TRAINING REGULATIONS

AQUACULTURE 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

AQUACULTURE NC II

TRAINING REGULATIONS FOR AQUACULTURE NC II

Section 1 AQUACULTURE NC II QUALIFICATION

The **AQUACULTURE NC II** Qualification consists of competencies that a person must achieve to assist in aquaculture operations, prepare and maintain aquaculture facilities, operate fish nursery, perform fish or shrimp grow-out operations and grow seaweeds.

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
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 calculations

Code	CORE COMPETENCIES
AGR641301	Conduct pre-operations aquaculture activities
AGR641302	Prepare and maintain aquaculture facilities
AGR641303	Operate fish nursery
AGR641304	Perform fish or shrimp grow-out operations

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

- **Aquaculture Farm Caretaker**
- **Aquaculture Farm Aide**
- **Aquaculture Facilities Repair and Maintenance Worker**
- **Fish Nursery Worker**
- **Shrimp and Fish Grow Out Worker**
- **Prawn Farm Cultivator**

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 **AQUACULTURE NC II.** These units of competency are categorized into basic, common and core competencies.

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 training 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 :

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

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Determined areas of concern for safety measures 1.2 Applied appropriate safety measures according to industry requirements 1.3 Prepared tools, materials and outfit needed 1.4 Performed proper disposal of used materials 1.5 Safekeep/cleaned tools, materials and outfit in designated facilities
2. Underpinning Knowledge and Attitudes	2.1 Safety Practices 2.1.1 Implementation of regulatory controls and policies relative to treatment of area and application of chemicals 2.1.2 Proper disposal of waste materials 2.2 Codes and Regulations 2.2.1 Compliance 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:

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:

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

UNIT OF COMPETENCY : CONDUCT PRE-OPERATIONAL AQUACULTURE ACTIVITIES

UNIT CODE : AGR641301

UNIT DESCRIPTOR: This unit covers the knowledge and skills required to assist in aquaculture operations including the preparation of tools and simple equipment and performance of simple routine operations

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Prepare tools and simple equipment	1.1 ***Tools*** and ***equipment*** are checked and cleaned 1.2 Harvesting tools are checked for damage and simple repair is performed if necessary 1.3 Catch nets are inspected and worn-out nets, if possible, are repaired 1.4 ***Aquaculture facilities*** are inspected and minor repair, if possible, are performed
2. Change water of aquaculture facility	2.1 Volume of water to be changed is determined in accordance to organizational standard procedures 2.2 Appropriate ***method of water exchange*** is selected in accordance to organizational standards 2.3 Water exchange is carried-out in accordance with supervisor instructions and standard procedures
3. Monitor and collect mortalities	3.1 Normal mortality is determined and differentiated from initial disease outbreak 3.2 Mortalities are counted and documented daily in accordance to organizational standard procedures 3.3 Mortalities are collected and placed in appropriate freezer for post mortem analysis
4. Prepare aquaculture facilities	4.1 Pond preparation is conducted in accordance to organizational standard procedures 4.2 Net cages and frames are brushed and repaired if possible 4.3 Tanks are cleaned and disinfected following standard procedures
5. Secure facilities	5.1 Facilities are checked for fish ***predators*** and trespassers 5.2 Fish predator***s*** and trespassers are prevented to enter the aquaculture facilities 5.3 Preventive structures are installed during inclement weather following standard procedures 5.4 Tools and equipment are properly stored

RANGE OF VARIABLES	
VARIABLE	**SCOPE**
1. Tools	1.1 Scoop nets 1.2 Basins 1.3 Buckets 1.4 Glassware
2. Simple equipment	2.1 Pumps 2.2 Weighing scales 2.3 Thermometer
3. Aquaculture facilities	3.1 Dikes 3.2 Nets 3.3 Frames 3.4 Drainage system
4. Method of water exchange	4.1 Flow-through 4.2 Drain and fill
5. Predators	5.1 Birds 5.2 Frogs 5.3 Man

EVIDENCE GUIDE	
1. Critical Aspects of Competency:	Assessment requires evidence that the candidate: 1.1 Prepared tools and simple equipment for aquaculture operations 1.2 Changed water of aquaculture facility 1.3 Monitored and collected mortalities 1.4 Prepared aquaculture facilities 1.5 Secured facilities
2. Underpinning Knowledge and Skills	2.1 Safety Practices 2.1.2 Swimming 2.1.3 Weighing 2.1.4 Proper application of disease treatment 2.1.5 Proper application of disinfectants, lime and fertilizers 2.2 Communication 2.2.1 Prepare and submit regular accomplishment reports on all fish aquaculture activities 2.3 Mathematics and Mensuration 2.3.1 Basic mathematical operations 2.3.1.1 Production recording 2.3.2 Percentages and rations 2.4 Blueprint reading 2.5 Codes and Regulations 2.5.1 Comply with fisheries and Environmental 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 2.10.1 Positive outlook towards work 2.10.2 Possesses pre-emptive/anticipatory skills

3. Underpinning Skills	3.1 Skills to determine good quality and expected performance of supplies, materials and equipment before accepting the goods delivered 3.2 Planning and prioritizing work activities to be undertaken 3.3 Regular monitoring, recording and making progress accomplishment reports about the aquaculture project
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 design, construction and operations of fish hatcheries should be readily available at the farm site 5.2 All workers involved in the fish hatchery project must be fully oriented and cautioned on the different specific work activities of the project 5.3 Technical supervisors should have skills and ability in the successful implementation of work program activities
6. Context of Assessment	6.1 In the workplace or in a simulated workplace setting 6.2 While tasks are undertaken either individually or as part of a team under limited supervision 6.3 Third party report

UNIT OF COMPETENCY : **PREPARE AND MAINTAIN AQUACULTURE FACILITIES**

UNIT CODE : AGR641302

UNIT DESCRIPTOR : This unit covers the knowledge and skills required to prepare and maintain aquaculture facilities for grow-out operations. Aquaculture facilities include the pond, tanks, pens and cages.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Evaluate site	1.1 Pond 1.1.1 Site is determined for suitability for a specific aquaculture project based on project standard 1.1.2 Soil is sampled using an Eckman Dredge and analyzed for ***soil type*** to ascertain water retention capacity such as clay: loam ratio 1.1.3 ***Water resource*** is determined for volume adequacy using flow rate meter or by volume calibration technique. 1.1.4 Water quality for suitability is assessed for common physico-chemical parameters based on The Standard Methods in the Analysis of Water and Wastewater. 1.1.5 ***Topography*** is measured using a transit to establish the zero datum, level for water supply and drainage system, 1.2 Pens and Cages 1.2.1 Water is analyzed for water current speed using water current meter 1.2.2 Natural food is determined by plankton sampling and microscopic examination to establish the feeding requirement 1.2.3 Transparency is measured using a Secchi disc to determine the suitable ***species*** to culture. 1.2.4 Substrate is determined by using the Eckman Dredge 1.2.5 Tide level of the area is read to establish type of material and depth of facilities 1.3 Tank 1.3.1 Land area size and project budget is determined to suite the size, ***shape*** and ***materials to be used.*** 1.3.2 *Water is sampled/analyzed* using water quality test instruments 1.3.3 *Water* adequacy *is* determined by water flow rate translated to liters per minute (lpm).

2. Draw the lay-out plan	2.1 Pond 2.1.1 Area and depth of pond is in conformity with project requirement and species to be cultured 2.1.2 The number and size of compartments is determined based on the available area of the land 2.1.3 Dikes crown and base is confirmed based on the tide level, typhoon and flooding history of the area 2.1.4 The materials to be used are determined based on production target and capitalization 2.1.5 Markers,/strings are placed as guide to the layout 2.1.6 Number of ***water pumps*** and well/water resource to be used and its location is determined 2.1.7 Other farm facilities are planned and laid-out 2.2 Tanks 2.2.1 Area and depth of Tank should conform with available site selected and species to be cultured 2.2.2 The number and size of compartments is determined based on the area of the land 2.2.3 The materials to be used are determined based on production target and capitalization 2.2.4 Markers,/strings are placed as guide to the layout 2.2.5 Determine number of water pumps and well/water resource to be used and location 2.2.6 Other farm facilities are planned and laid-out 2.3 Pens 2.3.1 Area and depth of facilities should conform with available site selected 2.3.2 Materials for frame and type of net to be used are determined based on the site selected and species to be cultured 2.3.3 Materials are source for availability in the area and cost is determined 2.3.4 Other farm facilities are planned and laid-out 2.4 Cages 2.4.1 Area and depth of facilities should conform with project requirement and species to be cultured

	2.4.2 Materials for frame and type to be used are determined based on the site selected 2.4.3 Mesh size of net is determined based on available fingerling size in the area and species of fish 2.4.4 Materials are source for availability in the area and cost is determined 2.4.5 Other farm facilities are laid-out
3. Mobile resources and carry-out installation of facilities	3.1 Ponds 3.1.1 Construction resources (***materials and manpower***) for ponds are prepared 3.1.2 Major and other support farm facilities are installed 3.1.3 ***Equipmen***t is positioned according to enterprise requirement 3.2 Tanks 3.2.1 Construction resources (materials and manpower) are prepared adequately 3.2.2 Lay-out of facilities are installed 3.2.3 ***Life support system*** is appropriately installed 3.2.4 Equipment is appropriately positioned 3.3 Pens 3.3.1 Construction resources are prepared including materials and manpower 3.3.2 Posts are positioned appropriately 3.3.3 Netting materials and attach floats and sinkers are fabricated 3.3.4 Net are inspected for any damage 3.3.5 Set-up Net are st up to fit the frame 3.3.6 Bottom of net is placed in proper place 3.4 Cages 3.4.1 Construction resources including materials and manpower are prepared 3.4.2 Posts are positioned according to enterprise requirements 3.4.3 netting materials are fabricated and attached to floats and sinkers 3.4.4 Net are inspected for damage 3.4.5 Net are set-up to fit the frame 3.4.6 Bottom of net is checked if it is in proper place 3.4.7 Mooring system is checked accdg. to industry requirements

RANGE OF VARIABLE

VARIABLE	RANGE
1. Soil type	1.1 Clay 1.2 Loam 1.3 Sand
2. Water resource	2.1 Shallow well 2.2 Irrigation 2.3 Natural waters (Lake, lagoon, impoundments, river)
3. Species	3.1 Tilapia 3.1 Milkfish 3.2 Grouper 3.3 Sea bass 3.4 Catfish
4. Life Support	4.1 Aeration line 4.2 Water Line 4.3 Drainage Line
5. Pumps	5.1 Electric 5.2 Diesel 5.3 Gasoline
6. Topography	6.1 Flat 6.2 Sloping
7. Farm Facilities	7.1 Guardhouse 7.2 Staff house 7.3 Feed warehouse
8. Materials to be used	8.1 Tanks 8.1.1 Cement 8.1.2 Fiberglass 8.1.3 Canvass 8.1.4 Plastic 8.2 Pens/Cages Frames 8.2.1 Bamboo 8.2.2 G.I. Pipe 8.2.3 PVC Pipes 8.3 Net Mesh 8.3.1 Size 22 8.3.2 Size 20 8.3.3 Size 17 8.3.4 Size 14 8.4 Pond 8.4.1 Cemented Dike 8.4.2 Plastic Lined 8.4.3 Earthen

EVIDENCE GUIDE	
1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selected a site that is suitable and available using the following skills: 1.1.1. Environmental scanning and survey using Instrument to measure water current velocity, volume assessment, water depth, etc. 1.1.2. Soil/water sampling for analysis using testing Instruments. 1.2 Selected site in conformity with ECC requirement and EMB-DENR regulations. 1.3 Effectively supervised, mobilized and utilized to the fullest the available construction resources: 1.3.1 Scheduled and implemented work program activities and attained targeted budget and time frame 1.3.2 Mobilized construction equipment and manpower requirement as per schedule 1.3.3 Canvassed construction materials and equipment and prioritized acquisition based on budget limitations 1.3.4 Supervised construction work in strict conformity with the project design and layout.
2. Underpinning Knowledge and Attitudes	2.1 Safety Practices 2.1.1 Good work supervision during the construction of aqua arm facilities ensuring that specifications are strictly followed and implemented 2.1.2 Where to source good quality supplies, materials and skilled laborers needed for the aqua facilities 2.1.3 Ideal good technical work habits to demonstrate to workers easy and safety standards during construction of the aqua farm projects 2.1.4 Program of work activities are implemented as scheduled 2.2 Communication 2.2.1 Prepare and submit regular accomplishment reports on all aqua facilities construction activities 2.3 Mathematics and Mensuration 2.3.1 Ability to calculate and measure volume, weight and distances. Ratio and proportion calculation 2.4 Drawings reading 2.4.1 Ability to read and interpret layout plan of an aquaculture facility

	2.5 Codes and regulations 2.5.1 Environmental Compliance Certificate (ECC) 2.5.2 Municipal Permit and regulations 2.5.3 Rules and regulations of mangrove exploitation 2.6 Materials: Uses and Specifications 2.6.1 Where to source good quality supplies, materials and equipment needed in the construction of the aqua farm project 2.7 Systems, Processes and Operations 2.7.1 Program of work activities are implemented as scheduled 2.8 Values 2.8.1 Positive attitude towards work 2.8.2 Possesses pre-emptive/anticipatory skills
3. Underpinning Skills	3.1 Sampled soil using Eckman Dredge and analyzed soil type 3.2 Assessed water for suitability based on the Standard Methods in the Analysis of water and wastewater 3.3 Assessed water volume adequacy using current flow or volumetric method 3.4 Established ground elevation using a transit
4. Method of Assessment	Competency in this unit must be assessed through: 4.1 Direct observation of applicant to task and questions related to underpinning knowledge 4.2 Third Party report
5. Resource Implications	5.1 All required supplies, materials and equipment needed during design, construction and operations of aquaculture facilities should be readily available at the farm site 5.2 All workers involved in the aqua farm project must be fully oriented and cautioned on the different specific work activities of the project 5.3 Technical supervisors should have skills and ability in the successful implementation of the work program
6. Context of Assessment	6.1 Direct observation and questioning 6.2 Third party report

UNIT OF COMPETENCY : **OPERATE FISH NURSERY**

UNIT CODE : AGR641303

UNIT DESCRIPTOR : This unit covers the knowledge and skills required to prepare and operate fish nursery in ponds.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Prepare nursery ponds	1.1 Dry pond until cracking stage 1.2 Repaired & plowed the soil and dried again 1.3 Selected ***lime*** to be used and computed for amount based on soil pH 1.4 ***Predator control*** is selected, amount computed and applied 1.5 Selected ***fertilizer*** and computed amount of application 1.6 Natural food is allowed to bloom 1.7 ***Aerators/agitators*** are set-up
2. Stock fish in nursery pond	2.1 *Water* quality parameters i.e. D.O., Transparency, Nitrates, Ammonia and Temperature are determined prior to stocking of fry 2.2 Determined amount of fry to be stocked 2.3 Assessed fry quality 2.4 Care was observed in handling, transporting and stocking of fishes
3. Perform feeding operations	3.1 Feeds are sourced, processed and stored properly 3.2 Formulated feed is sampled and analyzed for *feed ration* 3.3 Daily feed ration is computed
4. Monitor good water quality	4.1 Water quality is maintained 4.2 Water is changed regularly 4.3 Sustained the growth of natural food
5. Perform common disease monitoring and implement treatment	5.1 ***Disease*** **i**s periodically observed and monitored 5.2 Prevention and safeguard of disease and parasite occurrence 5.3 Diseased or moribund fish is sampled and brought to the laboratory for diagnosis based on ***symptoms*** 5.4 Appropriate treatment is determined
6. Harvest and post harvest handling	6.1 Timely scheduled harvest 6.2 Prepare supplies and materials required in the harvest operation 6.3 Observe proper capture and handling procedure during harvest so as to maintain good quality fish fingerlings 6.4 Initiated proper conditioning, grading, counting, packing and live fish handling/transport

RANGE OF VARIABLES	
VARIABLE	**RANGE**
1. Limed	1.1 Agricultural lime 1.2 Hydrated lime 1.3 Industrial lime
2. Fertilized	2.1 Chicken Manure 2.2 Urea 2.3 Ammonium phosphate 2.4 Combinations
3. Predator Control	3.1 Derris Roots (Tubli), 3.2 Tea Seed Cake, 3.3 Tobacco Dust, 3.4 Ammonium Sulfate.
4. Aerators/agitators	4.1 Ring/vortex blowers 4.2 Roots blower 4.3 Paddlewheel aerator 4.4 Airo2
5. Disease	5.1 Nutritional 5.2 Bacterial 5.3 Fungal 5.4 Parasitic 5.5 Viral 5.6 Environmental
6. Symptoms	6.1 Swirling 6.2 Swimming at surface 6.3 Non-feeding 6.4 Lethargic 6.5 Cottony growth 6.6 Lesions 6.7 Septicemia 6.8 Over production of mucous

EVIDENCE GUIDE	
1. Critical Aspects of Competency	1.1 Prepared nursery ponds 1.2 Performed nursery operations 1.3 Performed feeding operations 1.4 Maintained good water quality 1.5 Performed common disease monitoring and implement treatment 1.6 Practiced techniques in harvest and post harvest handling
2. Underpinning Knowledge and Attitudes	2.1 Safety Practices 2.1.1 Good work supervision during the construction of aqua farm ensuring that specifications are strictly followed and implemented 2.1.2 Ideal good technical work habits to demonstrate to workers easy and safety standards during construction and operation of aqua farm projects 2.2 Communication 2.2.1 Prepare and submit regular accomplishment reports on all aqua farm activities 2.3 Mathematics and Mensuration 2.3.1 Calculation to determine Average Body Weight (ABW) of fish, daily feeding ration and Feed Conversion ratio (FCR) 2.3.2 Calculation in fertilizer and lime application for a given unit area 2.3.3 Calculation for disease treatment and pest control 2.4 Drawings reading 2.4.1 Knowledgeable in reading, design lay-out and systems of a nursery ponds 2.5 Codes and Regulations 2.5.1 Comply with fisheries and Environmental Laws, Rules and Regulations 2.6 Tools & Equipment: Uses and Specifications 2.6.1 Knowledgeable in calibrating & using common aquaculture equipment 2.6.2 Can understand and follow instructional manuals 2.6.3 Safe keeping of equipment every after use 2.7 Materials: Uses and Specifications 2.7.1 Where to source good quality supplies, materials and equipment needed in the construction 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 equipment and facilities 2.9.2 Preventive maintenance skills 2.10 Values 2.10.1 Positive outlook towards work 2.10.2 Possesses pre-emptive/anticipatory skills
3. Underpinning Skills	3.1 Computed lime, fertilizer and predator control requirement for pond application 3.2 Performed correct fish sampling procedures 3.3 Solved problems related to fish nursery operations 3.4 Used and maintained aquaculture tools and equipment
4. Method of Assessment	Competency in this unit must be assessed through: 4.1 Direct observation and questioning 4.2 Third party report
5. Resource Implications	5.1 All supplies, materials and equipment needed during design, construction and operations of aqua farms should be readily available at the farm site 5.2 All workers involved in the aqua farm project must be fully oriented and cautioned on the different specific work activities of the project 5.3 Technical supervisors should have skills and ability in the successful implementation of work program activities
6. Context of Assessment	6.1 In the workplace or in a simulated workplace setting 6.2 While tasks are undertaken either individually or as part of a team under limited supervision 6.3 Third party report

UNIT OF COMPETENCY : **PERFORM FISH OR SHRIMP GROW-OUT OPERATIONS**

UNIT CODE : AGR641304

UNIT DESCRIPTOR : This unit covers the knowledge and skills required to perform fish or crustacean grow-out operations like the preparation of grow-out facilities, stocking, undertake grow-out farming protocols and harvesting.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Prepare grow-out facilities	1.1 Ponds 1.1.1 Pond is dried 1.1.2 Eliminated predators by applying ***predator control*** 1.1.3 *Lime* is applied to elevate soil pH 1.1.4 ***Fertilizer*** is applied 1.2 Pens and Cages 1.2.1 ***Frames*** *are installed* or set-up 1.2.2 ***Net Mesh are determined*** and fabricated into cages and installed to the cage frame 1.3 Tanks 1.3.1 Tanks are cleaned, dried and disinfected
2. Stocking of fingerlings	2.1 Fish/crustacean fingerlings are *acclimatized* for pH, temperature and salinity 2.2 Fingerling quality is assessed 2.3 Fingerlings are released as schedule or at appropriate time of the day 2.4 Maintained growth of natural food
3. Stock sampling	Procedures in stock sampling 3.1 Stock samples are weighed for ABW determination and counting for survival estimates 3.2 Stock sampling are undertaken regularly
4. Perform feeding operations	4.1 Feeds are selected based on ***quality*** 4.2 Feeds are sampled and analyzed periodically 4.3 Daily *feed ration* is computed and feed given are recorded
5. Maintain good water quality	5.1 Water quality is monitored using appropriate ***measuring instruments*** according to the Standard Methods In The Analysis Of Water And Wastewater 5.2 Optimum water quality is maintained by water exchange and bio-manipulation 5.3 Amount of water changed was based on water quality
6. Perform common disease diagnosis and treatment	6.1 Disease is observed and monitored through ***physical appearance and behavioral patterns*** 6.2 Infected fish is sampled and diagnosed 6.3 Treatment is identified and implemented 6.4 Prevention/safeguard against occurrences of viral, bacterial, fungal and parasitic diseases
7. Harvest stocks & Post harvest handling	7.1 Pond and cages are seined 7.2 Cages are lifted 7.3 Harvested fishes are packed and transported

RANGE OF VARIABLES

VARIABLE	RANGE
1. Limed	1.1 Agri-Lime 1.2 Hydrated Lime
2. Fertilized	2.1 Chicken Manure 2.2 Urea 2.3 Ammonium phosphate 2.4 Combinations
3. Appropriate Measuring instruments	3.1 DO Meter 3.2 Thermometer 3.3 PH meter 3.4 Secchi Disc 3.5 Ammonia and Nitrate test Kits
4. Predator Control	4.1 Derris Roots (Tubli) 4.2 Tea Seed Cake 4.3 Tobacco Dust 4.4 Ammonium Sulfate.
5. Disease	5.1 Nutritional 5.2 Bacterial 5.3 Fungal 5.4 Parasitic 5.5 Viral 5.6 Environmental
6. Physical appearance and behavioral patterns	6.1 Swirling 6.2 Swimming at surface 6.3 Non-feeding 6.4 Lethargic 6.5 Cottony growth 6.6 Lesions 6.7 Septicemia 6.8 Over production of mucous

EVIDENCE GUIDE	
1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Prepared grow-out facilities 1.2 Stocked fingerlings 1.3 Sampled the stocks 1.4 Performed feeding operations 1.5 Maintained good water quality 1.6 Performed common disease diagnosis and treatment 1.7 Harvested the stocks
2. Underpinning Knowledge and Skills	2.1 Safety Practices 2.2.1 Good work supervision during the construction of aqua farm facilities ensuring that specifications are strictly followed and implemented 2.2.2 Ideal good technical work habits to demonstrate to workers easy and safety standards during construction and operation of aqua farm projects 2.2 Communication 2.2.1 Prepare and submit regular accomplishment reports on all aqua farm activities 2.3 Mathematics and Mensuration 2.3.1 Calculation to determine Average Body Weight (ABW) of fish, daily feeding ration and Feed Conversion ratio (FCR) 2.3.2 Calculation in fertilizer and lime application for a given unit area 2.3.3 Calculation for disease treatment and pest control 2.4 Drawings reading 2.4.1 Knowledgeable in reading and interpreting, design lay-out and systems of grow-out ponds 2.5 Codes and Regulations 2.5.1 Comply with fisheries and Environmental Laws, Rules and Regulations 2.6 Tools & Equipment: Uses and Specifications 2.6.1 Knowledgeable in calibrating & using common aquaculture equipment 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 construction 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 2.10.1 Regular upkeep of equipments and facilities 2.9.2 Preventive maintenance skills 2.10 Values 2.10.1 Positive outlook towards work 2.10.2 Possesses pre-emptive/anticipatory skills
3. Underpinning Skills	3.1 Prepared facilities properly 3.2 Performed correct fish stocking procedures 3.3 Maintained growth of natural food 3.4 Performed fish sampling fish weekly 3.5 Computed ration 3.6 Monitored water quality parameters 3.7 Common diseases were diagnosed and treated 3.8 Used and maintained aquaculture tools and equipment
4. Method of Assessment	Competency in this unit will 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 design, construction and operations of aquaculture farms should be readily available at the farm site 5.2 All workers involved in the aqua farm project must be fully oriented and cautioned on the different specific work activities of the project 5.3 Technical supervisors should have skills and ability in the successful implementation of work program activities
6. Context of Assessment	6.1 Competency maybe assessed in the workplace or in a simulated workplace setting 6.2 Assessment shall be done while tasks are undertaken either individually or as part of a team under limited supervision 6.3 Third party report

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 Aquaculture NC II.

3.1. CURRICULUM DESIGN

Course Title: **AQUACULTURE** NC Level: **NC II**

Nominal Training Hours: **1,276 Hours**

Course Description:

This course is designed to enhance the knowledge, desirable skills and attitudes of aquaculture NCII in accordance with industry standards. It covers core competencies in *assisting in aquaculture operations, preparing and maintaining aquaculture facilities, operating fish nursery, performing fish or shrimp grow-out operations, and growing seaweeds.*.

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 pre-operational aquaculture activities	1.1 Inspect, clean/disinfect and repair tools, simple equipment and aquaculture facilities 1.2 Enumerate and explain fisheries and environmental laws, rules and regulations 1.3 Enumerate and explain the reasons for applying disease treatment 1.4 Apply the procedures in using disinfectants, lime and fertilizers 1.5 Determine method and volume of water for water exchange 1.6 Differentiate normal mortality from initial outbreak of disease 1.7 Apply the procedures in monitoring, collecting and analyzing mortalities 1.8 Identify and apply the various methods used in securing aquaculture facilities from various predators and other threats	Demonstration Dual training Self-paced learning (modular)	Written examination Demonstration of practical skills Direct observation Interview

2 Prepare and maintain Aquaculture Facilities	2.1 Select suitable pond site based on ECC/EMB-DENR Requirement 2.2 Determine Type of Soil 2.3 Determine Water Adequacy and Quality 2.4 Identify Prescribed Topography 2.5 Determine land area, size and project budget to suit the size shape, slope and materials to be used 2.6 Determine water adequacy and quality 2.7 Analyze water for water current speed using water current meter 2.8 Determine natural food by plankton sampling and microscopic examination 2.9 Measure water transparency 2.10 Determine substrate and tide level 2.11 Identify and design and print specification as to area of the land species to be cultured and systems 2.12 Design strong dike to counter act forces of nature 2.13 Identify materials to be used based on production target and capitalization 2.14 Plot markers as guide to the lay-out 2.15 Determine number of farm facilities 2.16 Determine number, size of compartment, depth of tank, based on the area available and the species for culture. 2.17 Identify materials to be used as to production and capitalization. 2.18 Plot markers as guide to the lay-out 2.19 Determine number of farm facilities to be used.	Demonstration Dual training Self-paced learning Lecture	Written examination Demonstration of practical skills Direct observation Interview

	2.20 Determine pen and cages size, number to be constructed as to availability of the given area. 2.21 Selecting framing materials, type of nets to be used as to the availability and suitability of the area and species to be cultured. 2.22 Determine materials based on site selected 2.23 Identify other farm facilities necessary to the culture module 2.24 Prepare Construction Resources for Pen and Cages 2.25 Fabricate Nets 2.26 Construct and Set Net Frame 2.27 Prepare Construction Resources for Ponds. 2.28 Perform Positioning of Major and Other Support Farm Facilities. 2.29 Position Equipment 2.30 Prepare construction resources for tanks 2.31 Install life support system and position equipment		

3 Operate Fish Nursery	3.1 Dry the pond. 3.2 Harrow and Dry the Soil 3.3 Select Lime to be Used and Apply 3.4 Select and Apply Predator Control 3.5 Allow the Natural Food to Bloom 3.6 Select Fertilizer and Compute Rate Application 3.7 Set-up aerators/agitators 3.8 Determine water quality parameters 3.9 Observe care in handling, transporting and stocking of fishes 3.10 Store Feeds Properly 3.11 Sample and Analyze Feeds for Ration 3.12 Compute Daily Feed Ration 3.13 Monitor Water Quality 3.14 Maintain Optimum Water Quality 3.15 Monitor and Observe Diseases 3.16 Diagnose Infected Fish 3.17 Identify Appropriate Treatment 3.18 Practice Preventive Measures Against Disease 3.19 Schedule harvest 3.20 Prepare harvesting materials 3.21 Observe proper handling while harvesting 3.22 Demonstrate proper grading, counting and packing of live fish	Demonstration Dual training Self-paced learning Lecture	Written examination Demonstration of practical skills Direct observation Interview

4 Perform Fish Or Shrimp Grow-Out Operations	4.1 Prepare pond 4.2 Install Pens and Cages 4.3 Clean Tanks 4.4 Acclimatize fish / crustacean fingerlings to pH, temperature and Salinity. 4.5 Release fingerlings at appropriate time of the day. 4.6 Determine procedures in stock sampling 4.7 Calculate periodic stock sampling 4.8 Source feeds 4.9 Store feeds properly 4.10 Compute feed ration and feed the fish 4.11 Monitor water quality using appropriate instrument 4.12 Maintain optimum water quality 4.13 Observe and Monitor Disease 4.14 Sample and Diagnose Infected Fish 4.15 Identify and Implement Treatment 4.16 Determine preventive measures against agents of diseases 4.17 Prepare harvesting materials 4.18 Seine stocks in pond and pen 4.19 Lift cage bags	Demonstration Dual training Self-paced learning Lecture	Written examination Demonstration of practical skills Direct observation Interview

3.2 TRAINING DELIVERY

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

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

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

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

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

AQUACULTURE NCII

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

TOOLS		EQUIPMENT		MATERIALS	
QTY		QTY		QTY	
5 pcs	DO meters	1	Surveying equipment	1	Manpower Resources
5 pcs	Flow rate meter	1	generator	1	Learning Materials
25 pcs	Laboratory thermometer	2	Microscope	1	R.A. 8550
10 pcs	Shovel	1	Plankton counter	1	Reference book
5 pcs	Water depth gauge	1	Welding machine	1	Instructional manual
5 pcs	Digging blades	5	G.I. pipe	1	Reference book
5 sets	Electrical tools	2	Puddle wheel	1	Brochures
	Lumber	1	Water pump	1	Local map
2 sets	Masonry tools	1	Hauling containers	1	Tide calendar
2 sets	Carpentry tools	1	oxygen tank	1	Model of different pond design
5 pcs	Cultivator / rake	1	Storage/tool cabinet	1	List of species for cultivation
	Lime	1	Feed storage	1	List of culture system
	Net	1	filled oxygen tank	1	Drawing materials
	P.E. rope	1	Chilling tank	1	Tide indicators
10 pcs	Pail, plastic	1	Guard house	1	Copy of financial statement
5 pcs	Running board			1	Lay-out plan
5 pcs	Weighing scale			1	List of dealers
10 pcs	Welding rod				
5 pcs	Cutting tools			1	Price list
5 rolls	Tying materials			1	Production size
5	Floats		Supplies and Materials	1	Illustration of different design and shape of pen and cages
25 pcs	Safety shoes	5	Live specimens	1	List of framing materials
25 pcs	Pencil	5	Normal fish, samples	1	List of materials available in the area
25 pcs	Ruler	5	Infected fish,	1	List of farm facilities

			samples		
5 rolls	Tracing paper	1 gal.	Therapeutic chemicals	1	Supporting documents for procurements
5 pcs	Sinkers	1 botl.	disinfectants	1	Construction manual
5 pcs	Eckman Dredge	2 gal	cleaning materials	1	Installation manual
5 pcs	Secchi disc	5 pcaks	Bag net	1	Instructional manual for aerators/agitators
5 sets	Water quality test kit	5	Scoop net	1	Micro- laboratory for feed analysis
5 pcs	pH meter	5	Siene net	1	Water quality test kits
5 pcs	Soil tester	5	Gill net	1	CD
5 pcs	Slidesmith cover		ce	1	Slides
10 pcs	Beaker	-	Drying materials	1	List of feeds supplier / producer
15 pcs	Netting needle	-	coconut leaves	1	Feed consumption chart
5	Water current meter	5	old fish nets	1	Tide calendar
1 kilo	Common nails	-	Specimen of different variety of seaweeds	1	Activity sheet
1 roll	String	1 gal	Formaldehyde	1	Pictures on seaweeds
5	Calculator	1 gal	Therapeutic chemicals	1	Posters / charts
			fingerlings	1	Pamphlet
5	Feed container	1 gal	Chlorine	1	List of potential buyers
5 pcs	Plastic basin	10 pcs	Bamboo pole	1	Questionnaires
5 pcs	Snakel	10 pcs	Bamboo slats / sheet	1	Purchase order forms
5 pcs	Thermometer (lab.)	1 sack	Feeds		
25 pcs	Hand gloves	1 sack	fertilizer / lime		
5	Mangrove stakes	1 kl	Soap (detergent)		
	Monofilament nylon		Seedlings		
10 pcs	Utility basket				
25 pcs	Pen				
25 pcs	Face mask				
25 pcs	Marker				
5 packs	Plastic bags				
5	Anchors/sinkers				
25 pcs	Bolo				
5 rolls	Cast net				

25 pcs	Clean sack				
5 pcs	Container				
5 pcs	Current meter				
5 pcs	Dissecting board				
5 sets	Dissecting tools				
5	Dissolved oxygen meter				
5 sets	Drawing instrument				
25 pcs	Face mask				
5 pcs	Fish grader				
10 pcs	Flashlights				
10 pcs	Forcep				
5 pcs	Hammer				
5 pcs	Harvesting containers				
25 pcs	Lab. gown				
5 pcs	Meter gauge				
1 roll	Moving line				
1 roll	Net				
25 pcs	P.E. bag				
25 pcs	P.L. bags				
5 pcs	Pecchi disc				
25 pcs	Personal safety gadgets				
5 pcs	Refractometer				
5 pcs	Ring/vortex blower				
5 packs	Rubber band				
5 pcs	Salinometer				
5 pcs	Saw				
5 pcs	Scalpel				
25 pcs	Scissor				
5 pcs	Scoop net				
5 pcs	Seine net				
5 pcs	Sinker				
10 pcs	Spatula				
5 pcs	Steel				
5 pcs	Steel brush / Plastic brush				
5 pcs	Styrofoam boxes				
5 pcs	Suspension net				
1 kl	Tea seed powder				

3.5 TRAINING FACILITIES

AQUACULTURE 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 Area (30% of teaching accommodation)		0	39.30
• Store Room	4.00 x 4.00	16.00	16.00
B. **Experimental Fish Farm**			**250.00**

3.6 TRAINER'S QUALIFICATIONS FOR AGRI-FISHERY SECTOR

AQUACULTURE NC II

TRAINER QUALIFICATION (TQ II)

- Must be a holder of Aquaculture NC Iil or its equivalent qualification
- 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 to be undertaken by the learner who enrolled in a structured learning program to determine the achievement of competencies. It is administered by the trainer/assessor at end of each learning module.

SECTION 4 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

4.1. To attain the National Qualification of Aquaculture 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 Aquaculture NC II may be attained through:

4..2.1. Accumulation of Certificates of Competency (COCs) in the following areas:

4.2.1.1. Prepare and maintain aquaculture facilties

4.2.1.2. Operate Fish Nursery
4.2.1.2.1. Conduct Pre-Operation Aquaculture activities
4.2.1.2.2. Operate Fish Nursery

4.2.1.3. Perform shrimp and fish grow-out operations
4.2.1.3.1. Conduct Pre-operation aquaculture activities
4.2.1.3.2. Perform shrimp and fish grow-out operations

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 the qualification.

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

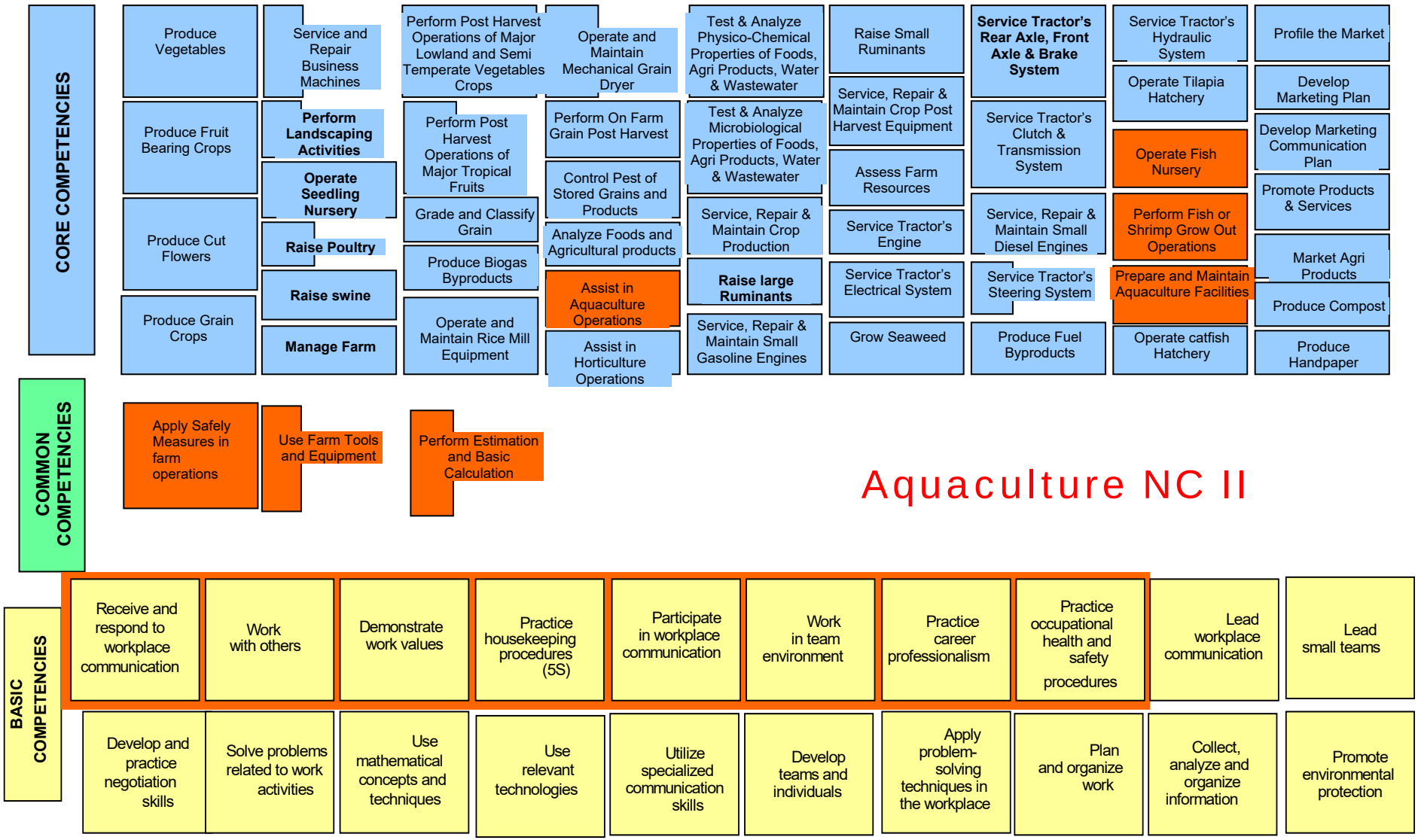
4.4. The following are qualified to apply for assessment and certification:

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

4.3.2 Experienced Workers (wage employed or self-employed)

4.5. 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

Acclimation - refers to adjusting the prevailing water condition of fish in an environment from lower to higher temperature to optimal temperature, from tower or higher salinity to optimal salinity (like from freshwater to salt water environment), etc.

Average Body Weight - is the total weight of fish over the number of Fish

AD-Libitum - refers to the mode of providing unlimited fish feeds to fish

AFMA - Agriculture and Fisheries Modernization Act

Aquarium Fish or Ornamental fish - Any fish that can be placed in confinement and with aesthetic value

Artemia - live food commonly used for fish larvae

BFAR - Bureau of Fisheries and Aquatic Resources

BOD - Biological Oxygen Demand

Brackish Water - refers to the mixture of freshwater and sea water naturally occurring in estuaries.

Brachionus - a rotifer used as larval feed for marine & freshwater fish larvae

Breeder - Sexually mature fish that are used for breeding

Chlorella - A unicellular green algae cultured to serve as food of the zooplankton, rotifers and fry.

Conditioning of Breeders - a method wherein the breeders are pampered by providing them nutritious feeds and optimum water conditions to effect the maturity of the fish

D.O. (Dissolved Oxygen) - refers to a quantity of oxygen mixed with water in the operation of a paddle wheel or the action of air current. The unit of the D.O. is commonly expressed in part per million (ppm).

FCR - Food Conversion Ratio is the Total amount of Feeds consumed over the Net Weight of Fish.

Egg Fertilization - the process of mixing the fish eggs with fish milt either by natural or artificial method.

Fish Nursery - refers to smaller unit areas of confinement wherein small fish larvae or fish fry are reared. It may either be in ponds, cages, tanks, etc

Fish Pond - an aquaculture facility with an earthen bottom surrounded by dikes, with water inlets and drain outlets.

Fish Cage - an aquaculture facility made of frames, net enclosures, mooring rope, anchors or poles installed in open waters like lakes, dams, rivers and sea-water coves, lagoons, impoundments etc.

Fish Pen - aquaculture facility in inland areas such as lakes, rivers, darns spring and deep wells devoid of salinity

Fry - newly hatched fish. Which are transparent, with big, head and does not in any way resemble the adult fish

Grow out - refers to bigger unit areas of confinement where fingerlings are stocked and grown to marketable size. It may either be in ponds, cages and fish pens.

Hapa Net - an enclosure made of fine mesh net for larvae/fry

Hatchery Operation - refers to a large production of larvae/fry

Hormones - are agents, (synthetically or naturally produced) used to fasten growth and induce ovulation and to effect sex reversal in fish.
Incubator - are hatching facilities where fertilized eggs are hatched.

Mature Breeders - fishes that are gravid (female) or with milt (male)

Induce Spawning - an artificial propagation method through hormone injection to hasten the maturity of the eggs and trigger spawning

Larvae - refers to newly hatched fish eggs

Liming - application of agricultural lime in ponds to elevate soil pH of acidic ponds

Modular Culture Technique - the process of culturing fish in grow-out units in short culture period. This requires one nursery unit in for every grow-out culture unit, thus making 4 to 5 harvests per year in one grow-out unit depending on the market size of fish
OHS - Operating Health Standard
Optimum - refers to the best environmental condition provided to the fish to effect maximum production
Pathogenic Bacteria – disease causing bacteria

pH Meter - instrument used to measure the hydrogen ions concentration of soil or water

Phytoplankton - unicellular microscopic algae suspended in water

Sea-Water - refers to waters with at east 32 ppt salinity

Satiation feeding - refers to the feed consumption of fish wherein it indicates whether fish is fully filled-up to the gut.

Seine Net - a type of fishing gear made up of nets, ropes, floats and sinkers used to harvest fish.

Spawner - mature female fish or shrimp used for breeding.

Stress - a negative environmental condition caused by biological, physical or chemical factors affecting the health, growth and well being of fish

Stripping - an artificial method by gently pressing the belly of male and female brood fish to release eggs and milt

Tanks - a culture system that is made up of cement, glass and plastic of different shapes

Viable - a state or condition where an undertaking or venture in aquaculture results to good performance as to technical and economic profitability of a project

Water Quality - refers to the over-all physical, chemical and biological parameters of the water

Zooplankton - animal base food protein

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- Region 3
- Region 5
- Region 8
- Region 11
- Region 12
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