TRAINING REGULATIONS

HORTICULTURE NC II

AGRICULTURE AND FISHERY SECTOR

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

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AGRI-FISHERY SECTOR

HORTICULTURE NC II

TRAINING REGULATIONS FOR
HORTICULTURE NC II

Section 1 HORTICULTURE QUALIFICATIONS

The **HORTICULTURE NC II** Qualification consists of competencies that a person must achieve in farm operations, produce vegetables, produce fruit bearing crops, perform post harvest operations of major tropical fruits and perform post harvest operations of major lowland and semi-temperate vegetable crops.

This Qualification is packaged from the competency map of the Agri-Fishery Sector as shown in Annex A.

The units of competency comprising this qualification include the following:

Code	BASIC COMPETENCIES
500311105	Participate in workplace communication
500311104	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 calculations

Code	CORE COMPETENCIES
AGR611101	Conduct pre-horticultural farm operations
AGR611102	Produce vegetables
AGR611103	Produce fruit bearing crops
AGR611104	Perform post harvest operations of major tropical fruits
AGR611105	Perform post harvest operations of major lowland and semi-temperate vegetable crops

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

- **Horticultural Farm Aide**
- **Horticultural Farm Caretaker**
- **Coffee Farmer**
- **Fruit Tree Farmer**
- **Cacao Farmer**
- **Vegetable Farmer**

SECTION 2 COMPETENCY STANDARDS

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 maters 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. 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 ~~is~~ 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
1. 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
2. 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 : **500311108**

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

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
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 • Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles • 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
3. 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
4. Methods of Assessment	Competency may be assessed through: 5.1 Portfolio Assessment 5.2 Interview 5.3 Case Study/Situation
5. 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
1. Determine areas of concern for safety measures	1.1 ***Work tasks*** are identified in line with farm operations 1.2 ***Place*** for safety measures are determined in line with farm operations 1.3 ***Time*** for safety measures are determined in line with farm operations 1.4 Appropriate ***tools, materials and outfits*** are prepared in line with job requirements
2. Apply appropriate safety measures	2.1 Tools and materials are used according to specifications and procedures 2.2 Outfits are worn according to farm requirements 2.3 Effectivity/shelf life/expiration of materials are strictly observed 2.4 ***Emergency procedures*** are known and followed to ensure a safework requirement 2.5 Hazards in the workplace are identified and reported in line with farm guidelines
3. Safekeep/dispose 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	May be selected from any of the following sectors: 1.1 Aquaculture 1.2 Animal Production 1.3 Crop Production 1.4 Post-harvest 1.5 Agri-marketing 1.6 Farm Equipment
2. Place	2.1 Animal pens, cages, barns 2.2 Fish ponds, cages 2.3 Stock room/storage areas/warehouse 2.4 Field/farm/orchard
3. Time	3.1 Vaccination and medication period 3.2 Fertilizer and pesticides application 3.3 Feed mixing and feeding 3.4 Harvesting and hauling 3.5 Cleaning, sanitizing and disinfecting 3.6 Dressing, butchering and castration
4. Tools, materials and outfits	4.1 Tools 4.1.1 Wrenches 4.1.2 Screw driver 4.1.3 Pliers 4.2 Materials 4.2.1 Bottles 4.2.2 Plastic 4.2.3 Bags 4.2.4 Syringe 4.3 Outfit 4.3.1 Masks 4.3.2 Gloves 4.3.3 Boots 4.3.4 Overall coats 4.3.5 Hat 4.3.6 Eye goggles
5. Emergency procedures	5.1 Location of first aid kit 5.2 Evacuation 5.3 Agencies contract 5.4 Farm emergency procedures
6. Waste materials	6.1 Animal manure 6.2 Waste water 6.3 Syringes 6.4 Unused farm chemicals e.g. pesticides, chemicals, fertilizers 6.5 Expired reagents 6.6 Dead animals
7. Hazards	7.1 Chemical 7.2 Electrical 7.3 Falls

EVIDENCE GUIDE

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

UNIT 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
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 equipments 2.4.2 Preventive maintenance skills 2.5 Values 2.5.1 Positive outlook towards work 2.5.2 Possesses pre-emptive/anticipatory skills
3. Underpinning Skills	3.1 Ability to recognized defective farm equipment 3.2 Perform proper management practices of safety measures
4. Method of Assessment	Competency in this unit must be assessed through: 4.1 Direct observation 4.2 Practical demonstration 4.3 Third Party Report
5. Resource Implications	5.1 Service/operational manual of farm tools and equipment 5.2 Tools and equipment 5.3 Farm implements
6. Context of Assessment	6.1 Assessment may occur in the workplace or in a simulated workplace or as part of a team under limited supervision

UNIT TITLE: **PERFORM ESTIMATION AND BASIC CALCULATION**

UNIT CODE: **AGR321203**

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

ELEMENT	PERFORMANCE CRITERIA
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	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

This section gives the details of the contents of the core units of competency required in Horticulture NC II.

UNIT OF COMPETENCY : **CONDUCT PRE-HORTICULTURAL FARM OPERATIONS OPERATIONS**

UNIT CODE : AGR611101

UNIT DESCRIPTOR : This unit covers the knowledge and skills required to assist in farm operations including the preparation of the tools, farm implements and simple equipment and perform routine operations.

ELEMENTS	PERFORMANCE CRITERIA
1. Prepare tools, farm implements and simple equipment for horticultural operations	1.1 Appropriate ***tools, farm implements*** and simple ***equipment*** are identified and sorted according to its usage. 1.2 Basic pre-operative checking of tools, farm implements and equipment is performed in accordance with manufacturer's manual. 1.3 Tools with wear and corrosions are segregated and treated according to maintenance plan and procedures.
2. Prepare and maintain Farm Facilities	2.1 Workplace **hazards** and environmental implications associated with maintenance procedures are controlled in line with farm requirements 2.2 Maintenance activities are performed to maximize efficiency and effectiveness of facilities 2.3 Relevant information with regard to the maintenance activities are identified are noted following standard procedures
3. Secure tools, farm implements/equipment and facilities	3.1 Simple repair and modifications of tools, farm implements/equipment and ***facilities*** is conducted following standard procedures. 3.2 Preventive structures are installed during inclement weather 3.3 Basic post-operative checks of tools, farm implements and equipment is conducted in accordance with manufacturer's manual 3.4 Tools, farm implements and equipment are stored according to approved practices.

RANGE OF VARIABLES

VARIABLE	SCOPE
1. Tools	Tools include the following but is not limited to: • Digging tools • Harvesting tools • Measuring tools
2. Farm implements/Simple equipment	• Water pumps • Hand tractor • Plow • Harrow • Sprayer
3. Hazards	Hazards may include: • Presence of wildlife in the workplace • Exposure to fumes and solar radiation • Adverse weather conditions • Hazardous substances like fuel, grease and oil spills
4. Facilities	Facilities include the following: • Plant Nursery including propagating shed • Pump house • Mechanical drier • Storage house • Machine shed • Drainage system

EVIDENCE GUIDE

1. Critical Aspects of Competency:	Assessment requires evidence that the candidate: 1.1 Prepared tools, farm implements and simple equipment for horticultural operations 1.2 Performed preparation of farm facilities for horticultural operations 1.3 Secured tools, farm implements and equipment
2. Underpinning Knowledge and Skills	2.1 Safety Practices 2.1.1. Proper application of chemicals such as fertilizer, pesticides, weedcides, flower inducer 2.1.2 Proper application use of tools, farm implements and equipment. 2.2 Communication 2.2.1 Prepare and submit required reports on all horticultural activities 2.3 Mathematics and Mensuration 2.3.1 Basic mathematical operations 1.2.a.1 Production recording 1.2.a.2 Percentages and rations 2.4 Blueprint reading 2.4.1 2.5 Codes and Regulations 2.5.1 Comply with DA, DENR, FPA Laws, Rules and Regulations 2.6 Tools & Equipment: Uses and Specifications 2.6.2 Can understand and follow instructional manuals 2.6.3 Safe keeping of equipments every after use 2.7 Materials: Uses and Specifications 2.7.1 Where to source good quality supplies, materials and equipment needed in the operation of the aqua farm project 2.8 Systems, Processes and Operations 2.8.1 Program of work activities are implemented as scheduled 2.9 Maintenance 2.9.1 Regular upkeep of equipments and facilities 2.9.2 Preventive maintenance skills 2.10 Values Positive outlook towards work 2.10.2 Possesses pre-emptive/anticipatory skills
3. Underpinning Skills	3.1 Skills in simple fabrication work 3.2 Simple repair and preventive maintenance of tools, farm implements/equipment. 3.3 Monitoring and data recording 3.1 Post harvest handling skills

4. Method of Assessment	Competency in this unit must be assessed through: 4.1 Direct observation and questions 4.2 Third party report
5. Resource Implications	5.1 All supplies, materials and equipment needed during farm operations should be readily available at the farm site 5.2 All workers involved in different activities must be fully oriented and cautioned on the different specific work activities of the farm 5.3 Technical supervisors should have skills and ability in the successful implementation of work program activities
6. Context of Assessment	3.5 In the workplace or in a simulated workplace setting 3.6 While tasks are undertaken either individually or as part of a team under limited supervision 3.7 Third party report

UNIT OF COMPETENCY : PRODUCE VEGETABLES

UNIT CODE : AGR611102

UNIT DESCRIPTOR : This unit covers the knowledge and skills required to produce vegetables including the preparation of land and planting materials. This unit also includes the proper growing of seedlings, transplanting of seedlings, maintaining growth of vegetables and harvesting of crops**.**

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range Statement
1. Prepare land for planting	1.1 Soil sample is collected for ***analysis*** based on DA standard and procedures 1.2 The field is 100% cleared and plowed with alternate harrowing prior to final leveling 1.3 Appropriate farm implements and equipment are chosen and used based on requirements 1.4 Safety precautions in operating farm tools and equipment are observed per standard operating procedures
2. Grow Seedlings	2.1 Good ***quality seeds*** are procured 2.2 ***Seed testing*** is conducted to determine the percentage germination of the seedstock in accordance with the standard procedures 2.3 ***Soil Components*** and proportion of different growing media are identified and mixed according to the ratio and proportions mentioned in the range of variables 2.4 Growing media are ***sterilized*** to prevent the attack of soil borne organism in accordance with the standard procedures specified in the Vegetable Production Manual (VPM) 2.5 Seeds are sown in tray compartments based on recommended seeding rate of one seed per component 2.6 Seedlings are properly watered in accordance with procedures set in the VPM 2.7 Right kind and amount of fertilizer applied in accordance with procedures set in the VPM 2.8 Right kind and amount of pesticides sprayed in accordance with procedures set in the VPM 2.9 Seedlings are hardened prior to planting to ensure a good head start based on the approved cultural practices described in the Vegetable Production Manual

3. Transplant seedlings	3.1 Fertilizer materials are applied based on the result of soil analysis 3.2 Seedlings are transplanted following the recommended distance of planting for different vegetable crops as specified in the Vegetable Production Manual 3.3 Newly transplanted seedlings are watered/irrigated as stated in the procedures for vegetable production 3.4 Watering schedules is followed based on the visual and feel of the soil approach
4. Maintain growth of vegetables	4.1 Soil is cultivated using suitable tools and raised at the based of the plant 4.2 Fertilizers, pesticides and other chemicals are applied in accordance with FPA Guidelines and policies 4.3 Right ***irrigation system*** selected and installed in the field 4.4 Effective ***control measures*** is determined on specific pest and diseases as described in the Vegetable Production Manual 4.5 All missing hills are replanted to maintain the desired plant population of the area 4.6 Suitable ***mulching materials*** are used 4.7 Fertilizer is applied in holes and covered with soil in accordance with procedures on VPM 4.8 Safe handling of chemicals is strictly observed in accordance with procedures on VPM
5. Harvest crops	5.1 ***Maturity indices*** of different vegetable crops are properly determined based on maturity index classification of vegetables 5.2 Appropriate harvesting tools and materials are used to avoid infecting damage to crops

RANGE OF VARIABLES

VARIABLE	SCOPE
1. Analysis	Soil samples can be analyzed through: 1.1 Soil Testing Kit (STK) 1.2 Soil Laboratory Analysis
2. Quality seeds	Characteristics of good quality seeds: 2.1 Damage free 2.2. True-to-type 2.3 Viability 2.4 Free from mixture 2.5 Free from seed-borne disease
3. Seed Testing:	Seed testing methods include: 3.1 Rag doll method 3.2 Petri dish 3.3 Seed bed/seedbox
4. Soil Components	Soil media components include: 4.1 Graden soil, 1 part 4.2 Sieved sand 1 part 4.3 Compost 1 part 4.4 Sawdust/ricehull 1 part
5. Sterilized	Growing media can be sterilized by means of: 5.1 Heat treatment 5.2 Chemical treatment
6. Irrigation System:	Irrigation system include: 6.1 Over head 6.1.1 Mist 6.1.2 Sprinkler 6.2 Surface Irrigation 6.2.1 Furrow irrigation 6.2.2 Drip irrigation 6.2.3 Sub-surface irrigation
7. Control Measures	Control measures include: 7.1 Biological 7.2 Chemical 7.3 Mechanical 7.4 Integrated Pest Management 7.5 Physical 7.6
8. Mulching Materials	8.1 Polyethelene plastic film 8.2 Rice straw 8.3 Cut grasses

9. Maturity Indices	Maturity indices includes: 9.1 Textural properties 9.1.1 Firmness 9.1.2 Tenderness 9.1.3 Toughness 9.2 Color 9.2.1 External 9.2.2 Internal 9.3 Size 9.4 Compositional factors 9.4.1 Acid content 9.4.2 Juice content 9.5 Shape 9.6 Specific gravity e.g. flotation technique 9.7 Surface Structure

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Prepared the land throroughly 1.2 Selected quality planting materials 1.3 Determined components and proportion of growing media 1.4 Produced quality seedlings 1.5 Calculated fertilizers and pesticides requirements accurately 1.6 Diagnosed pest and diseases and applied appropriate precautionary and control measures 1.7 Harvested crops properly
2. Underpinning Knowledge and Attitudes	2.1 Systems, Processes and Operations 2.1.1 Knowledge in plant propagation 2.1.2 Proficiency in procurement of stock plants 2.1.3 Knowledge in different cultural management practices of vegetable production .2 Tools, equipment and instrument specification and uses 2.2.1 Parts and functions of specific tools and equipment .*3* Mathematics and Mensuration 2.3.1 Basic mathematical operations 2.3.2 Percentage and parts per ppm 2.3.3 Unit conversion 2.3.4 Basic accounting principles and procedures .4 Communication 2.4.1 Preparation of monitoring reports 2.4.2 Documentation of nursery operations .5 Safety practices 2.5.1 Knowledge in handling of chemicals 2.5.2 Knowledge in handling of fertilizers 2.5.3 Knowledge on proper use of cutting tools .6 Maintenance 2.6.1 Knowledge on proper sharpness of cutting tools 2.6.2 The use of calibration principles 2.6.3 Use of appropriate supplies and materials .7 Codes and Regulations 2.7.1 TQM and other agricultural systems principle ISO 2.7.2 Within the codes and regulations set by Bureau of Plant Industry .8 Materials: Uses and Specifications 2.8.1 Appropriate use of office supplies like bond paper, pentel pens 2.8.2 Use of various farm implements .9 Values 2.9.1 Safety consciousness 2.9.2 Time consciousness and management 2.9.3 Resourcefulness 2.9.4 Cost consciousness 2.9.5 Diligence

	2.9.6 Determination 2.9.7 observes hygiene
2 Underpinning Skills	3.1 Basic mathematical skills 3.2 Skills in preparation of reports 3.3 Oral and written communication
3 Method of Assessment	Competency in this unit must be assessed through: .1 Direct observation and questioning of the trainee .2 Third Party Report .3 Written Examination
4 Resource Implications	The following resources MUST be provided: .1 Vegetable farm .2 Tools and equipment essential to vegetable production .3 Trained/tamed work animals .4 Supplies and materials appropriate to different cultural practices .5 Protective clothing equipment and materials
5 Context of Assessment	.1 Assessment may occur in an appropriately simulated environment through TESDA accredited assessment centers .2 Agricultural Schools Farm Laboratory .3 Private farms .4 Workplace

UNIT OF COMPETENCY : PRODUCE FRUIT-BEARING CROPS

UNIT CODE : AGR611103

UNIT DESCRIPTOR : This unit covers the knowledge and skills required to produce fruit-bearing crops including the selection and preparation of site. This unit also includes the proper growing of seedlings, transplant of seedlings, growing of trees and harvesting of fruits.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range Statement
1. Select and prepare site for planting	1.1 Site is assessed in terms of its ability to fruit-bearing crop production based on several ***factors*** which are elaborated in the range of variables 1.2 Site is 100% cleared, plowed and harrowed 1.3 Site is laid out and staked in accordance with the desired ***planting system*** 1.4 Holes are dug enough to accommodate the roots without overcrowding
2. Grow seedlings	2.1 ***Growing media components*** are gathered and mixed according to the desired proportions ***2.2*** Seed germination is hastened through ***seed treatment*** 2.3 Bagging operation is performed in accordance with Horticultural Manual 2.4 Seeds are sown in individual pots
3. Transplant seedlings	3.1 Basal fertilizer is applied at the rate of 5-10 grams per tree 3.2 Seedlings are planted without making the soil crumble 3.3 Root system is well covered by top soil 3.4 Newly planted seedlings are thoroughly watered as stated in the Horticultural Manual 3.5 Top pruning is done to avoid rapid transpiration following the procedures in the Horticultural Manual
4. Grow trees	4.1 Fertilizer materials are applied based on schedules and recommended rate 4.2 Pruning is done using appropriate tools 4.3 Tar or paints are applied to cuts 4.4 Flower inducer is applied following the right kind and rate as identified in the codes and regulations set by FPA 4.5 Handling of chemicals is in accordance with FPA and DA Codes and Regulations
5. Harvest fruits	5.1 ***Maturity indicators*** are precisely identified as described in Horticultural manual 5.2 Different ***harvesting methods*** are identified 5.3 Appropriate ***harvesting tools and materials*** are prepared

RANGE OF VARIABLES

VARIABLE	SCOPE
1. Factors	Important factors to consider in selecting the site: 1.1 Climatic requirement 1.2 Topography 1.3 Accessibility 1.4 Water supply 1.5 Facilities/amenities 1.6 Socio-economic condition 1.7 Soil 1.7.1 Type 1.7.2 Drainage 1.7.3 Depth 1.7.4 Fertility/organic matter content 1.7.5 PH level
2. Planting system	System of planting include: 2.1 Square 2.2 Quincux or diagonal 2.3 Hexagonal or triangular 2.4 Contour system
3. Growing media components	Growing media maybe composed of: 3.1 Garden soil 1 part 3.2 Compost 1 part 3.3 Sawdust/ricehull 1 part 3.4 Coco coir 1 part
4. Seed treatment	To hasten germination, the following technique may be employed: 4.1 Seed scarification 4.2 Seed stratification
5. Maturity indices	This include: 5.1 Desirable size of the fruits attained 5.2 Change in color 5.3 Physical appearance 5.4 Odor
6. Harvesting method	6.1 Manual 6.2 Mechanized
7. Harvesting tools and materials	7.1 Picks 7.2 Liners 7.3 Baskets or plastic crates

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selected site according to criteria 1.2 Laid out site for planting 1.3 Grown seedlings 1.4 Planted seedlings 1.5 Maintained orchard 1.6 Harvested fruit
2. Underpinning Knowledge and Attitudes	2.1 Systems, Processes and Operations 2.1.1 Knowledge in plant propagation 2.1.2 Seed testing 2.1.3 Germination process 2.1.4 System of planting 2.1.5 Application of fertilizer 2.1.6 Control of pests and diseases 2.1.7 Flower induction 2.2 Mathematics and Mensuration 2.2.1 Basic mathematical operation 2.2.1.1 Plant population requirement 2.2.1.2 Fertilizer computation 2.2.2 Percentage and ratio 2.2.2.1 Flower inducer in combination with other chemicals 2.2.2.2 Percentage germination 2.3 Communication 2.3.1 Preparation of calendar activities 2.3.2 Preparation of production reports 2.3.3 Preparation of financial reports 2.3.4 Documentation of nursery reports 2.4 Safe work practices 2.4.1 Knowledge in handling of chemicals 2.4.2 Knowledge in handling of fertilizers 2.4.3 Knowledge on proper use of cutting, digging and tillage tools 2.5 Maintenance 2.5.1 Knowledge on proper sharpness of cutting tools 2.5.2 The use of calibration principles 2.5.3 Use of appropriate supplies and materials 2.6 Codes and Regulations 2.6.1 Within the codes and regulations set by the Department of Agriculture and Fertilizers and Pesticides Authority

	2.7 Materials: Uses and Specifications 2.7.1 Polyethylene bags for raising seedlings 2.7.2 Planting board 2.7.3 Synthetic fertilizers 2.7.4 Cutting and pruning tools 2.7.5 Use of various farm implements 2.8 Values 2.8.1 Diligence 2.8.2 Time consciousness 2.8.3 Cost consciousness 2.8.4 Persistence 2.8.5 Hygiene consciousness
3. Underpinning Skills	3.1 Operations of tools and equipment 3.2 Use of relevant hand and power tools 3.3 Planning and prioritizing work
4. Method of Assessment	Competency in this unit must be assessed through: 4.1 Direct observation and questioning 4.2 Demonstration
5. Resource Implications	The following resources MUST be provided: 5.1 Relevant tools and equipment to produce fruit bearing crops 5.2 Materials relevant to the proposed activity and tasks 5.3 Orchard 5.4 Farm records
6. Context of Assessment	Assessment may occur in: 6.1 School orchard 6.2 Private farms 6.3 TESDA Accredited Assessment Centers

UNIT OF COMPETENCY : **PERFORM POST HARVEST OPERATIONS OF MAJOR TROPICAL FRUITS**

UNIT CODE : **AGR611104**

UNIT DESCRIPTOR : This unit covers the knowledge and skills necessary to perform post harvest operations of major tropical fruits including maintain quality of produce for distribution.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range Statement
1. Prepare pre – harvest operation	1.1 Field is prepared by visual or ocular inspection of fruit trees for harvest 1.2 ***Obstructions*** from the field are removed for efficient harvesting 1.3 ***Harvesting tools and materials*** are readied 1.4 ***Record books*** regarding fruits to be harvested are checked 1.5 Field is drained prior to harvest if necessary
2. Harvest fruits	2.1 ***Fruits*** are handled according to the basic principles of ***tender loving care*** 2.2 Fruits are picked from the trees based on factors and ***characteristics affecting harvest*** 2.3 Fruits are picked with picking poles 2.4 Fruits are subjected to ***maturity indices*** for maximum quality 2.5 Floatation method at 1% salt solution for mangoes and papayas is applied 2.6 ***Post harvest treatments*** are applied 2.7 Fruits are collected with baskets with liners 2.8 Fruits are trimmed and delatexed (removed latex from fruits) in accordance with HACCP principle
3. Conduct post harvest operation	3.1 Post harvest operations are identified and completed in line with job requirements 3.2 Relevant standards, charts and manuals are used in identifying appropriate post harvest operations 3.3 ***Fruits*** are trimmed, sorted, ***sized*** and washed according to enterprise requirements 3.4 Appropriate post harvest equipment is operated in line with manufacturer/enterprise procedures 3.5 ***Damage to fruits*** is prevented 3.6 Fruits are packaged according to variety and ***destination*** 3.7 Fruits are stored and stacked in cool dry place prior to distribution in line with enterprise procedures 3.8 Fruits are sprinkled with water if necessary in line with enterprise procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Obstructions	1.1 Weeds 1.2 Dead branches 1.3 Stakes and wedges
2. Harvesting tools and materials	2.1 Picking poles 2.2 Collecting baskets with liners 2.3 Harvesting crates with liner 2.4 Temporary shed
3. Record books	It Include records on: 3.1 Fruit history 3.2 Farm calendar 3.3 Farm records
4. Fruits	4.1 Mangoes 4.2 Papayas
5. Principles of tender loving care	5.1 Fruits are living organism 5.2 Fruits are handled with extra care 5.3 Fruits can prolong shelf life if properly handled
6. Characteristics affecting harvest	6.1 Energy-requiring 6.2 Continued state of change 6.3 High in water content 6.4 Subject to attack by pathogens and insects
7. Maturity indices	7.1 Days after flower induction 7.2 Floatation method 7.3 Visual means 7.4 Physical means
8. Postharvest treatments	8.1 Hot water treatment 8.2 Vapor heat treatment
9. Fruit sizes (Mangoes)	9.1 XL: 357 grams 9.2 L: 290-356 grams 9.3 M: 241-289 grams 9.4 S: 190-240 grams 9.5 SS: 160-189 grams
10. Damage to fruits	10.1 Bruising 10.2 Wounding 10.3 Abrasion 10.4 Physiological 10.5 Pathological
11. Destination	11.1 Domestic market (recycled cartons) 11.2 Export market (cell-type cartons)

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Prepared field and materials/tools used for harvesting 1.2 Identified characteristics of major tropical fruits that affect harvest 1.3 Identified and applied maturity indices when harvesting 1.4 Harvested and handled fruits properly according to tender loving care principles 1.5 Maintained quality of fruits while distribution and storage applying consideration for optimum condition
2. Underpinning Knowledge and Attitudes	2.1 Safety Practices 2.1.1 Knowledge on HACCP principles 2.2 Mathematics and Mensuration 2.2.1 Measurement of humidity and temperature 2.2.2 Simple mathematical computation 2.3 Tools & Equipment: Uses and Specification 2.3.1 Use of measuring devices 2.3.2 Operation of machines and equipment 2.4 Systems, Processes and Operations 2.4.1 Identification of post harvest facilities, principles, system, types and characteristics 2.4.2 Practices in post harvest of fruits 2.4.3 Principles and guides in post harvest handling of perishables 2.5 Values 2.5.1 Effective team player 2.5.2 Smooth Interpersonal Relationship (SIR) 2.5.3 Observant of work ethics
3. Underpinning Skills	3.1 Communicating ideas and info 3.2 Planning and organizing activities 3.3 Collecting, analyzing, organizing ideas and information 3.4 Proper use of tools and equipment 3.5 Maintain quality of stored commodities 3.6 Physical analysis of quality fruits
4. Method of Assessment	Competency in this unit must be assessed through: 4.1 Direct observation and questioning 4.2 Demonstration
5. Resource Implications	5.1 Facilities and equipment appropriate for postharvest of fruits 5.2 Supplies and materials contingent to machines 5.3 Packing houses and storage facilities
6. Context of Assessment	Assessment may occur in: 6.1 Private farms 6.2 School orchard 6.3 TESDA Accredited Assessment Centers

UNIT OF COMPETENCY : **PERFORM POST HARVEST OPERATIONS OF MAJOR LOWLAND AND SEMI- TEMPERATE VEGETABLE CROPS**

UNIT CODE : **AGR611105**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes necessary to perform postharvest operations of major lowland vegetables semi-temperate vegetables including the maintenance of quality produce for distribution.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range Statement
1. Prepare for harvest	1.1 Field is visited for visual or ocular inspection of vegetable crops for harvest 1.2 ***Obstructions*** from the field are removed for efficient harvesting 1.3 ***Harvesting tools and materials*** are readied 1.4 ***Record books*** regarding vegetable crops to be harvested are checked 1.5 Field is drained prior to harvest if necessary
2. Harvest fresh produce	2.1 Vegetables are handled according to the basic ***principles of tender loving care*** ***2.2*** Vegetables are picked based on ***factors of maximum quality harvest*** 2.3 Vegetables are gathered based on ***maturity indices*** of different kinds of vegetables 2.4 Vegetables are collected using baskets with liner 2.5 Vegetables are stacked under temporary shed as prescribed with the guidelines
3. Conduct postharvest operations	3.1 Postharvest operations are identified and completed in line with job requirements 3.2 Relevant standards, charts and manuals are used in identifying appropriate postharvest operations 3.3 Vegetables are trimmed, sorted, sized and washed according to enterprise requirements 3.4 Appropriate postharvest equipment is operated in line with manufacturer/enterprise procedures 3.5 ***Damage to vegetables*** is prevented 3.6 Vegetables are packaged according to ***variety*** and destination 3.7 Vegetables are stored and stacked in cool dry place prior to distribution in line with enterprise procedures 3.8 Vegetables are sprinkled with water if necessary in line with enterprise procedures

RANGE OF VARIABLES

VARIABLE	SCOPE
1. Obstructions	1.1 Weeds 1.2 Bushes
2. Harvesting tools and materials	2.1 Picking knife 2.2 Collecting baskets with liners 2.3 Harvesting crates with liner 2.4 Temporary shed
3. Record books	It includes records on: 3.1 Crop history 3.2 Cropping calendar 3.3 Farm records
4. Principles of tender loving care	4.1 Vegetables are living organism 4.2 Vegetables are handled with extra care 4.3 Shelf life of vegetables are prolonged when handled with care
5. Factors of maximum quality harvest	5.1 Energy-requiring 5.2 Continued state of change 5.3 High in water content 5.4 Subject to attack by pathogens and insects
6. Maturity indices	6.1 Days after planting/seeding 6.2 Visual measures (color, size, change in appearance) 6.3 Physical measures (feel, form, good, small)
7. Variety	7.1 Major lowland 7.1.1 Eggplant 7.1.2 Tomato 7.1.3 Bitter gourd 7.2 Semi-temperate 7.2.1 Carrots 7.2.2 Cabbage 7.2.3 Potatoes
8. Damage to vegetables	8.1 Bruising 8.2 Wounding 8.3 Abrasion

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Prepared the field and materials/tools for harvest 1.2 Identified and applied factors affecting harvest operations like characteristics of vegetables, maturity indices, and consideration for proper harvesting 1.3 Identified and applied trimming, washing, curing and grading operations 1.4 Harvested and handled vegetables according to tender loving care
2. Underpinning Knowledge and Attitudes	2.1 Safety Practices 2.1.1 Knowledge of HACCP principles 2.2 Mathematics and Mensuration 2.2.1 Measurement of oxygen, CO2, ethylene, humidity 2.2.2 Simple mathematical computation 2.3 Tools & Equipment: Uses and Specification 2.3.1 Operation of machines and equipment, facilities like graders, sorters, packing machines 2.3.2 Use of measuring devices like oxygen, CO2, ethylene meters, hygrometer 2.4 Systems, Processes and Operations 2.4.1 Identification of postharvest facilities, principles, system, types and characteristics 2.4.2 Practices in postharvest of lowland and semi-temperate vegetables 2.4.3 Principles and guides in postharvest handling of perishable 2.5 Values 2.5.1 Effective team player 2.5.2 Smooth Interpersonal Relationship (SIR) 2.5.3 Observant of work ethics
3. Underpinning Skills	3.1 Written communication skills required to make simple reports and records 3.2 Planning and organizing skills for daily tasks and activities 3.3 Skills in collecting, analyzing, and organizing ideas and information 3.4 Skills in the use of measuring instrument and device such as: thermometers, sealers, weighing balance, oxygen and CO2 meters and hygrometer 3.5 Skills in the use and operation of postharvest equipment and facilities like graders, sorters, packing house, cutters/trimmer, washing equipment, forklift 3.6. Skills in referring to standard table and charts like maturity indices chart, storage requirements

4. Method of Assessment	Competency in this unit must be assessed through: 4.1 Direct observation and questioning 4.2 Demonstration
5. Resource Implications	The following resources MUST be provided: 5.1 Facilities and equipment appropriate for postharvest of lowland and semi-temperate vegetables 5.2 Relevant industry regulation and codes of practice
6. Context of Assessment	6.1 Assessment/evaluation may occur in an appropriately simulated environment through TESDA accredited assessment centers with appropriate laboratories and testing equipment and facilities 6.2 Private Farms

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 **HORTICULTURE NCII.**

3.1 CURRICULUM DESIGN

Course Title: **HORTICULTURE** Level: **NC II**
Nominal Training Hours: 18 Hours (Basic)
14 Hours (Common)
Course Description:

This course is designed to enhance the knowledge, desirable skills and attitudes of Horticulture NCII in accordance with industry standards. It covers 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

Sector: **AGRI-FISHERY NCII**

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

Course Title: **HORTICULTURE** Level: **NC II**

Course Description:

This course is designed to enhance the knowledge, desirable skills and attitudes of Horticulture NCll in accordance with industry standards. It covers core competencies in *producing vegetable crops, fruits bearing crops, performing post-harvest operations of major tropical fruits, and post-harvest operations for major lowland and semi-temperate vegetable crops*.

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Conduct pre-horticultural farm operations	1.1. Enumerate and explain the reasons for applying chemicals such as fertilizer, pesticides, weedcides, flower inducers 1.2. Apply the procedures in using fertilizers, pesticides, weedcides, flower inducers 1.3. Enumerate and explain the function of tools, farm implements and equipment 1.4. Enumerate and explain the applicable DA, DENR, FPA laws codes and regulations in horticultural operations 1.5. Perform pre-operative checks on tools, farm implements and equipment 1.6. Clean and assist in the repair of tools, farm implements, equipment and facilities 1.7. Assists in farm inventory through data collection and recording 1.8. Assist in various horticultural operations as per instruction 1.9. Perform post-operative checks on tools, farm implements and equipment 1.10. Secure tools, farm implements, equipment and facilities	Demonstration Dual training Individual Self-paced learning Lecture	Written examination Demonstration of practical skills Direct observation Interview

2	Produce Vegetable Crops	2.1 Collect soil samples for soil analysis 2.2 Conduct oil analysis 2.3 Interpret the result of soil analysis 2.4 Choose and use right farm implements and equipment 2.5 Clear, plow and harrow of the area 2.6 Observe safety precautions in operating farm tools and equipment 2.7 Procure and select good quality seeds 2.8 Conduct seed testing 2.9 Identify and mix components and proportion of different growing media 2.10 Sterilize growing media 2.11 Sow seeds in tray compartments 2.12 Perform pre-cultural management practices 2.13 Apply fertilizers based on the result of soil analysis 2.14 Install mulching materials 2.15 Transplant seedlings following the right recommendation 2.16 Perform post-planting care on newly transplanted seedlings 2.17 Apply proper cultivation method for particular crop 2.18 Apply fertilizers and chemicals 2.19 Select and install right irrigation system 2.20 Determine control measures on specific pests and diseases 2.21 Perform replanting 2.22 Prepare all tools, materials and equipment needed 2.23 Determine when to harvest based on the maturity indices 2.24 Harvesting crops using appropriate materials and tools.	Demonstration Dual training Individual Self-paced learning Lecture	Written examination Demonstration of practical skills Direct observation Interview

3 Produce Fruit Bearing Crops	3.1 Assess the site in terms of its ability to support tree growth and any soil factors that might limit tree growth. 3.2 Assess the site for factors limiting space available for trees. 3.3 Assess the site for factors limiting root zone volume. 3.4 Stake the site according to planting system. 3.5 Install irrigation system according to site-specific specification. 3.6 Dig holes to accommodate enough the roots without overcrowding. 3.7 Gather growing media components and mix according to the designed 3.8 proportion. 3.9 Treat the seed with appropriate chemicals to hasten germination. 3.10 Perform bagging operation. 3.11 Sow seeds in individual pots. 3.12 Apply basal fertilizer with the recommended rate per tree. 3.13 Plant seedlings without crumbling the soil. 3.14 Cover the root system by topsoil. 3.15 Water newly planted seedlings. 3.16 Perform top pruning to avoid rapid transpiration. 3.17 Apply fertilizers based on needs & recommended rate. 3.18 Use appropriate tools in pruning. 3.19 Apply tar or paints to cuts. 3.20 Apply flower inducer with the right kind & rate. 3.21 Follow DA codes & regulations in handling chemicals	Demonstration Dual training Individual Self-paced learning Lecture	Interview Written Practical Direct Observation

4	Performing Post-Harvest Operations of Major Tropical Fruits.	4.1 Discuss the procedures in Post-Harvest operations in Tropical Fruits. 4.2 Prepare the field, materials, tools and equipment for harvest. 4.3 Harvest and handle fruits. 4.4 Maintain Quality of fruits	Demonstration Dual training Individual Self-paced learning Lecture	Interview Written Practical Application (Demo) Direct Observation
5	Performing Post-Harvest Operations for Major Lowland and Semi-Temperate Vegetable Crops	5.1 Discuss the Post-Harvest operations for Major Lowland and Semi-Temperate vegetable crops. 5.2 Prepare the field, materials, tools and equipment for harvest. 5.3 Harvest and handle fresh produce. 5.4 Maintain Quality of vegetables.	Demonstration Dual training Self-Paced Learning Lecture	Interview Written Practical Application (demo) Direct Observation

3.2 TRAINING DELIVERY

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

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

The competency-based TVET system recognizes various types of delivery modes, both on and off-the-job as long as the learning is driven by the competency standards specified by the industry. The following training modalities may be adopted when designing training programs:

- The dualized mode of training delivery is preferred and recommended. Thus programs would contain both in-school and in-industry training or fieldwork components. Details can be referred to the Dual Training System (DTS) Implementing Rules and Regulations.
- Modular/self-paced learning is a competency-based training modality wherein the trainee is allowed to progress at his own pace. The trainer 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.

- Able to read and write;
- With good moral character;
- Ability to communicate, both oral and written
- Physically fit and mentally healthy as certified by a Public Health Officer

3.4 LIST OF TOOLS, EQUIPMENT AND MATERIALS

HORTICULTURE– NC II

Recommended list of tools, equipment and materials for the training of 25 trainees for Horticulture NC II

TOOLS		EQUIPMENT		MATERIALS	
QTY		QTY		QTY	
25 pcs	• Bolos	2	• Booth/temporary shed	250 pcs.	• Agri bags, plastic
10 pcs	• Broomstick	5	• Cart (Kariton & paragus)	500 pcs.	• Bamboo stick
5 pcs	• Calculator	2	• Comb-tooth harrow	5 pcs.	• Basket
5 pcs	• Container	1	• Computer	5 rims	• Bond paper
5 sets	• Cutting tools	5	• Crates	5 pcs.	• Catching nets
5 sets	• Digging tools	1	• Drying oven	3 doz.	• Clips
2 pcs	• Drying meter	1	• Farm/ field	5 sacks	• Coconut dust
10 pcs	• Dulos	1	• Greenhouse/ nursery	5 sacks	• Compost
5 pcs	• Fruit crate	1	• Harvesting equipment	1 sack	• Fertilizers
5 sets	• Harvesting tools	1	• Irrigation system (sprinkler, mist/ drip irrigation)	1 kit	• First aide supplies/ medicine
25 pcs	• Hat	1	• Mower (grass cutter)	5 bottles	• Flower inducer
5 pcs	• Knapsack sprayer	1	• Over head projector (OHP)	5 bottles	• Fungicides
5 sets	• Knife	1	• Portable chain saw	25 pairs	• Gloves
5 pcs	• Light hoe	1	• Post-Harvest treatment equipment	5 sacks	• Growing media (garden soil, sewed sand, compost, soil, manure and sawdust/rice)
2 pcs	• Moisture meter	1	• Power sprayer	5 pcs.	• Killing bottles
2 pcs	• Petri-dish	1	• Rotavator		
3 pcs	• pH meter	1	• Service vehicle	5 pcs.	• Marking pens
5 pcs	• Pick mattock	1	• Sorting equipment	25 pcs.	• Masks
5 pcs	• Picking knife	2	• Spike tooth harrow	5 sacks	• Mulching material
5 pcs	• Plow	1	• Storage room	25 m	• Hair nets
2 sets	• Plumbing tools	1	• Surface irrigation system		• Packaging materials, assorted
5 sets	• Post-Harvest treatment tools	1	• Tractor/Carabao	5	• Pail

25 pcs	• Protective coat	1	• Typewriter	5 rims	• Paper/bond
25 pcs	• Protective gadgets			25	• Pencil
5 pcs	• Pruning sheers		**TRAINING MATERIALS**	25	• Pens
5 pcs	• Rake	25	• Brochures	5 bottles	• Pesticides/ Insecticides
10 pcs	• Scissors	2	• Instructional supplies & materials	5 pieces	• Pieces of cloth
5	• Seed bed	2	• Visual aids	100	• Plastic bag
5	• Seedling tray	5	• Reference materials/Books (Kinds of Tropical Fruits)	1 set	• Plumbing supplies
10	• Shovel	5	• Reference manuals (first aide kit with reference manual)	250	• Pots
15	• Sprinklers	5	• Data (Data on result of soil analysis)	5 sacks	• Propagating media (garden soil, sawdust, sand, composed, coconut coir)
2	• Step ladder	5	• Procedural manuals	3 sacks	• Rice hull
2	• Storage tools/cabinet	5	• Soil samples analysis	3 rolls	• Rope, (small, med. Large)
25 pcs	• Transplanting tools			3 boxes	• Rubber band
25 pcs	• Trowel			25 pairs	• Rubber boots
					• Rubber knots
				25 sacks	• Sacks
					• Sample of matured vegetable crops
				5 boxes	• Seed box
					• Seedlings, assorted
				2 packs per crop	• Seeds
				5	• Soil auger
				5 rolls	• String
				5 bottles	• Tetrazolium chemical
					• Transplanting supplies
				5 pcs.	• Detergent, liquid and powder soap
				5 pcs.	• Brush

3.5 TRAINING FACILITIES

HORTICULTURE 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)**			170.30
• Student/Trainee Working Space	2.00 x 2.00 per student/trainee	4.00 per student	100.00
• Learning Resource Center	3.00 x 5.00	15.00	15.00
• Facilities/Equipment/Circulation (30% of teaching accommodation)			39.30
• Store Room	4.00 x 4.00	16.00	16.00
B. **Experimental Land Area**	5 sq m /trainee	125.00	125.00

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

3.6 TRAINER'S QUALIFICATIONS FOR AGRI-FISHERY SECTOR

HORTICULTURE NC II

TRAINER QUALIFICATION (TQ II)

- Must be a holder of Horticulture NC III or its equivalent
- Must have undergone training on Training Methodology II (TM II)
- 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 issued 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 Horticulture NC II, the candidate must demonstrate competence in all units listed in Section 1. Successful candidates shall be awarded a National Certificate signed by the TESDA Director General.

4.2 The qualification of Horticulture NC II may be attained through:

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

4.2.1.1 Produce vegetables
4.2.1.2 Conduct pre-horticulture farm operations
4.2.1.3 Produce vegetables
4.2.1.4 Produce fruit- bearing trees
4.2.1.5 Conduct pre-horticulture farm operations
4.2.1.6 Produce fruit -bearing trees
4.2.1.7 Perform post harvest operations of major tropical fruits
4.2.1.8 Perform post harvest operations of major lowland and semi-tropical vegetable crops

Successful candidates shall be awarded Certificates of Competency (COCs) bearing the signature of the Regional Director and Chair of the recognized local industry body.

4.2.2 Demonstration of competence through project-type assessment covering all required units of qualification

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

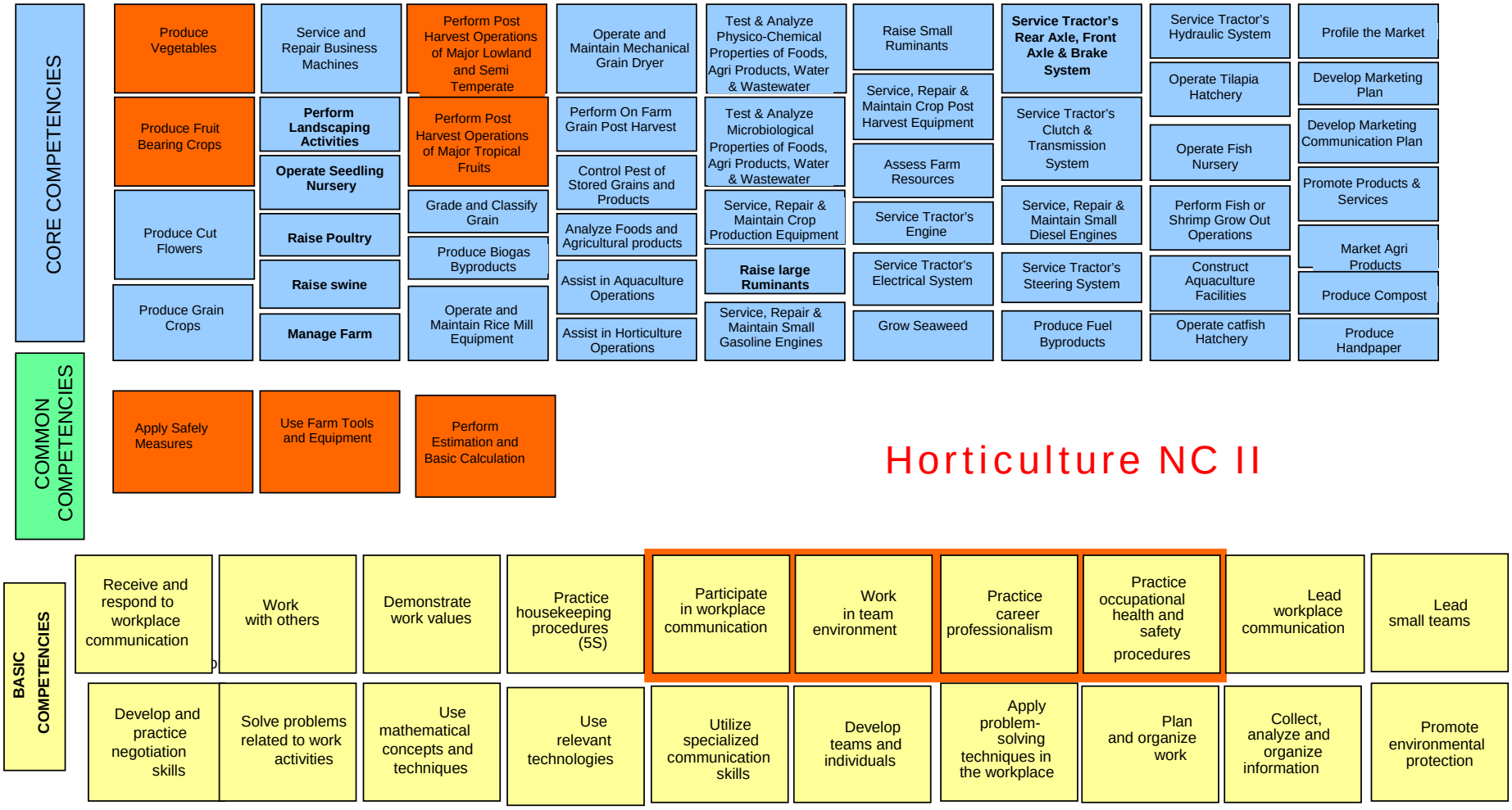
4.4. Candidates can be assessed on individual units of competency and be issued Certificates of Competency if found competent. Certificates of Competency shall bear the signature of the Regional Director and Chair of the recognized local industry body.

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)

4.9. 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).

Supermarket of Competencies
AGRI-FISHERY Sector



GLOSSARY OF TERMS

For the purpose of this standard, the word

- **Aflatoxin** – the toxin produced by some strains of the fungi *ASPERGILUS FLAVUS* and *ASPERGILUS PARASTICUS*; the most potent carcinogen yet discovered.

- **Ambient condition**– ordinary room temperature and relative humidity.

- **Ambient air** – the surrounding air (atmospheric).

- **Ambient storage** – any treatment or practice extending post harvest life of harvested commodity beyond that of similar commodity held under ambient conditions without treatment.

- **Airflow rate** – the amount of air passing through an obstruction per unit of time.

- **ACIAR** – Australian Center for International Agricultural Research

- **AFHB** – ASEAN Food Handling Bureau

- **BPRE** – Bureau of Post harvest Research & Extension

- **Curing** – process of toughening and self-healing of bruises and skinned areas in root and tubes crops or the rapid closing of the neck of bulb crops under favourable conditions

- **Driller** – a machine for sowing in furrows

- **Drip Irrigation** – application of water through small tubes and orifices or emitters which discharge small quantity of water to the base of the plant

- **Dry-bulb temperature** – the temperature of air indicated by a standard temperature

- **Equilibrium moisture content** – the moisture content at which moisture in a product is in equilibrium with the surrounding air. The product does not gain or loss moisture.

- **Fogging** – to cover or envelope with fog

- **Foliar Fertilizer** – fertilizer formulation containing nitrogen, phosphorous and potassium plus selected micronutrient element such as (Ca, Mg, Mn, Fe, Zn, Cl, B, Cu, S) applied by spraying on the leaves

- **Fumigant** – a chemical compound which acts in the gaseous state to destroy insects and their larvae.

- **Fumigation** – the process of treating stored products with insecticides/pesticides and the like in fumes or vapor form.

- **Furrow Irrigation** – a method of supplying water through a canal system wherein water flows down or across the slope of the field

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

- **GATT** – General Agreement on Tariff and Trade

- **Grading** – the process of classifying into groups according to a set of recognized criteria of quality and size, each group bearing an accepted name and size grouping.

- **Growing Medium** – mixture of different materials such as soil, sand, compost, coir dust, rice hull, perlite, peat, etc. for growing seedlings

- **HACCP** – Hazard Analysis Critical Control Points

- **Hardening** – the process of gradually withholding water and exposing to direct sunlight to prevent seedlings from transplanting stress/shock

- **Harrowing** – breaking of large soil clods that are caused by plowing

- **Hilling-Up** – the process of covering the applied fertilizer material by raising the soil towards the base of the plant to further stabilize its stand for better plant growth.

- **Hygrometer** – an instrument that measures humidity.

- **Insect pest** – a destructive or harmful insect.

- **Irrigation** - any method of supplying water to sustain plant growth

- **Off-Baring**- process of cultivating the soil away from the base of the plants

- **Pricking-Off**- methods of transferring of seedling to avoid overcrowding

- **Larvae** – the first stage of the life cycle of insects after leaving the egg.

- **Manometer** – an instrument that measures air pressure.

- **Maturity** – the quality or state of ripeness, or of being fully developed grain.

- **Maturity index** – signs or indications that a commodity is mature and is ready to be harvested.

- **Moisture content** – the conventional index used to determine whether the seed is dry enough for safe storage or for milling usually expressed in percent (% M.C.).

- **Molds** – superficial often woolly growth produced on various forms of organic matter, especially when damp or decaying.

- **NFA** – National Food Authority

- **Packaging** – technology or process to ensure adequate protection and safe delivery of a product from the produces to the ultimate consumer.

- **Packing** – act of putting commodities in a container.

- **Packinghouse** – place where the preparatory steps for storage or marketing are done.

- **Pallet** – low portable platform made of wood or metal or in combination to facilitate handling, storage or transport of materials as a unit load using forklift.

- **Perishables** – food crops for which value and/or quality is maintained over a short period of time after harvest. These include fruits, vegetables, flowers, young coconut, nursery stocks and some staple root crops such as sweet potato, cassava and yam.

- **Postharvest disease** – disease observed after harvest regardless of when or where initial infestation took place.

- **Post harvest handling** – specific term used for the movement of commodities and operations through which a commodity undergoes from harvest to possession of the fixed consumer, includes the technological aspects of marketing and distribution.

- **Post harvest infection** – infection that takes place after harvest.

- **Post harvest life** – period of time during which a commodity is still acceptable for its intended purpose.

- **Pre cooling** – strictly, it means the rapid cooling (48 hours or less) of a commodity to a desired transit or storage temperature soon after harvest before it is stored or moved in transit.

- **Pupa** – an intermediate stage of an insect that preys on one or more plants and animals that man wishes to preserve for his own use.

- **Refrigeration** – process of removing heat from a compartment or substance so that temperature is lowered and then maintained at a desirable level, usually refers to refrigeration by mechanical means.

- **Relative humidity** – the actual vapor pressure of the air relative to saturation.

- **Respiration** – biological process by which organic materials are broken down to simpler forms accompanied by the release of energy and heat.

- **Ripening** – the state of development of a fruit when it becomes soft and edible applies strictly to climacteric type fruit.

- **Rodents** – refer to rats and mice which destroy grains and other stored products.

- **Senescence** – final phase in the life of an organ in which a series of normally irreversible events are initiated leading to cellular breakdown or death of the organ.

- **Side-Dress Fertilizer** – additional amount of any fertilizer materials applied at the onset of flowering to complete the nutritional requirement of the crop

- **Sprinkler Irrigation** – a mechanical method of supplying water over the standing crop by means of a nozzle which is rotated by water pressure

- **Synthetic Mulch** – mulching materials made either of polyethylene or non-woven fabric

- **Sorting** – the process of classifying into groups designated by the person classifying crops or commodities the produce either according to a set criteria.

- **Standard** – the set of criteria and specifications of quality determining the grades, described as product characteristics such as maturity, color, cleanliness, shape, free from decay and blemishes and uniformity of size.

- **Storage** – process of keeping horticultural crops in a structure designed to protect the stored products from inclement weather and pests for a short or long period of time to await processing or movement to other location.

- **Storage life** – the longest time produce can be kept in a sound marketable condition.

- **Tachometer** – an instrument that measures revolutions per minute

- **Tillage** – the mechanical manipulation of the soil
- **Transplants** – vegetable seedlings produced for transplanting
- **Trellis** – a support structure for viny crops and can either be T, I, Y, A shaped
- **Velometer** – an instrument that measures velocity of air flow
- **Waxing** – application of a thin film of surface coating to fruits and vegetables.
- **Wet-bulb temperature** – temperature of moist air indicated by a thermometer whose bulb is covered with a moist wick which the air flow passing over has a velocity of 15 ft per second.

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