

## FISH FARM MANAGEMENT

**UNIT CODE:** 0811 451 17 A

**TVET CDACC UNIT CODE:** AGR/CU/AP/CR/03/5/MA

### Relationship to Occupational Standards

This unit addresses the unit of competency: Manage fish farm

**Duration of the unit: 100 Hours**

### UNIT DESCRIPTION

This unit describes competencies required to manage fish farm. This involves constructing fish holding units, performing fish farming management practices, process harvested fish, maintain fish hatcheries, maintain fish cages, maintain re-circulatory aquaculture and producing live fish feeds.

### Summary of Learning Outcomes

By the end of this unit, the learner should be able to:

S/No	Learning Outcomes	Duration (Hours)
1.	Construct fish holding units	10
2.	Perform fish farm management practices	20
3.	Process harvested fish	10
4.	Maintain fish hatcheries	20
5.	Maintain fish cages	10
6.	Maintain re-circulatory aquaculture	10
7.	Produce fish live feeds	20
<b>Total</b>		<b>100</b>

### Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcomes	Content	Suggested Assessment Methods
1. Construct fish holding units	1.1 Tools, equipment and materials for fish holding unit construction 1.2 Selection of fish farm 1.3 Designing of fish farm site 1.4 Preparation of fish farm site 1.5 Construction and installation of fish holding units 1.6 Installation of fish farm water filtration system 1.7 Auxiliary farm structures <ul style="list-style-type: none"> <li>• Farm stores</li> <li>• Roads</li> <li>• Fences</li> <li>• Offices</li> <li>• Laboratories</li> <li>• washrooms</li> </ul> 1.8 Installation of predator control devices 1.9 Soil erosion control 1.10 Conduct installation of fish farm water filtration system 1.11 Conduct installation of predator control devices	<ul style="list-style-type: none"> <li>• Written assessment</li> <li>• Practical</li> <li>• Projects</li> <li>• Third party report</li> <li>• Portfolio of evidence</li> <li>• Oral questions</li> </ul>
2. Perform fish farm management practices	2.1 Fish farm management practices 2.2 Water quality parameters <ul style="list-style-type: none"> <li>• Water temperature</li> <li>• Water PH</li> <li>• Dissolved oxygen</li> </ul>	<ul style="list-style-type: none"> <li>• Written assessment</li> <li>• Practical</li> <li>• Projects</li> <li>• Third party report</li> <li>• Portfolio of evidence</li> </ul>

	<ul style="list-style-type: none"> <li>● Ammonia</li> <li>● Nitrates</li> <li>● Nitrites</li> <li>● Salinity</li> <li>● Turbidity</li> <li>● Total suspended solids</li> <li>● Heavy metals</li> <li>● Hydrogen sulphide</li> </ul> <p>2.3 Fertilization of the fish pond</p> <p>2.4 Liming the fish pond</p> <p>2.5 Fish pond weed control</p> <p>2.6 Pond repair and maintenance</p> <p>2.6.1 Sealing leakage</p> <p>2.6.2 De-clogging</p> <p>2.6.3 Water flow rate regulation</p> <p>2.7 Control of fish predators</p> <p>2.8 Signs of infection and stress in fish brood stock</p> <p>2.9 Fish diseases and parasite</p> <p>2.9.1 Bacterial diseases</p> <p>2.9.2 Viral diseases</p> <p>2.9.3 Fungal diseases</p> <p>2.9.4 Protozoal diseases</p> <p>2.9.5 Nutritional diseases</p> <p>2.9.6 Worms</p> <p>2.9.7 Leaches</p> <p>2.10 Causes of fish diseases</p> <ul style="list-style-type: none"> <li>● Environmental/water quality causes</li> <li>● Hereditary/genetic causes</li> <li>● Microbial/pathogenic causes</li> <li>● Nutritional causes</li> </ul>	<ul style="list-style-type: none"> <li>● Oral questions</li> </ul>
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	<ul style="list-style-type: none"> <li>Physical injury</li> </ul> <p>2.11 Sanitation and hygiene practices</p> <p>2.11.1 Regular hand washing</p> <p>2.11.2 Sanitization</p> <p>2.11.3 Disinfection</p> <p>2.11.4 Use of foot bath</p> <p>2.12 Production of fish feeds</p> <p>2.12.1 Live or natural feeds</p> <p>2.12.2 Concentrate feeds</p> <p>2.13 Fish feeding</p> <p>2.14 Evaluation of fish feeding performance</p> <p>2.15 Bio-security measures in a fish rearing unit</p> <p>2.15.1 Sanitation and hygiene practices</p> <p>2.15.2 Sourcing of feeds, fingerlings, brood stock</p> <p>2.15.3 Self-closing doors</p> <p>2.15.4 Use of air conditioning instead of natural ventilation.</p> <p>2.15.5 Use of artificial lights</p> <p>2.15.6 Visitor Movement control</p> <p>2.16 Routine fish management records</p> <p>2.17 Waste management in a fish farm</p> <p>2.18 Record management</p>	
3. Process harvested fish	<p>3.1. Tools, equipment and materials</p> <p>3.2. Harvesting fish</p> <p>3.3. Sorting of harvested fish</p> <p>3.4. Preservation methods</p> <p>3.4.1. Chilling</p> <p>3.4.2. Freezing</p> <p>3.4.3. Salting</p>	<ul style="list-style-type: none"> <li>Written assessment</li> <li>Practical</li> <li>Projects</li> <li>Third party report</li> <li>Portfolio of evidence</li> <li>Oral questions</li> </ul>

	<p>3.4.4. Drying</p> <p>3.4.5. Salting</p> <p>3.4.6. Smoking</p> <p>3.5. Fish processing methods</p> <p>3.5.1. Salting</p> <p>3.5.2. Drying</p> <p>3.5.3. Salting</p> <p>3.5.4. Smoking</p> <p>3.5.5. Filleting</p> <p>3.5.6. Frying</p> <p>3.6. Fish quality assurance</p> <p>3.7. Marketing of fish products and by-products</p> <p>3.7.1. Fish fillets</p> <p>3.7.2. Bones</p> <p>3.7.3. Sutures</p> <p>3.7.4. Fish</p> <p>3.8. Fish processing records</p> <p>3.9. Carry out fish harvesting in a fish rearing unit</p> <p>3.10. Conduct fish preservation methods</p> <p>3.11. Conduct fish processing</p> <p>3.12. Carry out fish quality assurance</p>	
4. Maintain fish hatcheries	<p>4.1 Personal protective gears</p> <p>4.2 Hatchery management tools, equipment</p> <p>4.3 Hatchery Pre-stocking activities</p> <ul style="list-style-type: none"> <li>● Cleaning</li> <li>● De-clogging</li> <li>● Removal of sludge</li> <li>● Fixing water leakages</li> <li>● Liming</li> <li>● Filling with water</li> </ul>	<ul style="list-style-type: none"> <li>● Written assessment</li> <li>● Practical</li> <li>● Projects</li> <li>● Third party report</li> <li>● Portfolio of evidence</li> <li>● Oral questions</li> </ul>

	<ul style="list-style-type: none"> <li>● Controlling water flow rate</li> </ul> <p>4.4 Brood stock sourcing</p> <p>4.5 Brood stock sorting</p> <p>4.6 brood stock feeding</p> <p>4.7 Water quality parameters</p> <ul style="list-style-type: none"> <li>• Water temperature</li> <li>• Water PH</li> <li>• Dissolved oxygen</li> <li>• Ammonia</li> <li>• Nitrates</li> <li>• nitrites</li> <li>• Salinity</li> </ul> <p>4.8 Signs of infections and stress in brood stock</p> <p>4.9 Fingerlings production</p> <p>4.10 Fish hatchery records</p>	
5. Manage fish cages	<p><b>5.1</b> Design, set and stock Fish cages design</p> <p><b>5.2</b> Husbandry practices</p> <ul style="list-style-type: none"> <li>• Feeding</li> <li>• Aeration</li> <li>• Water flow rate control</li> <li>• Water quality monitoring</li> <li>• Predator control</li> <li>• Sludge removal</li> <li>• De-clogging of drainage system</li> <li>• Cleaning of filters</li> <li>• Harvesting</li> <li>• Growth monitoring</li> <li>• Fingerling/fry grading</li> <li>• Marketing of hatchery products</li> </ul>	<ul style="list-style-type: none"> <li>• Written assessment</li> <li>• Practical</li> <li>• Projects</li> <li>• Third party report</li> <li>• Portfolio of evidence</li> <li>• Oral questions</li> </ul>

	<ul style="list-style-type: none"> <li>• Fish health monitoring</li> <li>• Fish propagation</li> <li>• Fish stocking</li> <li>• Fingerling packaging and transport</li> </ul> <p><b>5.3 Fish safety and Bio security measures</b></p> <ul style="list-style-type: none"> <li>• Fencing</li> <li>• Proper Sourcing of feeds, fingerlings, brood stock</li> <li>• Predator control</li> <li>• Visitor Movement control</li> <li>• Quarantine and isolation</li> </ul> <p><b>5.4 Husbandry practices</b></p> <ul style="list-style-type: none"> <li>• Feeding</li> <li>• Aeration</li> <li>• Water flow rate control</li> <li>• Water quality monitoring</li> <li>• Predator control</li> <li>• Sludge removal</li> <li>• De-clogging of drainage system</li> <li>• Cleaning of filters</li> <li>• Harvesting</li> <li>• Growth monitoring</li> <li>• Fingerling/fry grading</li> <li>• Marketing of hatchery products</li> <li>• Fish health monitoring</li> <li>• Fish propagation</li> <li>• Fish stocking</li> </ul> <p><b>5.5 Fingerling packaging and transport</b></p> <p><b>5.6 Fish stock harvesting</b></p>	
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	<b>5.7 Fish cages maintenance</b> <b>5.8 Fish cage records</b>	
6. Manage re-circulatory aquaculture	6.1. Design Recirculating Aquaculture System (RAS) <ul style="list-style-type: none"> <li>● Bio-filters</li> <li>● Mechanical filters</li> <li>● Fish culture unit(s)</li> <li>● Water reservoir</li> <li>● Water drainage system</li> <li>● Water aeration system</li> </ul> 6.2. Install Recirculating Aquaculture System 6.3. Bio safety measures 6.4. RAS management activities <ul style="list-style-type: none"> <li>● Cleaning of the unit</li> <li>● De-clogging</li> <li>● Water flow rate control</li> <li>● Water aeration or oxygenation</li> <li>● Fish feeding</li> <li>● Water quality monitoring</li> <li>● Predator control</li> <li>● Sludge removal</li> <li>● De-clogging of drainage system</li> <li>● Cleaning of filters</li> <li>● Harvesting</li> <li>● Growth monitoring</li> <li>● Fingerling/fry grading</li> <li>● Marketing of hatchery products</li> <li>● Fish health monitoring</li> <li>● Fish propagation</li> <li>● Fish stocking</li> </ul>	<ul style="list-style-type: none"> <li>● Written assessment</li> <li>● Practical</li> <li>● Projects</li> <li>● Third party report</li> <li>● Portfolio of evidence</li> <li>● Oral questions</li> </ul>

	<ul style="list-style-type: none"> <li>Fingerling packaging and transport</li> </ul>	
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### Suggested methods of delivery

- Practical
- Project
- Demonstration
- Group work and Discussions
- Direct instruction

### Recommended resources for 25 trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A</b>	<b>Learning Materials</b>			
1	Charts	Flip Charts Rules and Regulations	5	1:5
2.	Markers	whiteboard markers and permanent markers	5	1:5
3.	Video clips Audio tapes	MP4, MP3	5	1:5
4.	Newspapers and Handouts	Daily	25	1:1
5.	Business Journals	Annual, Monthly, Daily	25	1:1
<b>B</b>	<b>Learning Facilities &amp; Infrastructure</b>			
1.	Lecture/Theory Room	(9* 8 sq. metres)	1	1:25
2.	Internet Connection	WI-FI, Dial-Up, Cable,	1	1:25

		Fixed-wireless,		
3.	Chain link fence	Surrounding fish pond	1	1:25
4.	Fish ponds	sufficient	1	1:25
<b>C</b>	<b>Consumable Materials</b>			
1.	Flashcards	Alphabet, Numbers, Math	25	1:1
2.	Stationery	Printing Papers, and Exercise Books Sizes A4, A3, A2 etc	5 reams	1:5
3.	water	sufficient	5	2:5
4.	Fishing nets		2	2:25
5.	Fish feeds	sufficient	5	1:5
6.	planktons	sufficient	5	1:5
<b>D</b>	<b>Tools And Equipment</b>			
1.	Computers/Laptops	Any model	1	1:25
2.	Projector	LED.LCD, Laser	5	1:5
3.	Whiteboard	Glass, melamine, porcelain	1	1:25
4.	Laboratory	Well equipped	1	1:25
5.	Fishing line with hook	sufficient	5	1:5
6	Buckets with lids	clean	5	1:5
7.	Jembe	Sufficient	5	1:5
	Slasher		5	1:5
	Spade		5	1:5
	Rake		5	1:5

8.	Refrigerator		1	1:25
9.	Freezer box	any	2	2:25
10.	Sludge remover	any	1	1:25
<b>F</b>	<b>Specimen</b>			
1.	Fingerlings	From reputable hatcheries	sufficient	

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