

GROW OUT FISH PRODUCTION

UNIT CODE: AQ/CU/AM/CR/04/4/B

Relationship to Occupational Standards

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

Duration of Unit: 100 hours

Unit Description

This unit specifies the competencies required to produce grow-out fish. It involves ability to apply food safety measures in producing grow out fish, prepare fish grow out culture units in readiness for stocking, as well as stock and feed the fish while monitoring and controlling disease occurrences. It also involves the competencies required to maintain farm cleanliness, manage other livestock that is integrated with fish farming, and harvest fish upon maturity.

Summary of Learning Outcomes

1. Apply food safety measures in producing grow out fish
2. Prepare grow out culture units
3. Stock grow out culture units
4. Feed and maintain fish in the grow out culture units
5. Maintain fish farm
6. Maintain fish culture units
7. Control disease, parasites and predators
8. Harvest fish
9. Maintain integrated livestock on fish farm

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply food safety measures in producing grow out fish	<ul style="list-style-type: none">• Introduction to food safety<ul style="list-style-type: none">○ Meaning of food safety○ Importance of food safety○ Principles of food safety• Prerequisite programmes<ul style="list-style-type: none">○ Meaning and importance of prerequisite programmes○ Relevant programmes for grow-out fish production	<ul style="list-style-type: none">• Written tests• Oral questioning• Observation

	<ul style="list-style-type: none"> • Hazard analysis for grow-out fish production <ul style="list-style-type: none"> ○ Types and sources of hazards ○ Significance of hazards ○ Methods of hazard control • Components of HACCP plan for grow-out fish production <ul style="list-style-type: none"> ○ Critical control points ○ Critical control limits ○ Monitoring procedures on the control limits ○ Corrective actions ○ Verification and validation ○ Record keeping • Standards and legislations of food safety on grow-out fish production 	
<p>2. Prepare grow out culture units</p>	<ul style="list-style-type: none"> • Types of grow-out units <ul style="list-style-type: none"> ○ Earthen ponds ○ Lined ponds ○ Tanks ○ Cages • Preparation of ponds <ul style="list-style-type: none"> ○ Tools and equipment used in pond preparation ○ Pond drainage and drying procedures ○ Dredging and cleaning of earthen ponds ○ Minor repair of dikes and water-flow systems ○ Cleaning and repair of lined ponds • Liming of fish ponds <ul style="list-style-type: none"> ○ Types of lime and their properties ○ Application rates ○ Methods of application • Fertilization of fish ponds <ul style="list-style-type: none"> ○ Types of fertilizers 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Practical tests

	<ul style="list-style-type: none"> ○ Application rates ○ Methods of applying organic and inorganic fertilizers ● Preparation of fish tanks <ul style="list-style-type: none"> ○ Drainage and cleaning ○ Detection and repair of cracks, leakages and other structural damages ○ Chemicals approved for use in disinfecting aquaculture facilities ● Preparation of cage culture units <ul style="list-style-type: none"> ○ Cleaning and repair of cage nets, framework, and floating devices ○ Disinfection and drying of cage nets ○ Assembly and set-up of cages in water ● Basic record keeping and maintenance 	
<p>3. Stock grow out culture units</p>	<ul style="list-style-type: none"> ● Sources of fry and fingerlings in Kenya ● Practical handling and care of fish and fingerlings ● Fingerling packaging and transportation methods ● Factors to consider when stocking ponds with fingerlings ● Procedure for stocking fish in: <ul style="list-style-type: none"> ○ Ponds ○ Tanks ○ Cages ● Post-harvest monitoring of stocked fish <ul style="list-style-type: none"> ○ Handling fingerling mortalities ● Signs of stress in newly stocked fish ● Effects of water quality and other physic-chemical factors on fingerling survival 	<ul style="list-style-type: none"> ● Written tests ● Oral questioning ● Oral presentations ● Practical tests

<p>4. Feed fish in the grow out culture units</p>	<ul style="list-style-type: none"> • Introduction to fish nutrition <ul style="list-style-type: none"> ○ Important nutrients in fish diets ○ Feeding in fish • Types of fish feeds <ul style="list-style-type: none"> ○ Natural food (live feeds) ○ Compounded feeds <ul style="list-style-type: none"> ○ Home-made feeds ○ Commercial feeds • Fish feeding methods <ul style="list-style-type: none"> ○ Hand feeding (broadcasting) ○ Automatic feeders ○ Demand feeders • Fish feeding habits behaviour • Feeding rates, frequency and timing • Fish sampling and calculation of feed ration adjustments • On-farm feed handling and storage • Maintenance of feeding records 	<ul style="list-style-type: none"> • Oral questioning • Written tests • Practical tests
<p>5. Maintain fish farm</p>	<ul style="list-style-type: none"> • Tools and equipment used required during farm maintenance • Design of farm maintenance checklists <ul style="list-style-type: none"> ○ Daily activities ○ Weekly activities ○ Monthly activities • Types of grass suitable for fish farms • Types of screening devices and their maintenance • Weed control in water channels • Cleaning and repair of water intake structures • Maintenance of cage facilities • Common defects on farm facilities <ul style="list-style-type: none"> ○ Pond breakages and leakages ○ Supply and drainage channels 	<ul style="list-style-type: none"> • Oral questioning • Practical tests • Written tests • Oral presentations

	<ul style="list-style-type: none"> ○ Inlets and outlets ○ Predator control structures ● Control of water quality in ponds 	
6. Maintain fish culture units	<ul style="list-style-type: none"> ● Water quality management <ul style="list-style-type: none"> ○ Physio-chemical parameters ○ Monitoring of water parameters ○ Pond fertilization ○ Corrective actions ● Identification and repairs of leakages in ponds ● Types of inlets and outlets commonly used in fish culture units ● How to repair lined ponds, wooden and concrete tanks, plumbing system ● Types of screening devices ● Water flow control and management ● Troubleshooting of common structural defects in fish culture units ● Pond weeds and their control ● Maintenance of indoor fish culture units ● Care and maintenance of fish cages 	<ul style="list-style-type: none"> ● Oral questioning ● Practical tests ● Written tests ● Oral presentations
7. Control disease, parasites and predators	<ul style="list-style-type: none"> ● Critical water quality parameters <ul style="list-style-type: none"> ○ Dissolved oxygen ○ pH ○ Temperature ○ Turbidity ● Monitoring and management of water quality parameters ● Common signs of stress in cultured fish ● Fish stress control measures in ponds and tanks ● Common diseases in fish <ul style="list-style-type: none"> ○ Signs of diseases ○ Causes ○ Control measures 	<ul style="list-style-type: none"> ● Oral questioning ● Practical tests ● Written tests ● Oral presentations

	<ul style="list-style-type: none"> • Common fish parasites in ponds <ul style="list-style-type: none"> ○ Types ○ Control measures • Mechanical and Biological control of parasites • Fish predators and intrusive animals <ul style="list-style-type: none"> ○ Types of predators and their behaviour ○ Types and behaviour of intrusive animals ○ Methods of controlling fish predators • Maintenance of biosecurity installations on a fish farm 	
8. Harvest fish	<ul style="list-style-type: none"> • Tools, equipment and materials used during fish harvests • Types of fish harvests <ul style="list-style-type: none"> ○ Partial and complete harvests ○ Synchronized and single harvests • Deciding when to harvest • Factors to consider before harvesting fish • Fish harvesting gears and methods • Care and handling of harvested fish • Cleaning, packing and transportation of harvested fish • Marketing of harvested fish • Maintenance of harvesting and marketing methods 	<ul style="list-style-type: none"> • Oral questioning • Practical tests • Written tests • Oral presentations
9. Maintain integrated livestock on fish farm	<ul style="list-style-type: none"> • Maintenance and cleaning of housing structures <ul style="list-style-type: none"> ○ Fish-Poultry integration ○ Fish – sheep integration • Factors to consider when selecting and livestock for an integrated system • Handling and care of integrated livestock 	<ul style="list-style-type: none"> • Oral questioning • Practical tests • Written tests • Oral presentations

	<ul style="list-style-type: none"> • Feeding and feed management of integrated farm animals • Disease and parasite control in integrated animals • Types of records and record keeping 	
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Suggested Delivery Methods

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

Recommended Resources

Tools and equipment

Slashers, Measuring tape, weighing scale, machetes, wheelbarrow, digital water test meters, water test kits, secchi disc, jembes, spades, rakes. Lime, fertilizer, tampers, liner repair kit, **seine net, scoop net, basic masonry tools, graders,**

Materials and supplies

Gunny bags, buckets, laundry baskets, perforators, lime, fertilizer, ropes, cover nets, twines, screens, fencing materials, traps and scarecrows, perforators, writing material, cement, sand, transport containers, fish feeds,

Personal protective equipment (PPEs)

Safety goggles, gum boots, helmets, gloves, dust coats, first aid kits, industrial mouth piece, wading suits, life jackets,