



REPUBLIC OF KENYA

COMPETENCY BASED CURRICULUM

FOR

AQUACULTURE MANAGEMENT

LEVEL 5



TVET CDACC
P.O. BOX 15745-00100
NAIROBI

First published 2019
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FOREWORD

The provision of quality education and training is fundamental to the Government's overall strategy for social economic development. Quality education and training will contribute to achievement of Kenya's development blueprint and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted to the formulation of the Policy Framework for Reforming Education and Training. A key feature of this policy is the radical change in the design and delivery of TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that this curriculum has been developed.

It is my conviction that this curriculum will play a great role towards development of competent human resource for the Agriculture sector's growth and sustainable development.

**PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING
MINISTRY OF EDUCATION**

PREFACE

Kenya Vision 2030 aims to transform the country into a newly industrializing, “middle-income country providing a high-quality life to all its citizens by the year 2030”. Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency Based Education and Training (CBET).

The Technical and Vocational Education and Training Act No. 29 of 2013 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET in order to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) in conjunction with Aquaculture Sector Skills Advisory Committee (SSAC), German International Cooperation and Ministry of Agriculture, Livestock and Fisheries have developed this curriculum. TVET CDACC in conjunction with Micro Enterprises Support Programme Trust (MESPT) have reviewed this curriculum and incorporated Food Safety.

This curriculum is designed and organized with an outline of learning outcomes; suggested delivery methods, training/learning resources and methods of assessing the trainee’s achievement. The curriculum is competency-based and allows multiple entry and exit to the course.

I am grateful to the Council Members, Council Secretariat, Aquaculture and Food Safety SSAC, expert workers and all those who participated in the development and review of this curriculum.

**CHAIRPERSON,
TVET CDACC**

ACKNOWLEDGMENT

This curriculum has been designed for competency-based training and has independent units of learning that allow the trainee flexibility in entry and exit. In developing the curriculum, significant involvement and support was received from various organisations.

I appreciate NEPAD Planning and Coordinating Agency (NPCA) of the Africa Union Commission and German Ministry of Economic Cooperation and Development (BMZ) through its implementing agency German International Cooperation (GIZ) GmbH which enabled the development of this curriculum through the CAADP ATVET project. I also appreciate the office of the National Coordinator of GIZ CAADP ATVET Project which was instrumental in the cooperation between the project team, Ministry of Agriculture, Livestock and Fisheries (MoALF) and Ministry of Education.

Much gratitude goes to Micro Enterprises Support Program Trust (MESPT) who initiated the review process and the incorporation of Food Safety in the Curriculum. I acknowledge the Danish International Development Agency (DANIDA) and the European Union (EU) who sponsored the review process.

I recognize with appreciation the role of the Aquaculture and Food safety Sector Skills Advisory Committee (SSAC) in ensuring that competencies required by the industry are addressed in the curriculum. I also thank all stakeholders in the Agriculture sector for their valuable input and all those who participated in the process of developing this curriculum.

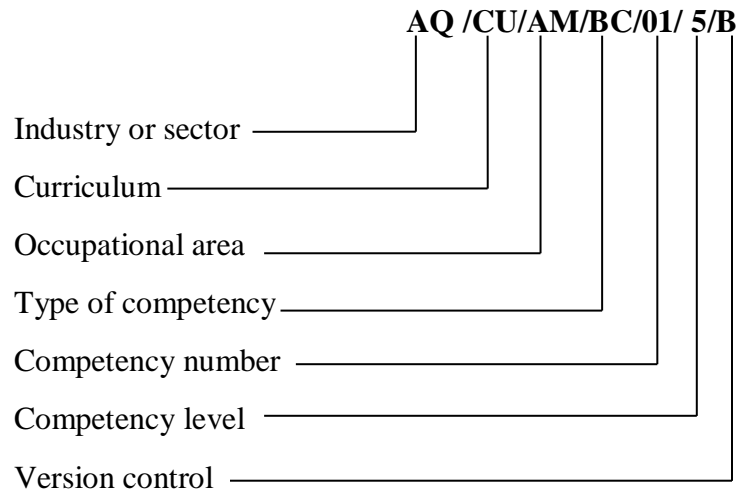
I am convinced that this curriculum will go a long way in ensuring that workers in Aquaculture Management acquire competencies that will enable them to perform their work more efficiently.

**COUNCIL SECRETARY/CEO
TVET CDACC**

ACRONYMS

AM	Aquaculture Management
AQ	Aquaculture
ATVET	Agricultural Technical and Vocational Education and Training
BC	Basic Competency
CAADP	Comprehensive Africa Agricultural Development Programme
CDACC	Curriculum Development, Assessment and Certification Council
CR	Core Competency
CU	Curriculum
DANIDA	Danish International Development Agency
KCPE	Kenya Certificate of Primary Education
KNQA	Kenya National Qualifications Authority
KCSE	Kenya Certificate of Secondary Education
MESPT	Micro Enterprises Support Programme Trust
PPE	Personal Protective Equipment
SSAC	Sector Skills Advisory Committee
TVET	Technical and Vocational Education and Training

KEY TO UNIT CODE



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COURSE OVERVIEW

This course is designed to equip individuals with competencies for selecting suitable sites for constructing fish ponds, producing on-farm formulated fish feeds as well as promoting growth of natural foods in ponds and tanks. It further aims at equipping the individual with competencies for stocking the ponds and tank with fingerlings and raising these to market size under optimum conditions. Additionally, the course is designed to impart the individuals with competencies to set up a small-scale fish hatchery and effectively operate it. The individual also acquire competencies in fish harvesting, handling and processing.

The course consists of the following basic and core units of learning:

Basic Units of Learning

Unit Code	Unit Title	Duration in Hours	CREDITS
AQ/CU/AM/BC/01/5/B	Communication skills	25	2.5
AQ/CU/AM/BC/02/5/B	Numeracy skills	40	4
AQ/CU/AM/BC/03/5/B	Digital literacy	45	4.5
AQ/CU/AM/BC/04/5/B	Entrepreneurial skills	70	7
AQ/CU/AM/BC/05/5/B	Employability skills	50	5
AQ/CU/AM/BC/06/5/B	Environmental literacy	25	2.5
AQ/CU/AM/BC/07/5/B	Occupational safety and health practices	25	2.5
Total		280	28

Core Units of Learning

Unit Code	Unit Title	Duration in Hours	Credits
AQ/CU/AM/CR/01/5/B	Setting up fish pond	120	20
AQ/CU/AM/CR/02/5/B	Fish feed production	190	19
AQ/CU/AM/CR/03/5/B	Fish hatchery operation	240	24
AQ/CU/AM/CR/04/5/B	Grow out fish production	230	23
AQ/CU/AM/CR/05/5/B	Post-harvest fish handling	210	21
AQ/CU/AM/CR/06/5/B	Setting up small-scale fish hatchery unit	260	26

	Industrial Attachment	360	36
Total		1690	169
		1890	189

The total duration of the course for an average trainee is 1690 hours which is equivalent to 56 weeks at 30 hours of learning per week plus 360 Hours of industrial attachment.

Entry Requirements

An individual entering this course should have any of the following minimum requirements:

- a) Kenya Certificate of Secondary Education (KCSE) mean grade D (Plain)
- Or**
- b) Artisan Certificate in Aquaculture Management Level 4
- Or**
- c) Equivalent qualifications as determined by Kenya National Qualifications Authority (KNQA)

Trainer qualification

A trainer for this course should have a higher qualification than the level of this course.

Assessment

The course will be assessed at two levels:

- a) **Internal assessment:** conducted continuously by the trainer (internal assessor) who is monitored by an accredited internal verifier
- b) **External assessment:** conducted by an accredited external assessor who is monitored by an accredited external verifier

The assessor and verifiers are accredited by TVET CDACC which also coordinates external assessment.

Certification

An individual candidate will be awarded a Record of Achievement on demonstration of competence in a unit of competency. To be awarded Certificate in Aquaculture Management Level 5, an individual must demonstrate competence in all the units of competency.

These certificates will be awarded by TVET CDACC in conjunction with the training provider

BASIC UNITS OF LEARNING

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COMMUNICATION SKILLS

UNIT CODE: AQ/CU/AM/BC/01/5/B

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Communication Skills

Duration of Unit: 25 hours

Unit Description

This unit covers the competencies required to demonstrate communication skills. It involves meeting communication needs of clients and colleagues, contributing to the development of communication strategies, conducting workplace interviews, facilitating group discussions and representing the organisation.

Summary of Learning Outcomes

1. Meet communication needs of clients and colleagues
2. Contribute to the development of communication strategies
3. Conduct interviews
4. Facilitate group discussions
5. Represent the organization

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Meet communication needs of clients and colleagues	<ul style="list-style-type: none">• Communication process• Modes of communication• Medium of communication• Effective communication• Barriers to communication• Flow of communication• Sources of information• Organizational policies• Organization requirements for written and electronic communication methods• Report writing	<ul style="list-style-type: none">• Interview• Third party reports• Written texts

	<ul style="list-style-type: none"> • Effective questioning techniques (clarifying and probing) • Workplace etiquette • Ethical work practices in handling communication • Active listening • Feedback • Interpretation • Flexibility in communication 	
2. Contribute to the development of communication strategies	<ul style="list-style-type: none"> • Dynamics of groups • Styles of group leadership • Openness and flexibility in communication • Communication skills relevant to client groups 	<ul style="list-style-type: none"> • Written • Observation
3. Conduct interviews	<ul style="list-style-type: none"> • Types of interview • Establishing rapport • Facilitating resolution of issues • Developing action plans 	<ul style="list-style-type: none"> • Written • Observation
4. Facilitate group discussions	<ul style="list-style-type: none"> • Identification of communication needs • Dynamics of groups • Styles of group leadership • Presentation of information • Encouraging group members participation • Evaluating group communication strategies 	<ul style="list-style-type: none"> • Written • Observation
5. Represent the organization	<ul style="list-style-type: none"> • Presentation techniques • Development of a presentation • Multi-media utilization in presentation • Communication skills relevant to client groups 	<ul style="list-style-type: none"> • Observation • Written

Suggested Methods of Instruction

- Role playing

- Viewing of related videos

Recommended Resources

- Desktop computers/laptops
- Internet connection
- Projectors
- Telephone

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NUMERACY SKILLS

UNIT CODE: AQ/CU/AM/BC/02/5/B

Relationship to Occupational Standards:

This unit addresses the Unit of Competency: Demonstrate Numeracy Skills

Duration of Unit: 40 hours

Unit Description

This unit covers the competencies required to demonstrate numeracy skills. It involves calculating with whole numbers and familiar fractions, decimals, and percentages for work estimating, measuring, and calculating with routine metric measurements for work, using routine maps and plans for work, interpreting, drawing and constructing 2D and 3D shapes for work, interpreting routine tables, graphs and charts for work, collecting data and constructing routine tables and graphs for work and using basic functions of calculator

Summary of Learning Outcomes

1. Calculate with whole numbers and familiar fractions, decimals and percentages for work
2. Estimate, measure and calculate with routine metric measurements for work
3. Use routine maps and plans for work
4. Interpret, draw and construct 2D and 3D shapes for work
5. Interpret routine tables, graphs and charts for work
6. Collect data and construct routine tables and graphs for work
7. Use basic functions of calculator

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Calculate with whole numbers and familiar fractions, decimals and percentages for work	<ul style="list-style-type: none">• Interpretation of whole numbers, fractions, decimals, percentages and rates• Calculations involving several steps• Calculation with whole numbers and routine or familiar fractions, decimals and percentages	<ul style="list-style-type: none">• Written• Practical test• Observation

	<ul style="list-style-type: none"> • Conversion between equivalent forms of fractions, decimals and percentages • Application of order of operations to solve multi-step calculations • Application of problem solving strategies • Making estimations to check reasonableness of problem solving process, outcome and its appropriateness to the context and task • Use of formal and informal mathematical language and symbolism to communicate the result of a task 	
2. Estimate, measure and calculate with routine metric measurements for work	<ul style="list-style-type: none"> • Selection and interpretation of measurement information in workplace tasks and texts • Identification and selection of routine measuring equipment • Estimation and making measurements using correct units • Estimation and calculation using routine measurements • Performing conversions between routinely used metric units • Using problem solving processes to undertake tasks • Recording information using mathematical language and symbols 	<ul style="list-style-type: none"> • Written • Practical test • Observation
3. Use routine maps and plans for work	<ul style="list-style-type: none"> • Identification of features in routine maps and plans • Symbols and keys used in routine maps and plans 	<ul style="list-style-type: none"> • Written • Practical test • Observation

	<ul style="list-style-type: none"> • Identification and interpretation of orientation of map to North • Demonstrate understanding of direction and location • Apply simple scale to estimate length of objects, or distance to location or object • Give and receive directions using both formal and informal language 	
4. Interpret, draw and construct 2D and 3D shapes for work	<ul style="list-style-type: none"> • Identify two dimensional shapes and routine three-dimensional shapes in everyday objects and in different orientations • Explain the use and application of shapes • Use formal and informal mathematical language and symbols to describe and compare the features of two-dimensional shapes and routine three-dimensional shapes • Identify common angles • Estimate common angles in everyday objects • Use formal and informal mathematical language to describe and compare common angles • Use common geometric instruments to draw two dimensional shapes • Construct routine three-dimensional objects from given nets 	<ul style="list-style-type: none"> • Written • Practical test • Observation
5. Interpret routine tables, graphs and charts for work	<ul style="list-style-type: none"> • Identify routine tables, graphs and charts in predominately familiar texts and contexts 	<ul style="list-style-type: none"> • Oral • Written • Practical test • Observation

	<ul style="list-style-type: none"> • Identify common types of graphs and their different uses • Identify features of tables, graphs and charts • Locate specific information • Perform calculations to interpret information • Explain how statistics can inform and persuade • Identify misleading statistical information • Discuss information relevant to the workplace 	
6. Collect data and construct routine tables and graphs for work	<ul style="list-style-type: none"> • Identify features of common tables and graphs • Identify uses of different tables and graphs • Determine data and variables to be collected • Determine audience • Select a method to collect data • Collect data • Collate information in a table • Determine suitable scale and axes • Draft and draw graph to present information • Check that data meets the expected results and context • Report or discuss information using formal and informal mathematical language 	<ul style="list-style-type: none"> • Written • Practical test • Observation
7. Use basic functions of calculator	<ul style="list-style-type: none"> • Identify and use keys for basic functions on a calculator • Calculate using whole numbers, money and routine decimals and percentages • Calculate with routine fractions and percentages 	<ul style="list-style-type: none"> • Written • Practical test • Observation

	<ul style="list-style-type: none">• Apply order of operations to solve multi-step calculations• Interpret display and record result• Make estimations to check reasonableness of problem solving process, outcome and its appropriateness to the context and task• Use formal and informal mathematical language and appropriate symbolism and conventions to communicate the result of the task	
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Suggested Methods of Instruction

- Demonstrations
- Role playing
- Viewing of related videos
- Discussion
- Assignments

Recommended resources

- Calculators
- Basic measuring instruments

DIGITAL LITERACY

UNIT CODE: AQ/CU/AM/BC/03/5/B

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Digital Literacy

Duration of Unit: 45 hours

Unit Description

This unit covers the competencies required to demonstrate digital literacy. It involves identifying appropriate computer software and hardware, applying security measures to data, hardware, software in automated environment, applying computer software in solving tasks, applying internet and email in communication at workplace, applying desktop publishing in official assignment and preparing presentation packages.

Summary of Learning Outcomes

1. Identify computer software and hardware
2. Apply security measures to data, hardware, software in automated environment
3. Apply computer software in solving tasks
4. Apply internet and email in communication at workplace
5. Apply desktop publishing in official assignments
6. Prepare presentation packages

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Identify computer hardware and software	<ul style="list-style-type: none">• Concepts of ICT• Functions of ICT• History of computers• Components of a computer• Classification of computers	<ul style="list-style-type: none">• Written tests• Oral presentation• Observation
2. Apply security measures to data, hardware and software	<ul style="list-style-type: none">• Data security and control• Security threats and control measures• Types of computer crimes• Detection and protection against computer crimes• Laws governing protection of ICT	<ul style="list-style-type: none">• Written tests• Oral presentation• Observation• Project

3. Apply computer software in solving tasks	<ul style="list-style-type: none"> • Operating system • Word processing • Spread sheets • Data base design and manipulation • Data manipulation, storage and retrieval 	<ul style="list-style-type: none"> • Oral questioning • Observation • Project
4. Apply internet and email in communication at workplace	<ul style="list-style-type: none"> • Computer networks • Network configurations • Uses of internet • Electronic mail (e-mail) concept 	<ul style="list-style-type: none"> • Oral questioning • Observation • Oral presentation • Written report
5. Apply desktop publishing in official assignments	<ul style="list-style-type: none"> • Concept of desktop publishing • Opening publication window • Identifying different tools and tool bars • Determining page layout • Opening, saving and closing files • Drawing various shapes using DTP • Using colour pellets to enhance a document • Inserting text frames • Importing and exporting text • Object linking and embedding • Designing of various publications • Printing of various publications 	<ul style="list-style-type: none"> • Oral questioning • Observation • Oral presentation • Written report • Project
6. Prepare presentation packages	<ul style="list-style-type: none"> • Types of presentation packages • Procedure of creating slides • Formatting slides • Presentation of slides • Procedure for editing objects 	<ul style="list-style-type: none"> • Oral questioning • Observation • Oral presentation • Written report • Project

Suggested Methods of Instruction

- Demonstration
- Viewing of related videos
- Discussions
- Assignments
- Direct instructions

Recommended Resources

- Computers
- Other digital devices
- Printers
- Storage devices
- Internet access
- Computer software

ENTREPRENEURIAL SKILLS

UNIT CODE: AQ/CU/AM/BC/04/5/B

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Entrepreneurship

Duration of unit: 70 hours

Unit Description

This unit covers the competencies required to demonstrate understanding of entrepreneurship. It involves demonstrating understanding of an entrepreneur, entrepreneurship and self-employment. It also involves identifying entrepreneurship opportunities, creating entrepreneurial awareness, applying entrepreneurial motivation and developing business innovative strategies.

Summary of Learning Outcomes

1. Demonstrate understanding of an entrepreneur
2. Demonstrate knowledge of entrepreneurship and self-employment
3. Identify entrepreneurship opportunities
4. Create entrepreneurial awareness
5. Apply entrepreneurial motivation
6. Develop innovative business strategies
7. Develop Business plan

Learning Outcome	Content	Suggested Assessment Methods
1. Demonstrate knowledge of entrepreneurship and self-employment	<ul style="list-style-type: none">• Importance of self-employment• Requirements for entry into self-employment• Role of an Entrepreneur in business• Contributions of Entrepreneurs to National development• Entrepreneurship culture in Kenya	<ul style="list-style-type: none">• Individual/group assignments• Projects• Written tests• Oral questions• Third party report

<p>2. Identify entrepreneurship opportunities</p>	<ul style="list-style-type: none"> • Business ideas and opportunities • Sources of business ideas • Business life cycle • Legal aspects of business • Assessment of product demand • Business environment • Factors to consider when evaluating business environment • Technology in business 	<ul style="list-style-type: none"> • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews
<p>3. Create entrepreneurial awareness</p>	<ul style="list-style-type: none"> • Forms of businesses • Sources of business finance • Factors in selecting source of business finance • Governing policies on Small Scale Enterprises (SSEs) • Problems of starting and operating SSEs 	<ul style="list-style-type: none"> • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews
<p>4. Apply entrepreneurial motivation</p>	<ul style="list-style-type: none"> • Internal and external motivation • Motivational theories • Self-assessment • Entrepreneurial orientation • Effective communications in entrepreneurship • Principles of communication • Entrepreneurial motivation 	<ul style="list-style-type: none"> • Case studies • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews
<p>5. Develop business innovative strategies</p>	<ul style="list-style-type: none"> • Innovation in business • Small business Strategic Plan • Creativity in business development • Linkages with other entrepreneurs • ICT in business growth and development 	<ul style="list-style-type: none"> • Case studies • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews

6. Develop Business Plan	<ul style="list-style-type: none"> • Business description • Marketing plan • Organizational/Management plan • Production/operation plan • Financial plan • Executive summary • Presentation of Business Plan 	<ul style="list-style-type: none"> • Case studies • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews
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Suggested Methods of instruction

- Direct instruction
- Project
- Case studies
- Field trips
- Discussions
- Demonstration
- Question and answer
- Problem solving
- Experiential
- Team training

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Recommended Resources

- Case studies
- Business plan templates
- Computers
- Overhead projectors
- Internet
- Mobile phone
- Video clips
- Films
- Newspapers and Handouts
- Business Journals
- Writing materials

EMPLOYABILITY SKILLS

UNIT CODE: AQ/CU/AM/BC/05/5/B

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Employability Skills

Duration of Unit: 50 hours

Unit Description

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating interpersonal communication, critical safe work habits, leading a workplace team, planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, problem solving skills and managing workplace ethics.

Summary of Learning Outcomes

1. Conduct self-management
2. Demonstrate interpersonal communication
3. Demonstrate critical safe work habits
4. Lead small teams
5. Plan and organize work
6. Maintain professional growth and development
7. Demonstrate workplace learning
8. Demonstrate problem solving skills
9. Demonstrate workplace ethics

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Conduct self-management	<ul style="list-style-type: none">• Self-awareness• Formulating personal vision, mission and goals• Strategies for overcoming life challenges• Emotional intelligence• Assertiveness versus aggressiveness• Expressing personal thoughts, feelings and beliefs	<ul style="list-style-type: none">• Written tests• Oral questioning• Interviewing• Portfolio of evidence• Third party report

	<ul style="list-style-type: none"> • Developing and maintaining high self-esteem • Developing and maintaining positive self-image • Articulating ideas and aspirations • Accountability and responsibility • Good work habits • Self-awareness • Self-development • Financial literacy • Healthy lifestyle practices 	
2. Demonstrate interpersonal communication	<ul style="list-style-type: none"> • Meaning of interpersonal communication • Listening skills • Types of audience • Writing skills • Reading skills • Meaning of empathy • Understanding customers' needs • Establishing communication networks • Sharing information 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
3. Demonstrate critical safe work habits	<ul style="list-style-type: none"> • Stress and stress management • Punctuality and time consciousness • Leisure • Integrating personal objectives into organizational objectives • Resources utilization • Setting work priorities • HIV and AIDS • Drug and substance abuse • Handling emerging issues 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
4. Lead a small team	<ul style="list-style-type: none"> • Leadership qualities • Team building • Determination of team roles and objectives • Team performance indicators • Responsibilities in a team 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report

	<ul style="list-style-type: none"> • Forms of communication • Complementing team activities • Gender and gender mainstreaming • Human rights • Maintaining relationships • Conflicts and conflict resolution 	
5. Plan and organize work	<ul style="list-style-type: none"> • Functions of management <ul style="list-style-type: none"> ○ Planning ○ Organizing • Time management • Decision making process • Task allocation • Evaluating work activities • Resource utilization • Problem solving • Collecting and organising information 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
6. Maintain professional growth and development	<ul style="list-style-type: none"> • Opportunities for professional growth • Assessing training needs • Licenses and certifications for professional growth and development • Pursuing personal and organizational goals • Identifying work priorities • Recognizing career advancement 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
7. Demonstrate workplace learning	<ul style="list-style-type: none"> • Managing own learning • Contributing to the learning community at the workplace • Cultural aspects of work • Variety of learning context • Application of learning • Safe use of technology • Identifying opportunities • Generating new ideas • Workplace innovation • Performance improvement 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report

	<ul style="list-style-type: none"> • Handling emerging issues • Future trends and concerns in learning 	
8. Demonstrate problem solving skills	<ul style="list-style-type: none"> • Problem identification • Problem solving • Application of problem-solving strategies • Resolving customer concerns 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
9. Demonstrate workplace ethics	<ul style="list-style-type: none"> • Meaning of ethics • Ethical perspectives • Principles of ethics • Values and beliefs • Ethical standards • Organization code of ethics • Common ethical dilemmas • Organization culture • Corruption, bribery and conflict of interest • Privacy and data protection • Diversity, harassment and mutual respect • Financial responsibility/accountability • Etiquette • Personal and professional integrity • Commitment to jurisdictional laws • Emerging issues in ethics 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report

Suggested Methods of Instruction

- Demonstrations
- Simulation/Role play
- Discussion
- Presentations
- Case studies
- Q&A

Recommended Resources

- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- Radio sets
- TV sets
- LCD projectors

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ENVIRONMENTAL LITERACY

UNIT CODE: AQ/CU/AM/BC/06/5/B

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Environmental Literacy

Duration of Unit: 25 hours

Unit Description

This unit describes the competencies required to demonstrate understanding of environmental literacy. It involves controlling environmental hazard, controlling control environmental pollution, complying with workplace sustainable resource use, evaluating current practices in relation to resource usage, identifying environmental legislations/conventions for environmental concerns, implementing specific environmental programs and monitoring activities on environmental protection/programs.

Summary of Learning Outcomes

1. Control environmental hazards
2. Control environmental Pollution
3. Demonstrate sustainable use of resource
4. Evaluate current practices in relation to resource usage
5. Identify Environmental legislations/conventions for environmental concerns
6. Implement specific environmental programs
7. Monitor activities on Environmental protection/Programs

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Control environmental hazards	<ul style="list-style-type: none">• Purposes and content of Environmental Management and Coordination Act 1999• Purposes and content of Solid Waste Act• Storage methods for environmentally hazardous materials	<ul style="list-style-type: none">• Written test• Oral questions• Observation

	<ul style="list-style-type: none"> • Disposal methods of hazardous wastes • Types and uses of PPE in line with environmental regulations • Occupational Safety and Health Standards (OSHS) 	
2. Control environmental Pollution control	<ul style="list-style-type: none"> • Types of pollution • Environmental pollution control measures • Types of solid wastes • Procedures for solid waste management • Different types of noise pollution • Methods for minimizing noise pollution 	<ul style="list-style-type: none"> • Written test • Oral questions • Observation
3. Demonstrate sustainable resource use	<ul style="list-style-type: none"> • Types of resources • Techniques in measuring current usage of resources • Calculating current usage of resources • Methods for minimizing wastage • Waste management procedures • Principles of 3Rs (Reduce, Reuse, Recycle) • Methods for economizing or reducing resource consumption 	<ul style="list-style-type: none"> • Written test • Oral questions • Observation
4. Evaluate current practices in relation to resource usage	<ul style="list-style-type: none"> • Collection of information on environmental and resource efficiency systems and procedures, • Measurement and recording of current resource usage • Analysis and recording of current purchasing strategies. • Analysis of current work processes to access information and data • Identification of areas for improvement 	<ul style="list-style-type: none"> • Written test • Oral questions • Observation

<p>5. Identify Environmental legislations/conventions for environmental concerns</p>	<ul style="list-style-type: none"> • Environmental issues/concerns • Environmental legislations /conventions and local ordinances • Industrial standard /environmental practices • International Environmental Protocols (Montreal, Kyoto) • Features of an environmental strategy 	<ul style="list-style-type: none"> • Written questions • Oral questions • Observation
<p>6. Implement specific environmental programs</p>	<ul style="list-style-type: none"> • Community needs and expectations • Resource availability • 5 s of good housekeeping • Identification of programs/Activities • Setting of individual roles /responsibilities • Resolving problems /constraints encountered • Consultation with stakeholders 	<ul style="list-style-type: none"> • Written questions • Oral questions • Observation
<p>7. Monitor activities on Environmental protection/Programs</p>	<ul style="list-style-type: none"> • Periodic monitoring and Evaluation of activities • Gathering feedback from stakeholders • Analysing data gathered • Documentation of recommendations and submission • Setting of management support systems to sustain and enhance the program • Monitoring and reporting of environmental incidents to concerned /proper authorities 	<ul style="list-style-type: none"> • Oral questions • Written tests • Practical test • Observation

Suggested Methods of Instruction

- Instructor led facilitation of theory
- Demonstration by trainer
- Viewing of related videos
- Project

- Assignments
- Role play

Recommended Resources

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Environmental Management and Coordination Act 1999
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE)
- ISO standards
- Company environmental management systems (EMS)
- Montreal Protocol
- Kyoto Protocol

OCCUPATIONAL SAFETY AND HEALTH PRACTICES

UNIT CODE: AQ/CU/AM/BC/07/5/B

Relationship to Occupational Standards

This unit addresses the unit of competency: Demonstrate occupational safety and health practices

Duration of Unit: 25 hours

Unit Description

This unit specifies the competencies required to identify workplace hazards and risk, identify and implement appropriate control measures and implement OSH programs, procedures and policies/guidelines

Summary of Learning Outcomes

1. Identify workplace hazards and risk
2. Control OSH hazards
3. Implement OSH programs

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Identify workplace hazards and risks	<ul style="list-style-type: none">• Identification of hazards in the workplace and/or the indicators of their presence• Evaluation and/or work environment measurements of OSH hazards/risk existing in the workplace is conducted by• Authorized personnel or agency• Gathering of OHS issues and/or concerns raised	<ul style="list-style-type: none">• Oral questions• Written tests• Portfolio of evidence• Third party report
2. Control OSH hazards	<ul style="list-style-type: none">• Prevention and control measures, including use of PPE (personal protective equipment) for specific hazards are identified and implemented	<ul style="list-style-type: none">• Oral questions• Written tests• Portfolio of evidence• Third party report

		<ul style="list-style-type: none"> • Appropriate risk controls based on result of OSH hazard evaluation is recommended • Contingency measures, including emergency procedures during workplace incidents and emergencies are recognized and established in accordance with organization procedures 	
3. Implement OSH programs	OSH	<ul style="list-style-type: none"> • Providing information to work team about company OHS program, procedures and policies/guidelines • Participating in implementation of OSH procedures and policies/guidelines • Training of team members and advice on OSH standards and procedures • Implementation of procedures for maintaining OSH-related records 	<ul style="list-style-type: none"> • Oral questions • Written tests • Portfolio of evidence • Third party report

Suggested Methods of Instruction

- Assignments
- Discussion
- Q&A
- Role play
- Viewing of related videos

Recommended Resources

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE) e.g.
 - Mask
 - Face mask/shield
 - Safety boots
 - Safety harness
 - Arm/Hand guard, gloves
 - Eye protection (goggles, shield)

- Hearing protection (ear muffs, ear plugs)
- Hair Net/cap/bonnet
- Hard hat
- Face protection (mask, shield)
- Apron/Gown/coverall/jump suit
- Anti-static suits
- High-visibility reflective vest

CORE UNITS OF LEARNING

easyvet.com

SET UP FISH POND

UNIT CODE: AQ/CU/AM/CR/01/5/B

Relationship to Occupational Standards

This unit addresses the unit of competency: Set up fish pond

Duration of Unit: 124 hours

Unit Description

This unit describes the competencies required to set up a fish pond. It involves competencies to apply food safety measures in setting up fish pond in carrying out site selection for fish ponds, design and construction of ponds, and repair of fish ponds.

Summary of Learning Outcomes

1. Apply food safety measures in setting up fish pond
2. Prepare to set up a fish pond.
3. Construct fish pond
4. Test run the pond
5. Exit pond construction site

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply food safety measures in setting up fish pond	<ul style="list-style-type: none">• Meaning of food safety• Importance of food safety• Principles of food safety• Prerequisite programmes<ul style="list-style-type: none">○ Meaning, importance, categories and establishment of prerequisite programmes○ Relevant programmes for setting up fish ponds• Hazard analysis for setting up fish ponds<ul style="list-style-type: none">○ Enterprise description○ Product description○ Layout of premises and surrounding environment○ Development of flow diagram	<ul style="list-style-type: none">• Written tests• Oral questioning• Observation• Case study• Third Party reports• Project• Practical tests

	<ul style="list-style-type: none"> ○ Identification of hazards at each step of the flow diagram ○ Describing the hazard ○ Significance of hazards ● Establishment of the HACCP plan for setting up fish ponds <ul style="list-style-type: none"> ○ Identification of critical control points ○ Procedures for setting up critical control limits ○ Establishment monitoring procedures on the control limits ○ Establishment of corrective actions ○ Verification procedures ○ Record keeping ○ Validation procedures ● Standards and legislations in food safety on setting up a fish farm 	
<p>2. Prepare to set up a fish pond.</p>	<ul style="list-style-type: none"> ● Fish pond <ul style="list-style-type: none"> ○ Definition ○ Parts of a fish pond ● Classification of ponds <ul style="list-style-type: none"> ○ Material of construction e.g. earthen, concrete, liner, paddy, wooden ○ Purpose of pond e.g. nursery, breeding, production, quarantine ● Site selection <ul style="list-style-type: none"> ○ Importance ○ Factors to consider ● Basic pond design <ul style="list-style-type: none"> ○ Dyke dimensions ○ Bottom slopes ○ Freeboard ○ Inlet, outlets ○ Drainage and ○ Spacing between ponds 	<ul style="list-style-type: none"> ● Written ● Oral ● Observation

	<ul style="list-style-type: none"> • Identification and use of materials, supplies, tools and equipment in pond construction • Costing pond construction • Interpretation of farm layout • Applicable statutory regulations 	
3. Construct fish pond	<ul style="list-style-type: none"> • Safety measures <ul style="list-style-type: none"> ○ Use of PPEs in pond construction ○ Carrying out basic first aid-cuts, blisters, CPR, fractures • Steps in pond construction <ul style="list-style-type: none"> ○ Site clearance ○ Pegging ○ Core trenching ○ Excavation ○ Compaction and shaping of dykes ○ Sloping of the pond bottom ○ Fitting inlets and outlets ○ Trenching of supply and drainage channels ○ Planting grass ○ Fencing off the pond area • Carrying out pond construction 	<ul style="list-style-type: none"> • Written tests • Oral presentation • Observation • Projects
4. Test run the pond	<ul style="list-style-type: none"> • Major defects associated with new ponds • Procedure for test running a new pond <ul style="list-style-type: none"> ○ Filling a new pond with water ○ Allow to settle for 24 hours ○ Observe and mark out major defects ○ Drain the pond ○ Repair of defects 	<ul style="list-style-type: none"> • Oral questioning • Observation • Project
5. Exit pond construction site	<ul style="list-style-type: none"> • Storing recyclable materials and supplies • Disposal methods for non-recyclable materials • Cleaning and storage of tools and equipment • Completion report writing • Handing over procedure 	<ul style="list-style-type: none"> • Oral questioning • Observation • Oral presentation • Written report

Suggested methods of Instruction

- Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Project
- Group discussions

Recommended Resources

- Tape measure, spirit level, string level, jembes, spades, pangas, pick axe, rake, slashers, hacksaw
- Compactors and rollers, wheelbarrows
- Strings and ropes, liners, pegs, PVC pipes and joints, adhesives, screens, lime, cement, sand, ballast
- Gloves
- Goggles
- Helmets
- Gum boots
- Overalls
- First aid kits

FISH FEED PRODUCTION

UNIT CODE: AQ/CU/AM/CR/02/5/B

Relationship to Occupational Standards

This unit addresses the unit of competency: Produce fish feeds

Duration of Unit: 194 hours

Unit Description

This unit describes the competencies required to produce fish feeds. It involves competencies to apply food safety measures in producing fish feeds to promote growth of natural fish foods and produce on-farm formulated feeds. It also involves trial of the fish feeds to evaluate their performance.

Summary of Learning Outcomes

1. Apply food safety measures in producing fish feeds
2. Produce natural fish foods
3. Produce on-farm formulated fish feeds
4. Package and store fish feeds
5. Evaluate fish feed performance

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply food safety measures in producing fish feeds	<ul style="list-style-type: none">• Meaning of food safety• Importance of food safety• Principles of food safety• Prerequisite programmes<ul style="list-style-type: none">○ Meaning, importance, categories and establishment of prerequisite programmes○ Relevant programmes for fish feed production• Hazard analysis for fish feed production<ul style="list-style-type: none">○ Enterprise description○ Product description○ Layout of premises and surrounding environment○ Development of flow diagram	<ul style="list-style-type: none">• Written tests• Oral questioning• Observation• Case study• Third Party reports• Project• Practical tests

	<ul style="list-style-type: none"> ○ Identification of hazards at each step of the flow diagram ○ Describing the hazard ○ Significance of hazards ● Establishment of the HACCP plan for fish feed production <ul style="list-style-type: none"> ○ Identification of critical control points ○ Procedures for setting up critical control limits ○ Establishment monitoring procedures on the control limits ○ Establishment of corrective actions ○ Verification procedures ○ Record keeping ○ Validation procedures <p>Standards and legislations in food safety on fish feed production</p>	
<p>2. Produce natural fish foods</p>	<ul style="list-style-type: none"> ● Types of fish feeds <ul style="list-style-type: none"> ○ Natural feeds ○ Artificial feeds ● Nutritional requirement of commonly culture fish species ● Use of PPEs in production of natural fish foods ● Tools and materials for natural fish production ● Production of natural feeds <ul style="list-style-type: none"> ○ Types of plankton ○ Types of fertilizers ○ Methods of fertilization ○ Frequency of fertilization ○ Measuring productivity in ponds 	<ul style="list-style-type: none"> ● Written tests ● Oral questioning ● Practical tests
<p>3. Produce on-farm formulated fish feeds</p>	<ul style="list-style-type: none"> ● Use of PPEs in production of fish feeds ● Safety measures to be observed ● Uses of fish feed production materials, supplies, tools and equipment 	<ul style="list-style-type: none"> ● Written tests ● Oral questioning ● Oral presentation ● Practical tests ● Projects

	<ul style="list-style-type: none"> • Production of artificial feeds <ul style="list-style-type: none"> ○ Feed ingredients and their properties ○ Feed formulation methods e.g Pearson's square, computer software ○ Anti-nutritional factors in feed ingredients ○ Factors affecting mixing ○ Procedure of mixing ○ Pelletizing process ○ Drying methods 	
4. Package and store fish feeds	<ul style="list-style-type: none"> • Types of packaging materials • Packaging methods • Labelling information • Fish feed handling and storage • Fish feeds price determination 	<ul style="list-style-type: none"> • Oral questioning • Practical tests • Oral presentation • Written tests
5. Evaluate fish feed performance	<ul style="list-style-type: none"> • Measurement of fish feeds physical parameters • Fish sampling procedure <ul style="list-style-type: none"> ○ Types and uses of sampling gears ○ Handling of fish samples ○ Sample size determination (5-10%) • Calculation and interpretation of feed conversion ratio (FCR) • Fish feed trial 	<ul style="list-style-type: none"> • Oral questioning • Practical tests • Written tests • Projects

Suggested methods of Instruction

- Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Projects
- Group discussions

Recommended Resources

- Meat mincers, blenders, grinders, weighing scales, dryer, mixers, containers, bag sealers, ovens, burners, drying racks.
- Fertilizers, secchi disks,
- Buckets , gunny bags, sticks, stakes
- Packaging bags, drying canvas/ polythene

- Safety goggles
- Gum boots
- Helmets
- Gloves
- Dust coats
- First aid kits
- Mouth piece

FISH HATCHERY OPERATION

UNIT CODE: AQ/CU/AM/CR/03/5/B

Relationship to Occupational Standards

This unit addresses the unit of competency: Operate fish hatchery

Duration of Unit: 248 hours

Unit Description

This unit describes the competencies required to operate fish hatchery. It involves ability to apply food safety measures in managing fish hatchery, source for quality broodstock, transporting, managing and breeding them. It also involves nursing and packaging fingerlings and maintaining hatchery facility.

Summary of Learning Outcomes

1. Manage Broodstock
2. Produce fingerlings
3. Maintain hatchery facility

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply food safety measures in managing fish hatchery	<ul style="list-style-type: none">• Meaning of food safety• Importance of food safety• Principles of food safety• Prerequisite programmes<ul style="list-style-type: none">○ Meaning, importance, categories and establishment of prerequisite programmes○ Relevant programmes in fish hatchery operations• Hazard analysis for fish hatchery operations<ul style="list-style-type: none">○ Enterprise description○ Product description○ Layout of premises and surrounding environment○ Development of flow diagram	<ul style="list-style-type: none">• Written tests• Oral questioning• Observation• Case study• Third Party reports• Project• Practical tests

	<ul style="list-style-type: none"> ○ Identification of hazards at each step of the flow diagram ○ Describing the hazard ○ Significance of hazards ● Establishment of the HACCP plan for fish hatchery operations <ul style="list-style-type: none"> ○ Identification of critical control points ○ Procedures for setting up critical control limits ○ Establishment monitoring procedures on the control limits ○ Establishment of corrective actions ○ Verification procedures ○ Record keeping ○ Validation procedures <p>Standards and legislations in food safety on managing fish hatchery</p>	
<p>2. Manage broodstock</p>	<ul style="list-style-type: none"> ● Meaning of terms e.g. hatcheries, brooder/ broodstock ● Types of hatcheries <ul style="list-style-type: none"> ○ Small scale ○ Commercial ● Types of fish holding facilities in a hatchery ● Safety measures <ul style="list-style-type: none"> ○ Use of PPEs in broodstock management ○ Carrying out basic first aid-cuts, CPR, fractures ● Handling and use of tools, equipment and materials ● Cleaning and disinfection of fish culture units ● Broodstock selection <ul style="list-style-type: none"> ○ Criteria ○ Sources of broodstock □ Transporting broodstock □ Acclimatization, quarantine and stocking 	<ul style="list-style-type: none"> ● Written tests ● Oral questioning ● Practical tests ● Oral presentations ● Projects

	<ul style="list-style-type: none"> □ Management of broodstock <ul style="list-style-type: none"> ○ Feeding –conditions, rations, timings, ○ Water quality management 	
3. Produce fingerlings	<ul style="list-style-type: none"> • Use of PPEs in production of fingerlings • Safety measures to be observed • Use of fingerling production materials, supplies, tools and equipment • Meaning of terms e.g. spawning, milt, pituitary glands, stripping • Selection of ripe broodstock • Types of breeding <ul style="list-style-type: none"> ○ Natural breeding ○ Induced breeding without hormone ○ Induced breeding with hormone ○ Artificial propagation • Monosex tilapia production <ul style="list-style-type: none"> ○ Preparation of hormone treated feed ○ Stage of hatchlings at first feeding ○ Duration of feeding • Nursing fry <ul style="list-style-type: none"> ○ Feeding ○ Grading 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Oral presentations • Practical tests • Projects
4. Maintain hatchery facility	<ul style="list-style-type: none"> • Components of a fish hatchery and their operation • Hatchery sanitation <ul style="list-style-type: none"> ○ Cleaning and disinfection ○ Waste disposal • Water quality management • Maintenance and repairs of hatchery components 	<ul style="list-style-type: none"> • Oral questioning • Practical tests • Oral presentations • Written reports

Suggested methods of Instruction

- Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Projects

- Group discussions

Recommended Resources

- Dissecting kit, weighing balance, pair of pincers, pestle and mortar, needle and syringe, measuring cylinders, hatching jars, larval rearing trays, perforators, basins, harvesting gear, happa nets, buckets, scoop nets, water test kits, refrigerators,
- Salt, towel, egg substrates, warm water, anaesthesia, 17- α Methyl Testosterone, feeds, fertilizers, ethanol, acetone, vials, cotton wool, assorted bowls
- Safety goggles
- Gum boots
- Wading suit
- Gloves
- Dust coats
- First aid kits
- Life ring
- Life jacket

GROW OUT FISH PRODUCTION

UNIT CODE: AQ/CU/AM/CR/04/5/B

Relationship to Occupational Standards

This unit addresses the unit of competency: Produce grow out fish

Duration of Unit: 234 hours

Unit Description

This unit describes the competencies required to produce grow-out fish. It involves ability to apply food safety measures in producing grow out fish, prepare grow out facilities, stock and manage fish until attainment of market size. It also involves the competencies required to maintain the fish culture facility, control predators and harvest fish.

Summary of Learning Outcomes

1. Apply food safety measures in producing grow out fish
2. Prepare grow out facility
3. Stock grow out facilities
4. Manage fish stock
5. Control fish predators
6. Harvest fish stock
7. Maintain grow out facilities

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply food safety measures in producing grow out fish	<ul style="list-style-type: none">• Meaning of food safety• Importance of food safety• Principles of food safety• Prerequisite programmes<ul style="list-style-type: none">○ Meaning, importance, categories and establishment of prerequisite programmes○ Relevant programmes in grow-out fish production• Hazard analysis for grow-out fish production<ul style="list-style-type: none">○ Enterprise description○ Product description○ Layout of premises and surrounding environment	<ul style="list-style-type: none">• Written tests• Oral questioning• Observation• Case study• Third Party reports• Project• Practical tests

	<ul style="list-style-type: none"> ○ Development of flow diagram ○ Identification of hazards at each step of the flow diagram ○ Describing the hazard ○ Significance of hazards ● Establishment of the HACCP plan for grow-out fish production <ul style="list-style-type: none"> ○ Identification of critical control points ○ Procedures for setting up critical control limits ○ Establishment monitoring procedures on the control limits ○ Establishment of corrective actions ○ Verification procedures ○ Record keeping ○ Validation procedures ● Standards and legislations in food safety on producing grow out fish 	
2. Prepare grow out facility	<ul style="list-style-type: none"> ● Use of PPEs in production of grow out fish ● Use of grow out fish production materials, supplies, tools and equipment ● Pond preparation <ul style="list-style-type: none"> ○ Pond draining ○ Removal of bottom sediments ○ Sun-drying ○ Lime application ○ Pond filling ○ Fertilization 	<ul style="list-style-type: none"> ● Written tests ● Oral questioning ● Practical tests
3. Stock grow out facilities	<ul style="list-style-type: none"> ● Safety measures to be observed ● Preparation of stocking plan <ul style="list-style-type: none"> ○ Source of fingerlings ○ Species of fish ○ Stocking density ○ Stocking schedule ● Handling of fingerlings 	<ul style="list-style-type: none"> ● Written tests ● Oral questioning ● Oral presentations ● Practical tests

	<ul style="list-style-type: none"> ○ Transportation ○ Acclimatization and stocking ● Post stocking monitoring <ul style="list-style-type: none"> ○ Behaviour ○ Mortalities 	
4. Manage fish stock	<ul style="list-style-type: none"> ● Fish feeding <ul style="list-style-type: none"> ○ Preparation of feeding plan ○ Types of feeds ○ Feeding methods ● Water quality management <ul style="list-style-type: none"> ○ Physico-chemical parameters ○ Monitoring of water parameters ○ Pond fertilization ○ Corrective actions ● Disease control <ul style="list-style-type: none"> ○ Observing for signs of sick fish ○ Basic remedial measures e.g. quarantine, stop feeding, partial displacement of water 	<ul style="list-style-type: none"> ● Oral questioning ● Written tests ● Practical tests
5. Control fish predators	<ul style="list-style-type: none"> ● Fish predators and intrusive animals ● Types and behaviour of predators ● Types and behaviour of intrusive animals ● Control measures 	<ul style="list-style-type: none"> ● Oral questioning ● Practical tests ● Written tests ● Oral presentations
6. Harvest fish stock	<ul style="list-style-type: none"> ● Use of harvesting tools, equipment and materials ● Preliminary procedure for harvesting <ul style="list-style-type: none"> ○ Flushing pond with freshwater ○ Starving fish to be harvested ● Harvesting methods ● Handling of harvested fish <ul style="list-style-type: none"> ○ Sorting and grading of fish ○ Stress minimization ○ Observation of hygiene ○ Short term preservation 	<ul style="list-style-type: none"> ● Oral questioning ● Practical tests ● Written tests ● Oral presentations
7. Maintain grow out facilities	<ul style="list-style-type: none"> ● Use of maintenance tools, equipment and materials ● Safety measures to be observed ● Weed control and dyke maintenance 	<ul style="list-style-type: none"> ● Oral questioning ● Practical tests ● Written tests ● Oral presentations

	<ul style="list-style-type: none">• Basic maintenance of grow out facility structures e.g. drainage channels, fence, cribs	
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Suggested methods of Instruction

- Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Group discussions

Recommended Resources

- Slashers, machetes, jembes, spades, wheelbarrow, rakes, measuring tape, weighing scale, wheelbarrow, pH meter, jembes, spades, rakes. Lime, fertilizer, tamper, ropes, liner repair kit, traps and scarecrows
- Gunny bags seine net, scoop net, buckets, laundry baskets, perforators, lime, fertilizer, tamper, ropes, net covers, twines, screens, fencing
- Safety goggles, gum boots, helmets, gloves, dust coats, first aid kits, industrial mouth piece

- **POST HARVEST FISH HANDLING**

UNIT CODE: AQ/CU/AM/CR/05/5/B

Relationship to Occupational Standards

This unit addresses the unit of competency: Handle harvested fish

Duration of Unit: 206 hours

Unit Description

This unit describes the competencies required to handle harvested fish. It involves ability to apply food safety measures in handling harvested fish, hygienically handle, preserve, and process harvested fish. It includes marketing of fish, fish products and by-products. It also involves disposal of wastes from fish processing.

Summary of Learning Outcomes

1. Apply food safety measures in handling harvested fish
2. Preserve harvested fish
3. Process harvested fish
4. Market fish, fish products and by-products
5. Manage waste from fish processing

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply food safety measures in handling harvested fish	<ul style="list-style-type: none"> • Meaning of food safety • Importance of food safety • Principles of food safety • Prerequisite programmes <ul style="list-style-type: none"> ○ Meaning, importance, categories and establishment of prerequisite programmes ○ Relevant programmes in post-harvest fish handling • Hazard analysis for post-harvest fish handling <ul style="list-style-type: none"> ○ Enterprise description ○ Product description ○ Layout of premises and surrounding environment ○ Development of flow diagram 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Observation • Case study • Third Party reports • Project • Practical tests

	<ul style="list-style-type: none"> ○ Identification of hazards at each step of the flow diagram ○ Describing the hazard ○ Significance of hazards ● Establishment of the HACCP plan for post-harvest fish handling <ul style="list-style-type: none"> ○ Identification of critical control points ○ Procedures for setting up critical control limits ○ Establishment monitoring procedures on the control limits ○ Establishment of corrective actions ○ Verification procedures ○ Record keeping ○ Validation procedures <p>Standards and legislations in food safety on handling harvested fish</p>	
<p>2. Preserve harvested fish</p>	<ul style="list-style-type: none"> ● Use of PPEs in preserving harvested fish ● Safety measures to be observed ● Use of fish preservation materials, supplies, tools and equipment ● Fish handling procedures <ul style="list-style-type: none"> ○ Grading ○ Cleaning ○ Scaling ○ Gutting ● Fish preservation methods <ul style="list-style-type: none"> ○ Icing ○ Smoking ○ Sun-drying ○ Salting ○ Freezing 	<ul style="list-style-type: none"> ● Written tests ● Oral questioning ● Practical tests ● Projects
<p>3. Process harvested fish</p>	<ul style="list-style-type: none"> ● Use of PPEs in processing harvested fish ● Safety measures to be observed ● Use of fish processing materials, supplies, tools and equipment ● Types of processed fish products 	<ul style="list-style-type: none"> ● Written tests ● Oral questioning ● Oral presentation ● Practical tests ● Projects

	<ul style="list-style-type: none"> • Processing methods <ul style="list-style-type: none"> ○ Frying ○ Roasting ○ Salting ○ Marinating ○ Filleting ○ Fermentation • Fish by-product processing <ul style="list-style-type: none"> ○ Oils ○ Frames ○ Skins • Packaging and labelling <ul style="list-style-type: none"> ○ Packaging tools and equipment ○ Packaging materials ○ Labelling information • Products storage 	
4. Market fish, fish products and by-products	<ul style="list-style-type: none"> • Factors affecting marketing of fish and fish products • Price determination • Distribution channels • Selling methods • Observation of hygiene 	<ul style="list-style-type: none"> • Oral questioning • Written tests • Observation
5. Manage waste from fish processing	<ul style="list-style-type: none"> • Use of tools, materials and equipment in disposal of fish processing wastes • Environmental regulations for disposal of fish processing wastes • Types of fish processing wastes • Disposal methods of fish processing wastes 	<ul style="list-style-type: none"> • Oral questioning • Practical tests • Written tests • Oral presentations

Suggested methods of Instruction

- Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Group discussions
- Role plays
- Field trips

Recommended Resources

- Weighing balance, wheelbarrow, pallets, filleting tables, knives, waste disposal containers, ice box, smoking kiln, solar dryer, drying racks, drying mats or canvass,

domestic freezers, cool boxes, meat mincer, blender, crockery, basins, buckets, hard brush, baskets, fire-fighting equipment

- Ice, salt, frying oil, polybags, cartons, gunny bags, ice packs, sealing tape, labels
- Gum boots, head covers, gloves, dust coats, first aid kits, mouth pieces, aprons

SETTING UP SMALL-SCALE FISH HATCHERY UNIT

UNIT CODE: AQ/CU/AM/CR/06/5/B

Relationship to Occupational Standards

This unit addresses the unit of competency: Set up small-scale fish hatchery unit

Duration of Unit: 258 hours

Unit Description

This unit describes the competencies required for setting up small scale fish hatchery unit. It involves applying food safety measures in setting up small scale fish hatchery, interpretation of basic fish hatchery designs, selection of ideal hatchery construction sites and preparation of cost estimates for hatchery construction. It also involves supervision of hatchery construction and installation of biosecurity measures.

Summary of Learning Outcomes

1. Apply food safety measures in setting up small scale fish hatchery
2. Prepare to set up a fish hatchery.
3. Supervise fish hatchery construction
4. Set up biosecurity measures

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply food safety measures in setting up small scale fish hatchery	<ul style="list-style-type: none">• Meaning of food safety• Importance of food safety• Principles of food safety• Prerequisite programmes<ul style="list-style-type: none">○ Meaning, importance, categories and establishment of prerequisite programmes○ Relevant programmes in setting up small scale fish hatchery• Hazard analysis for setting up small scale fish hatchery<ul style="list-style-type: none">○ Enterprise description○ Product description○ Layout of premises and surrounding environment	<ul style="list-style-type: none">• Written tests• Oral questioning• Observation• Case study• Third Party reports• Project• Practical tests

	<ul style="list-style-type: none"> ○ Development of flow diagram ○ Identification of hazards at each step of the flow diagram ○ Describing the hazard ○ Significance of hazards ● Establishment of the HACCP plan for setting up small scale fish hatchery <ul style="list-style-type: none"> ○ Identification of critical control points ○ Procedures for setting up critical control limits ○ Establishment monitoring procedures on the control limits ○ Establishment of corrective actions ○ Verification procedures ○ Record keeping ○ Validation procedures ● Standards and legislations in food safety on setting up small scale fish hatchery 	
<p>2. Prepare to set up a fish hatchery unit.</p>	<ul style="list-style-type: none"> ● Hatchery <ul style="list-style-type: none"> ○ Definition ○ Types and functions - small-scale vs. commercial ● Factors to consider in hatchery site selection <ul style="list-style-type: none"> ○ Physical factors ○ Statutory requirements ○ Economic factors ● Basic hatchery designs <ul style="list-style-type: none"> ○ Components of a fish hatchery unit ○ Interpretation of hatchery designs ● Validation of hatchery design done on-site ● Costing of hatchery construction 	<ul style="list-style-type: none"> ● Written tests ● Oral questioning ● Practical tests ● Projects

<p>3. Supervise fish hatchery construction</p>	<ul style="list-style-type: none"> • Use of PPEs in hatchery construction • Safety measures to be observed • Use of materials, supplies, tools and equipment in hatchery construction • Construction of culture units <ul style="list-style-type: none"> ○ Ponds – earthen, liner ○ Tanks – plastic, concrete ○ Collapsible fish ponds • Installation of indoor hatchery facilities <ul style="list-style-type: none"> ○ Sorting tables ○ Packaging tables ○ Incubation units ○ Plumbing works • Installation of outdoor hatchery facilities <ul style="list-style-type: none"> ○ Water intake structures ○ Piping ○ Overhead tanks ○ Drainage systems 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Oral presentation • Practical tests
<p>4. Set up bio-security measures</p>	<ul style="list-style-type: none"> • Meaning of bio-security • Factors to consider in fish hatchery bio-security • Installation of footbaths and filtration systems • Construction of fences and quarantine facilities • Installation of intruder control facilities and devices e.g. nets, meshes, screens, cover nets 	<ul style="list-style-type: none"> • Oral questioning • Written tests • Practical tests • Projects

Suggested methods of Instruction

- Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Group discussions

Recommended Resources

- Nets, meshes, screens, cover nets, gates, tape measure, spirit level, jembes, spades, pangas, plumbing tools, masonry tools,
- Compactors and rollers, wheelbarrows, aeration equipment, filtration

- Ropes and strings, liners, pegs, plumbing materials, lime, cement, sand, roofing materials, fencing wire, fittings, assorted screens, netting materials
- Safety goggles, gum boots, helmets, gloves, overalls, first aid kits, mouth piece

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