

## OPERATE FISH HATCHERY

**UNIT CODE:** AQ/OS/AT/CR/03/5/B

### UNIT DESCRIPTION

This unit specifies the competencies required to operate fish hatchery. It involves ability to implement fish hatchery food safety plan, source, stock and manage broodstock, breed, nurse and package fingerlings and maintain the hatchery facility.

| <b>ELEMENT</b><br>These describe the key outcomes which make up workplace function. | <b>PERFORMANCE CRITERIA</b><br>These are assessable statements which specify the required level of performance for each of the elements.<br><br><i><b>Bold and italicized terms are elaborated in the Range</b></i>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| 1. Implement fish hatchery food safety plan                                         | 1.1 Food safety <b>Hazards</b> in the fish hatchery are identified and documented.<br>1.2 Possible <b>sources</b> of physical, chemical and microbial contamination in the hatchery are identified based on the hazards<br>1.3 <b>Preventive measures</b> for fish hatchery hazards are applied as per manual of standard operating procedures<br>1.4 <b>Corrective measures</b> for fish hatchery hazards are applied as per manual of standard operating procedures<br>1.5 Risk is communicated as per policies for internal and external communication                                                                                                                  |
| 2. Manage Broodstock                                                                | 2.1 <b>PPE</b> 's are identified and gathered as per task requirements<br>2.2 <b>Tools, equipment and materials</b> are assembled as per task requirements<br>2.3 Quarantine ponds or tanks are cleaned, disinfected and filled with water fit for aquaculture as per standard operating procedures<br>2.4 Broodstock is identified and sourced from approved sources<br>2.5 Broodstock is acclimatized based on culture unit temperatures<br>2.6 Broodstock is quarantined based on information on possible infections from the source<br>2.7 Broodstock is sorted and stocked into broodstock ponds based on maturity stage and stocking density specific to the species |

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|                               | <p>2.8 Brood stock is fed at maintenance ratio</p> <p>2.9 <b>Water quality parameters</b> are monitored at regular intervals</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3. Produce fingerlings        | <p>3.1 Breeding facilities are cleaned and filled with water fit for aquaculture as per standard operating procedures</p> <p>3.2 Broodstock is selected for breeding based on the number of fingerlings to be produced and state of readiness</p> <p>3.3 Selected broodstock for natural breeding is transferred to breeding facilities based on species specific stocking density</p> <p>3.4 Selected broodstock for artificial propagation is treated with recommended doses of <b>hormones</b> to induce breeding as per manual of standard operating procedures</p> <p>3.5 Stripping, fertilization and incubation of eggs is carried out using standard procedures</p> <p>3.6 Hatchlings produced are nursed based on optimum water quality parameter ranges and nutritional requirements</p> <p>3.7 Tilapia hatchlings are sex reversed to males using feeds that have been treated using recommended hormone concentrations as per manual of standard operating procedures</p> <p>3.8 Fish fry are graded regularly by size based on growth rates and stocking density</p> <p>3.9 Fingerlings are harvested and packaged based on distance from the hatchery</p> |
| 4. Maintain hatchery facility | <p>4.1 Water flow rate into tanks or ponds is regulated based on species cultured, stage of development and water quality</p> <p>4.2 Hatchery facility is cleaned and disinfected with food grade cleaning and disinfecting agents</p> <p>4.3 Water quality parameter ranges are maintained within optimum levels</p> <p>4.4 <b>Basic repairs</b> on hatchery facilities are carried out based on identified faults</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## RANGE

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

| Variable                                                       | Range                                                                                                                                                                                                                                                                                                                                     |
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| 1. Hazards may include but not limited to:                     | <ul style="list-style-type: none"><li>• Physical</li><li>• Biological</li><li>• Chemical<ul style="list-style-type: none"><li>○ Heavy metals</li><li>○ Pesticide residues</li></ul></li><li>• Sick fish</li><li>• Parasites</li><li>• Viruses</li><li>• Bacteria</li><li>• Hormones</li><li>• Fish tags</li><li>• Wrong species</li></ul> |
| 2. Sources of hazards may include but not limited to:          | <ul style="list-style-type: none"><li>• Infected parent stock/ broodstock</li><li>• Poor water quality</li><li>• Human carriers</li><li>• Cleaning agents</li><li>• Pesticides</li><li>• Antibiotics misuse</li></ul>                                                                                                                     |
| 3. Preventive measures may include but not limited to:         | <ul style="list-style-type: none"><li>• Quarantine of brooders</li><li>• Good water quality</li><li>• Sanitary and phytosanitary measures</li><li>• Biosecurity measures</li></ul>                                                                                                                                                        |
| 4. Corrective measures may include but not limited to:         | <ul style="list-style-type: none"><li>• Parasite control</li><li>• Fish treatment</li><li>• Water flow management</li><li>• Sterilization of the hatchery</li></ul>                                                                                                                                                                       |
| 5. Food safety standards                                       | <ul style="list-style-type: none"><li>• Codes of practice</li><li>• Principles of food hygiene</li><li>• Specifications for maximum limits for hazards</li></ul>                                                                                                                                                                          |
| 6. <i>Water fit for aquaculture</i> include but not limited to | <ul style="list-style-type: none"><li>• Fish species specific recommended level of chlorine</li><li>• Fish species specific Recommended pH range</li><li>• Fish species specific Recommended Ammonia</li><li>• Fish species specific recommended turbidity level</li><li>• Free of infective pathogens</li></ul>                          |

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| 7. PPE's include but not limited to:                     | <ul style="list-style-type: none"> <li>• Safety goggles, gum boots, wading suit, gloves, dust coats, first aid kits, life ring, life jacket</li> </ul>                                                                                                                                                       |
| 8. Tools and equipment include but not limited to:       | <ul style="list-style-type: none"> <li>• Dissecting kit, weighing balance, pair of pincers, pestle and mortar, needle and syringe, measuring cylinders, hatching jars, larval rearing trays, perforators, basins, harvesting gear, happa nets, buckets, scoop nets, water test kits, refrigerator</li> </ul> |
| 9. Materials include but not limited to:                 | <ul style="list-style-type: none"> <li>• Salt, towel, egg substrates, warm water, anaesthesia, 17-<math>\alpha</math> Methyl Testosterone, feeds, fertilizers, ethanol, acetone, vials, cotton wool, assorted bowls</li> </ul>                                                                               |
| 10. Water quality parameters include but not limited to: | <ul style="list-style-type: none"> <li>• Dissolved oxygen, temperature, pH, ammonia, nitrite, alkalinity, turbidity,</li> </ul>                                                                                                                                                                              |
| 11. Breeding facilities include but not limited to       | <ul style="list-style-type: none"> <li>• Earthen ponds, happa nets, concrete tanks, plastic tanks,</li> </ul>                                                                                                                                                                                                |
| 12. State of readiness include but not limited to:       | <ul style="list-style-type: none"> <li>• Ready to spawn (swollen abdomen), not yet ready, already spawned</li> </ul>                                                                                                                                                                                         |
| 13. Hormones include but not limited to:                 | <ul style="list-style-type: none"> <li>• Pituitary extract, synthetic hormones</li> </ul>                                                                                                                                                                                                                    |
| 14. Basic repairs include but not limited to:            | <ul style="list-style-type: none"> <li>• Fixing minor leakages in ponds, pipes, tanks</li> <li>• Fixing damaged happa and harvesting nets</li> </ul>                                                                                                                                                         |

## REQUIRED SKILLS AND KNOWLEDGE

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

### Required Skills

The individual needs to demonstrate the following skills:

- Use of tools and equipment
- Weighing
- Numeracy
- Fish handling and packaging
- Dissection
- Identification of anatomical features
- Stripping and injection

- Basic first aid
- Hand sexing of brooders
- Identification of signs of healthy fish
- Testing water quality

### Required Knowledge

The individual needs to demonstrate knowledge of:

- Food safety Standards (codes of practice for fish and fishery products)
- Regulatory bodies/ Competent authorities
- Hazard Analysis Critical Control Point (HACCP)
- Types of tools, equipment and PPEs
- Use of water test kits and equipment
- Fish breeding
- Basic fish anatomy and physiology
- Fish diseases
- Water quality parameters
- Fish feeds and feeding
- Fish hatchery biosecurity

### EVIDENCE GUIDE

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

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| <p>1. Critical Aspects of Competency</p> | <p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Implemented fish hatchery food safety plan</li> <li>1.2 Sourced brood stock with desirable features</li> <li>1.3 Monitored water quality parameters using appropriate equipment</li> <li>1.4 Quarantined incoming broodstock in specially designated ponds</li> <li>1.5 Acclimatized the incoming fish upon arrival on the farm</li> <li>1.6 Accurately selected ripe females for breeding exercise</li> <li>1.7 Precisely identified and extracted pituitary gland from the donor fish</li> <li>1.8 Stripped brood fish of maximum possible amount of eggs or milt without spilling or dropping the fish</li> <li>1.9 Graded fry to uniform sizes</li> </ul> |
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| 2. Resource Implications               | <p>The following resources must be provided:</p> <p>2.1 Workplace or assessment location</p> <p>2.2 PPEs</p> <p>2.3 Materials, tools, and equipment</p> <p>2.4 Broodstock</p> |
| 3. Methods of Assessment               | <p>Competency may be assessed through:</p> <p>3.1 Observation</p> <p>3.2 Oral presentation</p> <p>3.3 Oral questioning</p> <p>3.4 Projects</p> <p>3.5 Written tests</p>       |
| 4. Context of Assessment               | <p>Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.</p>  |
| 5. Guidance information for assessment | <p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>                                                           |