



**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**AGRICULTURE AND EXTENSION TECHNICIAN**

**LEVEL 5**

**(CYCLE 3) PROGRAMME CODE: 0811 454A**



**TVET CDACC**  
**P.O. BOX 15745-00100**  
**NAIROBI**

## CARRY OUT FISH FARMING

**UNIT CODE: 0811 451 13A**

**TVET CDACC UNIT CODE: AGR/OS/EXT/CR/02/5/MA**

### UNIT DESCRIPTION

This unit specifies competencies required to carry out fish farming. This involves constructing fish farming structures, feed fish, managing fish hatcheries and managing fish cages. It also involves harvesting of fish, processing harvested fish as well as managing re- circulatory aquaculture systems

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the <b>key outcomes</b> which makeup <b>work place function</b> .	<b>PERFORMANCE CRITERIA</b> These are <b>assessable</b> statements which specify the required level of performance for each of the elements. <i><b>Bold and italicized terms are elaborated in the range.</b></i>
1. Establish fish holding units	1.1 PPE's are worn as per task requirements 1.2 Fish farm site is selected as per farm plan 1.3 Tools, equipment and materials are assembled as per work requirement 1.4 Fish holding unit is constructed and installed according to FPM 1.5 Fish farm water filtration system is installed based on design features 1.6 <i><b>Auxiliary farm structures</b></i> are constructed or installed based on the farm design specifications 1.7 <i><b>Predator control devices</b></i> are installed as per FPM
2. Perform fish farm management practices	2.1 <i><b>Water quality parameters</b></i> are monitored as per FPM 2.2 <i><b>Fish Pond maintenance practice</b></i> is carried out as per work requirement 2.3 Fish predators and parasites are controlled as per FPM

	<p>2.4 <b><i>Fish diseases</i></b> are controlled as per work procedures</p> <p>2.5 <b><i>Fish are fed</i></b> as per work requirement</p> <p>2.6 Fish farm wastes are managed as per environmental protection guidelines</p> <p>2.7 Records are kept as per work procedures</p>
3. Manage fish hatcheries	<p>3.1 Hatchery management tools, equipment and materials are assembled as per task requirements</p> <p>3.2 <b><i>Hatchery Pre-stocking activities</i></b> are performed as per FPM</p> <p>3.3 Brood stock is fed according to FPM.</p> <p>3.4 Water quality is monitored as per FPM</p> <p>3.5 Brood health is managed as per work requirement.</p> <p>3.6 Hatchery records are kept as per work procedure</p>
4. Process harvested fish	<p>4.1 Tools, equipment and materials for processing are assembled as per work procedures</p> <p>4.2 Harvesting of fish is carried out as per FPM</p> <p>4.3 Harvested fish is sorted according to FPM</p> <p>4.4 <b><i>Preservation methods</i></b> are performed as per FPM</p> <p>4.5 <b><i>Fish processing methods</i></b> are performed as per FPM</p> <p>4.6 Fish products and by-products are marketed as per workplace procedure</p> <p>4.7 <b>Records</b> are kept as per work procedures</p>

## RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range
1. Fish farm site preparation activities may include but not limited to:	<ul style="list-style-type: none"> <li>• Site selection</li> <li>• Site clearance</li> <li>• Measurement and pegging</li> </ul>

2. Auxiliary farm structures may include but not limited to:	<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>
3. Water quality parameters may include but not limited to:	<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> <li>• Turbidity</li> <li>• Salinity</li> <li>• Total suspended solids</li> <li>• Heavy metals</li> <li>• Hydrogen sulphide</li> </ul>
4. Pond repair and maintenance may include but not limited to:	<ul style="list-style-type: none"> <li>• Sealing leakage</li> <li>• Dyke repair</li> <li>• Bush/grass clearing</li> <li>• Declogging</li> <li>• Water flow rate regulation</li> </ul>
5. Fish disease causes may include but not limited to:	<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> <li>• Physical injury</li> </ul>
6. Sanitation and hygiene may	<ul style="list-style-type: none"> <li>• Regular hand washing</li> </ul>

include but not limited to:	<ul style="list-style-type: none"> <li>• Sanitization</li> <li>• Disinfection</li> <li>• Use of foot bath</li> </ul>
7. Fish feeds may include but not limited to	<ul style="list-style-type: none"> <li>• Live or natural feeds</li> <li>• Concentrate feeds</li> </ul>
8. Bio-security measures may include but not limited to:	<ul style="list-style-type: none"> <li>• Sanitation and hygiene practices</li> <li>• Sourcing of feeds, fingerlings, brood stock</li> <li>• Self closing doors</li> <li>• Use of air conditioning instead of natural ventilation.</li> <li>• Use of artificial lights.</li> <li>• Visitor Movement control</li> </ul>
9. Preservation methods may include but not limited to:	<ul style="list-style-type: none"> <li>• Chilling</li> <li>• Freezing</li> <li>• Salting</li> <li>• Drying</li> <li>• Salting</li> <li>• Smoking</li> </ul>
10. Fish processing methods may include but not limited to:	<ul style="list-style-type: none"> <li>• Salting</li> <li>• Drying</li> <li>• Salting</li> <li>• Smoking</li> <li>• Filleting</li> <li>• Frying</li> </ul>
11. Hatchery Pre-stocking activities may include but not limited to:	<ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Declogging</li> <li>• Removal of sludge</li> <li>• Fixing water leakages</li> </ul>

	<ul style="list-style-type: none"> <li>• liming</li> <li>• Filling with water</li> <li>• Controlling water flow rate</li> </ul>
12. Husbandry practices may include but not limited to:	<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>• Declogging 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> <li>• Fingerling packaging and transport</li> </ul>
13. Fish safety and Biosecurity measures may include but not limited to:	<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>
14. Recirculating Aquaculture System (RAS) may include but not limited to:	<ul style="list-style-type: none"> <li>• Bio-filters</li> <li>• Mechanical filters</li> <li>• Fish culture unit(s)</li> </ul>

	<ul style="list-style-type: none"> <li>• Water reservoir</li> <li>• Water drainage system</li> <li>• Water aeration sytem</li> </ul>
15. RAS management activities may include but not limited to:	<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>• Declogging 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> <li>• Fingerling packaging and transport</li> </ul>

## REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

### Required knowledge

The individual needs to demonstrate knowledge of:

- Arithmetic
- Net working
- Fish biology
- Water chemistry

## Required skills

The individual needs to demonstrate the following skills:

- Fish handling
- Procurement
- water quality equipment Calibration
- Net repair and maintenance
- Record keeping
- Fish stocking
- Fish harvesting
- Fish packaging and transportation
- Fish health monitoring
- Water flow rate control
- Fish feeding
- Fish growth monitoring
- Fish marketing
- Communication
- Problem solving
- Time management
- Digital
- Critical thinking

## EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Adhere to safe work procedures. 1.2 Set up fish culture unit 1.3 Humane fish handling. 1.4 Package and transport fish
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	1.5 Maintain water flow rate 1.6 Produce fish feeds 1.7 Aerate fish holding unit 1.8 Feed fish. 1.9 Stock fish 1.10 Fertilize earthen pond 1.11 Lime earthen pond 1.12 Manage fish health. 1.13 Harvest fish 1.14 Handle harvested fish. 1.15 Market fish products and by products 1.16 Keeps records
2. Resource implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place 2.2 Access to relevant work environment 2.3 Resources relevant to the proposed activities or tasks
3. Methods of assessment	Competency in this unit may be assessed through: 3.1 Practical assessment 3.2 Oral assessment 3.3 Portfolio of evidence 3.4 Project 3.5 Case study 3.6 Third party report (recognition of prior learning) 3.7 Written tests
4. Context of assessment	This competency may be assessed in a workplace or in a simulated workplace.
5. Guidance	Holistic assessment with other units relevant to the industry

information for assessment	sector and workplace job role is recommended.
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