FEDERAL MINISTRY OF EDUCATION

National Skills Qualifications

FOR

FISH FARMING ACTIVITY

(AQUACULTURE)

LEVEL 1, 2 & 3

February, 2025

NBTE
NATIONAL BOARD FOR TECHNICAL EDUCATION

NBTE-IDEAS
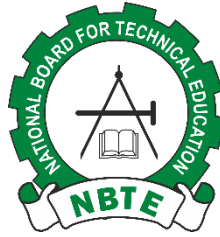
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Funded by IDEAS project

National Board for Technical Education
Plot B, Bida Road, P.M.B. 2239, Kaduna, Nigeria

NATIONAL SKILLS QUALIFICATION

FISH FARMING ACTIVITY

AQUACULTURE SECTOR

LEVEL 1-3

FEBRUARY, 2025

Contents

NATIONAL SKILLS QUALIFICATION

FISH FARMING ACTIVITY

AQUACULTURE SECTOR

LEVEL 1

FEBRUARY, 2025

GENERAL INFORMATION

QUALIFICATION PURPOSE

This qualification is aimed at developing competence in fish production across different platforms. The focus is on fish production process, communication skills, inter-personal skills development and workplace experience.

QUALIFICATION OBJECTIVES

To achieve this qualification, the learner should be able to:

- Apply safe working practices in their work environment
- Communicate effectively in a fish farming working environment.
- Work in a team in a fish farming environment
- Understand the importance of aquaculture and biosecurity.
- Recognise the different systems of fish production
- Carry out simple fish pond operation practices
- Use fish harvesting gears and crafts

Mandatory units

S/No	Reference Number	NOS Title	Credit Value	Guided Learning Hours	Remarks
1	**AqCS/FFA/01/L1**	Work Safely in Fish Farming Environment	2	20	Mandatory
2	**AqCS /FFA/02/L1**	Communicate Effectively in Fish Farming Environment	2	20	Mandatory
3	**AqCS /FFA/03/L1**	Team Work in Fish Farming Practice	2	20	Mandatory
4	**AqCS /FFA/04/L1**	Introduction to Fish Farming in Nigeria	3	30	Mandatory
5	**AqCS /FFA/05/L1**	Basic Aquaculture	4	40	Mandatory
6	**AqCS /FFA/06/L1**	Introduction to Fish Pond Management	3	30	Mandatory
7	**AqCS /FFA/07/L1**	Introduction to Harvesting Gear and Craft technology	3	30	Mandatory
		Grand Total	**19**	**190**	

NOTE:
The minimum credit required for Level I qualification in Fish Farming is 19 credit value.
To achieve this qualification; A Learner is required to achieve 16 credits from mandatory units and 3 from optional unit.

Each Credit is equivalent to 10 Guided Learning Hours (GLH). The Total Learning Hours will therefore consist of the GLH *plus* the independent learning hours of the candidate, which is generally 50% – 150% of the GLH.

Unit 01: Work Safely in Fish Farming Environment

Unit Reference Number:	**AqCS /FFA/01/L1**
NSQ Level:	**1**
Credit Value:	**2**
Guided Learning:	**20 Hours**

Unit Purpose: This unit is on the adherence to health and safety precaution and avoidance of environmental hazards associated with fish farming.

Unit assessment requirements/evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out. *Simulation is not allowed* in this unit and level.

Assessment methods to be used include:
1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Personal statement (PS) or Reflective Practice (RP)
5. Work Product (WP)
6. Recognition of Prior Learning (RPL)
7. Other methods (O t), assignments, case study, essay, project, etc.

UNIT 01: Work Safely in Fish Farming Environment

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type				Evidence Ref. No.		Page	
LO 1: Work safely in Fish Farming Environment.	1.1	Explain safe work practices along the fish production value chain								
	1.2	Identify safety signs and symbols in fish facilities								
	1.3	Describe safety signs and symbols correctly								
	1.4	Demonstrate safe work practices and instructions in fish facilities								
	1.5	Demonstrate swimming ability								
LO 2: Comply with safety standards in fish farming facilities	2.1	Identify work environment hazards								
	2.2	State types of hazards and risks while using fish farming facilities								
	2.3	State safety standards in fish farming facilities								
	2.4	Use safety tools, materials and equipment in fish farming facilities								
LO 3: Apply personal protective equipment (PPE) in fish farming facilities	3.1	Identify the types of PPEs								
	3.2	Select appropriate PPE								
	3.3	Demonstrate the use of PPE								
	3.4	Maintain PPE before and/ or after use								
LO 4: Respond to accidents/injury in fish farming	4.1	Locate first aid facility								
	4.2	Use basic dressing materials								
	4.3	Respond to supervisor given instructions								
	4.4	Report accident/injury to the appropriate supervisor								
LO 5: Apply safe work habit and clean work environment in fish farming	5.1	Use safe access and exit routes in the work environment								
	5.2	Identify appropriate working tools, materials and equipment								
	5.3	Use tools and equipment safely in accordance with the supervisors instructions								
	5.4	Return all tools, equipment and unused materials for appropriate storage								

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
	5.5	Carry out general housekeeping of work environment									
	5.6	Dispose all wastes appropriately to designated waste facilities									
LO 6: Comply with standards of handling, lifting, loading/offloading and stacking of materials in fish farming facilities	6.1	Identify lifting and stacking techniques									
	6.2	Demonstrate lifting techniques in loading and offloading of materials without assistance									
	6.3	Demonstrate correct lifting and loading techniques with mechanical assistance									
	6.4	Stack materials correctly									

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

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Unit 02: Communicate Effectively in Fish Farming Environment

Unit Reference Number: **AqCS /FFA/02/L1**
NSQ Level: **1**
Credit Value: **2**
Guided Learning Hours: **20 Hours**

Unit Purpose: This unit is about simple communication techniques in fish farming.

Unit Objectives:
  Unit assessment requirements/evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out. *Simulation is/or is not allowed* in this unit and level.

Assessment methods to be used include:
1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Personal statement (PS) or Reflective Practice (RP)
5. Work Product (WP)
6. Recognition of Prior Learning (RPL)
7. Other methods (O t), assignments, case study, essay, project, etc.

UNIT 02: Communicate Effectively in Fish Farming Environment

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type				Evidence Ref. No.		Page	
LO 1: Apply the use of a non-complex communication system in a work environment	1.1	Use a verbal means to pass on necessary information								
	1.2	Use non-verbal means to convey necessary information e.g. body language, signs								
	1.3	Interpret symbols and signs appropriately								
LO 2: Source for information in a work environment	2.1	Identify the source of information in the work environment								
	2.2	Relate effectively with the source of information								
	2.3	Use the different information flow systems in a work environment								
	2.4	Use information gathered to avoid challenges in a work situation								
	2.5	Report findings appropriately in accordance with laid down procedures in the work environment i.e. Cards, Flip Chart								
	2.6	Use simple communication gadget like mobile phones and table phones								
LO 3: Apply various means of communication in a work environment	3.1	Locate the various communication equipment in the work environment								
		Use effectively the various communication equipment in a work environment								
	3.2	Pass information effectively to the right personnel								
	3.3	Obey instructions in line with ethics of the work environment								

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

UNIT 03: Team work

Unit Reference Number: **AqCS /FFA/03/L1**
NSQ Level: **1**
Credit Value: **2**
Guided Learning Hours: **20 Hours**

Unit Purpose:
The purpose for this unit is to impact into the learner the necessary skills, knowledge and understanding required to develop team spirit and positive working relationship with colleagues.

Unit Assessment requirement
Assessment of this unit must be at a real practical work environment; simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Professional Discussion
- Question and Answer

Unit 03: Team work

LO (Learning outcome)		Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1 Demonstrate Positive working relationship with colleagues	1.1	Identify the need for developing positive working relationship with colleagues									
	1.2	Recognize the importance of relating with other people in a way that makes them feel valued and respected									
	1.3	Assist team members when required.									
	1.4	Report to the appropriate personnel when request for assistance fall outside area of responsibility.									
	1.5	Communicate information to colleagues about individual work that may affect team work.									
LO 2 Take responsibility within the team											
	2.1	Recognize own role and responsibilities within a team									
	2.2	Perform individual tasks in line with the team's rules and regulations.									
	2.3	Participate effectively in teamwork.									
LO.3 Compliance with policy of organisation											
	3.1	Explain organizational code of conduct									
	3.2	Work in line with organizational standard									
	3.3	Use organizational code of practice									
	3.4	Adhere strictly to instructions given by the Management									

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

UNIT 04:   Introduction to Fish Farming in Nigeria

Unit Reference Number: **AqCS /FFA/05/L1**
NSQ Level: **1**
Credit Value: **3**
Guided Learning Hours: **30hours**

Unit Purpose:
The unit is designed to acquaint learners with the general knowledge of fish farming in Nigeria

Unit Objective:
At the end of the unit, the learner should be able to:
- Understand the basics of aquaculture and the importance of biosecurity.
- Recognise the different types of fish and shell fish commonly farmed in aquaculture.
- Understand the role of aquaculture in food production and the importance of sustainable practices.

Unit Assessment requirement
Assessment of this unit must be at a real practical work environment; simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Question and Answer
- Assignment

UNIT 04: Introduction to Fish Farming in Nigeria

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number					
LO1 Understand the basics of aquaculture and the importance of biosecurity	1.1	Define aquaculture.												
	1.2	Identify the various culture system in aquaculture.												
	1.3	Identify the different types of aquaculture systems.												
	1.4	List common sources of water in aquaculture												
	1.5	Discuss the importance of biosecurity												
LO2 Recognise the different types of fish and shell fish commonly farmed in aquaculture														
	2.1	Identify various culturable fish species												
	2.2	Describe the external features of fish												
	2.3	Identify major fish types in Nigeria e.g. table fish, ornamental fish, shellfish.												
	2.4	Draw different culturable and non-culturable fish species (fin fish and shell fish).												
LO3 Understand the role of aquaculture in food production and the importance of sustainable practices														
	3.1	Explain the importance of aquaculture in food production and security.												
	3.2	Discuss the economic benefit of aquaculture												
	3.3	State the social and environmental sustainability of aquaculture.												

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

UNIT 05:   Basic Aquaculture

Unit Reference Number: AqCS /FFA/05/L1
NSQ Level: 1
Credit Value: 4
Guided Learning Hours: 40hours

Unit Purpose:
The unit is designed to acquaint learners with the general principle of aquaculture particularly as it affects warm water fish species.

Unit Objective:
At the end of the unit, the learner should be able to:
- Demonstrate knowledge of the meaning and scope of aquaculture.
- Describe various types of fish Farming systems.
- Demonstrate knowledge of enemies of fish under culture.
- Control water pollution in fish farming.
- Control weed.

Unit Assessment requirement
Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Question and Answer
- Assignment

UNIT 05: Basic Aquaculture

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number				
LO1 Demonstrate knowledge of the meaning and scope of aquaculture	1.1	Describe Fish farming											
	1.2	Identify major culturable fish types in Nigeria e.g. table fish, ornamental fish, shellfish.											
	1.3	Identify key species of fish cultured in Nigeria.											
	1.4	Recognise the major features of different fish types in Nigeria e.g. table fish, ornamental fish, shellfish.											
LO2 Describe various types of Fish Farming systems													
	2.1	Describe the facilities used for fish culture											
	2.2	Identify the facilities for the culture of fish											
	2.3	Differentiate the various fish culture facilities											
LO3 Demonstrate knowledge of enemies of fish under culture													
	3.1	Identify fish predators e.g. frogs/toads crocodiles, alligators, water tortoise, turtles, dragon fly larvae, birds etc.											
	3.2	Describe methods of controlling fish predators.											
	3.3	Control fish predators.											
LO 4 Control water pollution in fish farming													
	4.1	Recognise water pollution.											
	4.2	Identify water pollution in fish farm											
	4.3	Describe various methods of controlling water pollution.											
LO 5 Control of weeds in fish farm													
	5.1	Identify different types of weeds											
	5.2	State the benefits of aquatic weeds in fish farming e.g. Duck weed, Mosquito ferns (Azolla) weed - serve as complementary feed - serve as water purifier - serve as bio shades used to stabilize temperature of water											
	5.3	Distinguish between useful and non-useful aquatic weeds											
	5.4	Describe methods of controlling aquatic weeds eg by physical methods such as removing of weeds.											

Learners Signature:	Date:
Assessors Signature: 17	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

UNIT 06:   Introduction to Fish Pond Practices
Unit reference number: **AqCS /FFA/006/L1**
NSQ level: **1**
Credit value: **3**
Guided learning hours: **30hours**

Unit Purpose:
  The unit is designed to acquaint learners with the knowledge and skills of fish pond practices

Unit Objective:
The learner should be able to:
- Carry out fish Pond Preparation
- Carry out different methods of feeding
- Demonstrate the maintenance practices of a pond

Unit Assessment requirement
Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Question and Answer
- Assignment

UNIT 06: Introduction to Fish Pond Practices

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number				
LO1 Understand fish Pond Preparation	1.1	Perform De-mudding of fish pond											
	1.2	Carry out Pond clearing											
	1.3	Perform filling of pond with water											
	1.4	Carry out liming and fertilization of pond											
LO2 Carry out different methods of feeding													
	2.1	Identify different size of fish feed pellets appropriate for feeding fish of different sizes											
	2.2	State the time of feeding											
	2.3	Describe various feeding methods											
	2.4	Measure the quantity of feed											
	2.5	Record the quantity of feed fed											
LO3 Demonstrate the maintenance practices of a pond													
	3.1	Identify the inlet and outlet of a pond											
	3.2	Operate the inlet and outlet of a pond											
	3.3	Carry out pond repair											
	3.4	Remove dead fish from the pond											
	3.5	Carry out netting against predators in a pond											

Learners Signature	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

UNIT 07:   **Introduction to Harvesting Gear and Craft Technology**

Unit Reference Number: **AqCS /FFA/007/L1**
NSQ level: **2**
Credit value: **3**
Guided learning hours: 30hours

Unit Purpose:
The unit is designed to acquaint learners with the knowledge and skills of harvesting gear and craft technology

Unit Objective:
The learners should be able to:
- Demonstrate understanding of fish harvesting gears and craft technology used in aquaculture
- Demonstrate the use of fish harvesting gears and craft in Aquaculture
- Construct Simple Harvesting Gears in Aquaculture

Unit Assessment requirement
Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Question and Answer
- Assignment

UNIT 07: Introduction to Harvesting Gear and Craft Technology

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number			
LO1 Demonstrate understanding of fish harvesting gears and craft technology used in aquaculture	1.1	List different harvesting gear (e.g. Scoop net, Hand net, Cast net, Seine, Drag net, etc)										
	1.2	Identify the various harvesting gears used in aquaculture (e.g. Scoop net, Hand net, Cast net, Seine, Drag net, etc)										
	1.3	Describe harvesting craft used in aquaculture										
	1.4	Demonstrate how to use various harvesting craft.										
LO 2 Demonstrate the use of fish harvesting gears and craft in Aquaculture												
	2.1	Explain the meaning of setting in harvesting gear										
	2.2	Cast the drag net for harvesting in ponds										
	2.3	Use the scoop net, for fish harvesting in pond.										
LO3 Construct Simple Harvesting Gears in Aquaculture.												
	3.1	Identify materials used in the construction of simple harvesting gears in aquaculture										
	3.2	Design simple harvesting gears in aquaculture										
	3.3	Make a simple fish harvesting gear e.g. scoop net										

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

NATIONAL SKILLS QUALIFICATION

FISH FARMING ACTIVITY

AQUACULTURE SECTOR

LEVEL 2

FEBRUARY, 2025

GENERAL INFORMATION

QUALIFICATION PURPOSE

This qualification is aimed at developing competence in fish production across different platforms. The focus is on fish production process, communication skills, inter-personal skills development and workplace experience.

QUALIFICATION OBJECTIVES

To achieve this qualification, the learner should gain the following competencies:

- Apply safe working practices in their work environment
- Communicate effectively and exhibit interpersonal skills in fish farming environment.
- Working in a team in a fish farming environment
- Knowledge of the basic biology of fishes
- Assist in fish hatchery operations
- Assist in fish pond operation practices
- Assist in fish feed production and storage.
- Carry out safe handling and transportation of live fish
- Detect fish health condition
- Assist in fish post-harvest processing and preservation operations

Mandatory Units

S/N	Reference Number	NOS Title	Credit Value	Guided Learning Hours	Remark
1	AqCS /FFA/01/L2	Health, safety and environmental practices in fish farming	3	30	Mandatory
2	AqCS /FFA/02/L2	Communication and Interpersonal Skill	2	20	Mandatory
3	AqCS /FFA/03/L2	Team Work in Fish Farming Environment	2	20	Mandatory
4	AqCS /FFA/04/L2	Biology of Fishes	3	30	Mandatory
5	AqCS /FFA/05/L2	Fish hatchery operations	3	30	Mandatory
6.	AqCS /FFA/06/L2	Fish pond operation practices	3	30	Mandatory
7.	AqCS /FFA/07/L2	Feed production and storage	4	40	Mandatory
8.	AqCS /FFA/08/L2	Live fish handling and transportation	2	20	Mandatory
		Sub-total	**22**	**220**	
	OPTIONAL UNITS				
9.	AqCS /FFA/09/L2	Fish health in fresh water fish culture	2	20	Optional
10.	AqCS /FFA/10/L2	Fish post-harvest processing and preservation	3	30	Optional
		Sub-total	5	50	
		Grand-total	**27**	**270**	

NOTE:

The minimum credit required for Level 2 Qualification in Fish Farming is 27 credit value.
 To achieve this qualification; Learners are required to achieve 22 credits from mandatory units and 5 from optional units.
Each Credit is equivalent to approximate to 10 Guided Learning Hours (GLH). The Total Learning Hours will therefore consist of the GLH *plus* the independent learning hours of the candidate, which is generally 50% – 150% of the GLH.

Qualification Purpose:

The qualification is designed to produce competent personnel capable of processing fish and operating the activity as a business along the processing value chain

Purpose

This unit specifies the competencies required to understand the concept of health, safety and environmental practices in freshwater fish farming in Nigeria. It includes the use of protective clothes, biosecurity measures and general environmental sanitation in farms, proper use and maintenance of farm tools and equipment. This unit standard is intended for those interested in operating small scale fish farm and carrying out associated fish production processes.

1.   Entry information
        Pre requisite(s):
        Unit ID F/001 – Basic literacy
        Unit F/002 – Basic numeracy

Special Notes

1.   This unit standard is to be delivered and assessed in the context of understanding of the health, safety and environmental practices in fish farming and should be assessed in conjunction with other relevant technical units selected from this domain.
2.   To demonstrate competence, at a minimum, evidence is required of the correct interpretation of the health, safety and environmental practices in freshwater fish farming. Perform these tasks ensuring correct application of health, safety and environmental practices in fish rearing.
3.   Assessment evidence may be collected from a real workplace or a simulated real workplace or an appropriate simulated realistic environment in which fish farming operations are carried out.
4.   All inspection, operation and maintenance procedures associated with the use of tools and equipment shall comply with manufacturers' and company guidelines, instructions, and reasonable flat rate time.
5.   Glossary:
        "Biosecurity": refers to protection of animals against harm from diseases or from human
                    exploitation.
        "Disinfectants": refers to chemicals used in killing microorganisms on inanimate objects such as floors, equipment etc.
        "Antiseptic": refers to chemicals used on living body (animate objects) to prevent infection.

Quality Assurance Requirements

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the National Board for Technical Education and which comply with the national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the National Board for Technical Education.

Range:
- Tools for environmental sanitation include but not limited to: Rake, shovel, spade, wheel barrow, head pan, slasher, broom, hand gloves, etc.
- Sources of pollution include human, animal, waste products, litter, rubbish, transport fumes, noise, light pollution
- Sources of human environmental damage includes vandalism, waste dumping, human traffic, tourism, damage by compaction and wear, litter, dog fouling, leisure activities, construction activities, inappropriate agricultural management activities, inappropriate waste disposal methods.

- Measures to minimize human environmental damage include education and training, interpretation boards and notices/signs, prohibition (fencing, limited access, restricted areas), recycling, minimizing consumption and waste products, use of biodegradable materials and products
- Habitats on a fish farm map include but not limited to water courses and wet areas, field margins, ditches, banks and walls
- Common habitat includes but are not limited to water features, woodlands, grassland, hedgerows, moorland, lowland heath, peat bogs
- Habitat maintenance and improvement may include mowing, renovation, planting and staking as applicable, clearing (path, fence line), coppicing, uprooting, hedge maintenance, pruning, thinning, cutting or mowing and mulching, pond, stream and ditch clearance, use of pesticides, herbicides and fertilizer.
- Reduction re-uses and/or recycling of materials may include composting materials that can be composted, re-used and/or recycled, finding alternative uses, methods of recycling, avoid wastage etc.

UNIT 01: Health, safety and environmental practices in fish farming

Unit Reference Number:	**AqCS/FFA/01/L2**
NSQ Level:	**2**
Credit Value:	**3**
Guided Learning Hours:	**30hours**

Unit Assessment requirement
Assessment of this unit must be at a real practical work environment; simulation is not allowed unless where indicated.

Unit Purpose:
The unit is designed to acquaint learners with the general safety practices in the fish farm work environment.

Unit Objective:
The learners should be able to:
- Practice health and safety rules in fish farming
- Carry out environmental protection and water improvement in fish farming
- Assist in promoting environmental sustainability

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

UNIT 01: Follow health, safety and environmental practices in fish farming

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number				
LO1 Practice health and safety rules in fish farming	1.1	Identify the common hazards in fish farming in Nigeria.											
	1.2	Describe the various ways to minimize hazards in fish farming											
	1.3	Identify key personnel to whom accidents or problems must be reported to											
	1.4	Describe the use of Personal Protective Equipment (PPE) in fish farming											
	1.5	Demonstrate the safe working practices of tools and equipment used in fish farming											
	1.6	Identify appropriate PPE in freshwater fish farming											
	1.7	Wear appropriate PPE in freshwater fish farming											
	1.8	Use various fish farming equipment and/or materials safely											
	1.9	Clean tools, equipment and PPE in accordance with laid down procedures											
	1.10	Store tools, equipment and PPE in accordance with laid down procedures											
	1.11	Report incidents, accidents and emergencies to appropriate personnel.											
	1.12	Demonstrate ability to swim and safe drowning person											
LO2 Carry out environmental protection and water improvement in fish farming													
	2.1	Recognise signs of pollution in freshwater fish farming.											
	2.2	Identify sources of pollution in freshwater fish farming.											
	2.3	Carry out general environmental protection and water improvement in fish farm											
	2.4	Dispose of waste from fish farm											

LO3 Promote environmental sustainability	3.1	Assist in preventing erosion and land degradation									
	3.2	Assist in the protection of water shed areas									
	3.3	Assist in the prevention of flooding in fish farm									
	3.4	Assist in the promotion of the reduction, re-use and/or recycling of materials									

Learners Signature: Date:

Assessors Signature: Date:

IQA Signature (if sampled)   Date:

EQA Signature (if sampled)   Date:

Unit 02: Communicate Effectively in Fish Farming Environment

Unit Reference Number:	**AqCS /FFA/02/L2**
NSQ Level:	**2**
Credit Value:	**2**
Guided Learning Hours:	**20 Hours**

Unit Purpose:
This unit is about communication management in Fish   Farming Environment.

Unit Objective:
The learners should be able to:
- Apply the use of communication system in a work environment.
- Source for information in a work environment.
- Apply various means of communication in a work environment.

Unit assessment requirements/evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out. *Simulation is not allowed* in this unit and level.
***Assessment methods to be used include*:**
1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Personal statement (PS) or Reflective Practice (RP)
5. Work Product (WP)
6. Recognition of Prior Learning (RPL)
7. Other methods (O t), assignments, case study, essay, project, etc.

UNIT 02: Communicate Effectively in Fish Farming Environment

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.				
LO 1: Demonstrate use of communication system in a work environment	1.1	Use a verbal means to pass on necessary information										
	1.2	Use non-verbal means to convey necessary information e.g. body language, signs										
	1.3	Interpret symbols and signs appropriately										
LO 2: Source for information in a work environment	2.1	Identify the source of information in the work environment										
	2.2	Relate effectively with the source of information										
	2.3	Apply the different information flow systems in a work environment										
	2.4	Use information gathered to manage challenges in a work situation										
	2.5	Report findings appropriately in accordance with laid down procedures in the work environment i.e. Cards, Flip Chart										
	2.6	Use simple communication gadget like mobile phones and table phones										
LO 3: Apply various means of communication in a work	3.1	Locate the various communication equipment in the work environment										
	3.2	Use effectively the various communication equipment in a work environment										
	3.3	Pass information effectively to the right personnel										
	3.4	Obey instructions in line with ethics of the work environment										

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

Unit 03: Team work in Fish Farming Environment

Unit Reference Number:	**AqCS /FFA/03/L2**
NSQ Level:	**2**
Credit Value:	**2**
Guided Learning Hours:	**20 Hours**

Unit Purpose:
This unit is designed to equip learner with knowledge and skills of how to demonstrate teamwork in Fish Farming Enterprises

Unit Objective:
The learners should be able to:
- Exhibit positive working relationships with colleagues.
- Ability to take responsibility within the team.
- Comply with organisational policies

Unit assessment requirements/evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out. *Simulation is/or is not allowed* in this unit and level.

Assessment methods to be used include:
1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Personal statement (PS) or Reflective Practice (RP)
5. Work Product (WP)
6. Recognition of Prior Learning (RPL)

UNIT 03: Team work in Fish Farming Environment

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Exhibit positive working relationships with colleagues	1.1	Identify the need for developing positive working relationship with colleagues									
	1.2	Recognize the importance of relating with other people in a way that makes them feel valued and respected									
	1.3	Assist team members when required									
	1.4	Report to the personnel when request for assistance fall outside area of responsibility									
	1.5	Communicate information to colleagues about one's work that might affect others									
LO 2: Ability to take responsibility within the team	2.1	Recognize own role and responsibilities within team.									
	2.2	Perform individual tasks in line with the team rules and regulations.									
	2.3	Participate effectively in teamwork.									
LO 3: Comply with organisational policies	3.1	Work in line with organizational standards									
	3.2	Explain organizational code of practice.									
	3.3	Explain organizational code of conduct									

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

UNIT 04: Biology of Fishes

Unit reference number:	**AqCS /FFA/004**
NSQ level:	**2**
Credit value:	**3**
Guided learning hours:	**30 hours**

Purpose:
This unit standard specifies the competencies required to demonstrate the understanding of the concept of biology of freshwater fish in Nigeria.

Unit Assessment requirement:
Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit Objective:
The learners should be able to:
- Outline the anatomy of fish.
- Distinguish between different cultured fishes in Nigeria.
- Distinguish between the sexes of fresh water fish.

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

Unit 04: Biology of Fishes

LO (Learning outcome)		Performance Criteria:-	Evidence Type				Evidence Ref Page number			
LO1 Outline the anatomy of fish	1.1	Identify external anatomical features of freshwater fish								
	1.2	Identify various internal organs in freshwater fish.								
	1.3	Describe the function of external anatomical feature								
	1.4	Describe the function of the internal organs of freshwater fish								
LO2 Distinguish between different cultured fishes in Nigeria										
	2.1	Name common freshwater fish species and their importance in Nigeria								
	2.2	Identify common freshwater fish using their external features								
	2.3	Differentiate between closely related fish species (e.g. *Clarias gariepinus and Clarias angullaris*)								
	2.4	Describe the different types of fish cultured in Nigeria								
LO3 Distinguish between the sexes of fresh water fish										
	3.1	Identify external features of the male common fish species								
	3.2	identify external features of females of common fish species								
	3.3	Distinguish between male and female of major culturable fish species								

Learners Signature:		Date:
Assessors Signature:		Date:
IQA Signature (if sampled)		Date:
EQA Signature (if sampled)		Date:

UNIT 05: Fish hatchery operations

Unit reference number:	**AqCS /FFA/005**
NSQ level:	**2**
Credit value:	**3**
Guided learning hours:	**30hours**

<u>Purpose</u>

This unit specifies the competencies required to demonstrate the understanding of fish seed production.

Unit Objective:

The learners should be able to:

- Assist in hatchery Operations
- Managing Water Quality in hatchery
- Manage Brood-stock in the Hatchery

Unit Assessment requirement

Assessment of this unit must be at a real practical work environment. Simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements

- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

UNIT 05: Fish hatchery operations

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number			
LO 1 Demonstrate understanding of hatchery management	1.1	Distinguish between indoor and outdoor hatchery										
	1.2	carryout brood-stock handling and sorting										
	1.3	Recognize gravid brood-stocks										
	1.4	Describe egg incubation, hatching and larval rearing.										
	1.5	Identify the different hormones used in artificial reproduction in fresh water fish farming.										
	1.6	Keep accurate records of hatchery operations										
	1.7	Carry-out hatchery maintenance tasks (e.g., equipment servicing, facility cleaning)										
	1.8	Carry out appropriate feeding regime in the fingerling production cycle										
LO 2 Managing Water Quality in hatchery												
	2.1	Monitor water quality parameters (e.g., pH, temperature, dissolved oxygen, ammonia).										
	2.2	Demonstrate water quality management tasks (e.g., changing of water, aeration, filtration etc).										
	2.3	Carry-out flow-through procedure and draining of tanks										
	2.4	Explain the process of brood stock handling.										
	2.5	Describe the behavior of a brood stock after hormonal treatment										
	2.6	Outline the importance of brood-stock production in fish seed production										
	2.7	Record data in brood stock handling in accordance with laid down procedures										
LO3 Manage Brood-stock in the Hatchery												
	3.1	Carry-out feeding of brood-stock in hatchery										

	3.2	Monitor feeding behaviour of brood-stock									
	3.3	Maintain fish health records and report any abnormalities.									
	3.4	Carry-out brood-stock handling and transfer operations.									
	3.5	Cleaning fish tanks and equipment									

Learners Signature: Date:

Assessors Signature: Date:

IQA Signature (if sampled)   Date:

EQA Signature (if sampled)   Date:

UNIT 06: Fish pond operation practices

Unit reference number:	**AqCS/FFA/06/L2**
NSQ level:	**2**
Credit value:	**3**
Guided learning hours:	**30 hours**

Purpose

This unit specifies the competencies required to understand the facilities and resources used in freshwater fish farming in Nigeria.

Unit Objective:

The learners should be able to:
- Demonstrate the ability to monitor water quality parameters.
- Demonstrate Feeding operations in ponds.
- Perform Fish harvesting Operation.
- Demonstrate Pond Tools and Equipment maintenance.

Unit Assessment requirement

Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements

- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

UNIT 06: Fish pond management

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number				
LO I Demonstrate the ability to monitor water quality parameters.	1.1	Identify water quality equipment (e.g., pH meter, thermometer, dissolved oxygen meter, conductivity meter).											
	1.2	Determine the pond water Ph											
	1.3	Carry-out water quality management tasks (e.g., changing of water, draining, filling of pond etc)..											
	1.4	Carry-out pond maintenance task like de-mudding, operate pumping machine, borehole etc											
LO 2 Demonstrate Feeding operations in ponds													
	2.1	Identify feed size for different size/growth stages of fish.											
	2.2	Carry out appropriate feeding methods (spot, broadcast, tray and demand).											
	2.3	Monitor feed inventory and report any discrepancies											
	2.4	Maintain accurate records of feed usage and costs											
LO3 Perform Fish harvesting Operation													
	3.1	Carry out pre harvest operations prior to fish harvesting (e.g starving the fish at least 24 hours prior to harvest, gradual draining of pond water volume)											
	3.2	Carry-out fish harvesting and sorting operations.											
	3.3	Conduct fish pond harvesting using different harvesting gears.											
	3.4	Carry-out and maintain accurate record of harvest data (e.g. weight, size).											
	3.5	Carry out fish gear maintenance after harvesting of fish (e.g. Wash fishing gears, hanging of gear to dry)											
LO 4 Demonstrate Pond Tools and Equipment maintenance													
	4.1	Carry out maintenance practice on specified tools used on a fish farm in accordance with manufacturer's specifications e.g. shovel, digger, hoe, cutlass etc											

	4.2	Carry out maintenance practice on specified equipment used on a fish farm in accordance with manufacturer's specifications e.g. pumping machine, aerator, blower etc										
	4.3	Report any equipment malfunction or maintenance needs										
	4.4	Carry-out equipment installation and upgrade										

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

UNIT 07: Fish Feed Production and Storage

Unit reference number:	**AqCS /FFA/07/L2**
NSQ level:	**2**
Credit value:	**4**
Guided learning hours:	**40 hours**

Purpose:

This unit standard specifies the competencies required to demonstrate understanding of the concept of fish feed formulation, processing methods and feed types in Nigeria.

Unit Objective:

The learners should be able to:
- Demonstrate knowledge of Nutrient ingredient sources for fish feed.
- Process fish feed ingredients using different methods.
- Operate simple feed mill machinery.
- Demonstrate knowledge of sources of fish feed.
- Carry out packaging and storage of prepared fish feed.

Unit Assessment requirement

Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements

- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

UNIT 07: Fish Feed Production and Storage

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number			
LO I Demonstrate knowledge of Nutrient ingredient sources for fish feed.	1.1	Identify various fish feed ingredient e.g maize, millet, soybean, groundnut cake etc										
	1.2	Classify fish feed ingredients into different nutrient sources (i.e. carbohydrates, protein, fat and oil, vitamins)										
	1.3	Identify fish feed ingredients of animal sources										
	1.4	Identify fish feed ingredients of plant sources.										
	1.5	Differentiate fish feed ingredients into animal and plant sources										
LO 2 Process fish feed ingredients using different methods												
	2.1	Identify various processing methods used in on fish feed ingredients. E.g. toasting, soaking, fermentation, germinating etc.										
	2.2	Carry-out out toasting of soya beans seed.										
	2.3	Carry-out correct weighing of different feed ingredients										
LO3 Operate simple feed mill machinery												
	3.1	Identify parts of simple feed mill machines (e.g hammer mill, pelleting machine, mixer etc)										
	3.2	Operate the hammer mill										
	3.3	Clean the hammer mill										
LO 4 Demonstrate knowledge of sources of fish feed												
	4.1	Identify types of fish feed based on floatability in water (floating and sinking)										
	4.2	Identify types of fish feed based on size (0.2mm, 0.5mm, 2mm, 4mm, 6mm etc)										
	4.3	Identify types of fish feed based on shape (ball, pellet, flake etc)										
LO 5 Carry out packaging and storage of prepared fish feed	5.1	Identify various packaging materials. (polythene, sacs etc).										
	5.2	Demonstrate package of prepared fish feed.										
	5.3	Package feed in accordance to acceptable standard										

	5.4	Label each pack of feed in accordance to acceptable standard									
	5.5	List the requirements for fish feed storage: • Properly ventilated environment • Avoid over stacking • Protect from rodent, chickens and other animals • Protect from insect infestation • Storage should not exceed 4-6weeks									
	5.6	Keep detailed records of stored fish feeds									

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

UNIT 08: Live fish handling and transportation
Unit reference number: **AqCS /FFA/08/L2**
NSQ level: **2**
Credit value: **2**
Guided learning hours: **20 hours**

Purpose:

This unit standard specifies the competencies required to demonstrate the understanding of safe handling and transportation of live fish in Nigeria.

Unit Objective:

The learners should be able to:

- Carry out safe handling of live Fish.
- Carry out Pre-Transportation Preparation.
- Carry out live fish transportation.
- Carry out Post-Transportation Care

Unit Assessment requirement

Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements

- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

UNIT 08: Live fish handling and transportation

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number				
LO I Carry out safe handling of live Fish.	1.1	Handle fish gently (to avoid causing physical damage, stress or death).											
	1.2	Handle fish with soft-mesh nets or scoops net											
	1.3	Demonstrate how to minimize air exposure to prevent fish from dying out or experiencing osmotic shock											
	1.4	Stock fish appropriately to avoid overcrowding											
LO 2 Carry out Pre-Transportation Preparation													
	2.1	Conditions fish for transportation.											
	2.2	Monitor water quality parameters (e.g., pH, temperature, dissolved oxygen) to ensure they are within suitable ranges for the fish species											
	2.3	Use containers specifically designed for transporting live fish, (such as insulated tanks or bags with oxygen supply, kegs e.t.c.)											
LO3 Carry out live fish transportation													
	3.1	Maintain optimal water conditions (e.g., temperature, pH, dissolved oxygen) during transport.											
	3.2	State water quality parameters during transport.											
	3.3	Carry out gassing of bag with adequate oxygen supply during transport, (using oxygen generators or bottled oxygen)											
	3.4	Demonstrate how to avoid extreme high (hot) temperatures during transport, using ice packs, insulation or climate-controlled vehicles											
LO 4													
	4.1	Use Anti-stress medication for the fish											

Carry out Post-Transportation Care	4.2	Acclimatize fish to their new environment after transport									
	4.3	Monitor fish health and behaviour after transport.									

Learners Signature:	Date:	
Assessors Signature:	Date:	
IQA Signature (if sampled)	Date:	
EQA Signature (if sampled	Date:	

Unit 09: Fish Health in Fresh Water Culture

Unit Reference Number:
NSQ Level: **2**
Credit Value: **2**
Guided Learning Hours: **20 Hours**
Purpose
This unit standard specifies the competencies required to demonstrate the understanding of the concept of fish health.

Unit Objective:

The learners should be able to:
- Carry out Fish Health Inspections.
- Carry out prevention and control of common freshwater fish diseases.
- Carry out mortality Management.

Unit assessment requirements/evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out. *Simulation is allowed* in this unit and level.

Assessment methods to be used include:
- Direct Observation]/oral questions (DO)
- Question and Answer (QA)
- Witness Testimony (WT)
- Work Product (WP)
- Recognition of Prior Learning (RPL)
- Simulation

Unit 09: Fish Health in Fresh Water Culture

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.				
LO 1: Carry out Fish Health Inspections	1.1	Conduct routine inspections of fish (against symptoms of disease, injury, or stress).										
	1.2	Explain fish behaviour for change in (appetite, swimming patterns, or social interactions).										
	1.3	Identify clinical signs of disease, lesions, (fin erosion, or labored breathing).										
	1.4	Monitor feeding behavior to ensure fish are consuming feed efficiently										
LO 2: Carry out prevention and control of common freshwater fish diseases	2.1	Implement biosecurity measures, such as disinfecting equipment, personnel and restricting access to the facility.										
	2.2	Conduct regular cleaning and disinfection of tanks, equipment and facilities										
	2.3	Isolate diseased fish to prevent spread of infections										
LO 3: Carry out mortality Management	3.1	Remove dead fish(s) promptly.										
	3.2	Record mortality data appropriately.										
	3.3	Mention Drug/chemical suitable for treating a named fresh water fish disease										
	3.4	Explain appropriate dosage of drug/chemical to be used in treatment of named fresh water fish disease.										
	3.5	Prepare appropriate dosage of drug/chemical for treatment of named fresh water fish disease.										
	3.6	Carry out treatment on a diseased fish using appropriate treatment procedures.										
	3.7	Apply the appropriate safety rules and regulations during medication to the infected fish.										

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
	3.8	Observe the withdrawal period for medications.									

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

Unit 10: Fish Post Harvest Handling, Processing and Preservation

Unit Reference Number:	AqCS/FFA/10/L2
NSQ Level:	2
Credit Value:	3
Guided Learning Hours:	30 Hours

Unit Purpose:
This unit is aimed to build competencies of the candidate in enhancing efficiency of post-harvest handling and processing of fish to improve livelihood of fish farmers and traders and preventing losses from fish spoilage.

Unit Objective:

The learners should be able to:
- Carry out pre-harvest operations in fish farm.
- Carry out fish harvesting in fish ponds.
- Carry out maintenance of gears after harvesting.
- Carry out post- harvest handling and processing of fish.
- Demonstrate preservation of harvested fish.
- Carry out packaging, labelling and storage of fish.

Unit assessment requirements/evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out. *Simulation is allowed* in this unit and level.

Assessment methods to be used include:
- Direct Observation/oral questions (DO)
- Question and Answer (QA)
- Witness Testimony (WT)
- Work Product (WP)
- Recognition of Prior Learning (RPL)
- Simulation

Unit 10: Fish Post Harvest Handling, Processing and Preservation

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type				Evidence Ref. Page No.			
LO 1: Carry out pre-harvest operations in fish farm	1.1	Identify the purpose for harvest (e.g maturity, processing, sorting, removing predator, disease outbreak e.t.c)								
	1.2	starve the fish for at least 24 hours prior to harvest								
	1.3	Carry out gradual draining of pond water volume								
LO 2: Carry out fish harvesting in fish ponds	2.1	Conduct fish pond harvesting using different harvesting gears								
	2.2	Differentiate between partial and total harvesting								
	2.3	Identify various types of gear used in fish harvesting								
	2.4	Conduct fish pond harvesting using different harvesting gears								
LO 3: Carry out maintenance of gears after harvesting	3.1	Wash the Fish gears								
	3.2	Hang used gear to dry								
	3.3	Check net for tears and mend them								
	3.4	Store the gear/net in a dry and safe place								
LO 4: Carry out post-harvest handling and processing of fish	4.1	Identify tool used in post-harvest handling of fish								
	4.2	Keep fish cool to prevent spoilage								
	4.3	Cut fresh fish to appropriate sizes after harvesting								
LO 5: Demonstrate preservation of harvested fish	5.1	Identify different methods preserving harvested fish (e.g. Smoking, Salting, Icing, Sun drying, Canning, Frying etc)								
	5.2	Carryout salting process of fish preservation								
	5.3	Carry out sun drying process of fish preservation								
	5.4	Carry out icing and freezing process of fish preservation								
	5.5	Carry out smoking process of fish preservation								
	5.6	Carry out frying process of fish preservation								
	5.7	Assemble and refrigerate fish for preservation								

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type				Evidence Ref. Page No.			
LO 6: Carry out packaging, labelling and storage of fish	6.1	Identify different packaging materials for processed fish								
	6.2	Describe fish packaging process for storage and transportation.								
	6.3	Keep accurate record of fish packaged for storage or transportation								
	6.4	Label packaged fish appropriately for storage								

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

NATIONAL SKILLS QUALIFICATION

FISH FARMING ACTIVITY

AQUACULTURE SECTOR

LEVEL 3

FEBRUARY, 2025

GENERAL INFORMATION

QUALIFICATION PURPOSE
This qualification is aimed at developing competence in fish production across different platforms. The focus is on fish production process, communication skills, inter-personal skills development and workplace experience.

QUALIFICATION OBJECTIVES
To achieve this qualification, the learner should gain the following competencies:
- Apply safety in health and good environmental practices in their work environment.
- Communicate effectively and exhibit interpersonal skill in fish farming environment.
- Comply with Organizational Plans and Policies in Fish Farming Enterprises
- Working in a team in a fish farming environment
- Identify the Aquaculture Industry in Nigeria
- Use Aquaculture Systems and Equipment
- Demonstrate Fish Nutrition and Feeding
- Carry out Aquaculture Production and Management
- Carry out Hatchery operations and management
- Conduct post-harvest fish processing, preservation and storage
- Carry out Fish Health and Welfare checks
- Establish Aquaculture Business and Marketing

Mandatory Units

S/N	Reference Number	NOS Title	Credit Value	Guided Learning Hours	Remark
1	AqCS /FFA/01/L3	Health, safety and environmental practices in fish farming	3	30	Mandatory
2	AqCS /FFA/02/L3	Communication and Interpersonal Skill	2	20	Mandatory
3	AqCS /FFA/03/L3	Comply with Organizational Plans and Policies in Fish Farming Enterprises	2	20	Mandatory
4	AqCS /FFA/04/L3	Aquaculture Industry	3	30	Mandatory
5	AqCS /FFA/05/L3	Aquaculture Systems and Equipment	3	40	Mandatory
6.	AqCS /FFA/06/L3	Aquaculture Production and Management	4	40	Mandatory
7.	AqCS /FFA/07/L3	Fish Nutrition and Feeding	4	40	Mandatory
8.	AqCS /FFA/08/L3	Fish hatchery management	4	40	Mandatory
		Sub-total	**26**	**260**	
9.	AqCS /FFA/09/L3	Fish post-harvest processing and preservation	3	30	Optional
10.	AqCS /FFA/10/L3	Fish Health and Welfare	3	30	Optional
11.	AqCS /FFA/11/L3	Aquaculture Business and Marketing	2	20	Optional
		Sub-total	8	80	
		Grand-total	34	340	

NOTE:

The minimum credit required for Level 3 Qualification in Fish Farming is 34 credit values.

To achieve this qualification; Learners are required to achieve 26 credits from mandatory units and 8 from optional units.

Each Credit is equivalent to approximate 10 Guided Learning Hours (GLH). The Total Learning Hours will therefore consist of the GLH *plus* the independent learning hours of the candidate, which is generally 50% – 150% of the GLH.

Qualification Purpose:

The qualification is designed to produce competent personnel capable of applying knowledge and understanding of aquaculture principles and practice in to real-world situations.

UNIT 01: Follow Health, Safety and Environmental practices in fish farming

Unit Reference Number: AqCS /FFA/01/L3
NSQ Level: 3
Credit Value: 3
Guided Learning Hours: 30 hours

Purpose

This unit specifies the competencies required to understand the concept of health, safety and environmental practices in freshwater fish farming in Nigeria. It includes the use of protective clothes, biosecurity measures and general environmental sanitation in farms, proper use and maintenance of farm tools and equipment. This unit standard is intended for those interested in operating small scale fish farm and carrying out associated fish production processes.

2.   Entry information
      Pre requisite(s):
      Unit ID F/001 – Basic literacy
      Unit F/002 – Basic numeracy

Special Notes

6.   This unit standard is to be delivered and assessed in the context of understanding of the health, safety and environmental practices in fish farming and should be assessed in conjunction with other relevant technical units selected from this domain.

7.   To demonstrate competence, at a minimum, evidence is required of the correct interpretation of the health, safety and environmental practices in freshwater fish farming. Perform these tasks ensuring correct application of health, safety and environmental practices in fish rearing.

8.   Assessment evidence may be collected from a real workplace or a simulated real workplace or an appropriate simulated realistic environment in which fish farming operations are carried out.

9.   All inspection, operation and maintenance procedures associated with the use of tools and equipment shall comply with manufacturers' and company guidelines, instructions, and reasonable flat rate time.

10.   Glossary:
      "Biosecurity": refers to practices to prevent disease introduction and spread, including access control, disinfection, visitor management, quarantine etc.
      "Disinfectants": refers to chemicals used in sterilizing floors, equipment (inanimate objects) etc.
      "Antiseptic": refers to chemicals used for sterilization of living body (animate objects).

Quality Assurance Requirements

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the National Board for Technical Education and which comply with the national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the National Board for Technical Education.

Range:
*   Tools for environmental sanitation include but not limited to: Rake, shovel, spade, wheel barrow, head pan, slasher, broom, hand gloves, etc.

- Sources of pollution include but are not limited to human, animal pollution, waste products, litter, rubbish, transport fumes, noise, light pollution
- Sources of human environmental damage includes vandalism, waste dumping, human traffic, tourism, damage by compaction and wear, litter, dog fouling, leisure activities, construction activities, inappropriate agricultural management activities, inappropriate waste disposal methods.
- Measures to minimize human environmental damage include education and training, interpretation boards and notices/signs, prohibition (fencing, limited access, restricted areas), recycling, minimizing consumption and waste products, use of biodegradable materials and products
- Habitats on a fish farm map include but not limited to water courses and wet areas, field margins, ditches, banks and walls
- Common habitat includes but are not limited to water features, woodlands, grassland, hedgerows, moorland, lowland heath, peat bogs
- Habitat maintenance and improvement may include mowing, renovation, planting and staking as applicable, clearing (path, fence line), coppicing, uprooting, hedge maintenance, pruning, thinning, cutting or mowing and mulching, pond, stream and ditch clearance, use of pesticides, herbicides and fertilizer.
- Reduction re-uses and/or recycling of materials may include composting materials that can be composted, re-used and/or recycled, finding alternative uses, methods of recycling, avoid wastage etc.

Unit Objective:

The learners should be able to:
- Practice health and safety rules in fish farming
- Carry out environmental protection and water improvement in fish farming
- Assist in promoting environmental sustainability

Unit Assessment requirement

Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

UNIT 01: Health, Safety and Environmental practices in fish farming

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number				
LO1 Practice health and safety rules in fish farming	1.1	Identify the common hazards in fish farming in Nigeria.											
	1.2	Describe the various ways to minimize hazards in fish farming											
	1.3	Identify key personnel to whom accidents or problems must be reported to											
	1.4	Describe the use of Personal Protective Equipment (PPE) in fish farming											
	1.5	Demonstrate the safe working practices of tools and equipment used in fish farming											
	1.6	Identify appropriate PPE in freshwater fish farming											
	1.7	Wear appropriate PPE in freshwater fish farming											
	1.8	Clean tools, equipment and PPE in accordance with laid down procedures											
	1.9	Store tools, equipment and PPE in accordance with laid down procedures											
	1.10	Demonstrate ability to swim and safe drowning person											
LO2 Carry out environmental													
	2.1	Identify the signs of pollution in freshwater fish farming.											

protection and water improvement in fish farming	2.2	Identify sources of pollution in freshwater fish farming.								
	2.3	Carry out general environmental protection and water improvement in fish farm								
	2.4	Dispose of waste in fish farm								
LO3 Promote environmental sustainability	3.1	Carry out erosion and land degradation measures								
	3.2	Assist in the protection of water shed areas								
	3.3	Describe the preventive measures of flooding in fish farm								
	3.4	Support habitat maintenance in accordance with site management plans.								

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

Unit 02: Communicate Effectively in Fish Farming Environment

Unit Reference Number: **AqCS /FFA/02/L3**
NSQ Level: **3**
Credit Value: **2**
Guided Learning Hours: **20 Hours**

Unit Purpose:
This unit is about communication management in Fish   Farming Environment

Unit Objective:
The learners should be able to:
- Apply the use of a communication system in a work environment
- Source for information in a work environment
- Apply various means of communication in a work

Unit assessment requirements/evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out. *Simulation is not allowed* in this unit and level.
Assessment methods to be used include:
8. Direct Observation/oral questions (DO)
9. Question and Answer (QA)
10. Witness Testimony (WT)
11. Personal statement (PS) or Reflective Practice (RP)
12. Work Product (WP)
13. Recognition of Prior Learning (RPL)
14. Other methods (O t), assignments, case study, essay, project, etc.

UNIT 02: Communicate Effectively in Fish Farming Environment

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.				
LO 1: Apply the use of a communication system in a work environment	1.1	Use a verbal means to pass on necessary information										
	1.2	Use non-verbal means to convey necessary information e.g. body language, signs										
	1.3	Interpret symbols and signs appropriately										
LO 2: Source for information in a work environment	2.1	Identify the source of information in the work environment										
	2.2	Relate effectively with the source of information										
	2.3	Apply the different information flow systems in a work environment										
	2.4	Use information gathered to avoid challenges in a work situation										
	2.5	Report findings appropriately in accordance with laid down procedures in the work environment i.e. Cards, Flip Chart										
	2.6	Use simple communication gadget like mobile phones and table phones										
LO 3: Apply various means of communication in a work	3.1	Locate the various communication equipment in the work environment										
		Use effectively the various communication equipment in a work environment										
	3.2	Pass information effectively to the right personnel										
	3.3	Obey instructions in line with ethics of the work environment										

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

Unit 03: Comply with Organizational Plans and Policies in Fish Farming Enterprises

Unit Reference Number:	**AqCS/FFA/03/L3**
NSQ Level:	**3**
Credit Value:	**2**
Guided Learning Hours:	**20 Hours**

Unit Purpose:
This unit is about Organizational Planning and Policies in Rice Business Enterprises

Unit Objective:
The learners should be able to:
- Exhibit positive working relationships with colleagues
- Ability to take responsibility within the team
- Comply with organisational policies

Unit assessment requirements/evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out. *Simulation is/or is not allowed* in this unit and level.

Assessment methods to be used include:
7. Direct Observation/oral questions (DO)
8. Question and Answer (QA)
9. Witness Testimony (WT)
10. Personal statement (PS) or Reflective Practice (RP)
11. Work Product (WP)
12. Recognition of Prior Learning (RPL)
13. Other methods (Ot), assignments, case study, essay, project, etc.

UNIT 03: Comply with Organizational Plans and Policies in Fish Farming Enterprises

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type				Evidence Ref. Page No.			
LO 1: Exhibit positive working relationships with colleagues	1.1	Identify the need for developing positive working relationship with colleagues								
	1.2	Recognize the importance of relating with other people in a way that makes them feel valued and respected								
	1.3	Assist team members when required								
	1.4	Report to the personnel when request for assistance fall outside area of responsibility								
	1.5	Communicate information to colleagues about own work that might affect others								
LO 2: Take responsibility within the team	2.1	Recognize own role and responsibilities within team.								
	2.2	Perform individual tasks in line with the team rules and regulations.								
	2.3	Participate effectively in teamwork.								
LO 3: Comply with organisational policies	3.1	Work in line with organizational standards								
	3.2	Explain organizational code of practice.								
	3.3	Comply with organizational code of practice.								
	3.4	Explain organizational code of conduct								

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

UNIT 04: Aquaculture Industry in Nigeria

Unit reference number:	**AqCS/FFA/04/L3**
NSQ level:	**3**
Credit value:	**3**
Guided learning hours:	**30hours**

Purpose:
This unit standard specifies the competencies required to demonstrate the understanding of the aquaculture sector in Nigeria. It is intended for those interested in operating medium and large scale fish farming and those intended to specialise as fingerling producers, table size producers, fish processors and carrying out associated fish production processes.

Unit Objective:
The learners should be able to:
- Understand the history and development of fish farming in Nigeria
- Understand the benefits of Aquaculture
- Understand challenges facing aquaculture industry
- Distinguish between different culture fishes in Nigeria

Unit Assessment requirement:

Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

Unit 04: Aquaculture Industry in Nigeria

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number				
LO1 Understand the history and development of fish farming in Nigeria	1.1	State the origin of fish farming in Nigeria.										
	1.2	Explain the history and development of fish farming in Nigeria, and current trends.										
	1.3	Explain the socio-economic importance of fish farming in Nigeria.										
	1.4	State relevant laws and regulations applicable to fish farming in Nigeria.										
LO 2 Understand the benefits of Aquaculture												
	2.1	Describe the contribution of aquaculture towards food security in Nigeria										
	2.2	Explain how aquaculture create job for the population										
	2.3	Explain how aquaculture reduce pressure on wild fish										
	2.4	Explain health benefit of eating fish										
LO 3 Understand challenges facing aquaculture industry												
	3.1	Explain environmental impacts such as (water pollution and habitat destruction)										
	3.2	Explain effects of diseases and parasites on aquaculture										
	3.3	Describe challenges of feed procurement, quality and cost effects										
	3.4	Explain government policy and regulatory constraints										
LO4 Distinguish between different cultured fishes in Nigeria												
	4.1	Name common freshwater fish species of aquaculture importance in Nigeria										
	4.2	Identify common freshwater fish species of aquaculture importance in Nigeria using their external features										
	4.3	Differentiate between closely related catfish species (e.g. *Clarias gariepinus* and *Clarias angullaris*)										
	4.4	Differentiate between closely related Tilapia species (e.g. *Oreochromis* and *Sarotherodon*)										

Learners Signature:		Date:
Assessors Signature:	67	Date:
IQA Signature (if sampled)		Date:
EQA Signature (if sampled)		Date:

UNIT 05: Aquaculture Systems and Equipment

Unit reference number:	**AqCS/FFA/05/L3**
NSQ level:	**3**
Credit value:	**4**
Guided learning hours:	**40hours**

Purpose

This unit is intended for those who are interested in operating small to large scale fish farms and carrying out associated production processes.

Unit Objective:

The learners should be able to:
- Identify the different types of aquaculture systems based on environment and purpose
- Recognise various methods of Fish Farming systems
- Construct simple aquaculture systems
- Identify different aquaculture equipment
- Carry–out Fish production using common methods

Unit Assessment requirement

Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

UNIT 05: Aquaculture Systems and Equipment

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number			
LO1 Identify the different types of aquaculture systems based on environment and purpose	1.1	Identify the characteristic of freshwater aquaculture system										
	1.2	Describe the characteristic of brackish water aquaculture system										
	1.3	Describe the characteristic of saltwater aquaculture system										
	1.4	Mention aquaculture types based on purpose (food fish, ornamental, bait and recreational)										
LO2 Recognise various methods of Fish Farming systems												
	2.1	Identify extensive and intensive fish farming systems.										
	2.2	Differentiate between extensive and intensive fish farming systems.										
	2.3	Explain the advantages and disadvantages of extensive and intensive fish farming systems										
LO 3 Construct simple aquaculture systems												
	3.1	Perform the construction of fish pond										
	3.2	Identify parts of Recirculating aquaculture systems (RAS) e.g (Production tank, Sedimentation tank, Bio filter, Chemical filter etc).										
	3.3	Install the components of plastic tank for fish culture										
	3.4	Identify the cage culture systems										
LO 4 Identify different aquaculture equipment												
	4.1	Install pumps and piping systems.										
	4.2	Operate pumps and piping systems.										
	4.3	Perform aeration using aerators, air blowers, diffusers, etc.										
	4.4	Clean fish farm equipment. (Gears collapsible, etc).										
	4.5	Carry out storage of fish farm equipment. (Gears. Collapsible etc).										
LO5												
	5.1	Explain the fish production in earthen ponds										

Demonstrate Fish production using common methods	5.2	Demonstrate fish production in concrete and plastic tanks									
	5.3	Describe fish production in a flow-through system									
	5.4	Describe fish production in water recirculation system									

Learners Signature:	Date:	
Assessors Signature:	Date:	
IQA Signature (if sampled)	Date:	
EQA Signature (if sampled)	Date:	

UNIT 06: Aquaculture Production and Pond Management

Unit reference number:	AqCS/FFA/06/L3
NSQ level:	3
Credit value:	4
Guided learning hours:	40hours

Purpose
This unit specifies the competencies required for a comprehensive understanding of the principles and practices involved in planning, implementing, and managing aquaculture production systems.

Unit Objective:
The learners should be able to:
- Demonstrate understanding of the principles in aquaculture construction
- Carry out fish stocking into pond and other culture systems
- Carry out water quality management
- Carry out disease detection, treatment and control of freshwater fish
- Carry-out Feeding in aquaculture

Unit Assessment requirement
Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

Unit 06: Aquaculture production and management

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Demonstrate understanding of the principles in aquaculture construction	1.1	List the steps involved in the construction of earthen pond using locally available resources.									
	1.2	List the steps involved in the construction of concrete pond									
	1.3	outline the steps involved in the setting up of plastic tank for fish farming									
	1.4	Describe the steps involved in the construction of water recirculating system									
	1.5	Operate the various aquaculture systems (earthen, concrete ponds, WRS etc)									
	1.6	Describe aquaculture systems in terms of input (Extensive, semi-intensive and intensive systems)									
LO 2: Carry out fish stocking into pond and other culture systems	2.1	Acclimatize the fish to the pond water temperature. (By gradually introducing them to the pond water over 15 to30 minutes)									
	2.2	Stock the fish into the pond while not overcrowding the pond									
	2.3	Monitor the fish and water quality parameters to ensure their well- being									
	2.4	Perform correct species-specific stocking rate									

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.				
LO 3: Perform water quality management	3.1	Analyse water quality parameters. (using equipment like Ph meter, Thermometer, DO meter, Conductivity meter etc).										
	3.2	Carry-out water treatment measures. (To maintain optimal quality through aeration, filtration, refilling, chemical treatment etc).										
	3.3	change water to maintain optimal water quality										
	3.4	Improve pond water quality through fertilization.										
LO 4: Carry out disease detection, treatment and control of freshwater fish	4.1	Identify disease condition common in fresh water fish (e.g. fin rot, white spot disease, boils, bloating etc.)										
	4.2	Classify fish diseases into viral, bacteria, protozoan, fungi, etc.										
	4.3	Explain nutritional disorder in fish										
	4.4	Identify stress related disorder in fish										
LO 5 Demonstrate efficient feeding of fish at various stages of production	5.1	Carry out appropriate feeding strategy for different stages of common cultured fishes in Nigeria (Feeding rate, feeding frequency, feeding method)										
	5.2	Keep accurate record of fish growth and feed utilization										

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type						Evidence Ref. Page No.				
	5.3	Monitor feeding rate using the record in 5.2											
	5.4	Calculate feed conversion ratio(FCR) using the record in 5.2											
	5.5	Calculate feed cost for producing one kg of adult fish using the record in 5.2											
	5.6	Calculate total feeding cost using the record in 5.2											

Learner's Signature	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

UNIT 07: Fish Nutrition and Feeding

Unit reference number: AQC/FFA/07/L3
NSQ level: 3
Credit value: 4
Guided learning hours: 40hours

Purpose:

This unit standard specifies the competencies required to demonstrate understanding of the concept of fish feed formulation, processing methods and feed types in Nigeria.

Unit Objective:

The learners should be able to:

- Identify sources of fish feed ingredients.
- Identify the nutritional requirement of different fish species
- Recognise the different types of fish feeds.
- Process fish feed using different methods
- Carry-out mixing of fish feed ingredients
- Prepare fish feed using appropriate methods
- Carry-out feed storage using best practices

Unit Assessment requirement

Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements

- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

UNIT 07: Fish Nutrition and Feeding

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number				
LO I Identify sources of fish feed ingredients.	1.1	Identify different types of fish feed ingredients											
	1.2	Classify fish feed ingredients into different nutrient sources (i.e. carbohydrates, protein, fat and oil, vitamins, etc)											
	1.3	Identify non-conventional feed ingredients used in fish feed											
LO 2 Identify the nutritional requirement of different fish species	2.1	Identify the nutritional requirement of common cultured species (Catfish, Tilapia, *Heterotis*, Carp etc)											
	2.2	Identify the nutritional requirement of different stages of common cultured species (Catfish, Tilapia, *Heterotis*, Carp etc)											
	2.3	Identify the nutritional requirement of uncommon cultured species (*Gymnarchus*, Grasscarp, ornamental fishes etc)											
LO 3 Recognise the different types of fish feeds	3.1	Describe commercial pellets (Extruded floating and pelleted sinking feed)											
	3.2	Identify live foods (Zooplankton, artemia, worms, insect larvae etc)											
	3.3	Identify plant-based feeds (Duckweed, Azolla, spirulina etc)											
LO 4 Process fish feed using different methods	4.1	Identify different methods of processing fish feed ingredients											
	4.2	Carry-out different methods used in processing fish feed ingredients (Toasting, grinding, crushing etc)											
	4.3	Explain the effects of each method of processing fish feed ingredients on the feed quality.											
	4.4	Process groundnut, soybeans, fish, palm kernel seeds as fish feed ingredients											
LO 5													

Carry-out mixing of fish feed ingredients	5.1	Select ingredients based on protein source, energy source and vitamins and minerals									
	5.2	Weigh various feed ingredients based on the formulated proportion									
	5.3	Mix the weighed ingredients in 5.2 above									
LO 6 Prepare fish feed using appropriate methods	6.1	Outline the procedures involved in the preparation of fish feed.									
	6.2	Apply health and safety rules in the preparation of fish feed									
	6.3	Identify the tools and equipment used in preparation of fish feed (e.g. shovel, bowls, scale, grinder-hammer mill, mixer., pelleting machine)									
	6.4	Identify various forms of feed produced									
LO 7 Carry-out feed storage using best practices											
	7.1	Implement a first-in, first-out (FIFO) inventory									
	7.2	Carry-out accurate records of feed including feed type, date of storage and quantity stored									
	7.3	Inspect feed storage facilities for sign of (spoilage, contamination, or pest infestation).									
	7.4	Rotate feed stock regularly to prevent old feed from becoming stale or spoilt.									

Learners Signature:	Date:
Assessors Signature	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

UNIT 08: Fish Hatchery Management

Unit reference number: **AqCS/FFA/08/L3**
NSQ level: **3**
Credit value: **4**
Guided learning hours: **40hours**

Purpose
This unit specifies the competencies required to demonstrate the understanding of fish seed production.

Unit Objective:
The learners should be able to:
- Identify types and components of a standard fish hatchery
- Carry-out the procedures of induced breeding in catfish
- Carry-out the procedures of breeding in Tilapia
- Carry-out reconditioning of female brood stock

Unit Assessment requirement
Assessment of this unit must be at a real practical work environment, simulation is not allowed unless where indicated.

Unit assessment requirements/evidence requirements
- Observation
- Work Product
- Question and Answer
- Assignment
- Personal Statement
- Recognition of Prior Knowledge

UNIT 08: Fish Hatchery Management

LO (Learning outcome)		Criteria:-	Evidence Type						Evidence Ref Page number			
LO 1 Identify types and components of a standard fish hatchery	1.1	Identify the types of hatchery (Indoor and outdoor)										
	1.2	Itemize the components of a standard hatchery (Broodstock holding tanks, breeding/spawning tanks, nursery/rearing tanks, aerator/blower, overhead tank, thermostat heater etc).										
	1.3	List the materials used in hatchery operations (Broodstock, hormone, saline water, syringe, towel, bowls, feathers, spoons etc)										
LO2 Carry-out the procedures of induced breeding in catfish	2.1	Select mature and gravid male and female broodstock (Ratio 1male to 2 females)										
	2.2	Condition the broodstocks in broodstock tanks										
	2.3	Sex the broodstock (1:1 or 1:2)										
	2.4	Calculate the appropriate hormone dosage based on body weight										
	2.5	Perform hormone injection (inject intramuscularly/ intravenously)										
	2.6	Perform milt collection from male and stripping of eggs from the female										
	2.7	Carry-out fertilization by mixing the milt and eggs										
	2.8	Spread fertilized eggs on kakaban for incubation										
	2.9	Aerate and maintain water flow on the hatching eggs										
	2.10	Separate the larvae from the shell and unfertilized eggs by siphoning										
	2.11	Carry-out larvae feeding and rearing with (artemia or zooplankton and water quality management)										
	2.12	Perform transfer of the fingerling to the rearing tank and monitor										

		larvae for growth, health and water quality										
LO3 Carry-out the procedures of breeding in Tilapia												
	3.1	Select healthy mature tilapia (6-12 months old)										
	3.2	Condition the brood-stock in separate tanks										
	3.3	Perform pairing of the male and female in breeding tank or hapas (Ratio 1male to 3or 4 females)										
	3.4	Collect the fertilized eggs from the mouth of the female every five days										
	3.5	Carry out incubation of eggs incubation jar with continuous aeration										
	3.6	Perform rearing of larvae to juvenile in hatchery tanks using zooplankton or formulated feed										
LO 4 Carry-out reconditioning of female brood stock												
	4.1	Describe the process of reconditioning of spent brood-stock										
	4.2	Identify the materials used for reconditioning spent brood-stock										
	4.3	Carry out the process of reconditioning of spent brood-stock										

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	Date:

Unit 09: Fish Post Harvest Handling, Processing and Preservation

Unit Reference Number:	**AqCS/FFA/09/L3**
NSQ Level:	**3**
Credit Value:	**3**
Guided Learning Hours:	**30 Hours**

Unit Purpose:

This unit is aimed to build competencies of the candidate in enhancing efficiency of post-harvest handling and processing of fish to improve livelihood of fish farmers and traders and preventing losses from fish spoilage.

Unit Objective:

The learners should be able to:

- Carry out post- harvest handling and processing of fish
- Preserve harvested fish using salting method
- Preserve harvested fish using smoke drying method
- Preserve harvested fish using cooling method
- Preserve harvested fish using sun drying method
- Carry out packaging, labelling and storage of fish

Unit assessment requirements/evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out. *Simulation is allowed* in this unit and level.
Assessment methods to be used include:

- Direct Observation/oral questions (DO)
- Question and Answer (QA)
- Witness Testimony (WT)
- Work Product (WP)
- Recognition of Prior Learning (RPL)
- Simulation
- Other methods (Ot), assignments, case study, essay, project, etc.

Unit 09: Fish Post Harvest Handling, Processing and Preservation

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type				Evidence Ref. Page No.			
LO 1: Carry out post-harvest handling and processing of fish	1.1	Cool harvested fish (To prevent spoilage)								
	1.2	Identify tools used in post-harvest handling of fish								
	1.3	Carry-out descaling of fish and removal of the fins								
	1.4	Carry-out gutting of fish after harvesting								
	1.5	Carry-out filleting of fresh fish								
LO 2: Preserve harvested fish using salting method	2.1	Identify materials required for fish salting								
	2.2	Carry-out salting process								
	2.3	Perform curing of salted fish for longer shelf life								
	2.4	Carry-out proper cleaning of salting materials and equipment								
LO 3: Preserve harvested fish using smoke drying method	3.1	Identify materials required for smoke drying of fish								
	3.2	Carry-out smoke drying process								
	3.3	Perform post smoke drying treatment of fish for longer shelf life								
	3.4	Carry-out proper cleaning of smoking kilns and other equipment								
LO 4: Preserve harvested fish using cooling method	4.1	Identify materials required for freezing of fish								
	4.2	Perform freezing process using flash and block methods								
	4.3	Carry-out glazing, wrapping and vacuuming of iced fish for longer shelf life								
	4.4	Carry-out proper cleaning of freezing materials and equipment								
LO 5: Preserve harvested fish using sun drying method	5.1	Identify materials required for sun drying of fish								
	5.2	Carry-out sun drying process								
	5.3	Perform curing of sun dried fish (for longer shelf life)								
	5.4	Carry-out proper cleaning of sun drying materials and equipment								

LEARNING OUTCOME (LO)		PERFORMANCE CRITERIA	Evidence Type				Evidence Ref. Page No.			
The learner will:		**The learner can:**								
LO 6: Carry out packaging, labelling and storage of fish	6.1	Identify different packaging materials for packaging processed fish								
	6.2	State storage duration for different processed fish								
	6.3	Carry-out fish packaging process for storage and transportation.								
	6.4	Carry out accurate record of fish packaged for storage or transportation								
	6.5	Label packaged fish appropriately for storage								

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

Unit 10: Fish Health and Welfare

Unit Reference Number:	AqCS/FFA/10/L3
NSQ Level:	3
Credit Value:	3
Guided Learning:	30 Hours

<u>**Purpose**</u>

This unit standard specifies the competencies required to demonstrate the understanding of the concept of fish health. It includes disease causative agents, classification of diseases, basic rules for disease prevention and control, and identification of diseased fish.

Unit Objective:

The learners should be able to:

- Carry out Fish Health Inspections
- Undertake disease prevention and control in fish farm
- Carry out treatment of diseased fish

Unit assessment requirements/evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out. *Simulation is allowed* in this unit and level.

Assessment methods to be used include:

- Direct Observation/oral questions (DO)
- Question and Answer (QA)
- Witness Testimony (WT)
- Work Product (WP)
- Recognition of Prior Learning (RPL)
- Simulation
- Other methods (Ot), assignments, case study, essay, project, etc.

Unit 10: Fish Health and Welfare

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. No.	Page		
LO 1: Carry out Fish Health Inspections	1.1	Conduct daily inspections of fish (To check for signs of disease, injury, or stress)									
	1.2	Monitor fish behaviour in relation to environmental stress									
	1.3	Identify common fish diseases,									
	1.4	Differentiate fish diseases (Viral, bacteria, fungi, protozoan, helminthic etc)									
LO 2: Undertake disease prevention and control in fish farm	2.1	Carry out biosecurity measures, (such as disinfecting equipment and restricting access to the facility)									
	2.2	Monitor water quality parameters (e.g. pH, temperature, dissolved oxygen)									
	2.3	Provide balanced ration									
	2.4	Manage stocking densities of fish at various stages growth.									
	2.5	Monitor fish regularly for signs of disease, and take prompt action if disease is suspected									
LO 3: Carry out treatment of diseased fish	3.1	Observe fish for signs of disease, (such as lethargy, loss of appetite, visible lesion, fish rot etc).									
	3.2	Collect sample to confirm disease diagnosis									
	3.3	Consult veterinarian or specialist to provide guidance on treatment									
	3.4	Quarantine or isolate disease affected fish, tank or pond									
	3.5	Administer medication as prescribed by fish health expert.									
	3.7	Keep record of diseases and treatments									
	3.8	Carry out common treatments procedures for fish diseases (such as antibiotics, antiparasitics and antifungal, vaccination)									

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

Unit 11: Aquaculture business and Marketing

Unit Reference Number:	**AqCS/FFA/11/L3**
NSQ Level:	**3**
Credit Value:	**3**
Guided Learning:	**30 Hours**

Purpose

This unit specifies the competencies required to demonstrate the understanding business planning and management and marketing strategies in fish production in Nigeria. It includes the distribution of fresh water fish stock in Nigeria. This unit is intended for those interested in operating small to large scale fish farming and carrying out associated production processes.

Unit Objective:

The learners should be able to:
- Carry out market research and analysis.
- Identify fresh water fish marketing strategies in Nigeria
- Carry-out business planning and management
- Manage fish supply chain
- Carry out Marketing and sales of fish products.

Unit assessment requirements/evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out. *Simulation is allowed* in this unit and level.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Work Product (WP)
5. Recognition of Prior Learning (RPL)
6. Simulation

Unit 11: Aquaculture business and Marketing

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. No.	Page		
LO 1: Carry out market research and analysis.	1.1	Analyse consumer demand, market trends for informed business decisions									
	1.2	Identify major factors that leads to price fluctuation of fish products									
	1.3	Identify competitor activity for informed business decisions									
LO 2: Identify fresh water fish marketing strategies in Nigeria	2.1	Identify specific consumer segments and tailoring marketing efforts to meet their needs and preferences.									
	2.2	Identify different marketing channels based on the people involved in fish marketing									
	2.3	Recognise the food safety requirements in marketing of fish.									
LO 3: Carry-out business planning and management	3.1	Develop and implement business plans.									
	3.2	Manage finances and oversee operations									
	3.3	Carry-out book keeping in aquaculture									
	3.4	Identify type of records kept in fish farm (Input, Production, Sales, Fixed asset, cash flow)									
LO 4 Manage fish supply chain	4.1	Manage the production process to ensure efficient and cost-effective operations.									
	4.2	Carry out the sourcing of inputs, and coordinating logistics to ensure efficient and cost-effective operations.									
	4.3	. Comply with laws and regulations, and manage risks associated with aquaculture operations, (such as disease									

LEARNING OUTCOME (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type				Evidence Ref.	Page	
		outbreaks and environmental impacts)							
LO 5: Marketing and sales	5.1	Explain how to promote and sell fish products to consumers, wholesalers, and retailers through various channels, (including online platforms, trade shows, and direct sales).							
	5.2	Identify wholesalers, retailers and consumers of fish products							
	5.3	Compare benefits of direct sales and value addition							

Learners Signature:	Date:
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

National Skills Qualifications

FOR

FISH FARMING ACTIVITY
(AQUACULTURE)

LEVEL 1, 2 & 3

NBTE
NATIONAL BOARD FOR TECHNICAL EDUCATION

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