TRAINING REGULATIONS

PEST MANAGEMENT (VEGETABLES) NC II

AGRICULTURE AND FISHERIES SECTOR

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

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AGRI-FISHERIES SECTOR

PEST MANAGEMENT (VEGETABLES) NC II

TRAINING REGULATIONS FOR
PEST MANAGEMENT (VEGETABLES) NC II

SECTION 1 PEST MANAGEMENT (VEGETABLES) NC II QUALIFICATION

The **PEST MANAGEMENT (VEGETABLES) NC II** Qualification consists of competencies that a person must achieve in implementing pest management activities in both backyard and commercial vegetable farms. Specifically, it involves carrying out competencies in pest management in relation to the growing of vegetables specifically solinaceous crops such as tomato, pepper and eggplant, and crucifers such as cabbage, broccoli, cauliflower, and Chinese cabbage.

The qualification involves a certain level of decision-making on pest management strategies in line with the integrated pest management (IPM) framework..

This Qualification is packaged from the competency map for pest management for vegetables.

The units of competency comprising this qualification include the following:

Code	BASIC COMPETENCIES
500311105	Participate in workplace communication
500311106	Work in a team environment
500311107	Practice career professionalism
500311108	Practice occupational health and safety procedures

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

Code	CORE COMPETENCIES
AGR321320	Conduct field assessment
AGR321321	Apply bio-control measures
AGR321322	Apply cultural management strategies
AGR321323	Apply physical control measures
AGR321324	Apply chemical control measures
AGR321325	Monitor results of pest management activities and provide feedback

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

- Pest-Management/Pest-Control Technician

SECTION 2 COMPETENCY STANDARDS

These guidelines are set to provide the Technical Vocational Education and Training (TVET) providers with information and other important requirements to consider when designing training programs for **PEST MANAGEMENT (VEGETABLES) NC II.**

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE : 500311105

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from ***appropriate sources*** 1.2 Effective questioning , active listening and speaking skills are used to gather and convey information 1.3 Appropriate ***medium*** is used to transfer information and ideas 1.4 Appropriate non- verbal communication is used 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed 1.6 Defined workplace procedures for the location and ***storage*** of information are used 1.7 Personal interaction is carried out clearly and concisely
2. Participate in workplace meetings and discussions	2.1 Team meetings are attended on time 2.2 Own opinions are clearly expressed and those of others are listened to without interruption 2.3 Meeting inputs are consistent with the meeting purpose and established ***protocols*** 2.4 ***Workplace interactions*** are conducted in a courteous manner 2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to 2.6 Meetings outcomes are interpreted and implemented
3. Complete relevant work related documents	3.1 Range of ***forms*** relating to conditions of employment are completed accurately and legibly 3.2 Workplace data is recorded on standard workplace forms and documents

	3.3 Basic mathematical processes are used for routine calculations 3.4 Errors in recording information on forms/ documents are identified and properly acted upon 3.5 Reporting requirements to supervisor are completed according to organizational guidelines

RANGE OF VARIABLES

VARIABLE	RANGE
1. Appropriate sources	1.1. Team members 1.2. Suppliers 1.3. Trade personnel 1.4. Local government 1.5. Industry bodies
2. Medium	2.1. Memorandum 2.2. Circular 2.3. Notice 2.4. Information discussion 2.5. Follow-up or verbal instructions 2.6. Face to face communication
3. Storage	3.1. Manual filing system 3.2. Computer-based filing system
4. Forms	4.1. Personnel forms, telephone message forms, safety reports
5. Workplace interactions	5.1. Face to face 5.2. Telephone 5.3. Electronic and two way radio 5.4. Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams
6. Protocols	6.1. Observing meeting 6.2. Compliance with meeting decisions 6.3. Obeying meeting instructions

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1. Prepared written communication following standard format of the organization 1.2. Accessed information using communication equipment 1.3. Made use of relevant terms as an aid to transfer information effectively 1.4. Conveyed information effectively adopting the formal or informal communication
2. Underpinning Knowledge and Attitudes	2.1. Effective communication 2.2. Different modes of communication 2.3. Written communication 2.4. Organizational policies 2.5. Communication procedures and systems 2.6. Technology relevant to the enterprise and the individual's work responsibilities
3. Underpinning Skills	3.1. Follow simple spoken language 3.2. Perform routine workplace duties following simple written notices 3.3. Participate in workplace meetings and discussions 3.4. Complete work related documents 3.5. Estimate, calculate and record routine workplace measures 3.6. Basic mathematical processes of addition, subtraction, division and multiplication 3.7. Ability to relate to people of social range in the workplace 3.8. Gather and provide information in response to workplace Requirements
4. Resource Implications	4.1. Fax machine 4.2. Telephone 4.3. Writing materials 4.4. Internet
5. Methods of Assessment	5.1. Direct Observation 5.2. Oral interview and written test
6. Context of Assessment	6.1. Competency may be assessed individually in the actual workplace or through accredited institution

UNIT OF COMPETENCY: WORK IN TEAM ENVIRONMENT

UNIT CODE : 500311106

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Describe team role and scope	1.1. The ***role and objective of the team*** is identified from available ***sources of information***
	1.2. Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources
2. Identify own role and responsibility within team	2.1. Individual role and responsibilities within the team environment are identified
	2.2. Roles and responsibility of other team members are identified and recognized
	2.3. Reporting relationships within team and external to team are identified
3. Work as a team member	3.1. Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives
	3.2. Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and ***workplace context***
	3.3. Observed protocols in reporting using standard operating procedures
	3.4. Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members

RANGE OF VARIABLES

VARIABLE	RANGE
1. Role and objective of team	1.1. Work activities in a team environment with enterprise or specific sector 1.2. Limited discretion, initiative and judgement maybe demonstrated on the job, either individually or in a team environment
2. Sources of information	2.1. Standard operating and/or other workplace procedures 2.2. Job procedures 2.3. Machine/equipment manufacturer's specifications and instructions 2.4. Organizational or external personnel 2.5. Client/supplier instructions 2.6. Quality standards 2.7. Occupational Health and Safety (OHS) and environmental standards
3. Workplace context	3.1. Work procedures and practices 3.2. Conditions of work environments 3.3. Legislation and industrial agreements 3.4. Standard work practice including the storage, safe handling and disposal of chemicals 3.5. Safety, environmental, housekeeping and quality guidelines

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1. Operated in a team to complete workplace activity 1.2. Worked effectively with others 1.3. Conveyed information in written or oral form 1.4. Selected and used appropriate workplace language 1.5. Followed designated work plan for the job 1.6. Reported outcomes
2. Underpinning Knowledge and Attitude	2.1. Communication process 2.2. Team structure 2.3. Team roles 2.4. Group planning and decision making
3. Underpinning Skills	3.1. Communicate appropriately, consistent with the culture of the workplace
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 tasks
5. Methods of Assessment	Competency may be assessed through: 5.1. Observation 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 for Assessment	6.1. Competency may be assessed in workplace or in a simulated workplace setting 6.2. Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY: PRACTICE CAREER PROFESSIONALISM

UNIT CODE : 500311107

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in promoting career growth and advancement.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Integrate personal objectives with organizational goals	1.1 Personal growth and work plans are pursued towards improving the qualifications set for the profession 1.2 Intra- and interpersonal relationships are maintained in the course of managing oneself based on performance evaluation 1.3 Commitment to the organization and its goal is demonstrated in the performance of duties
2. Set and meet work priorities	2.1 Competing demands are prioritized to achieve personal, team and organizational goals and objectives. 2.2 ***Resources*** are utilized efficiently and effectively to manage work priorities and commitments 2.3 Practices along economic use and maintenance of equipment and facilities are followed as per established procedures
3. Maintain professional growth and development	3.1 ***Trainings and career opportunities*** are identified and availed of based on job requirements 3.2 ***Recognitions*** are sought/received and demonstrated as proof of career advancement 3.3 ***Licenses and/or certifications*** relevant to job and career are obtained and renewed

RANGE OF VARIABLES

VARIABLE	RANGE
1. Evaluation	1.1 Performance Appraisal 1.2 Psychological Profile 1.3 Aptitude Tests
2. Resources	2.1 Human 2.2 Financial 2.3 Technology 2.3.1 Hardware 2.3.2 Software
3. Trainings and career opportunities	3.1 Participation in training programs 3.1.1 Technical 3.1.2 Supervisory 3.1.3 Managerial 3.1.4 Continuing Education 3.2 Serving as Resource Persons in conferences and workshops
4. Recognitions	4.1 Recommendations 4.2 Citations 4.3 Certificate of Appreciations 4.4 Commendations 4.5 Awards 4.6 Tangible and Intangible Rewards
5. Licenses and/or certifications	5.1 National Certificates 5.2 Certificate of Competency 5.3 Support Level Licenses 5.4 Professional Licenses

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Attained job targets within key result areas (KRAs) 1.2 Maintained intra - and interpersonal relationship in the course of managing oneself based on performance evaluation 1.3 Completed trainings and career opportunities which are based on the requirements of the industries 1.4 Acquired and maintained licenses and/or certifications according to the requirement of the qualification
2. Underpinning Knowledge	2.1. Work values and ethics (Code of Conduct, Code of Ethics, etc.) 2.2. Company policies 2.3. Company-operations, procedures and standards 2.4. Fundamental rights at work including gender sensitivity 2.5. Personal hygiene practices
3. Underpinning Skills	3.1. Appropriate practice of personal hygiene 3.2. Intra and Interpersonal skills 3.3. Communication skills
4. Resource Implications	The following resources must be provided: 4.1. Workplace or assessment location 4.2. Case studies/scenarios
5. Methods of Assessment	Competency may be assessed through: 5.1 Portfolio Assessment 5.2 Interview 5.3 Simulation/Role-plays 5.4 Observation 5.5 Third Party Reports 5.6 Exams and Tests
6. Context of Assessment	6.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY: PRACTICE OCCUPATIONAL HEALTH AND SAFETY PROCEDURES

UNIT CODE : 500311107

UNIT DESCRIPTOR : This unit covers the outcomes required to comply with regulatory and organizational requirements for occupational health and safety.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Identify hazards and risks	1.1 ***Safety regulations*** and workplace safety and hazard control practices and procedures are clarified and explained based on organization procedures 1.2 ***Hazards/risks*** in the workplace and their corresponding indicators are identified to minimize or eliminate risk to co-workers, workplace and environment in accordance with organization procedures 1.3 ***Contingency measures*** during workplace accidents, fire and other emergencies are recognized and established in accordance with organization procedures
2. Evaluate hazards and risks	2.1 Terms of maximum tolerable limits which when exceeded will result in harm or damage are identified based on threshold limit values (TLV) 2.2 Effects of the hazards are determined 2.3 OHS issues and/or concerns and identified safety hazards are reported to designated personnel in accordance with workplace requirements and relevant workplace OHS legislation
3. Control hazards and risks	3.1 Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace are consistently followed 3.2 Procedures for dealing with workplace accidents, fire and emergencies are followed in accordance with organization OHS policies 3.3 ***Personal protective equipment (PPE)*** is correctly used in accordance with organization OHS procedures and practices 3.4 Appropriate assistance is provided in the event of a workplace emergency in accordance with established organization protocol
4. Maintain OHS awareness	4.1 ***Emergency-related drills and trainings*** are participated in as per established organization guidelines and procedures 4.2 ***OHS personal records*** are completed and updated in accordance with workplace requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Safety regulations	May include but are not limited to: 1.1 Clean Air Act 1.2 Building code 1.3 National Electrical and Fire Safety Codes 1.4 Waste management statutes and rules 1.5 Philippine Occupational Safety and Health Standards 1.6 DOLE regulations on safety legal requirements 1.7 ECC regulations
2. Hazards/Risks	May include but are not limited to: 2.1 Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation 2.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects 2.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors 2.4 Ergonomics 2.4.1 Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles 2.4.2 Physiological factors – monotony, personal relationship, work out cycle
3. Contingency measures	May include but are not limited to: 3.1 Evacuation 3.2 Isolation 3.3 Decontamination 3.4 (Calling designed) emergency personnel
4. PPE	May include but are not limited to: 4.1 Mask 4.2 Gloves 4.3 Goggles 4.4 Hair Net/cap/bonnet 4.5 Face mask/shield 4.6 Ear muffs 4.7 Apron/Gown/coverall/jump suit 4.8 Anti-static suits

VARIABLE	RANGE
5. Emergency-related drills and training	5.1 Fire drill 5.2 Earthquake drill 5.3 Basic life support/CPR 5.4 First aid 5.5 Spillage control 5.6 Decontamination of chemical and toxic 5.7 Disaster preparedness/management
6. OHS personal records	6.1 Medical/Health records 6.2 Incident reports 6.3 Accident reports 6.4 OHS-related training completed

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Explained clearly established workplace safety and hazard control practices and procedures 1.2 Identified hazards/risks in the workplace and its corresponding indicators in accordance with company procedures 1.3 Recognized contingency measures during workplace accidents, fire and other emergencies 1.4 Identified terms of maximum tolerable limits based on threshold limit value (TLV). 1.5 Followed Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace 1.6 Used Personal Protective Equipment (PPE) in accordance with company OHS procedures and practices 1.7 Completed and updated OHS personal records in accordance with workplace requirements
2. Underpinning Knowledge and Attitude	2.1 OHS procedures and practices and regulations 2.2 PPE types and uses 2.3 Personal hygiene practices 2.4 Hazards/risks identification and control 2.5 Threshold Limit Value (TLV) 2.6 OHS indicators 2.7 Organization safety and health protocol 2.8 Safety consciousness 2.9 Health consciousness
3. Underpinning Skills	3.1 Practice of personal hygiene 3.2 Hazards/risks identification and control skills 3.3 Interpersonal skills 3.4 Communication skills
4. Resource Implications	The following resources must be provided: 4.1 Workplace or assessment location 4.2 OHS personal records 4.3 PPE 4.4 Health records
5. Methods of Assessment	Competency may be assessed through: 5.1 Portfolio Assessment 5.2 Interview 5.3 Case Study/Situation
6. Context for Assessment	6.1 Competency may be assessed in the work place or in a simulated work place setting

COMMON COMPETENCIES

UNIT TITLE : 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 safe work requirement 2.5 Hazards in the workplace are identified and reported in line with farm guidelines
3. Safekeep/dispose 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 subsectors: 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 to health program of DOH and DENR 2.2.2 Hazard identification 2.2.3 Emergency procedures 2.3 Tools and 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 4.2 Third Party Report
5. Resource Implications	The following resources must be provided: 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 TITLE: **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 equipments 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 equipment 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 4.2 Practical demonstration 4.3 Third Party Report
5. Resource Implications	The following resources must be provided: 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 TITLE: **PERFORM ESTIMATION AND BASIC CALCULATIONS**

UNIT CODE: **AGR321203**

UNIT DESCRIPTOR: This unit covers the knowledge, skills and attitudes required to perform basic workplace calculations.

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. Calculations	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 4.2 Volume 4.3 Weight

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	The following resources **must** be provided: 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: CONDUCT FIELD ASSESSMENT

UNIT CODE : AGR321320

UNIT DESCRIPTOR: This unit covers the skills, knowledge and attitudes required for performing field-assessment activities. It involves assessment of the area, identification of pests and their natural enemies, and other beneficial organisms, collecting data related to natural enemy populations and pest infestations and maintaining records and providing feedback.

ELEMENT	PERFORMANCE CRITERIA (***Italicized*** terms are elaborated in the range of variables)
1. Assess the area	1.1. Field is visited for assessment according to ***farm work procedures*** 1.2. Plant appearance and growth are observed for possible presence of ***pests and their natural enemies, other beneficial organisms and nutritional disorders*** according to farm work procedures 1.3. ***Occupational Health and Safety (OHS) hazards*** are identified, risks assessed and suitable preventive measures are implemented according to farm work procedures 1.4. ***Environment and other relevant information*** with regard to assessment activities are noted following standard procedures
2. Identify pests and their natural enemies, and other beneficial organisms	2.1. Pests and their natural enemies, and other beneficial organisms are identified and recorded in field notes according to farm work procedures 2.2. The supervisor or the pest specialist is consulted as required to validate the identity of pests and their natural enemies, and other beneficial organisms in line with farm work procedures

ELEMENT	PERFORMANCE CRITERIA
3. Collect data related to natural enemy populations and pest infestations	3.1. Information on the identified natural enemies' density as well as degree of pest infestation and severity of pest damage are gathered according to farm work procedures 3.2. Data on the environment and other relevant information are collected in accordance with farm work procedures 3.3. Levels of infestation/severity tolerated by the client, market or environment are determined in line with integrated pest management plan 3.4. Professional advice is obtained as required according to enterprise guidelines
4. Maintain records and provide feedback	4.1. ***Records*** are completed and updated in line with workplace procedures 4.2. Results of assessment activities are discussed with the supervisor following standard procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Farm work procedures	1.1. Supervisor/s' oral and written instructions 1.2. Standard operating procedures 1.3. Pest management plan 1.4. Industry best practice guidelines on pest management 1.5. Good agricultural practices (GAP) 1.6. OHS procedures
2. Pests	2.1. Insect pests 2.2. Weeds 2.3. Diseases 2.4. Others (snails, birds,rodents, slugs, etc.)
3. Natural enemies and beneficial organisms	3.1. Parasites/parasitoids 3.2. Predators 3.3. Pollinators 3.4. Repellant or refuge plants 3.5. Micro-organisms / Entomopathogens
4. Nutritional disorders	Deficiencies in: 4.1. Nitrogen 4.2. Phosphorus 4.3. Potassium 4.4. Microelements
5. OHS hazards	Hazards may include: 5.1. body irritation 5.2. poisoning 5.3. solar radiation 5.4. dust 5.5. pollen 5.6. soil-borne micro organisms 5.7. noise 5.8. chemicals and hazardous substances 5.9. slippery or uneven surfaces 5.10. moving equipment 5.11. machinery and vehicles 5.12. sharp objects

VARIABLE	RANGE
6. Environment	6.1. Soil Fertility 6.2. Soil Type 6.3. Weather Conditions 6.4. Topography 6.5. Water, Etc.
7. Other relevant information	7.1. Crop variety 7.2. Cropping pattern/system 7.3. Stage of the crop
8. Records	8.1. Date and time of inspection 8.2. Location 8.3. Identity of pests and their natural enemies, and beneficial organisms 8.4. Manifestations/Symptoms 8.5. Plant parts attacked (e.g. leaf, fruit, etc.) 8.6. Nature of damage (borer, miner, leaf feeder, leaf curling, etc.) 8.7. Extent of damage (number of plants / plots affected / size of area) 8.8. Population counts of natural enemies 8.9. Environment (soil fertility, soil type, weather conditions, topography, water , etc.) and other relevant information (e.g. crop variety, cropping pattern/system, stage of crop, etc.)

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate: 1.1. assessed the area; 1.2. identified the range of pests present and their natural enemies, and other beneficial organisms; 1.3. collected data related to natural enemy populations and pest infestations; and 1.4. maintained records and provided feedback. The skills and knowledge required to conduct field assessment must be transferable to a different work environment. For example, this may include different vegetables, fields/farms and pests.
2. Underpinning Knowledge and Attitude	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 <u>knowledge</u> requirements for this competency standard are listed below: 2.1. Pest and natural enemy recognition, and other beneficial organisms 2.2. Range of vegetable species/varieties 2.3. IPM concepts and principles (Identification, biology, behavior, population dynamics) 2.4. Procedures for agro-ecosystems analysis (AESA) 2.5. Interactions among pest infestations, natural enemy populations, other beneficial organisms, the environment and other relevant information (e.g. cropping systems/patterns, crop varieties and others) 2.6. Nutritional disorders (deficiencies in NPK and microelements) 2.7. OHS risks, hazards, and prevention 2.8. data collection requirements 2.9. record keeping requirements 2.10. reporting requirements <u>Attitude:</u> 2.11. Accuracy 2.12. Environment-conscious 2.13. Positive work values 2.14. Work ethics 2.15. Cost consciousness 2.16. Safety consciousness

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: <u>Literacy:</u> 3.1. pests and natural enemy recognition, and other beneficial organisms 3.2. symptoms recognition 3.3. familiarity with life cycle/biology, habitat and destructive stage of pest and natural enemies 3.4. follow guidelines and procedures for inspection activities <u>Numeracy:</u> 3.5. density count / estimation 3.6. damage degree estimation 3.7. collect data 3.8. keep records <u>Interpersonal:</u> 3.9. make oral and written reports 3.10. communicate with farmers, team members and supervisor
4. Resource Implications	The following resources MUST be provided: 4.1. vegetable farm or a simulated workplace/demonstration farm 4.2. farm procedures relating to field assessment activities
5. Methods of Assessment	Competency must be assessed through: 5.1. Direct observation with oral questioning 5.2. Demonstration with oral questioning 5.3. Portfolio assessment
6. Context for Assessment	6.1. Assessment should be in a vegetable field or in a simulated workplace/demo farm 6.2. Ability to apply competency over time and on a number of occasions.

UNIT OF COMPETENCY: APPLY BIO-CONTROL MEASURES

UNIT CODE : AGR321321

UNIT DESCRIPTOR: This unit covers the skills, knowledge and attitudes required to apply bio-control measures for pests as a primary IPM strategy. It includes identifying the target pests and their natural enemies and other beneficial organisms, selecting bio-control activities and preparing for the application, implementing the control activities and checking the performance of the said control activities.

ELEMENT	PERFORMANCE CRITERIA (***Italicized terms*** are elaborated in the range of variables)
1. Identify target pests and their natural enemies, and other beneficial organisms	1.1. ***Pests,*** which warrant action, and their ***natural enemies, and other beneficial organisms*** are identified according to ***general classification / life cycle and behavior / signs and symptoms*** *and* ***stage of plant growth*** 1.2. The supervisor, or the pest specialist, is consulted as required to validate data on target pests and their natural enemies, and other beneficial organisms according to ***farm work procedures*** 1.3. Requirement for available ***bio-control measures*** are assessed in line with the ***IPM*** strategy
2. Select bio-control activities and prepare for the application	2.1. Bio-control measures are selected according to target pests and their natural enemies, and other beneficial organisms, availability and appropriateness to prevailing pest density, level of severity/infestation, the ***environment*** and ***other relevant information*** in accordance with farm work procedures 2.2. All necessary ***supplies and materials***, and ***tools, machinery , equipment and facilities*** are prepared according to farm work procedures 2.3. Suitable ***PPE*** is selected according to ***OHS requirements***

ELEMENT	PERFORMANCE CRITERIA
3. Implement control activities	3.1. Appropriate bio-control measures are implemented in line with farm work procedures 3.2. Tools, machinery and equipment, facilities and PPE are used in accordance with OHS requirements
4. Check performance of control activities	4.1. Management options implemented are recorded and monitored in line with farm work procedures 4.2. Supplemental and remedial actions are undertaken, as necessary, according to work instructions 4.3. ***Records*** are maintained according to standard procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Pests	1.1. Insect pests 1.2. Weeds 1.3. Diseases 1.4. Others (snails, birds,rodents, slugs, etc.)
2. Natural enemies and beneficial organisms	2.1. Parasites/parasitoids 2.2. Predators 2.3. Pollinators 2.4. Repellant or refuge plants 2.5. Micro-organisms / Entomopathogens
3. General classification	3.1. Defoliator, borer, miner, root feeder, etc. (for insect pests) 3.2. Grass, broad leaf, or sedge (for weeds) 3.3. Bacterium, fungus, virus, plant parasitic nematode, mycoplasma, viroids (for diseases)
4. Life cycle (for insect pests and their natural enemies, and other beneficial organisms)	4.1 Complete life cycle 4.1.1. Egg 4.1.2. Larva 4.1.3. Pupa 4.1.4. Adult 4.2 Incomplete life cycle 4.2.1. Egg 4.2.2. Nymph 4.2.3. Adult
5. Behavior (for insect pests and natural enemies, and other beneficial organisms)	5.1. Where it stays/ Habitat 5.2. Diurnal/nocturnal 5.3. Destructive stage 5.4. Alternate hosts/predators 5.5. Reproduction as influenced by external factors 5.6. Response to external factors (e.g. rain, severe dehydration, shading) 5.7. Nature and extent of damage 5.8. Critical period of infestation
6. Signs (for insect pests) and	6.1. Signs of pest infestation such as population

symptoms (for diseases)	density, severity of damage, etc. 6.2. Manifestations of the disease such as spotting, rotting, wilting, blighting, curling, yellowing, dwarfing, etc.
7. Stage of plant growth	7.1. Seed / Seedling 7.2. Vegetative stage 7.3. Reproductive stage
8. Farm work procedures	8.1. Supervisor/s' oral and written instructions 8.2. Standard operating procedures 8.3. Pest management plan 8.4. Best practice guidelines on pest management 8.5. Good agricultural practices 8.6. OHS procedures
9. Bio-control measures	9.1. Enhancement of natural enemies population (e.g., avoid indiscriminate use of pesticides) 9.2. Supplemental use of other beneficial organisms (e.g., parasitoids, predators, insect pathogens, entomopathogens) 9.3. Planting repellent and trap crops 9.4. Selective use of botanical pesticides 9.5. Others (e.g., natural population build-up of frogs, lizards, snakes)
10. Integrated Pest Management (IPM)	10.1. Biological, cultural, and physical management options that can be integrated to avoid indiscriminate use of chemical measures
11. Environment	11.1. Soil Fertility 11.2. Soil Type 11.3. Weather Conditions 11.4. Topography 11.5. Water, Etc.
12. Other relevant information	12.1. Crop variety 12.2. Cropping pattern/system 12.3. Stage of the crop
13. Supplies and materials	May include: 13.1. farmer-level or village-laboratory mass-produced biological control agents (e.g., parasitoids, predators, or insect pathogens) 13.2. other natural enemies, or beneficial organisms 13.3. selected botanical pesticides (e.g. chilli or hot pepper solution, marigold extracts) 13.4. repellent crops (e.g. marigold) 13.5. trap crops (e.g. susceptible crops or alternate hosts of destructive pests)

	13.6. cards 13.7. paper strips 13.8. measuring cup, others
14. Tools, machinery , equipment, and facilities	May include: 14.1. village-level bio-control laboratory 14.2. mist blower/sprayer/applicator 14.3. nets, others
15. Personal protective equipment	May include: 15.1. Boots 15.2. Hat/Hard hat 15.3. Coveralls, Gloves 15.4. Protective eyewear 15.5. Hearing protection 15.6. Respirator or face mask 15.7. Sun protection (sun hat, sun screen).
16. OHS requirements	Systems and procedures for: 16.1. the safe operation and maintenance of tools, machinery and equipment. 16.2. identifying hazards, assessing and reporting risks. 16.3. emergency operating procedures. 16.4. safe lifting, carrying and handling techniques. 16.5. manual handling systems and procedures, handling and storage of hazardous substances, and the appropriate use of personal protective clothing and equipment. 16.6. manual on understanding hazards on the use of pesticides to natural enemies, humans, and other non-target organisms 16.7. 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.
17. Records	17.1. Date and time of application 17.2. Location 17.3. Specific control measures implemented 17.4. Supplies and materials used (quantity, cost, etc.) 17.5. Labor (man days and wage rates) 17.6. Field assessment records

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate: 1.1. identified target pests and their natural enemies, and other beneficial organisms 1.2. selected and applied appropriate bio-control measures 1.3. followed work instructions 1.4. complied with OHS requirements The skills and knowledge required to apply bio-control measures for managing pests must be transferable to a different work environment. For example, this may include different vegetables, pests and farms/areas.
2. Underpinning Knowledge and Attitude	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. IPM concepts and principles (Identification, biology, behavior, population dynamics) 2.2. Range of vegetable species / varieties 2.3. Range of common pests and their natural enemies, and other beneficial organisms, including their life cycles 2.4. Economic, aesthetic or environmental thresholds for a range of pests 2.5. Range of applicable bio-control measures 2.6. Occupational health hazards and safety requirements 2.7. Selection, use and maintenance of personal protective equipment 2.8. Relevant provincial/municipal legislations and regulations Attitude: 2.9. Accuracy 2.10. Environment-conscious 2.11. Positive work values 2.12. Work ethics 2.13. Cost consciousness 2.14. Safety consciousness

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: <u>Literacy:</u> 3.1. Recognize common pests of vegetables and their natural enemies, and other beneficial organisms 3.2. Ability to apply appropriate bio-control options 3.3. Differentiate between symptoms and manifestations of diseases and nutrient deficiencies 3.4. Ability to apply appropriate disease and nutrient management options 3.5. Use, maintain and store appropriate PPE 3.6. Follow work instructions <u>Numeracy:</u> 3.7. Density count / estimation 3.8. Damage degree estimation 3.9. Collect data 3.10. Keep records <u>Interpersonal skills:</u> 3.11. Make oral and written reports 3.12. Communicate with farmers, team members and supervisor
4. Resource Implications	The following resources MUST be provided: 4.1. Vegetable farm or a simulated workplace/demo farm 4.2. Village-level bio-control mass-rearing laboratories 4.3. Enterprise procedures relating to bio-control measures
5. Methods of Assessment	Competency must be assessed through: 5.1. Direct observation with oral questioning 5.2. Demonstration with oral questioning 5.3. Portfolio assessment
6. Context for Assessment	6.1. Assessment should be in a vegetable farm or in a simulated workplace/demo farm 6.2. Ability to apply competency over time and on a number of occasions.

UNIT OF COMPETENCY: APPLY CULTURAL MANAGEMENT STRATEGIES

UNIT CODE : AGR321322

UNIT DESCRIPTOR: This unit covers the skills, knowledge and attitude required to apply cultural management strategies for pests, in line with the IPM strategy. It includes identifying the target pests and their natural enemies, and other beneficial organisms, selecting the cultural management strategies and preparing for their implementation, implementing the control activities and checking the performance of the control activities.

ELEMENT	PERFORMANCE CRITERIA (*Italicized* terms are elaborated in the range of variables)
1. Identify target pests and their natural enemies, and other beneficial organisms	1.1. ***Pests,*** which warrant action, and their ***natural enemies, and other beneficial organisms*** are identified according to ***general classification / life cycle and behavior / signs and symptoms*** and ***stage of plant growth*** 1.2. The supervisor, or the pest specialist, is consulted as required to validate identification of target pests according to ***farm work procedures*** 1.3. Requirement for ***cultural management strategies*** are assessed in line with the ***IPM*** strategy
2. Select cultural management strategies and prepare for implementation	2.1. Cultural management strategies are selected according to target pest and their natural enemies, and other beneficial organisms, availability and appropriateness to prevailing pest density, level of severity/infestation, the ***environment*** and ***other relevant information*** in accordance with farm work procedures 2.2. All necessary ***supplies and materials,*** and ***tools, machinery and equipment*** are prepared according to farm work procedures 2.3. Suitable ***personal protective equipment*** is selected according to ***OHS requirements***

3. Implement control activities	3.1. Appropriate cultural management strategies are implemented in line with farm work procedures 3.2. Tools, machinery and equipment, as well as PPE are used in accordance with OHS requirements
4. Check performance of control activities	4.1. Control activities are recorded and monitored in line with farm work procedures 4.2. Supplemental and remedial actions are undertaken, if necessary, according to work instructions 4.3. ***Records*** are maintained according to standard procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Pests	1.1. Insect pests 1.2. Weeds 1.3. Diseases 1.4. Others (snails, birds,rodents, slugs, etc.)
2. Natural enemies and beneficial organisms	2.1. Parasites/parasitoids 2.2. Predators 2.3. Pollinators 2.4. Repellant or refuge plants 2.5. Micro-organisms / Entomopathogens
3. General classification	3.1. Defoliator, borer, miner, root feeder, etc. (for insect pests) 3.2. Grass, broad leaf, or sedge (for weeds) 3.3. Bacterium, fungus, virus, plant parasitic nematode, mycoplasma, viroids (for diseases)
4. Life cycle (for insect pests and their natural enemies, and other beneficial organisms)	4.1 Complete life cycle 4.1.1. Egg 4.1.2. Larva 4.1.3. Pupa 4.1.4. Adult 4.2 Incomplete life cycle 4.2.1. Egg 4.2.2. Nymph 4.2.3. Adult 4.2.4. Niad 4.2.5. Adult
5. Behavior (for insect pests and natural enemies, and other beneficial organisms)	5.1. Where it stays/ Habitat 5.2. Diurnal/nocturnal 5.3. Destructive stage 5.4. Alternate hosts/predators 5.5. Reproduction as influenced by external factors 5.6. Response to external factors (e.g. rain, severe dehydration, shading) 5.7. Nature and extent of damage 5.8. Critical period of infestation
6. Signs (for insect pests) and	6.1. Signs of pest infestation such as population density, severity of damage, etc.

symptoms (for diseases)	6.2. Manifestations of the disease such as spotting, rotting, wilting, blighting, curling, yellowing, dwarfing, etc.
7. Stage of plant growth	7.1. Seed / Seedling 7.2. Vegetative stage 7.3. Reproductive stage
8. Farm work procedures	8.1. Supervisor/s' oral and written instructions 8.2. Standard operating procedures 8.3. Pest management plan 8.4. Best practice guidelines on pest management 8.5. Good agricultural practices 8.6. OHS procedures
9. Cultural management strategies	9.1. Land preparation 9.2. Hilling up 9.3. Pruning / Thinning 9.4. Trellising 9.5. Weeding 9.6. Irrigation 9.7. Sanitation 9.8. Soil sterilization / solarization 9.9. Mulching 9.10. Timing of planting and harvesting 9.11. Use of resistant varieties 9.12. Crop rotation 9.13. Intercropping 9.14. Others
10. Integrated Pest Management (IPM)	10.1 Biological, cultural, and physical management options that can be integrated to avoid indiscriminate use of chemical measures
11. Environment	11.1 Soil Fertility 11.2 Soil Type 11.3 Weather Conditions 11.4 Topography 11.5 Water, Etc
12. Other relevant information	12.1. Crop variety 12.2. Cropping pattern/system 12.3. Stage of the crop
13. Supplies and materials	May include: 13.1. fumigants 13.2. disinfectants 13.3. soil inoculants (e.g trichoderma for soil sterilization) 13.4. planting materials of resistant crops and intercrops 13.5. wires 13.6. bamboo poles 13.7. mulching materials 13.8. plastic sheets, others

14. Tools, machinery , equipment, and facilities	14.1 Tools may include: 14.1.1 hoe 14.1.2 bolo 14.1.3 shovel 14.1.4 hose 14.1.5 pruning shears/scissors, others 14.2 Machinery and equipment may include: 14.2.1 tractor 14.2.2 other farm implements 14.2.3 animal-drawn farm implements
15. Personal protective equipment	May include: 15.1. Boots 15.2. Hat/Hard hat 15.3. Coveralls, Gloves 15.4. Protective eyewear 15.5. Hearing protection 15.6. Respirator or face mask 15.7. Sun protection (sun hat, sun screen).
16. OHS requirements	Systems and procedures for: 16.1. the safe operation and maintenance of tools, machinery and equipment. 16.2. identifying hazards, assessing and reporting risks. 16.3. emergency operating procedures. 16.4. safe lifting, carrying and handling techniques. 16.5. manual handling systems and procedures, handling and storage of hazardous substances, and the appropriate use of personal protective clothing and equipment. 16.6. 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.
17. Records	17.1. Date and time of application 17.2. Location 17.3. Specific control measures implemented 17.4. Supplies and materials used (quantity, cost, etc.) 17.5. Labor (man days and wage rates) 17.6. Field assessment records

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate: 1.1. identified target pests, their natural enemies and other beneficial organisms 1.2. selected and applied appropriate cultural management strategies 1.3. followed work instructions 1.4. complied with OHS requirements The skills and knowledge required to apply cultural management strategies for managing pests must be transferable to a different work environment. For example, this may include different vegetables, pests and farms/areas.
2. Underpinning Knowledge and Attitude	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 <u>knowledge</u> requirements for this competency standard are listed below: 2.1. IPM concepts and principles (Identification, biology, behavior, population dynamics) 2.2. Range of vegetable species / varieties 2.3. Range of common pests and their natural enemies 2.4. Economic, aesthetic or environmental thresholds for a range of pests 2.5. Cultural management strategies 2.6. Range and use of tools, equipment and machinery for applying cultural management strategies 2.7. Occupational health and safety requirements 2.8. Selection, use and maintenance of personal protective equipment 2.9. Relevant provincial/municipal legislation and regulations <u>Attitude:</u> 2.10. Accuracy 2.11. Environment-conscious 2.12. Positive work values 2.13. Work ethics 2.14. Cost consciousness 2.15. Safety consciousness

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: <u>Literacy:</u> 3.1. Recognize common pests of vegetables and their natural enemies 3.2. Differentiate between symptoms of diseases and nutrient deficiencies 3.3. Apply cultural management strategies 3.4. Use, maintain and store appropriate PPE 3.5. Follow work instructions <u>Numeracy:</u> 3.6. Density count / estimation 3.7. Damage degree estimation 3.8. Collect data 3.9. Keep records <u>Interpersonal:</u> 3.10. Make oral and written reports 3.11. Communicate with farmers, team members and supervisor
4. Resource Implications	The following resources MUST be provided: 4.1. Vegetable farm or a simulated workplace 4.2. Enterprise procedures relating to cultural management strategies
5. Methods of Assessment	Competency must be assessed through: 5.1. Direct observation with oral questioning 5.2. Demonstration with oral questioning 5.3. Portfolio assessment
6. Context for Assessment	6.1. Assessment should be in a vegetable farm or in a simulated workplace 6.2. Demonstration of competency over time and on a number of occasions.

UNIT OF COMPETENCY: APPLY PHYSICAL-CONTROL MEASURES

UNIT CODE : AGR321323

UNIT DESCRIPTOR: This unit covers the skills, knowledge and attitude required to apply physical-control measures for pests, in line with the IPM strategy. It includes identifying the target pests and their natural enemies, and other beneficial organisms, selecting the physical control activities and preparing for their implementation, implementing the control activities and checking the performance of the control activities.

ELEMENT	PERFORMANCE CRITERIA (*Italicized* terms are elaborated in the range of variables)
1. Identify target pests and their natural enemies, and other beneficial organisms	1.1. ***Pests,*** which warrant action, and their ***natural enemies, and other beneficial organisms*** are identified according to ***general classification / life cycle and behavior / signs and symptoms*** and ***stage of plant growth*** 1.2. The supervisor, or the pest specialist, is consulted as required to validate identification of target pests according to ***farm work procedures*** 1.3. Requirement for ***physical control measures*** is assessed in line with the ***IPM*** strategy
2. Select physical control measures and prepare for implementation	2.1. Physical control measures are selected according to target pest and their natural enemies, and other beneficial organisms, availability and appropriateness to prevailing pest density, level of severity/infestation, the ***environment*** and ***other relevant information*** in accordance with farm work procedures 2.2. All necessary ***supplies and materials,*** and ***tools, machinery and equipment*** are prepared according to farm work procedures 2.3. Suitable ***personal protective equipment*** is selected according to ***OHS requirements***

ELEMENT	PERFORMANCE CRITERIA
3. Implement control activities	3.1. Appropriate physical control measures are implemented in line with farm work procedures 3.2. Tools, machinery and equipment, as well as PPE are used in accordance with OHS requirements
4. Check performance of control activities	4.1. Control activities are recorded and monitored in line with farm work procedures 4.2. Supplemental and remedial actions are undertaken, if necessary, according to work instructions 4.3. ***Records*** are maintained according to standard procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Pests	1.1. Insect pests 1.2. Weeds 1.3. Diseases 1.4. Others (snails, birds,rodents, slugs, etc.)
2. Natural enemies and beneficial organisms	2.6. Parasites/parasitoids 2.7. Predators 2.8. Pollinators 2.9. Repellant or refuge plants 2.10. Micro-organisms / Entomopathogens
3. General classification	3.1. Defoliator, borer, miner, root feeder, etc. (for insect pests) 3.2. Grass, broad leaf, or sedge (for weeds) 3.3. Bacterium, fungus, virus, plant parasitic nematode, mycoplasma, viroids (for diseases)
4. Life cycle (for insect pests and their natural enemies, and other beneficial organisms)	4.1 Complete life cycle 4.1.1. Egg 4.1.2. Larva 4.1.3. Pupa 4.1.4. Adult 4.2 Incomplete life cycle 4.2.1. Egg 4.2.2. Nymph 4.2.3. Adult
5. Behavior (for insect pests and natural enemies, and other beneficial organisms)	5.1. Where it stays/ Habitat 5.2. Diurnal/nocturnal 5.3. Destructive stage 5.4. Alternate hosts/predators 5.5. Reproduction as influenced by external factors 5.6. Response to external factors (e.g. rain, severe dehydration, shading) 5.7. Nature and extent of damage 5.8. Critical period of infestation
6. Signs (for insect	6.1. Signs of pest infestation such as population

pests) and symptoms (for diseases)	density, severity of damage, etc. 6.2. Manifestations of the disease such as spotting, rotting, wilting, blighting, curling, yellowing, dwarfing, etc.
7. Stage of plant growth	7.1. Seed / Seedling 7.2. Vegetative stage 7.3. Reproductive stage
8. Farm work procedures	8.1. Supervisor/s' oral and written instructions 8.2. Standard operating procedures 8.3. Pest management plan 8.4. Best practice guidelines on pest management 8.5. Good agricultural practices 8.6. OHS procedures
9. Physical control measures	9.1. Hand pulling 9.2. Hoeing 9.3. Tillage 9.4. Mulching 9.5. Wrapping / bagging 9.6. Pruning / thinning 9.7. Use of physical barriers (e.g. nets) 9.8. Traps (e.g. sticky traps, bait traps) 9.9. Others
10. Integrated Pest Management (IPM)	10.1. Biological, cultural, and physical management options that can be integrated to avoid indiscriminate use of chemical measures
11. Environment	11.1. Soil Fertility 11.2. Soil Type 11.3. Weather Conditions 11.4. Topography 11.5. Water, Etc.
12. Other relevant information	12.1. Crop variety 12.2. Cropping pattern/system 12.3. Stage of the crop
13. Supplies and materials	May include: 13.1. gloves 13.2. mulching materials (e.g. cogon grass, rice straw, other grasses) 13.3. plastic (e.g. polyethylene sheets) 13.4. wrapping/bagging materials (e.g. newspaper, plastic) 13.5. disinfectants 13.6. trapping materials 13.7. nets
14. Tools, machinery ,	May include:

equipment, and facilities	14.1 hoe 14.2 bolo 14.3 shovel 14.4 pruning shears 14.5 work animal 14.6 animal- drawn farm implements
15. Personal protective equipment	May include: 15.1. Boots 15.2. Hat/Hard hat 15.3. Coveralls, Gloves 15.4. Protective eyewear 15.5. Hearing protection 15.6. Respirator or face mask 15.7. Sun protection (sun hat, sun screen)
16. OHS requirements	Systems and procedures for: 16.1. the safe operation and maintenance of tools, machinery and equipment. 16.2. identifying hazards, assessing and reporting risks. 16.3. emergency operating procedures. 16.4. safe lifting, carrying and handling techniques. 16.5. manual handling systems and procedures, handling and storage of hazardous substances, and the appropriate use of personal protective clothing and equipment. 16.6. 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.
17. Records	17.1. Date and time of application 17.2. Location 17.3. Specific control measures implemented 17.4. Supplies and materials used (quantity, cost, etc.) 17.5. Labor (man days and wage rates) 17.6. Field assessment records

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate: 1.1. identified target pests and their natural enemies, and other beneficial organisms 1.2. selected and applied physical control measures 1.3. followed work instructions 1.4. complied with OHS requirements The skills and knowledge required to apply physical control measures for managing pests must be transferable to a different work environment. For example, this may include different vegetables, pests and farms/areas.
2. Underpinning Knowledge and Attitude	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 <u>knowledge</u> requirements for this competency standard are listed below: 2.1. IPM concepts and principles (Identification, biology, behavior, population dynamics) 2.2. Range of vegetable species / varieties 2.3. Range of common pests and their natural enemies 2.4. Economic, aesthetic or environmental thresholds for a range of pests 2.5. Physical control measures 2.6. Range and use of tools and farm implements for applying physical control measures 2.7. Occupational health and safety requirements 2.8. Selection, use and maintenance of personal protective equipment 2.9. Relevant provincial/municipal legislation and regulations <u>Attitude:</u> 2.10. Accuracy 2.11. Environment-conscious 2.12. Positive work values 2.13. Work ethics 2.14. Cost consciousness 2.15. Safety consciousness

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: <u>Literacy:</u> 3.1. Recognize common pests of vegetables and their natural enemies 3.2. Differentiate between symptoms of diseases and nutrient deficiencies 3.3. Apply physical control measures 3.4. Use, maintain and store appropriate PPE 3.5. Follow work instructions <u>Numeracy:</u> 3.6. Density count / estimation 3.7. Damage degree estimation 3.8. Collect data 3.9. Keep records <u>Interpersonal:</u> 3.10. Make oral and written reports 3.11. Communicate with farmers, team members and supervisor
4. Resource Implications	The following resources MUST be provided: 4.1. Vegetable farm or a simulated workplace/demo farm 4.2. Enterprise procedures relating to physical control measures
5. Methods of Assessment	Competency must be assessed through: 5.1. Direct observation with oral questioning 5.2. Demonstration with oral questioning 5.3. Portfolio assessment
6. Context for Assessment	6.1. Assessment should be in a vegetable farm or in a simulated workplace/demo farm 6.2. Demonstration of competency over time and on a number of occasions.

UNIT OF COMPETENCY: APPLY CHEMICAL CONTROL MEASURES

UNIT CODE : AGR321324

UNIT DESCRIPTOR: This unit covers the skills, knowledge and attitude required when one decides to apply chemical control measures, after thorough consideration of non-chemical alternatives within the integrated pest management strategy. It involves identification of the target pest and their natural enemies, and other beneficial organisms, selecting the appropriate pesticide, preparing for its safe application, actual application, cleaning up after, and record keeping.

ELEMENT	PERFORMANCE CRITERIA (*Italicized* terms are elaborated in the range of variables)
1. Identify target pests and their natural enemies, and other beneficial organisms	1.1. ***Pests,*** which warrant action, and their ***natural enemies, and other beneficial organisms*** are identified according to ***general classification / life cycle and behavior / signs and symptoms*** and ***stage of plant growth*** 1.2. The supervisor, or the pest specialist, is consulted as required to validate identification of target pests and their natural enemies according to ***farm work procedures*** 1.3. Requirement for ***pesticide*** use is assessed as an option after consideration of non-chemical alternatives within the ***IPM*** strategy
2. Select appropriate pesticide	2.1. Appropriate pesticide(s) is(are) selected based on target pest, pest and natural enemy density, level of severity/infestation, ***environment*** and ***other relevant information*** in accordance with farm work procedures 2.2. ***Labels*** are checked according to requirements and specifications 2.3. Pesticide to be used is in accordance with ***legislations and regulations*** 2.4. ***OHS hazards*** are identified, risks assessed, controls implemented and reported to the supervisor according to farm work procedures

3. Prepare for the application of appropriate pesticide	3.1. Suitable ***personal protective equipment*** is selected according to product label and safety requirements 3.2. Suitable ***application equipment and tools*** are selected according to farm work procedures 3.3. ***Pre-operational and safety checks*** on application equipment and tools are carried out, and calibrations and adjustments made, according to manufacturers' specifications and farm work procedures 3.4. Pesticide mixing rates are defined and calculated according to requirements and specifications 3.5. Pesticides are mixed according to directions, standards and legislative requirements
4. Apply appropriate pesticide	4.1. ***Meteorological conditions*** and forecasts are assessed prior to and during application according to farm work procedures 4.2. Specific products are applied in accordance with prescribed timing, rate and method according to farm work procedures and product labels/directions, with due consideration of the ***environmental implications*** 4.3. Appropriate PPE are used according to farm work procedures and product labels/directions
5. Clean up following application	5.1. Application equipment and tools are cleaned and stored according to farm work procedures 5.2. Unused chemicals are stored or disposed of according to storage temperature requirements, standard procedures and label directions 5.3. Used containers are disposed of properly according to prescribed procedures 5.4. Site is cleaned according to directions and standards 5.5. Chemical spills are handled according to standard procedures 5.6. Personal safety is observed according to prescribed procedures

6. Check and record performance of control activities	6.1. Product applications are recorded according to farm work procedures 6.2. Supplemental and remedial actions are undertaken, if necessary, according to work instructions 6.3. Observable adverse effects to natural enemies, humans, farm animals and the environment are recorded according to farm work procedures 6.4. ***Records*** are maintained as required by legislation and enterprise guidelines
7. Transport, handle and store chemicals	7.1. Chemicals are transported or carried to and from the farm building using specified container/equipment and materials 7.2. Unused chemicals are properly stored using first in first out system

RANGE OF VARIABLES

VARIABLE	RANGE
1. Pests	1.1. Insect pests 1.2. Weeds 1.3. Diseases 1.4. Others (snails, birds,rodents, slugs, etc.)
2. Natural enemies and beneficial organisms	2.1. Parasites/parasitoids 2.2. Predators 2.3. Pollinators 2.4. Repellant or refuge plants 2.5. Micro-organisms / Entomopathogens
3. General classification	3.1. Defoliator, borer, miner, root feeder, etc. (for insect pests) 3.2. Grass, broad leaf, or sedge (for weeds) 3.3. Bacterium, fungus, virus, plant parasitic nematode, mycoplasma, viroids (for diseases)
4. Life cycle (for insect pests and their natural enemies, and other beneficial organisms)	4.1 Complete life cycle 4.1.1. Egg 4.1.2. Larva 4.1.3. Pupa 4.1.4. Adult 4.2 Incomplete life cycle 4.2.1. Egg 4.2.2. Nymph 4.2.3. Adult
5. Behavior (for insect pests and natural enemies, and other beneficial organisms)	5.1. Where it stays/ Habitat 5.2. Diurnal/nocturnal 5.3. Destructive stage 5.4. Alternate hosts/predators 5.5. Reproduction as influenced by external factors 5.6. Response to external factors (e.g. rain, severe dehydration, shading) 5.7. Nature and extent of damage 5.8. Critical period of infestation

6. Signs (for insect pests) and symptoms (for diseases)	6.1. Signs of pest infestation such as population density, severity of damage, etc. 6.2. Manifestations of the disease such as spotting, rotting, wilting, blighting, curling, yellowing, dwarfing, etc.
7. Stage of plant growth	7.1. Seed / Seedling 7.2. Vegetative stage 7.3. Reproductive stage
8. Farm work procedures	8.1. Supervisor/s' oral and written instructions 8.2. Standard operating procedures 8.3. Pest management plan 8.4. Best practice guidelines on pest management 8.5. Good agricultural practices 8.6. OHS procedures
9. Pesticide	9.1. Herbicide 9.2. Insecticide 9.3. Fungicide 9.4. Bactericide 9.5. Nematicide 9.6. Rodenticide 9.7. Acaricide 9.8. Other chemicals for managing pests
10. Integrated Pest Management (IPM)	10.1. Biological, cultural, and physical management options that can be integrated to avoid indiscriminate use of chemical measures
11. Environment	11.1. Soil Fertility 11.2. Soil Type 11.3. Weather Conditions 11.4. Topography 11.5. Water, Etc.
12. Other relevant information	12.1. Crop variety 12.2. Cropping pattern/system 12.3. Stage of the crop
13. Labels	13.1. Pesticide label may be: 13.1.1. green (less toxic) 13.1.2. blue (slightly toxic) 13.1.3. yellow (moderately toxic) or 13.1.4. red (highly toxic). 13.2. The label also defines the: 13.2.1. active ingredient

	13.2.2. the re-entry period 13.2.3. manufacturer's recommended dosages 13.2.4. time intervals between applications 13.2.5. compatibility with other pesticides 13.2.6. expiration date
14. Legislations and regulations	May include: 14.1. Pesticides Acts, 14.2. Occupational Health and Safety Acts 14.3. Hazardous Substances Regulations/ Codes of Practice 14.4. Dangerous Drugs Acts 14.5. Poisons Act 14.6. Protection of the Environment Acts.
15. OHS hazards and risks	15.1. 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. 15.2 Risks may include acute poisoning, chronic or long-term health effects, and lack of appropriate insurance coverage
16. Personal protective equipment	May include: 16.1. Boots 16.2. Hat/Hard hat 16.3. Coveralls, Gloves 16.4. Protective eyewear 16.5. Hearing protection 16.6. Respirator or face mask 16.7. Sun protection (sun hat, sun screen).
17. Application equipment	17.1 Sprayer (e.g. knapsack, hand held pneumatic sprayers, power sprayers)
18. Pre-operational and safety checks	Checks may be made on: 18.1. weather conditions (e.g., wind) 18.2. application equipment 18.3. nozzles 18.4. hoses 18.5. regulators/gauges 18.6. respirator 18.7. cartridges 18.8. drench and protective clothing and equipment.

19. Meteorological conditions	19.1 Rain, wind, temperature, and relative humidity
20. Environmental implications	20.1 Detrimental environmental impacts may arise where excessive/indiscriminate use and improper disposal of chemicals and waste materials lead to contamination of the produce, water systems, among others.
21. Records	21.1. Date and time of application 21.2. Location 21.3. Specific control measures implemented 21.4. Rate of application 21.5. Supplies and materials used (quantity, cost, etc.) 21.6. Labor (man days and wage rates) 21.7. Chemical disposal methods 21.8. Success of treatments 21.9. Observable negative effects on the environment 21.10. Economic thresholds 21.11. Effectivity of the pesticides / results of application 21.12. Inventory records 21.13. Field assessment records

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate, after consideration of available non-chemical alternatives: 1.1. Selected, prepared and applied appropriate pesticide 1.2. Followed work instructions 1.3. Complied with OHS requirements The skills and knowledge required to apply chemicals must be transferable to a different work environment. For example, this could include different chemicals, application methods, vegetables, pests, and farms/areas.
2. Underpinning Knowledge and Attitude	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. IPM concepts and principles (Identification, biology, behavior, population dynamics) 2.2. Range of vegetable species / varieties 2.3. Recognition of common pests of vegetables and their natural enemies 2.4. Economic, aesthetic or environmental thresholds for a range of pests 2.5. Impact of pesticides on the environment (e.g., on natural enemies, humans and other non-target organisms) as well as human health 2.6. Proper transport, handling and storage of pesticides 2.7. Proper disposal of pesticides 2.8. Types/classification, uses, application rates and their calculations, and methods of application of chemicals 2.9. Range and use of tools and equipment for implementing chemical control measures 2.10. Calibration and adjustments of application equipment 2.11. Pre-operational and safety check requirements for application tools, machinery and equipment Cost effective use of chemicals

	2.12. Selection, use and maintenance of PPE 2.13. OHS issues, legislative requirements and Codes of Practice relevant to chemical use and hazardous substances <u>Attitude:</u> 2.14. Accuracy 2.15. Environment-conscious 2.16. Positive work values 2.17. Work ethics 2.18. Cost consciousness 2.19. Safety consciousness
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: <u>Literacy:</u> 3.1. Recognize common pests of vegetables and their natural enemies 3.2. Differentiate between symptoms of diseases and nutrient deficiencies 3.3. Use, maintain and store appropriate PPE 3.4. Skill in operation of application equipment 3.5. Proper transport, handling and storage of pesticides 3.6. Read and interpret chemical labels 3.7. Follow work instructions <u>Numeracy:</u> 3.8. Calculate quantities and application rates of chemicals 3.9. Calibrate equipment 3.10. Collect data 3.11. Keep records <u>Interpersonal:</u> 3.12. Make oral and written reports 3.13. Communicate with farmers, team members and supervisor

4. Resource Implications	The following resources MUST be provided: 4.1 Vegetable farm or simulated workplace/demo farm 4.2 Materials, tools, machinery and equipment for chemical mixing and application, and storage facilities 4.3 Enterprise procedures relating to chemical use
5. Methods of Assessment	Competency must be assessed through: 5.1. Direct observation with oral questioning 5.2. Demonstration with oral questioning 5.3. Portfolio assessment
6. Context for 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: **MONITOR RESULTS OF PEST-MANAGEMENT ACTIVITIES AND PROVIDE FEEDBACK**

UNIT CODE **:** AGR321325

UNIT DESCRIPTOR: This unit covers the skills and knowledge required for monitoring the results of control activities and providing feedback. It involves checking and recording the performance of control activities and addressing the performance of control activities.

ELEMENT	PERFORMANCE CRITERIA (***Italicized terms*** are elaborated in the range of variables)
1. Check and record performance of control activities	1.1 Targeted plant response to ***pest management activities*****,** as well as any non-targeted effects such as environmental impact or pest responses, is regularly monitored and recorded, according to work instructions, ***OHS requirements*** and protocols and standards 1.2 Progress report is prepared and submitted to supervisor as required, according to ***farm work procedures***
2. Address performance of control activities	2.1 Any gap or deviation from expected results of control activities is reported to supervisor according to standard procedures 2.2 Adjustments to control measures are implemented, where necessary, according to work instructions 2.3 ***Records*** are kept and updated regularly according to farm work procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Pest management activities	1.1. Bio-control measures 1.2. Physical control measures 1.3. Cultural management strategies 1.4. Chemical control measures
2. OHS requirements	Systems and procedures for: 2.1. the safe operation and maintenance of machinery and equipment including hydraulics and guarding of exposed moving parts. 2.2. identifying hazards, assessing and reporting risks. 2.3. emergency operating procedures. 2.4. safe lifting, carrying and handling techniques. 2.5. manual handling systems and procedures, handling and storage of hazardous substances, and the appropriate use of personal protective clothing and equipment. 2.6. 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.
3. Farm work procedures	3.1. Supervisor/s' oral and written instructions 3.2. Standard operating procedures 3.3. Pest management plan 3.4. Best practice guidelines on pest management 3.5. Good agricultural practices 3.6. OHS procedures
4. Record	4.1. Date and time of monitoring 4.2. Location 4.3. Specific control measures implemented 4.4. Success of treatments 4.5. Observable negative effects on the environment 4.6. Effectivity of the control measures implemented / results of application

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate: 1.1 Monitored results of control activities and provided feedback 1.2 Followed work instructions The skills and knowledge required to monitor results of control activities and provide feedback must be transferable to a different work environment. For example, this may include different crops, control measures and farms/areas.
2. Underpinning Knowledge and Attitude	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. Types of control measures 2.2. Expected effects/impacts of control measures 2.3. Possible remedial actions for gaps/deviations between the effect/impact of control measures and actual results 2.4. OHS requirements 2.5. Record keeping requirements 2.6. Reporting requirements 2.7. Monitoring requirements <u>Attitude:</u> 2.8. Accuracy 2.9. Environment-conscious 2.10. Positive work values 2.11. Work ethics 2.12. Cost consciousness 2.13. Safety consciousness
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: <u>Literacy:</u> 3.1. Determine gaps/deviations between expected effect/impact and actual results 3.2. Prepare and use properly tools, equipment and machinery, including PPE,

	for pest management activities 3.3. Apply remedial actions, when necessary 3.4. Follow work instructions <u>Numeracy:</u> 3.5. Collect data 3.6. Keep records <u>Interpersonal:</u> 3.7. Make oral and written reports 3.8. Communicate with farmers, team members and supervisor
4. Resource Implications	The following resources MUST be provided: 4.1. Vegetable farm or simulated workplace / demo farm 4.2. Enterprise procedures relating to pest management activities
5. Methods of Assessment	Competency must be assessed through: 5.1. Direct observation with oral questioning 5.2. Demonstration with oral questioning 5.2. Portfolio assessment
6. Context for 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

SECTION 3. TRAINING STANDARDS

These guidelines are set to provide the Technical and Vocational Education and Training (TVET) providers with information and other important requirements to consider when designing training programs for **PEST MANAGEMENT (VEGETABLES) NC II.**

3.1 CURRICULUM DESIGN

Course Title: **PEST MANAGEMENT (VEGETABLES) NC II**

Nominal Training Duration: 18 Hours (Basic)
14 Hours (Common)
280 Hours (Core)
312 Total Hours

Course Description:

The **PEST MANAGEMENT (VEGETABLES) NC II** Qualification consists of competencies that a person must achieve in vegetable pest management in both backyard and commercial farms. It covers the basic, common and core competencies.

BASIC COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Participate in workplace communication	1.1 Obtain and convey workplace information 1.2 Complete relevant work related documents 1.3 Participate in workplace meeting and discussion	• Group discussion • Interaction	• Demonstration • Observation • Interviews/ questioning
2. Work in a team environment	2.1 Describe and identify team role and responsibility in a team 2.2 Describe work as a team member	• Discussion • Interaction	• Demonstration • Observation • Interviews/ questioning
3. Practice career professionalism	3.1 Integrate personal objectives with organizational goals 3.2 Set and meet work priorities 3.3 Maintain professional growth and development	• Discussion • Interaction	• Demonstration • Observation • Interviews/ questioning

4. Practice occupational health and safety	4.1 Evaluate hazard and risks 4.2 Control hazards and risks 4.3 Maintain occupational health and safety awareness	• Discussion • Plant tour • Symposium	• Observation • Interview

COMMON COMPETENCIES

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

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Conduct field assessment	1.1. Assess the area 1.2. Identify the pest and their natural enemies, and other beneficial organisms 1.3. Collect data related to natural enemy populations and pest infestations 1.4. Maintain records and provide feedback	• Lecture/ Discussion • Direct observation • Practical demonstration	• Direct observation with oral questioning • Practical demonstration with oral questioning • Portfolio assessment
2. Apply bio-control measures	2.1. Identify target pests and their natural enemies, and other beneficial organisms 2.2. Select the bio-control activities and prepare for their implementation 2.3. Implement control activities 2.4. Check performance of control activities	• Lecture/ Discussion • Direct observation • Practical demonstration	• Direct observation with oral questioning • Practical demonstration with oral questioning • Portfolio assessment
4. Apply cultural management strategies	3.1. Identify target pests and their natural enemies, and other beneficial organisms 3.2. Select the cultural management strategies and prepare for their implementation 3.3. Implement control activities 3.4. Check performance of control activities	• Lecture/ Discussion • Direct observation • Practical demonstration	• Direct observation with oral questioning • Practical demonstration with oral questioning • Portfolio assessment

4. Apply physical control	4.1. Identify target pests and their natural enemies, and other beneficial organisms 4.2. Select the physical control measures and prepare for their implementation 4.3. Implement control activities 4.4. Check performance of control activities	• Lecture/ Discussion • Direct observation • Practical demonstration	• Direct observation with oral questioning • Practical demonstration with oral questioning • Portfolio assessment
5.Apply chemical control	5.1. Identify the target pests and their natural enemies 5.2. Select the appropriate chemical 5.3. Prepare for the application of the chemical 5.4. Apply chemical 5.5. Clean up following application 5.6. Record chemical control activities 5.7. Transport, handle and store chemicals	• Lecture/ Discussion • Direct observation • Practical demonstration	• Direct observation with oral questioning • Practical demonstration with oral questioning • Portfolio assessment
6. Monitor results of pest management activities and provide feedback	6.1. Check performance of control activities 6.2. Address performance of control activities	• Lecture/ Discussion • Direct observation • Practical demonstration	• Direct observation with oral questioning • Practical demonstration with oral questioning • Portfolio assessment

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 learner-centered and should accommodate individualized and self-paced learning strategies;
- 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 program allows for recognition of prior learning (RPL) or current competencies;
- Training allows for multiple entry and exit; and
- Training programs are registered with UTPRAS.

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 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, or audio, video or computer technologies.
- Project-Based Instruction is an authentic instructional model or strategy in which students plan, implement and evaluate projects that have real world applications.

3.3 TRAINEE ENTRY REQUIREMENTS

Trainees or students wishing to enroll in this course should possess the following requirements:

- Ability to communicate, both orally and in writing; and
- Physically fit and mentally healthy as certified by a Public Health Officer.

4.1 LIST OF TOOLS, EQUIPMENT AND MATERIALS

PEST MANAGEMENT (VEGETABLES) NC II

Recommended list of tools, equipment and materials for the training of 25 trainees for Pest Management for Vegetables NC II.

QTY	TOOLS	QTY	EQUIPMENT	QTY	MATERIALS
5 pcs	Measuring cup	5 pcs	Knapsack sprayer	5 different samples	vegetables
10 pcs	Shovel	1pc	Power sprayer	5 different samples	pests
5 pcs	Light hoe	1unit	Mower	5 different samples	repellant and trap crops
25 pcs	Bolo	1 unit	Tractor/carabao	5 different samples	beneficial organisms
1 pc	Harrow			25 pcs	Protective eyewear
1 pc	Animal-drawn plow			25 pairs	Rubber boots
1 pc	Disc plow			25 pairs	Gloves
5 pcs	Cutting tools	1unit	Overhead projector/LCD projector	25 pcs	Mask
5 sets	Digging tools	5 units	Computer	25 pcs	Hearing protection
5 sets	Knife			5 pcs	Catching nets
5 pcs	Pruning shears		**OTHERS**		Botanical pesticides
25 pcs	Trowel	1 lot	Storage area	5 bottles	Fungicides
25 pcs	Sprinklers			5 bottles	Insecticides
15 pcs	Rake				Cleaning agents (e.g. detergent, soap)
10 pcs	Broomstick			5 pcs	Cloth

5 pcs	Container			5 sacks	Mulching materials
25 pcs	Hat		**LEARNING MATERIALS**	3 sacks	Rice hull
2 pcs	Storage tools/cabinet		Instructional supplies and materials	5 pcs	Pail
10 pcs	Scissors		Reference materials / books	3 rolls	Rope
5 pcs	Calculator		Visual aids	250 pcs	Agri bags, plastic
			Procedural manuals		
				5 pcs	Marking pens
				25 pcs	Pens
				25 pcs	Pencils
				25 pcs	Notebooks
				5 reams	Bond paper
				3 dozens	Paper clips
				1 kit	First aide supplies/ medicine

3.5 TRAINING FACILITIES

PEST MANAGEMENT (VEGETABLES) NC II

Based on a class size of 25 students/trainees

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	TOTAL AREA IN SQ. METERS
A. Building (permanent)			
• Student/Trainee Working Space	2.00 x 2.00 per student trainee	4.00 per student	100.00
• Lecture Room	7.00 x 5.00	35.00	35.00
• Learning Resource Center (Library)	3.00 x 5.00	15.00	15.00
• Facilities/Equipment/ Circulation Area (30% of teaching accommodation)			39.30
• Store room	4.00 x 4.00	16.00	16.00
B. Experimental Land Area (Vegetable Farm)*	5.00 per student trainee	125.00	125.00

** Experimental area may vary depending on availability of land and type of vegetable.*

3.6 TRAINER'S QUALIFICATIONS FOR PEST MANAGEMENT (VEGETABLES) NC II

TRAINER QUALIFICATION (TQ II)

- Must be a holder of Pest Management for Vegetables NC II or its equivalent
- Must have undergone training on Training Methodology II (TM II) or equivalent in training/experience
- Must be computer literate
- Must be physically and mentally fit
- *Must have at least 2 years job/industry experience
- Must be a civil service eligible (for government position or appropriate professional license issue by the Professional Regulatory Commission)

* Optional: Only when required by the hiring institution

Reference: TESDA Board Resolution No. 2004-03

3.7. INSTITUTIONAL ASSESSMENT

Institutional assessment is undertaken by trainees to determine their achievement of units of competency. A certificate of achievement is issued for each unit of competency.

SECTION 4 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

4.1. To attain the National Qualification of PEST MANAGEMENT (VEGETABLES) NC II, the candidate must demonstrate competence in 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 PEST MANAGEMENT (VEGETABLES) NC II may be attained through accumulation of Certificates of Competency (COCs) in the following areas:

4.2.1. Conduct field assessment
4.2.2. Apply bio-control measures
4.2.3. Apply cultural management strategies
4.2.4. Apply physical control measures
4.2.5. Apply chemical control measures
4.2.6. Monitor results of control activities and provide feedback

Successful candidates shall be awarded Certificates of Competency (COCs).

4.3. Upon accumulation and submission of all COCs required for the relevant units of competency comprising this 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. 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 (PTQCS).

COMPETENCY MAP FOR PEST MANAGEMENT (VEGETABLES)

CORE COMPETENCIES

Conduct field assessment	Apply bio-control measures	Apply cultural management strategies	Apply physical control measures	Apply chemical control measures	Monitor results of pest management activities and provide feedback

COMMON COMPETENCIES

Apply Safety Measures In Farm Operations	Use Farm Tools and Equipment	Perform Estimation and Basic Calculation

BASIC COMPETENCIES

Receive and respond to workplace communication	Work with others	Demonstrate work values	Practice housekeeping procedures	**Participate in workplace communication**	**Work in a team environment**	**Practice career professionalism**	**Practice occupational health and safety procedures**	Lead workplace communication	Lead small teams
Develop and practice negotiation skills	Solve problems related to work activities	Use mathematical concepts and techniques	Use relevant technologies	Utilize specialized communication skills	Develop teams and individuals	Apply problem solving techniques in the workplace	Plan and organize work	Collect, analyze and organize information	Promote environmental protection

DEFINITION OF TERMS

Beneficial organisms - organisms such as parasite, predator, pollinators and volunteer or cultivated plants that out-compete the weeds, insects and other non-vertebrates, and micro organisms that attack the weeds.

Biological control - the use of living organisms such as parasites, predators, among others, to control pests

Botanical pesticides – indigenous plants with insecticidal properties that are used to control pests

Chemical – substance that is used to control pests

Chemical control – strategy for controlling pests employing the use of pesticides

Crop rotation – the practice of planting two or more crops in a regular succession such that the crop that is susceptible to a serious pest is replaced with another crop that is not susceptible, on a rotating basis.

Cultural management strategy – in relation to pest management refers to the modification of the environment to lessen the area's attractiveness to pests

Disease - results from the interaction of three factors: a susceptible host, a pathogen (disease causing organism) and a favorable environment. It may be caused by parasitic (e.g. fungi, bacteria, virus, mycoplasma, nematodes, and flowering parasitic plants) and non-parasitic (e.g. lack or excess nutrients, unfavorable soil-weather relations) factors

Furrowing - the final step in land preparation by making furrows or beds for planting

Hilling up - the process of covering the applied fertilizer material by raising the soil towards the base of the plant to stabilize its stand for better plant growth

Insect pest – a destructive or harmful insect

Integrated pest management (IPM) - a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health, and environmental risks (National IPM Network)

Intercropping - the practice of cultivating two or more crops in the same space at the same time

Irrigation – any method of supplying water to the plant to sustain growth

Land preparation - process of readying the soil prior to planting to enhance the successful establishment of the crop

Mulching – the process of covering the soil around the stem of a growing plant with organic materials, plastic or other materials mainly to conserve soil moisture, prevent soil erosion, suppress weed growth, prevent soil-borne diseases

Natural enemy – a beneficial insect or organism used for the control of insect pests

Pest - a living organism that has a damaging effect on plants and animals. It includes insect pests, weeds, diseases, others (e.g. rats, birds, slugs, domestic animals)

Pest management - strategy of maintaining pest populations below the economic injury level through the use of any control measures that are ecologically, economically and socially acceptable

Pesticide - any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest

Physical control – also known as mechanical control, involve the use of barriers, traps, or physical removal to prevent or reduce pest problems.

Pruning – the removal of diseased or weak parts of plants

Repellent crops – crops which repel destructive pests

Resistant variety – crop variety that can resist the adverse effects of pests and unfavorable weather conditions

Sanitation - keeping the area clean of plants or materials that may harbor pests

Smudging - burning of plant debris to create a cleansing smoke bath

Thinning - the removal of undesirable plants

Tillage - the mechanical manipulation of the soil

Trap crops - alternate crops planted in an area to attract destructive pests and reduce their impact on the specific crop

Weed - any undesirable plant

Wrapping - the practice of putting protective on the produce cover to protect them from being attacked by pests. May include the use of newspapers, plastics, and other materials.

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