

GROW-OUT FISH PRODUCTION

UNIT CODE: AQ/CU/AM/CR/04/6/B

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Produce Grow Out Fish

Duration of Unit: 300 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 culture units, stock them with fingerlings, as well as feed and manage fish health in these units. It also involves the competencies required to control predators, harvest fish and integrate fish farming with livestock and poultry, and maintain the fish culture facilities in good condition.

Summary of Learning Outcomes

1. Apply food safety measures in producing grow out fish
2. Develop fish stocking and harvesting plan
3. Prepare grow out culture units
4. Stock grow out culture units
5. Manage fish feeding
6. Manage fish stock health
7. Control weeds, predators and intrusive animals
8. Harvest fish stock
9. Maintain grow out culture units
10. Integrate fish farming with livestock and poultry

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">• Meaning of food safety• Importance of food safety• Principles of food safety• Prerequisite programmes<ul style="list-style-type: none">• Meaning, importance, categories and establishment of prerequisite programmes• Relevant programmes for grow-out fish production | <ul style="list-style-type: none">• Written tests• Oral questioning• Observation• Portfolio of Evidence• Third Party reports• Project• Practical tests |

| | | |
|--|---|---|
| | <ul style="list-style-type: none"> • Hazard analysis for grow-out fish production <ul style="list-style-type: none"> • Enterprise description • Product description • Layout of premises and surrounding environment • Development of flow diagram • Identification of hazards at each step of the flow diagram • Describing the hazard • Significance of hazards • Establishment of the HACCP plan for grow-out fish production <ul style="list-style-type: none"> • Identification of critical control points • Procedures for setting up critical control limits • Establishment monitoring procedures on the control limits • Establishment of corrective actions • Verification procedures • Record keeping • Validation procedures <p>Standards and legislations of food safety on grow out fish production</p> | |
| 2. Develop fish stocking and harvesting plan | <ul style="list-style-type: none"> • Definition of fish stocking plan • Contents of a fish stocking plan • Preparation of stocking plan <ul style="list-style-type: none"> • Source of fingerlings • Species of fish • Stocking density • Stocking schedule • Factors to consider when developing a fish stocking plan | <ul style="list-style-type: none"> • Written tests • Oral questioning • Practical tests • Portfolio of Evidence |

| | | |
|-----------------------------------|---|---|
| | <ul style="list-style-type: none"> • Factors to consider when developing a fish harvesting plan • Advantages of stocking and harvesting plans | |
| 3. Prepare grow out culture units | <ul style="list-style-type: none"> • Use of PPEs in production of grow out fish • Pond preparation equipment, materials, and tools • Pond preparation procedures <ul style="list-style-type: none"> • Repairs of inlets, outlets, and drainage systems • Pond draining • Pond repairs • Desiltation • Sun-drying • Lime application • Pond filling • Pond Fertilization and rates of application • Methods of lime and fertilizer application • Cleaning and disinfection of concrete and plastic fish tanks | <ul style="list-style-type: none"> • Written tests • Oral questioning • Oral presentations • Practical tests • Portfolio of Evidence |
| 4. Stock grow out culture units | <ul style="list-style-type: none"> • Types of fish species commonly cultured in Kenya • Sources of fry and fingerlings in Kenya • Factors affecting survival of fry and fingerlings • Practical handling and care of fish • Fish packaging and Transportation <ul style="list-style-type: none"> • Size sorting of fish and fingerlings • Transportation of live fish • Packing of fry and fingerlings • Packing of large fish • Acclimatization and stocking of fish and fingerlings • Post stocking monitoring <ul style="list-style-type: none"> • Behaviour • Handling mortalities | <ul style="list-style-type: none"> • Oral questioning • Written tests • Practical tests • Portfolio of Evidence |

| | | |
|---|---|---|
| <p>5. Manage fish feeds and feeding</p> | <ul style="list-style-type: none"> • Nutritional requirements of commonly farmed fish • Types of fish feeds • Floating, sinking • Pellets, mash, flakes • Natural feeds, artificial/commercial feeds • Natural feeds • Water quality management • Pond liming and fertilization • Measurement of natural productivity • Fish feeding methods • Hand feeding (broadcasting) • Automatic feeders • Demand feeders • Feeding rates, frequency and timing • Feed conversion efficiency and calculations (FCR) • On-farm feed handling and storage • Fish sampling methods • Maintenance of fish feed and feeding records • Fish waste management | <ul style="list-style-type: none"> • Oral questioning • Practical tests • Written tests • Portfolio of Evidence |
| <p>6. Manage fish stock</p> | <ul style="list-style-type: none"> • Fish sampling techniques • Water quality management <ul style="list-style-type: none"> • Physico-chemical parameters • Monitoring of water parameters • Pond fertilization • Corrective actions • Fish Diseases • Definition of disease • Common fish diseases in ponds • Methods of disease transmission • Clinical symptoms of stress and disease in cultured fish • Common fish parasites <ul style="list-style-type: none"> • Ectoparasites • Endoparasites • Mechanical and Biological control of parasites | <ul style="list-style-type: none"> • Oral questioning • Practical tests • Written tests • Portfolio of Evidence |

| | | |
|---|---|---|
| | <ul style="list-style-type: none"> • Common bacterial and viral diseases in cultured fish. • Approved drugs in Aquaculture • Application methods • Bio-security procedures in a fish farm facility | |
| 7. Control weeds, predators and intrusive animals | <ul style="list-style-type: none"> • Types of weeds found in ponds <ul style="list-style-type: none"> • Submerged plants • Emergent plants • Floating plants • Algal blooms • Methods of weed control in ponds • Fish predators and intrusive animals <ul style="list-style-type: none"> • Difference between predators and intrusive animals • Types of predators and their behaviour • Types and behaviour of intrusive animals • Methods of controlling predators on fish farms | <ul style="list-style-type: none"> • Oral questioning • Practical tests • Written tests • Project • Portfolio of Evidence |
| 8. Harvest fish stock | <ul style="list-style-type: none"> • Factors to consider before harvesting fish • Tools, equipment and materials used during fish harvests • Handling and storage of equipment, drugs and chemicals • Steps involved during fish harvests <ul style="list-style-type: none"> • Starving of fish • Reducing water levels • Harvesting methods • Handling of harvested fish <ul style="list-style-type: none"> • Sorting and grading of fish • Stress minimization • Keeping of harvesting records • Cleaning, packing and transportation of harvested fish | <ul style="list-style-type: none"> • Oral questioning • Practical tests • Written tests • Portfolio of Evidence • Third party report |
| 9. Maintain grow out culture units | <ul style="list-style-type: none"> • Tools, equipment and materials required during maintenance of fish culture units • Water quality management | <ul style="list-style-type: none"> • Oral questioning • Practical tests • Written tests |

| | | |
|---|---|---|
| | <ul style="list-style-type: none"> • Physio-chemical parameters • Monitoring of water parameters • Pond fertilization and liming • Corrective actions • Clearing and repair of pond dikes, channels and piping • Maintenance of water channels and flood control structures • Identification and repairs of leakages • Maintenance and repairs of ancillary farm structures <ul style="list-style-type: none"> • Trimming of grass around compound • Fences repairs • Trimming tree branches • How to repair lined ponds, wooden and concrete tanks, plumbing system • Maintenance records and record keeping | <ul style="list-style-type: none"> • Portfolio of Evidence |
| 10. Integrate fish farming with livestock and poultry | <ul style="list-style-type: none"> • Managing integrated systems <ul style="list-style-type: none"> • Fish-Poultry integration • Fish – Livestock integration • Fish – paddy integration • Aquaponics • Factors to consider when selecting an ideal animals and plants for an integrated system • Common designs of integrated fish culture systems • Animal stocking densities in integrated facilities • Feeding and feed management of integrated farm animals • Management and disease control in integrated animals • Records and record keeping | <ul style="list-style-type: none"> • Oral questioning • Practical tests • Written tests • Portfolio of Evidence |

Suggested Methods of Instruction

- Instructor led facilitation of theory
- Demonstration by trainer

- Practical work by trainee
- Viewing of related videos
- Group discussions

Recommended Resources

Reference materials

- standard operating procedures.
- statutory requirements and standards
- OSHA
- stocking plan
- Feed manufacturer's instructions.
- FAO Technical Guidelines for Responsible Fisheries- Aquaculture
- HACCP plan.

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, microscope

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,