fertilizers.
7. Storage	7.1. They may be permanent and/or temporary storages, fixed and/or portable commodity handling equipment, the surrounding areas, entry, exit and site roads.
8. Cleaning activities	8.1. They are the handling of equipment, storage facilities, buildings and surrounding grounds.

VARIABLE	RANGE
9. Cleaning and maintenance	9.1. On the storage site, it will be aspects of site tidiness and cleanliness, weed control, and cleaning of spilled materials and rubbish.
10. Maintained	10.1. The presence of water or water damage, presence and activity of pests including insects, moulds, birds and rodents, dead vertebrate pest in storage, breakdown of storage security and integrity, e.g. holes, cracks, poor sealing or general physical deterioration, storm damage, and/or level of hygiene will need to be seen to.
11. Workplace information	11.1. Records may include environmental parameters, date of maintenance work, and what has been checked/maintained.
12. Waste	12.1. Waste may include left over treatments, unused containers, general debris, or discarded components.
13. External environment	13.1. Environmental implications may include the contamination of off-site ground water or soils from solids, debris, nutrients or chemicals, foul smell should be reduced, air pollution.
14. Organizations and statutory instructions	14.1. They might be those relating to health and safety, quality control, administrative reporting, commodity storage and movement control, residual fumigants and confined space entry.
15. Potential emergency situations	15.1. Inclement weather during operations, machinery breakdowns, and storm damage to equipment and site & workers not in good condition to work.

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidences that the candidate 1.1. prepared bulk material storage - that the storage facility, the surrounding area, and the bulk material handling equipment are cleaned, operable, and within the hygiene standards required by the organization. The skills and knowledge required to prepare bulk material storage must be **transferable** to a different work environment. For example, across a range of storage facility types, materials and enterprise guidelines.
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. range of construction methods, potential hazards, safety and structural requirements for storage 2.2. erection/dismantling for types of temporary storage used by organization 2.3. organization and commodity quality requirements 2.4. .organization hygiene requirements 2.5. typical signs of damage to be documented and reported 2.6. appropriate legislative requirements, manufacturers instructions and organization procedures/ instructions 2.7. appropriate action in contingency situations 2.8. organization requirements for protective equipment and safe practices in relation to OHS 2.9. pre-operational and safety checks, servicing and maintenance procedures for tools and equipment 2.10. potential hazards associated with the operation of basic tools and equipment 2.11. general machine maintenance procedures 2.12. machinery operating principles and operating methods/manual of operational procedures. 2.13. machinery storage and protection methods 2.14. relevant Provincial/municipal legislation, regulations and codes of practice with regard to workplace OHS, and the use and control of machinery and equipment 2.15. environmental impacts associated with the operation of machinery and equipment 2.16. personal protective clothing and equipment and when and how it should be used 2.17. cleaning and storage of machinery, equipment and materials 2.18. organization recording and reporting procedures.
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These skills are: 3.1. erect simple temporary bulk material storages 3.2. use communication systems 3.3. check equipment and storage facilities, and identify current or impending faults 3.4. handle and manoeuvre equipment

	3.5. complete pre-operational checks on basic tools and equipment 3.6. perform routine safety, service and maintenance procedures on tools, equipment and machinery 3.7. operate hand and independently powered tools and cleaning equipment to industry standards 3.8. clean, secure and store machinery and equipment 3.9. perform basic trouble shooting 3.10. recognize and rectify minor operational faults 3.11. handle hazardous substances (fuels) safely 3.12. read and interpret manufacturers specifications, work and maintenance plans, and Material Safety Data Sheets 3.13. interpret and apply task instructions, communicate with work team and supervisor, and record and report faults, workplace hazards and accidents.
4. Resource Implications	The following resources must be provided: 4.1. workplace with grain storage facilities 4.2. mechanical or manual aids for load shifting 4.3. enterprise procedures.
5. Methods of Assessment	Competency should be assessed: 5.1. Through direct observation / demonstration 5.2. Portfolio assessment
6. Context of assessment	6.1. Assessment should be in a workplace or in a simulated workplace. 6.2. Demonstration of competency over time and on a number of occasions.

UNIT OF COMPETENCY : **COMPLY WITH INDUSTRY QUALITY ASSURANCE REQUIREMENTS**

UNIT CODE : **AGR611329**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to comply with industry quality assurance requirements in the production of meat, milk or eggs. It requires the ability to implement quality assurance practices on food safety, quality, and animal welfare, biosecurity, implement standard operating procedures, and report problems that affect quality. Complying with industry quality assurance requirements requires knowledge of industry quality assurance requirements, animal production processes, Hazard Analysis Critical Control Point (HACCP) approach to quality assurance, and enterprise policies, guidelines and standard operating procedures relating to food safety, quality and animal welfare.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Implement quality assurance practices on food safety and quality, biosecurity and animal welfare	1.1 ***Elements*** of the industry quality assurance requirements are determined**.** 1.2 ***Hazards*** to ***food*** safety and quality are identified for work area according to enterprise guidelines and standard operating procedures. 1.3 Critical control points for work area are determined according to workplace procedures. 1.4 Record keeping is completed according to industry QA requirements.
2. Implement standard operating procedures	2.1 Standard operating procedures are implemented in accordance with enterprise requirements. 2.2 Non-conforming or defective product reported to supervisor according to enterprise/industry requirements. 2.3 Corrective action taken in accordance with enterprise policy and procedures.
3. Report problems that affect quality	3.1 Recognize potential or existing quality problems. 3.2 Identify instances of variation in quality from specifications or work instructions. 3.3 Report variation and potential problems to supervisor/manager according to enterprise guidelines.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Food	1.1. Meat, milk and eggs.
2. Elements of the QA system	2.1. These include Hazard Analysis Critical Control Point (HACCP) charts, mission statement, work instructions, corrective action and monitoring procedures, standard operating procedures, enterprise and industry policies and codes of practice.
3. Hazards	These may include: 3.1. Physical hazards where foreign objects such as retained, broken needles, welding rods, nails or wire are present in animals. 3.2. Chemical hazards resulting from residues such as antibiotics, pesticides, alkaloids and other substances used in animal production. 3.3. Biological hazards where contamination from other animals (e.g. mice, rats, cats), poor housing/transport conditions, and dirty water affects animal health and food quality. 3.4. Food quality hazards resulting from poor handling of animals, unhealthy or diseased animals, inappropriate use of dogs, extreme weather conditions, poor loading and transport conditions, and time off feed.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. complied with industry quality assurance requirements in an animal production enterprise. The skills and knowledge required to comply with industry quality assurance requirements must be **transferable** to a range of work environments and contexts. For example, this could include different animals, production systems, and industry QA requirements.
2. Underpinning Knowledge	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this unit are listed below: 2.1. industry QA requirements, such as the Philippine Pig Industry Quality Program (APIQ) 2.2. animal production processes 2.3. HACCP (Hazard Analysis Critical Control Point) approach to quality assurance 2.4. enterprise policies, guidelines and standard operating procedures (SOP's) relating to food safety quality, biosecurity, and animal welfare. 2.5. enterprise OHS requirements 2.6. animal health and welfare.
3. Underpinning Skills	To achieve the performance criteria, some complementary skills are required. These skills include the ability to: 3.1. implement quality assurance practices on food safety and quality, biosecurity and animal welfare 3.2. implement standard operating procedures 3.3. report problems that affect quality.
4. Resource Implications	The following resources must be provided: 4.1. workplace that produces meat, eggs or milk (requiring a HACCP food safety plan) 4.2. HACCP plan 4.3. enterprise procedures HACCP and food safety
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace or in a simulated workplace. 6.2. Demonstration of competency over time

UNIT OF COMPETENCY : **MAINTAIN AND MONITOR ENVIRONMENTAL WORK PRACTICES**

UNIT CODE : **AGR611330**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to maintain and monitor positive environmental work practices. It requires the ability to recognize basic environmental hazards and threats. It includes the ability to follow and give workplace directions and instructions by communicating accurately with supervisors and workplace colleagues, and to keep records. Maintaining and monitoring environmental work practices requires awareness of, and an ability to implement relevant environmental legislation, policies and workplace/industry practices.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Maintain workplace environmental procedures	1.1 ***Workplace procedures and work instructions*** for integrated environmental work practices for own work area are ***recognized, followed*** and conveyed to team members. 1.2 Relevant ***legislation, codes and national standards*** that impact on workplace environmental practices are recognized, conveyed to team members and followed.
2. Recognize and report on potential environmental threats	2.1 Existing and ***potential environmental risks and hazards*** are identified, reported to ***designated personnel*** and dealt with. 2.2 Location and extent of the potential environmental threat are accurately recorded. 2.3 Reports on the potential environmental threat are completed according to enterprise guidelines.
3. Support continuous improvement of environmental work practices	3.1 Information is gathered and improvements are ***suggested*** to support the development of improved environmental workplace practices. 3.2 ***Environmental issues*** and their relationship to workplace practices are discussed in the workplace. 3.3 Changes to ***workplace approaches to environmental practices*** are responded to positively and promptly in accordance with enterprise requirements. 3.4 Individuals/teams are informed of the results of environmental improvements in the workplace. 3.5 Environmental training needs of the work team are identified, and training is sought where required.
4. Maintain environmental records	4.1 ***Environmental records*** are accurately and legibly maintained and stored securely in a form accessible for reporting purposes. 4.2 Internal and external reporting procedures are identified and maintained.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Workplace procedures	1.1. These could include written procedures or work instructions for environmental hazard and risk identification, avoiding or minimising environmental risks, improving environmental performance, waste minimisation and segregation, environmental monitoring, signs and labels (e.g. chemical labels), emergency procedures, hazard and incident recording and reporting procedures, and environmental data recording and reporting procedures where applicable. Verbal instructions from persons with responsibility related to environmental work practices are also included in this definition.
2. Environmental policies	2.1. Waste minimization and management, sustainability, local, regional, State and National strategies on weed and pest management, protection of land and habitat and the conservation of resources, energy use, greenhouse gas emissions, use of chemicals, and plant and equipment.
3. Recognize and follow mean	3.1. That a person will acknowledge that environmental impacts, hazards and risks exist, and that they have a responsibility to work in a manner which will minimize the impact on the environment within the guidelines established by the workplace.
4. Legislation, codes and national standards	4.1. Award and enterprise agreements, relevant environmental legislation from all levels of government, Philippine standards, international agreements and relevant industry codes of practice.
5. Report	5.1. Verbally (face-to-face or through communication equipment) and in writing (notes, faxes, email or electronic messages).
6. Environmental risks and hazards	6.1. These could include spills, leaks, pollution, planned and unplanned emissions, soil compaction, disturbance and erosion, accidents and disposal of waste, and damage or disruption to ecosystems resulting from work practices. Also includes plants, animals or diseases that are classified as an environmental threat or problem in an area, unauthorised changes in land use, fire risks and threats, and inappropriate human interaction on the environment. This may include damage to habitat resources, disruption of animal behaviour and territorial use, illegal vegetation clearance, seed collection, firewood gathering, nest disturbance and egg collecting.
7. Designated personnel in a workplace	7.1. Manager, supervisor, and people who are responsible for work area or who may be assigned to act as a mentor/trainer to a person under instruction.
8. Suggestions	8.1. Ideas to minimize hazards and risks, reduce waste, make more efficient use of resources and improve environmental performance, reduce soil disturbance and improve habitat resources.

VARIABLE	RANGE
9. Environmental issues	9.1. Sustainability, reduction and disposal of waste, water quality, energy efficiency, biodiversity and habitat protection, conservation of natural resources, air quality, land contamination, noise, soil and salinity management, and fire management.
10. Workplace approaches to environmental practices	10.1. Preventing and minimising the production of pollution (e.g. discharges to air, land and water, hazardous waste, reducing 'burning off', composting, recycling materials, conservation practices), and improving workplace maintenance practices (e.g. using a broom instead of a hose, using environment-friendly cleaning agents).
11. Environmental records	11.1. Environmental data, maintenance and inspection reports, incident or accident reports, and complaints from the public.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. monitored and maintained environmental work practices - that skills and knowledge have been successfully and appropriately applied and demonstrated in a work place or equivalent situation The skills and knowledge required to monitor and maintain environmental work practices must be **transferable** to a range of work environments and contexts. For example, this could include different workplaces, environmental hazards and risks, and workplace practices and procedures.
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this unit are listed below: 2.1. relevant legislation from all levels of government on environmental issues 2.2. relevant environmental policies and workplace/industry practices and procedures 2.3. good practice approaches relevant to work area particularly in regard to minimising environment hazards and risks, and improving environmental performance 2.4. environmental issues, especially in regard to water catchments, air, noise, ecosystems, habitat, efficient use of resources, sustainability and waste minimisation *2.5.* potential environmental threats and problems relevant to a given region and occupation 2.6. general work place practices and their potential impact on the environment.
3. Underpinning Skills	To achieve the performance criteria, some complementary skills are required. These skills include the ability to: 3.1. communicate with supervisors and workplace colleagues 3.2. recognize environmental hazards and threats 3.3. act upon environmental hazards and threats by following enterprise procedures legislative requirements 3.4. instruct/advise others to follow enterprise procedures and legislative requirements 3.5. follow workplace directions and instructions 3.6. keep environmental records.
4. Resource Implications	The following resources must be provided: 4.1. workplace 4.2. enterprise policies and environment related procedures
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. checking workplace records and production plans
6. Context of Assessment	6.1. Assessment should be in a workplace. 6.2. Demonstration of competency over time

UNIT OF COMPETENCY : **KEEP RECORDS FOR A FARM BUSINESS**

UNIT CODE : **AGR611331**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required. This competency standard covers the process of creating and maintaining physical records, preparing and processing basic financial transactions, establishing and maintaining a cashbook, and reconciling and preparing invoices within primary production businesses. Both the physical and financial records of the business are vital for use by management for planning purposes, meeting legislative requirements, and the efficient operation of the business on a daily basis.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Prepare and store physical records	1.1 ***Physical records*** and inventories required for the organization are determined in consultation with the ***management team***. 1.2 ***Methods for collecting information*** are reliable, and time and resources are used efficiently. 1.3 Appropriate ***interpersonal skills*** are used to access relevant information from individuals and teams. 1.4 Information is organized into a ***format*** suitable for analysis, interpretation and dissemination in accordance with organizational requirements. 1.5 ***Business equipment/technology*** is used to maintain information in accordance with organizational and OHS requirements. 1.6 Records are updated and stored in accordance with organizational requirements.
2. Process petty cash transactions	2.1 Petty cash claims and vouchers are ***checked for accuracy and authenticity*** prior to processing. 2.2 Petty cash transactions are processed and recorded in accordance with organizational requirements. 2.2 Petty cash book balanced in accordance with organizational requirements.
3. Establish and maintain cash book	3.1 Cash receipts and payments book created, and d***ocumentation*** relating to financial ***transactions checked for validity*** prior to processing. 3.2 ***Cashbook*** balances reconciled with bank and creditor statements. 3.3 Cashbook balances are used to complete ***legislative reporting requirements***. 3.4 ***Cash flow statements*** are prepared on the basis of summarised cashbook entries.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
4. Reconcile invoices for payment to creditors	4.1 Adjustments and errors are identified, reported and rectified in accordance with organizational requirements. 4.2 Invoices processed and payment made in accordance with organizational requirements.
5. Prepare invoices for debtors	5.1 Invoices are prepared accurately and, if required, distributed to nominated person for verification prior to despatch. 5.2 Adjustments are made as required in accordance with organizational requirements. 5.3 Invoices and other related documents copied and filed in accordance with organizational requirements for ***taxation and auditing*** purposes.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Physical records	1.1. Records may include a property plan, livestock, paddock treatments including spraying, paddocks, rainfall, production, sales data, supplies, machinery and equipment, and stock.
2. Management team	2.1. They may be oneself, family members, fellow managers, employees, professional advisors, partners, and mentors.
3. Methods for collecting information	3.1. Methods for collecting information may include observation and listening, previous file records, individual research, statistics and reports from other organizations, producing reports from data collected on the farm, translating data from diaries and note-books, or professional data collection agency.
4. Interpersonal skills	4.1. Interpersonal skills may include effective listening, open questioning techniques, verbal and non verbal communication skills, appropriate body language, and the ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities.
5. Format	5.1. Format for records and inventories could include maps, graphs, charts, cards, electronic, databases, diaries, or notebooks.
6. Business equipment/ technology	6.1. Business equipment and technology that might be used include computer, software, Internet, email, calculator, fax or phone.
7. Checking for accuracy and authenticity	7.1. Checking may include correct information on voucher, receipt of purchase, and ensuring items are business related.
8. Cashbook	8.1. A cashbook documents the daily receipts and payments of the business. It may be created and maintained manually and/or electronically.
9. Documentation requires checking for validity	9.1. Documentation may include cheques, taxation invoices, accounts, and credit card vouchers. 9.2. Validity may include checking date, signature, details on cheque are correct, expiry date of credit cards, information on taxation invoice, and accounts are accurate.
10. Legislative reporting requirements	10.1. Legislative reporting requirements may include recording Philippine Business Number (ABN), business activity statements (BAS), instalment activity statements (AIS), PAYG withholding, superannuation, taxation, or work cover.
11. Cash flow statements	11.1. Cash flow statements summarise the organizations actual and expected cash flow over designated periods of time. Budgets allocate income against expenses. Both types of statements can be created manually or electronically.

VARIABLE	RANGE
12. Creditors and debtors	12.1. Creditors and debtors may include financial institutions, goods and service suppliers, rural merchants, contractors, professional advisors, and co-operatives.
13. Taxation and auditing requirements	13.1. Taxation and auditing requirements would include accurate records of all business assets, liabilities, income, expenses and entitlements to be analyzed by an accountant for compliance purposes.
14. Transactions	14.1. Financial transactions may include purchasing and selling products, machinery and equipment, vehicles and supplies, banking cheques, paying invoices and bills, or transferring funds electronically.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. created, maintained and stored financial records in accordance with legislative and organizational requirements. 1.2. processed and recorded financial transactions involving cash, electronic funds transfer, cheques and invoices accurately in accordance with legislative and organizational requirements The skills and knowledge required to keep records in a rural business must be **transferable** to a different work environment. For example, across a wide range of small, medium and large agricultural and horticultural businesses.
2. Underpinning Knowledge	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. nature of the business and its legal and organizational structure 2.2. relevant national, provincial and municipal government legislative requirements, especially in regard to OHS and environmental requirements 2.3. organizational policies and procedures relating to the distribution of workplace information, legal and ethical obligations 2.4. methods to identify sources of information 2.5. procedures to analyze information to identify patterns and trends 2.6. the organizations record keeping/filing systems, security of information and safe record keeping procedures 2.7. principles of effective interpersonal communication 2.8. principles and procedures for cash and non cash handling 2.9. principles of single entry accounting, and cash flow statements.
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1. relate to people from a range of social, cultural and ethnic backgrounds, and of varying physical and mental abilities 3.2. collect and record accurate and reliable information 3.3. present data in a format suitable for the organizations requirements 3.4. use business equipment and technology correctly and safely

	3.5. file records accurately in accordance with organizational requirements 3.6. perform calculations and balance accounts 3.7. prepare cash flow statements and budgets 3.8. reconcile creditors invoices and prepare debtors invoices 3.9. process forms and other documentation.
4. Resource Implications	The following resources must be provided: 4.1. workplace 4.2. source records for farm 4.3. farm procedures processing income and expenses, and reporting
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. portfolio assessment
6. Context of Assessment	6.1. Assessment should be in a workplace or in a simulated workplace. 6.2. Demonstration of competency over time

UNIT OF COMPETENCY : **PERFORM SPECIALISED MACHINERY AND EQUIPMENT MAINTENANCE**

UNIT CODE : **AGR611332**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to maintain specialized machinery and equipment. Specialized machinery and equipment refers to machinery and equipment used principally in agriculture and horticulture, work where there is high wear and tear on components. It requires the ability to carry out engine and equipment checks, undertake transmission checks, maintain high wear components and attachments, and record maintenance work. Performing specialized machinery maintenance requires knowledge of general machine function principles and maintenance, and operational replacement wear component requirements and procedures.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1 Carry out prime mover checks	1.1 Regular ***prime mover*** checks are carried out on ***specialised machinery and equipment*** as specified in operator's manual. After use check-up. 1.2 All relevant grease or lubricant points are lubricated according to manufacturers' specifications. Regular periodic check-up. 1.3 Oils and filters are changed at intervals prescribed in operator's manual. 1.4 Systems (i.e. cooling, electrical, lubrication, etc.) checked for deterioration and took action to defects in line with supervisor's instructions. 1.5 ***OHS hazards*** in the workplace are identified, risk assessed and reported according to enterprise requirements.
2 Carry out transmission checks	2.1 Drive and steering clutches are checked for operation and adjustment in line with operator's manual. 2.2 Transmission oil levels are checked in line with operator manual. 2.3 Tracks/wheels and undercarriage are checked for oil leaks, wear and alignment. 2.4 Faulty seals or leaks are identified and corrective actions taken according to operator's instructions. 2.5 ***Transmission*** is regularly checked for: alignment in case of belt transmission oil levels in case of enclosed transmission.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
3 Maintain components and attachments	3.1 Suitable ***personal protective equipment*** is selected, used, maintained and stored according to ***OHS requirements.***
	3.2 ***Machine operational replacement wear components*** are checked for wear and condition.
	3.3 Worn or unserviceable replacement components are replaced as part of daily routines.
	3.4 Component inspection and replacement activities are completed safely following enterprise and industry guidelines.
	3.5 ***Moving operational components*** are checked for wear and condition and adjusted to the tolerances specified in the operator's manual where applicable.
	3.6 Work areas are cleaned, returned to operating condition and maintained according to enterprise and OHS requirements.
4 Record maintenance	4.1 Identified faults and defects are recorded in machine record.
	4.2 Maintenance procedures including duplicates usage are recorded in workshop record.
	4.3 Service or repair requirements are reported and took action according to prescribed procedures.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Specialised machinery and equipment	1.1. Self-propelled machinery and equipment for crop production (i.e. land levellers, front end loaders); harvesting (i.e. cane harvester, rice combine, corn harvester, etc.) and post-harvest machinery (i.e. rice mill plant, drying plant, etc.)
2. Prime movers	2.1. This may include the internal combustion engines or electric motors.
3. Hazards	3.1. Workplace hazards may include exposure to loud noise and fumes, solar radiation, dust, and hazardous substances. It may also include oil and grease spills, electricity, mechanical malfunctions and entanglement with machinery and equipment from exposed moving parts including hydraulics.
4. Personal protective equipment	4.1. This may include boots, hat/hard hat, overalls, gloves, protective eyewear, safety harness, hearing protection, respirator or dust mask, and sun protection (sun hat, sunscreen).
5. OHS	Safe systems and procedures for: 5.1. operating and maintaining machinery and equipment including hydraulics and guarding of exposed moving parts. 5.2. hazard and risk control. 5.3. manual handling including lifting and carrying. 5.4. the provision of safety decals and signage. 5.5. handling, application and storage of hazardous substances. 5.6. outdoor work including protection from solar radiation, dust and noise. 5.7. lock out or danger tag procedures. 5.8. protection of people in the workplace. 5.9. the appropriate use, maintenance and storage of personal protective clothing and equipment.
6. Regular maintenance checks	6.1. Gauges, fan, engine oil, air cleaners (wet and dry), visible gaskets, exhaust colour, tyres, tracks, track rollers and carriers, fuel and oil filters, crankcase ventilation, cooling systems, belts and chains, transmission, gearbox, hydraulic hoses, hydraulic systems, final drives, oilers, batteries and electrical systems, level linkage wear, oil and fuel leaks, brakes, Rollover Protection Systems/safety guards, guards over exposed parts, sources of hazardous noise.
7. Machinery and equipment maintenance	7.1. Operating checks, daily checks, programmed maintenance, breakdown maintenance, prescribed lubrication.

VARIABLE	RANGE
8. Transmission	8.1. Clutches, gearbox, direct drive and power shaft transmission, torque converter, final drives, includes universal Joints, drive links.
9. Tracks/wheels and undercarriage	9.1. Sprockets, idler wheels, track roller frames, track rollers, carrier rollers, track chains, track shoes and grousers, tyre pressure, power transfer links and abnormal wear patterns.
10. Engine equipment	10.1. Oil/coolant levels, filters, oil, air, fuel, and air conditioner.
11. Machine operational replacement wear components	11.1. Ground engaging components, buckets, blades, cutter teeth and forks and other components specified in the operator's manual.
12. Moving operational components	12.1. Elevator and loading chains, cutters/knives, belts and other components specified in the operator's manual.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. Maintained specialised machinery and equipment according to enterprise guidelines and industry best practice The skills and knowledge required to maintain specialised machinery and equipment must be **transferable (normal and adverse work conditions)** to a range of work environments and contexts. For example, this could include different machinery and equipment, operational systems, maintenance procedures and working environments
2. Underpinning Knowledge and Attitudes	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts and to deal with unplanned events. The knowledge requirements for this unit are listed below. 2.1. Engine function principles. 2.2. Turbo charging and after cooling. 2.3. Assessing engine specifications in line with power requirements. 2.4. All engine electric and hydraulic indicators and gauges. 2.5. Transmission and drive systems. 2.6. Safety including relevant OHS issues, OHS legislative requirements and Codes of Practice. 2.7. Machinery and equipment operation principles. 2.8. OHS responsibilities of employees and employers. 2.9. Hazard identification and control.
3. Underpinning Skills	To achieve the performance criteria, some complementary skills are required. These skills include the ability to: 3.1. read and comprehend operator's manuals 3.2. carry out engine/equipment checks 3.3. carry out transmission checks. 3.4. maintain machinery and equipment components. 3.5. record maintenance.
4. Resource Implications	4.1. Specialised equipment 4.2. Manufacturer specifications 4.3. Operator guidelines/manuals 4.4. Tools and equipment used for maintenance 4.5. Spare parts and materials used in maintaining specialised machinery 4.6. Maintenance procedures 4.7. Workplace documentation
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. Through portfolio evidence
6. Context of Assessment	6.1. Assessment should be in a workplace. 6.2. Demonstration of competency over time and on a number of occasions. It should address a range of equipment that is reflective of the workplace.

UNIT OF COMPETENCY : **INSTALL IRRIGATION SYSTEMS**

UNIT CODE : **AGR611333**

UNIT DESCRIPTOR : This unit covers the skills and knowledge required to install pressurised irrigation systems. It requires the ability to organize resources for installation work, set out and prepare site, install irrigation components, complete installation work, commission irrigation systems and communicate with work team members, supervisors, contractors and consultants. Installing irrigation systems requires knowledge of methods and techniques of irrigation, components of an irrigation system, behaviour of water on varying terrain and soil types, soil water retention testing techniques and soil characteristics, and enterprise OHS procedures.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
1. Organize resources for installation work	1.1 ***Materials, tools, equipment and machinery*** are selected according to the irrigation system design requirements and enterprise work procedures. 1.2 The construction site for *the* ***irrigation system*** and construction method is identified according to the site and irrigation system plans and ***enterprise work procedures****.* 1.3 Parts and ***equipment*** delivered to site are checked according to system drawings and specifications. 1.4 Pre-operational and safety checks are carried out on tools, equipment and machinery according to manufacturers specifications and enterprise work procedures. 1.5 ***OHS hazards*** are identified, risks assessed, controls implemented and reported to the supervisor. 1.6 Suitable ***safety*** *and* ***personal protective equipment (PPE*****)** are selected, used and maintained. 1.7 ***Water supply*** is checked to ensure that it is compatible with system specifications.
2. Set out and prepare site	2.1 Measurement and marking out of irrigation lines are consistent with the plan. 2.2 Trenches where constructed are at the specified depth without damage to services, facilities, features and established plants. 2.3 Equipment operation and work practices conform to enterprise and legislative ***OHS requirements****.* 2.4 Regulations and legislation relevant to the situation are observed. 2.5 Work practices reflect sustainable horticulture principles and respond to local community requirements.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables
3. Install irrigation components	3.1 Plan is interpreted and where applicable, contractors are supervised and work is monitored to conform to the plan. 3.2 Components are assembled and connected according to the plan, joints are completed and tested according to manufacturers specifications. 3.3 Fittings and valves are fitted and adjusted to the requirements of the installation plan, and all joints are secured according to enterprise guidelines. 3.4 A ***clean and safe work area*** is maintained while installation work is carried out. 3.5 Tools appropriate to the task being undertaken are chosen and used according to guidelines and safe working practices are employed.
4. Complete installation work	4.1 Earthworks are finished off to plan specifications and enterprise work procedures. 4.2 The system configuration and capacity matches the installation plan. 4.3 The site is restored and ***waste material*** is removed from the site and disposed of in an environmentally aware and safe manner according to enterprise work procedures. 4.4 Tools, equipment and machinery are cleaned, maintained and stored according to enterprise work procedures
5. Commission irrigation system	5.1 Start-up sequence is in accordance with operations manual. 5.2 System is flushed as required. 5.3 Operating faults are identified and corrective actions taken according to the operations manual. 5.4 ***Testing*** and monitoring equipment are calibrated to manufacturer's specifications. 5.5 Work outcomes are recorded or reported to the supervisor according to enterprise work procedures.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Materials	1.1. Materials may include irrigation system components, glues, welds, and construction and backfill materials.
2. Tools, equipment and machinery	2.1. Tools, equipment and machinery may include surveying and levelling 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 irrigation system.
3. Irrigation systems	3.1. Irrigation systems may include mains pressure, low pressure, below ground, above ground, spray systems, dripper, and capillary systems.
4. Enterprise work procedures	4.1. 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.
5. Irrigation equipment	5.1. Irrigation equipment may include pumps, motors, delivery equipment, sprays, system controllers, injectors, tensiometers, probe tubes, flow meter, pressure gauge, computer and/or other scheduling devices, recycling equipment, and spray equipment.
6. OHS hazards	6.1. 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.
7. Safety equipment	7.1. Safety equipment may include signage and barriers.
8. Personal protective equipment	8.1. PPE may include hat, boots, overalls, gloves, goggles, respirator or face mask, face guard, hearing protection, sunscreen lotion and hard hat.
9. Water supplies	9.1. Water supplies may be underground, mains or surface storage including fixtures such as dams, bores, windmills, tanks, and channels.

VARIABLE	RANGE
10. OHS requirements	10.1. 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.
11. Clean and safe work area	11.1. 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 and removing after construction activities are completed, and swiftly and efficiently removing and processing debris and waste from the work area.
12. Waste material	12.1. Waste material may include unused construction and excavated materials, and plant debris, litter and broken components. 12.2. 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. 12.3. Waste may be removed to designated areas for recycling, reuse, return to the manufacturer or disposal.
13. Testing equipment	13.1. Testing equipment may include pressure gauges and flow meters.

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate : 1.1. Prepared for installation, set out the installation works, installed and tested the irrigation system and cleaned- up the site The skills and knowledge required to install an irrigation system must be **transferable** to a different work environment. For example, this could include different types of irrigation systems and components, water supplies, soil types and enterprises.
2. Underpinning Knowledge	Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below: 2.1. methods and techniques of irrigation 2.2. components of an irrigation system 2.3. characteristics and operation of joints, valves and sprinkler components 2.4. operation of pumps and water flow rates 2.5. behaviour of water on varying terrain and soil types 2.6. soil water retention testing techniques 2.7. water quality and water filtration techniques 2.8. calculations for installing irrigation systems 2.9. soil characteristics 2.10. enterprise OHS procedures.
3. Underpinning Skills	To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complementary skills are required. These include the ability to: 3.1. organize resources for installation work 3.2. set-out and prepare site 3.3. install irrigation components 3.4. complete installation work 3.5. commission irrigation system 3.6. communicate with work team members, supervisors, contractors and consultants 3.7. implement and follow relevant enterprise OHS and environmental policies and procedures.
4. Resource Implications	The following resources must be provided: 4.1. workplace site onto which to install irrigation system 4.2. tools, equipment and materials used in installing irrigation 4.3. irrigation design plan 4.4. enterprise procedures relating to irrigation installations and site work.
5. Methods of Assessment	Competency should be assessed: 5.1. through direct observation / demonstration 5.2. checking workplace records and production plans (portfolio)
6. Context of Assessment	6.1. Assessment should be in a workplace. 6.2. Demonstration of competency over time and on a number of occasions.

SECTION 3 TRAINING STANDARDS

This set of standards provides Technical and Vocational Education and Training (TVET) providers with information and other important requirements to consider when designing training programs for Agricultural Crops Production NC III.

This includes information on curriculum design; training delivery; trainee entry requirements; tools and equipment; training facilities; and trainers qualification.

3.1 CURRICULUM DESIGN

Course Title: **AGRICULTURAL CROPS PRODUCTION** NC Level: **NC III**

Nominal Training Duration: **445 Hours**

Course Description:

This course is designed to enhance the knowledge, skills and attitude of Tailor in accordance with industry standards. In general, it covers core competencies on undertaking preparation of land for agricultural crop production, implementing a post-harvest program, implementing a plant nutrition program, controlling weeds and preparing and applying chemicals. In agronomic, it covers core competencies on establishing agronomic crops, undertaking agronomic crop maintenance activities, undertaking agronomic crop harvesting activities, saving, preparing and storing agricultural seed and implementing vertebrate pest control program.

To obtain this, all units prescribed for this qualification must be achieved:

BASIC COMPETENCIES
18 Hours

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Lead workplace communication.	1.1. Communicate information about workplace processes 1.2. Lead workplace discussions 1.3. Identify and communicate issues arising in the workplace	▪ Group discussion ▪ Role play ▪ Brainstorming	▪ Observation ▪ Interviews
2. Lead small teams.	2.1. Provide team leadership 2.2. Assign responsibilities among members 2.3. Set performance expectation for team members 2.4. Supervise team performance	▪ Lecture ▪ Demonstration ▪ Self-paced (modular)	▪ Demonstration ▪ Case studies
3. Develop and practice negotiation skills	3.1. Identify relevant information in planning negotiations 3.2. Participate in negotiations 3.3. Document areas for agreement	▪ Direct observation ▪ Simulation/ ▪ role playing ▪ Case studies	▪ Written test ▪ Practical/ performance test

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
4. Solve problems related to work activities	4.1. Explain the analytical techniques 4.2. Identify the problem 4.3. Determine the possible cause/s of the problem	▪ Direct observation ▪ Simulation/Role playing ▪ Case studies	▪ Written test ▪ Practical/performance test
5. Use mathematical concepts and techniques	5.1. Identify mathematical tools and techniques to solve problem 5.2. Apply mathematical procedures/solution 5.3. Analyze results	▪ Direct observation ▪ Simulation/ role playing ▪ Case studies	▪ Written test ▪ Practical/ performance test
6. Use relevant technologies	6.1. Identify appropriate technology 6.2. Apply relevant technology 6.3. Maintain/enhance relevant technology	▪ Direct observation ▪ Simulation/ role playing ▪ Case Studies	▪ Written test ▪ Practical/ performance test

COMMON COMPETENCIES

14 Hours

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Apply safety measures in farm operations	1.1. Determine areas of concern for safety measures 1.2. Apply appropriate safety measures 1.3. Safekeep/maintain/ dispose tools, materials and outfit.	▪ Self-paced/ modular ▪ Lecture/ Discussion ▪ Interaction ▪ Practical Demonstration ▪ Visit/tour	▪ Oral/Written Interviews ▪ Direct Observation ▪ Practical Demonstration
2. Use farm tools and equipment	2.1. Prepare and use farm tools 2.2. Prepare and operate farm equipment 2.3. Perform preventive maintenance procedures/practices	▪ Self-paced/ modular ▪ Lecture/ Discussion ▪ Interaction ▪ Practical Demonstration ▪ Visit/tour	▪ Oral/Written Interviews ▪ Direct Observation ▪ Practical Demonstration
3. Perform estimation and basic calculation	3.1. Perform estimation 3.2. Perform basic workplace calculation 3.3. Apply corrective measures as necessary	▪ Self-paced/modular ▪ Lecture/Discussion ▪ Interaction ▪ Practical Exercise	▪ Oral/Written examination ▪ Practical exercise

CORE COMPETENCIES
413 Hours

General

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Undertake preparation of land for agricultural crop production	1.1 Prepare for cultivation	▪ Discussion	▪ Written exam ▪ Actual ▪ Designing
	1.2 Prepare the cultivating equipment	▪ Discussion ▪ Demonstration	▪ Written exam ▪ Actual Demonstration ▪ Observation
	1.3 Cultivate soil	▪ Discussion ▪ Demonstration	▪ Written exam ▪ Actual Demonstration ▪ Observation
	1.4 Prepare site for planting	▪ Demonstration	▪ Actual Demonstration ▪ Questioning
	1.5 Complete land preparation operations	▪ Demonstration	▪ Actual Demonstration ▪ Questioning
2. Implement a post-harvest program	2.1 Prepare for implementation of post-harvest operations	▪ Discussion	▪ Written exam
	2.2 Co-ordinate post-harvest work	▪ Demonstration	▪ Actual ▪ Demonstration ▪ Questioning
	2.3 Implement post-harvest treatments	▪ Demonstration	▪ ctual Demonstration ▪ Questioning
	2.4 Implement hazardous waste disposal guidelines	▪ Demonstration	▪ Actual Demonstration ▪ Questioning
	2.5 Implement packaging requirements of produce	▪ Demonstration	▪ Actual Demonstration ▪ Questioning
	2.6 Implement storage requirements of produce	▪ Demonstration	▪ Demonstration with Questioning
3. Implement a plant nutrition program	3.1 Prepare for implementation of the plant nutrition program	▪ Demonstration ▪ Field visit	▪ Direct Observation and Interview
	3.2 Monitor soil pH	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
	3.3 Determine nutritional problems in plants	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
	3.4 Prepare to use fertilizers	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
	3.5 Prepare application equipment	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
	3.6 Apply specific products at appropriate rates	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
4. Control weeds	4.1 Assess weed infestation	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
	4.2 Plan the implementation of control measures	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
	4.3 Implement control measures	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
	4.4 Monitor control weeds	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
5. Prepare and apply chemicals	5.1 Determine the need for chemical use	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
	5.2 Prepare appropriate chemical	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
	5.3 Prepare to use chemicals according to the label and MSDS	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
	5.4 Apply chemicals	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
	5.5 Clean up following chemical application	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview
	5.6 Record application details	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview

Agronomic

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Establish agronomic crops	1.1 Prepare machinery and equipment for use 1.2 Prepare for agronomic crop establishment 1.3 Sow the crop 1.4 Complete seeding operations	▪ Demonstration ▪ Simulation	▪ Direct Observation and Interview

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
2. Undertake agronomic crop maintenance activities	2.1 Assess agronomic crop condition, growth and requirements 2.2 Apply fertilizer and amendments 2.3 Monitor crop condition, growth and requirements 2.4 Complete cleaning and hygiene operations	▪ Demonstration ▪ Simulation	▪ Direct Observation ▪ Interview
3. Undertake agronomic crop harvesting activities	3.1 Prepare to harvest agronomic crops 3.2 Prepare the harvesting equipment 3.3 Harvest crops 3.4 Complete harvesting operations	▪ Demonstration ▪ Simulation	▪ Direct Observation ▪ Interview
4. Save, prepare and store agricultural seed	4.1 Select seed from agricultural crops 4.2 Evaluate and grade seed 4.3 Store seed 4.4 Collect and deliver seed	▪ Demonstration ▪ Simulation	▪ Direct Observation ▪ Interview
5. Implement vertebrate pest control program	5.1 Assess requirements for pest control 5.2 Prepare to implement control program 5.3 Control vertebrate pests 5.4 Complete control program	▪ Demonstration ▪ Simulation	▪ Direct Observation ▪ Interview

3.2 TRAINING DELIVERY

The delivery of training should adhere to the design of the curriculum. Delivery should be guided by the 10 basic principles of competency-based TVET.

- The training is based on curriculum developed from the competency standards;
- Learning is modular in its structure;
- Training delivery is individualized and self-paced;
- Training is based on work that must be performed;
- Training materials are directly related to the competency standards and the curriculum modules;
- Assessment is based in the collection of evidence of the performance of work to the industry required standard;
- Training is based both on and off-the-job components;
- Allows for recognition of prior learning (RPL) or current competencies;
- Training allows for multiple entry and exit; and
- Approved training programs are Nationally Accredited

The competency-based TVET system recognizes various types of delivery modes, both on and off-the-job as long as the learning is driven by the competency standards specified by

the industry. The following training modalities may be adopted when designing training programs:

- The dualized mode of training delivery is preferred and recommended. Thus programs would contain both in-school and in-industry training or fieldwork components. Details can be referred to the Dual Training System (DTS) Implementing Rules and Regulations.

- Modular/self-paced learning is a competency-based training modality wherein the trainee is allowed to progress at his own pace. The trainer just facilitates the training delivery.

- Peer teaching/mentoring is a training modality wherein fast learners are given the opportunity to assist the slow learners.

- Supervised industry training or on-the-job training is an approach in training designed to enhance the knowledge and skills of the trainee through actual experience in the workplace to acquire specific competencies prescribed in the training regulations.

- Distance learning is a formal education process in which majority of the instruction occurs when the students and instructor are not in the same place. Distance learning may employ correspondence study, audio, video or computer technologies.

3.3 TRAINEE ENTRY REQUIREMENTS

Trainees or students wishing to gain entry into this course should possess the following requirements:

- can communicate either oral and written
- physically and mentally fit
- with good moral character
- can perform basic mathematical computation

This list does not include specific institutional requirements such as educational attainment, appropriate work experience, and others that may be required of the trainees by the school or training center delivering the TVET program.

3.4 TOOLS AND EQUIPMENT AND MATERIALS AGRICULTURAL CROPS PRODUCTION NC III

Recommended list of tools, equipment and materials for the training of 25 trainees for Agricultural Crops NC III

TOOLS		EQUIPMENT		MATERIALS	
QTY	DESCRIPTION	QTY	DESCRIPTION	QTY	DESCRIPTION
25 pcs	• Bolos	2	• Booth/temporary shed	250 pcs.	• Agri bags, plastic
10 pcs	• Broomstick	5	• Cart (Kariton & paragus)	500 pcs.	• Bamboo stick
5 pcs	• Calculator	1	• Coolroom	5 pcs.	• Basket
5 pcs	• Container	1	• Comb-tooth harrow	5 rims	• Bond paper
5 sets	• Cutting tools	5	• Computer with record keeping	5 pcs.	• Catching nets

TOOLS		EQUIPMENT		MATERIALS	
QTY	DESCRIPTION	QTY	DESCRIPTION	QTY	DESCRIPTION
			software applications		
5 sets	• Digging tools	1	• Crates	3 dozen	• Clips
2 pcs	• Drying meter	1	• Drying oven	5 sacks	• Coconut dust
10 pcs	• Dulos	1	• Farm/ field	5 sacks	• Compost
5 pcs	• Fruit crate	1	• Greenhouse/ nursery	1 sack of each	• Fertilizers-various
5 sets	• Harvesting tools	1	• Harvesting equipment	1 kit	• First aide supplies/medicine
25 pcs	• Hat	1	• Irrigation system (sprinkler, mist/drip irrigation)	5 bottles	• Flower inducer
5 pcs	• Knapsack sprayer	1	• Mower (grass cutter)	5 bottles	• Fungicides
5 sets	• Knife	1	• Over head projector (OHP)	25 pairs	• Gloves
5 pcs	• Light hoe	1	• Portable chain saw	5 sacks	• Growing media (garden soil, sewed sand, compost, soil, manure and sawdust/rice
2 pcs	• Moisture meter	1	• Post-Harvest treatment equipment	5 pcs.	• Killing bottles
5	• Personal protection equipment	1	• Power sprayer		
2 pcs	• Petri-dish	1	• Propagation Equipment	5 pcs.	• Marking pens
3 pcs	• pH meter	1	• Pump for irrigation	25 pcs.	• Masks
5 pcs	• Pick mattock	1	• Rotavator	25 pcs.	• Material Safety Data Sheets
5 pcs	• Picking knife	1	• Service vehicle	5 sacks	• Mulching material
5 pcs	• Plow	1	• Sorting /Grading equipment	25 m	• Hair nets
2 sets	• Plumbing tools	2	• Spike tooth harrow	20	• Packaging materials, assorted
5 sets	• Post-Harvest treatment tools	1	• Storage room	5	• Pail
25 pcs	• Protective coat	1	• Surface irrigation system	5 rims	• Paper/bond
25 pcs	• Protective gadgets		• Tractor/Carabao	25	• Pencil
5 pcs	• Pruning sheers		• Typewriter	25	• Pens

TOOLS		EQUIPMENT		MATERIALS	
QTY	DESCRIPTION	QTY	DESCRIPTION	QTY	DESCRIPTION
5 pcs	• Rake			5 bottles	• Pesticides/Insecticides
10 pcs	• Scissors	25	**TRAINING MATERIALS**	5 pieces	• Pieces of cloth
5	• Seed bed	2	• Brochures	100	• Plastic bag
5	• Seedling tray	2	• Instructional supplies & materials	1 set	• Plumbing supplies
10	• Shovel	5	• Visual aids	250	• Pots
15	• Sprinklers	5	• Reference materials/Books (technical information on horticultural and agronomic crops)	Variety	• Propagation materials e.g. seeds spores, cuttings etc.,
2	• Step ladder	5	• Reference manuals (first aide kit with reference manual)	5 sacks	• Propagating media (garden soil, sawdust, sand, composed, coconut coir)
2	• Storage tools/cabinet	5	• Data (Data on result of soil analysis)	3 sacks	• Rice hull
25 pcs	• Transplanting tools	5	• Procedural manuals	3 rolls	• Rope, (small, med. Large)
25 pcs	• Trowel		• Soil samples analysis	3 boxes	• Rubber band
			• Examples of farm standard operating procedures (SOPs)	25 pairs	• Rubber boots
					• Rubber knots
				25 sacks	• Sacks
					• Sample of matured vegetable crops
				5 boxes	• Seed box
					• Seedlings, assorted
				2 packs per crop	• Seeds
				5	• Soil auger
				5 rolls	• String
				5 bottles	• Tetrazolium chemical
					• Transplanting supplies
				5 pcs.	• Detergent, liquid and powder soap
				5 pcs.	• Brush

3.5 TRAINING FACILITIES
AGRICULTURAL CROPS PRODUCTION NC III

Based on a class intake of 25 students/trainees

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	TOTAL AREA IN SQ. METERS
A. **Building (permanent)**			170.30
• Student/Trainee Working Space	2.00 x 2.00 per student/trainee	4.00 per student	100.00
• Learning Resource Center	3.00 x 5.00	15.00	15.00
• Facilities/Equipment/Circulation (30% of teaching accommodation)			39.30
• Store Room	4.00 x 4.00	16.00	16.00
B. **Experimental Land Area**	5 sq m /trainee	125.00	125.00

Note: Experimental area will change according to availability of land.

3.6 TRAINERS' QUALIFICATION
AGRICULTURAL CROPS PRODUCTION NC III

TRAINER QUALIFICATION (TQ III)

- Must be a holder of NC III
- Must have undergone training on Training Methodology III (TM III)
- Must be physically and mentally fit
- *Must have at least 2 years job/industry experience

* Optional. Only when required by the hiring institution
Reference: TESDA Board Resolution No. 2004 03

3.7 Institutional Assessment

Institutional Assessment is to be undertaken by the learner who enrolled in a structured learning program to determine their achievement of competencies. It is administered by the trainer/assessor at end of each learning module.

SECTION 4 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

4.1. To attain the National Qualification of **Agricultural Crops Production NC III,** the candidate must demonstrate competence through project type assessment covering all the units listed in Section 1. Successful candidates shall be awarded a National Certificate signed by the TESDA Director General.

4.2. The qualification of Agricultural Crops Production NC III may be attained through:

4.2.1. Accumulation of Certificates of Competency (COCs) in the following areas:

4.2.1.1 Prepare land for agricultural crop production
4.2.1.2 Implement post-harvest program
4.2.1.3 Implement plant nutrition program
4.2.1.4 Control weeds
4.2.1.5 Prepare and apply chemicals
4.2.1.6 Establish agronomic crops
4.2.1.7 Undertake agronomic crop maintenance program
4.2.1.8 Undertake agronomic crop harvesting activities
4.2.1.9 Save, prepare and store agricultural seed
4.2.2.0 Implement vertebrate pest control program

Successful candidates shall be awarded Certificates of Competency (COCs)

4.3. Upon accumulation and submission of all COCs acquired for the relevant units of competency comprising a qualification, an individual shall be issued the corresponding National Certificate.

4.4. Assessment shall focus on the core units of competency. The basic and common units shall be integrated or assessed concurrently with the core units.

4.5. Elective units may be selected from the list below depending on workplace requirements and/or specialization. To increase flexibility and enhance employability, elective units of competency may also be chosen from any other promulgated Training Regulations at the same NC level or one level higher (NC IV), including Agricultural Crops Production NC IV. Certificates of Competency shall be issued for each additional unit undertaken. The candidate however may be awarded the qualification of Agricultural Crops Production NC III based on the accumulation of core units as specified in **4.2.1.,** even without these electives:

4.5.1. Follow site quarantine procedures
4.5.2. Collect samples for a rural production or horticultural monitoring program
4.5.3. Handle bulk materials in storage area
4.5.4. Prepare grain storages
4.5.5. Comply with industry quality assurance requirements
4.5.6. Maintain and monitor environmental work practices
4.5.7. Keep records for farm business
4.5.8. Perform specialized machinery maintenance
4.5.9. Install irrigation system

4.5. The following are qualified to apply for assessment and certification:

4.5.1. Graduates of formal, non-formal and informal including enterprise-based training programs.

4.5.2. Experienced workers (wage employed or self-employed)

4.6. The guidelines on assessment and certification are discussed in detail in the Procedures manual on Assessment and Certification and Guidelines on the implementation of the Philippine TVET Qualification and Certification System.

COMPETENCY MAP FOR AGRI-FISHERY SECTOR
AGRICULTURAL CROPS PRODUCTION SUB-SECTOR

CORE UNITS OF COMPETENCY

Supervise agronomic crop maintenance	Produce fruit bearing crops	Undertake agronomical crop maintenance activities	Implement vertebrate pest control program	Implement a plant establishment program
Maintain the workplace	Perform post harvest operations of major tropical fruits	Undertake agronomic crop harvesting activities	Establish agronomic crops	Transport, handle and store chemicals
Support agronomic crop work	Perform post harvest operation of major lowland and semi-temperate vegetable crops	Save, prepare and store agricultural seed	Collect samples for a rural production of horticulture monitoring program	Supervise agricultural crop establishment
Support horticultural crop work	Prepare land for agricultural crop production	Undertake field budding and grafting	Save, prepare and store agricultural seed	Implement and monitor quality assurance procedures
Support irrigation work	Prepare and apply chemicals	Keep records for a farm business	Undertake agronomic crop maintenance activities	Support and review business structures and relationships
Support nursery work	implement a plant nutrition program	Monitor and operate water treatment processes	Coordinate machinery and equipment maintenance and repair for agricultural crops	Promote plant health
Conduct pre-horticultural farm operations	Control weeds	Comply with industry quality assurance requirements	Operate pertigation equipment	Implement and monitor a property improvement plan
Produce vegetables	Implement a post-harvest program	Transport farm produce or bulk materials	Operate within a budget framework	Supervise maintenance of machinery and equipment
Plan & implement a chemical use program	Establish agronomic crops	Supervise horticultural crop harvesting	Plan a propagation program	Develop a horticultural crop maintenance program
Apply basic first aid	Implement vertebrate pest control program	Control weeds, pests and /or diseases in crops	Supervise agronomic crop harvesting	Analyze and interpret production data

Continuation ….. Competency Map for Agri Fishery Sector (Agricultural Crops Sub-Sector)

COMPETENCY MAP FOR AGRI-FISHERY SECTOR
AGRICULTURAL CROPS PRODUCTION SUB-SECTOR

COMMON UNITS OF COMPETENCY

Apply safety measures in farm operations	Use farm tools and equipment	Perform estimation and calculation	Apply basic first aid

BASIC UNITS OF COMPETENCY

Receive and Respond to Workplace Communication	Participate in Workplace Communication	Lead Workplace Communication	Use relevant technologies	Develop Team and Individual
Work With Others	Work in a Team Environment	Lead Small Team	Solve problems related to work activities	Apply Problem Solving Techniques in the Workplace
Practice basic housekeeping procedures	Demonstrate work values	Develop and practice negotiation skills	Use mathematical concepts and techniques	Plan and Organize Work

DEFINITION OF TERMS

For the purpose of this standard, the word

- **Aflatoxin** – the toxin produced by some strains of the fungi *ASPERGILUS FLAVUS* and *ASPERGILUS PARASTICUS*; the most potent carcinogen yet discovered.
- **Agronomy** – the application of the various soil and plant sciences to soil management and raising of crops.
- **Agronomic crops** – may include coarse grains, grain legumes, coffee, coconuts, cotton, soya beans, peanuts and sugar cane.
- **Agricultural crops** – may include fruits, vegetables, herbs, flowers, foliage, bulbs, tubers, nuts, mushrooms, wild harvest plants and oils.
- **Ambient condition**– ordinary room temperature and relative humidity.
- **Ambient air** – the surrounding air (atmospheric).
- **Ambient storage** – any treatment or practice extending post harvest life of harvested commodity beyond that of similar commodity held under ambient conditions without treatment.
- **Airflow rate** – the amount of air passing through an obstruction per unit of time.
- **ACIAR** – Australian Center for International Agricultural Research
- **AFHB** – ASEAN Food Handling Bureau
- **BPRE** – Bureau of Post harvest Research & Extension
- **Curing** – process of toughening and self-healing of bruises and skinned areas in root and tubes crops or the rapid closing of the neck of bulb crops under favourable conditions
- **Driller** – a machine for sowing in furrows
- **Drip Irrigation** – application of water through small tubes and orifices or emitters which discharge small quantity of water to the base of the plant
- **Dry-bulb temperature** – the temperature of air indicated by a standard temperature
- **Equilibrium moisture content** – the moisture content at which moisture in a product is in equilibrium with the surrounding air. The product does not gain or loss moisture.
- **Fogging** – to cover or envelope with fog
- **Foliar Fertilizer** – fertilizer formulation containing nitrogen, phosphorous and potassium plus selected micronutrient element such as (Ca, Mg, Mn, Fe, Zn, Cl, B, Cu, S) applied by spraying on the leaves
- **Fumigant** – a chemical compound which acts in the gaseous state to destroy insects and their larvae.
- **Fumigation** – the process of treating stored products with insecticides/pesticides and the like in fumes or vapor form.
- **Furrow Irrigation** – a method of supplying water through a canal system wherein water flows down or across the slope of the field
- **Furrowing** – final step in land preparation by making furrows or beds for planting
- **GATT** – General Agreement on Tariff and Trade

- **Grading** – the process of classifying into groups according to a set of recognized criteria of quality and size, each group bearing an accepted name and size grouping.
- **Growing Medium** – mixture of different materials such as soil, sand, compost, coir dust, rice hull, perlite, peat, etc. for growing seedlings
- **HACCP** – Hazard Analysis Critical Control Points
- **Hardening** – the process of gradually withholding water and exposing to direct sunlight to prevent seedlings from transplanting stress/shock
- **Harrowing** – breaking of large soil clods that are caused by plowing
- **Hilling-Up** – the process of covering the applied fertilizer material by raising the soil towards the base of the plant to further stabilize its stand for better plant growth.
- **Hygrometer** – an instrument that measures humidity.
- **Insect pest** – a destructive or harmful insect.
- **Irrigation** - any method of supplying water to sustain plant growth
- **Off-Baring**- process of cultivating the soil away from the base of the plants
- **Pricking-Off**- methods of transferring of seedling to avoid overcrowding
- **Larvae** – the first stage of the life cycle of insects after leaving the egg.
- **Manometer** – an instrument that measures air pressure.
- **Maturity** – the quality or state of ripeness, or of being fully developed grain.
- **Maturity index** – signs or indications that a commodity is mature and is ready to be harvested.
- **Moisture content** – the conventional index used to determine whether the seed is dry enough for safe storage or for milling usually expressed in percent (% M.C.).
- **Molds** – superficial often woolly growth produced on various forms of organic matter, especially when damp or decaying.
- **NFA** – National Food Authority
- **Packaging** – technology or process to ensure adequate protection and safe delivery of a product from the produces to the ultimate consumer.
- **Packing** – act of putting commodities in a container.
- **Packinghouse** – place where the preparatory steps for storage or marketing are done.
- **Pallet** – low portable platform made of wood or metal or in combination to facilitate handling, storage or transport of materials as a unit load using forklift.
- **Perishables** – food crops for which value and/or quality is maintained over a short period of time after harvest. These include fruits, vegetables, flowers, young coconut, nursery stocks and some staple root crops such as sweet potato, cassava and yam.
- **Postharvest disease** – disease observed after harvest regardless of when or where initial infestation took place.
- **Post harvest handling** – specific term used for the movement of commodities and operations through which a commodity undergoes from harvest to possession of the fixed consumer, includes the technological aspects of marketing and distribution.
- **Post harvest infection** – infection that takes place after harvest.

- **Post harvest life** – period of time during which a commodity is still acceptable for its intended purpose.
- **Pre cooling** – strictly, it means the rapid cooling (48 hours or less) of a commodity to a desired transit or storage temperature soon after harvest before it is stored or moved in transit.
- **Pupa** – an intermediate stage of an insect that preys on one or more plants and animals that man wishes to preserve for his own use.
- **Refrigeration** – process of removing heat from a compartment or substance so that temperature is lowered and then maintained at a desirable level, usually refers to refrigeration by mechanical means.
- **Relative humidity** – the actual vapor pressure of the air relative to saturation.
- **Respiration** – biological process by which organic materials are broken down to simpler forms accompanied by the release of energy and heat.
- **Ripening** – the state of development of a fruit when it becomes soft and edible applies strictly to climacteric type fruit.
- **Rodents** – refer to rats and mice which destroy grains and other stored products.
- **Senescence** – final phase in the life of an organ in which a series of normally irreversible events are initiated leading to cellular breakdown or death of the organ.
- **Side-Dress Fertilizer** – additional amount of any fertilizer materials applied at the onset of flowering to complete the nutritional requirement of the crop
- **Sprinkler Irrigation** – a mechanical method of supplying water over the standing crop by means of a nozzle which is rotated by water pressure
- **Synthetic Mulch** – mulching materials made either of polyethylene or non-woven fabric
- **Sorting** – the process of classifying into groups designated by the person classifying crops or commodities the produce either according to a set criteria.
- **Standard** – the set of criteria and specifications of quality determining the grades, described as product characteristics such as maturity, color, cleanliness, shape, free from decay and blemishes and uniformity of size.
- **Storage** – process of keeping horticultural crops in a structure designed to protect the stored products from inclement weather and pests for a short or long period of time to await processing or movement to other location.
- **Storage life** – the longest time produce can be kept in a sound marketable condition.
- **Tachometer** – an instrument that measures revolutions per minute
- **Tillage** – the mechanical manipulation of the soil
- **Transplants** – vegetable seedlings produced for transplanting
- **Trellis** – a support structure for vinyl crops and can either be T, I, Y, A shaped
- **Velometer** – an instrument that measures velocity of air flow
- **Waxing** – application of a thin film of surface coating to fruits and vegetables.
- **Wet-bulb temperature** – temperature of moist air indicated by a thermometer whose bulb is covered with a moist wick which the air flow passing over has a velocity of 15 ft per second.

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- **QSO**

List of Published Training Regulations

- ❑ Agricultural Crops NC I
- ❑ **Agricultural Crops NC III**
- ❑ Animal Production NC II
- ❑ Aquaculture NC II
- ❑ Automotive Body Painting/Finishing NC II
- ❑ Automotive Body Repair NC II
- ❑ Automotive Engine Rebuilding NC II
- ❑ Automotive Servicing NC II
- ❑ Bartending NC II
- ❑ Building Wiring Installation NC II
- ❑ Carpentry NC II
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- ❑ Deck Seafaring NC II
- ❑ Dressmaking NC II
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- ❑ Engine Seafaring NC II
- ❑ Fish Capture NC I
- ❑ Food and Beverage Services NC II
- ❑ Footwear Making NC II
- ❑ Heavy Equipment Operation NC II
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