

SETTING UP RECIRCULATING AQUACULTURE SYSTEM (RAS) UNIT

UNIT CODE: AQ/CU/AM/CR/07/6/B

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Set Up Small-Scale Aquaculture Re-Circulating System (RAS) Unit

Duration of Unit: 300 hours

Unit Description

This unit specifies the competencies required to apply food safety measures in setting up RAS, design and cost a small-scale re-circulating Aquaculture System, supervise construction and installation works, and manage operations of a RAS facility.

Summary of Learning Outcomes

1. Apply food safety measures in setting up RAS
2. Design a small-scale re-circulating aquaculture system
3. Supervise construction of RAS facility
4. Set up biosecurity measures
5. Manage RAS facility

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply food safety measures in setting up RAS	<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 setting up RAS• Hazard analysis for setting up RAS<ul style="list-style-type: none">• Enterprise description• Product description• Layout of premises and surrounding environment	<ul style="list-style-type: none">• Written tests• Oral questioning• Observation• Third Party reports• Project• Practical tests• Portfolio of Evidence

	<ul style="list-style-type: none"> • 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 setting up RAS <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 in food safety on setting up RAS</p>	
2. Design a small-scale RAS	<ul style="list-style-type: none"> • Recirculating Aquaculture System <ul style="list-style-type: none"> • Definition • Types • Factors to consider in siting a RAS <ul style="list-style-type: none"> • Power supply • Piped water • Transport network • Internet connectivity • Components of a fish hatchery unit <ul style="list-style-type: none"> • Culture units • Plumbing works • Water treatment – biofilters • Layout of the RAS <ul style="list-style-type: none"> • Factors to consider – components, space, surrounding land gradient, , 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Practical tests • Projects • Portfolio of Evidence

	<p>waste disposal, biofilters, water flow either by pump or gradient</p> <ul style="list-style-type: none"> • Costing of hatchery construction • Relevant statutory requirements - EMCA, WARMA 	
3. Supervise construction of RAS facility	<ul style="list-style-type: none"> • Use of PPEs in hatchery construction • Safety measures to be observed • Use of materials, supplies, tools and equipment in hatchery construction • Construction of a RAS shed <ul style="list-style-type: none"> • Site clearing • Construct a shade • Installation of RAS components <ul style="list-style-type: none"> • Culture tanks • Sorting tables • Packaging tables • Incubation units • Plumbing works • Construction of outdoor culture units <ul style="list-style-type: none"> • Ponds – earthen, liner • Tanks – plastic, concrete • Installation of waste disposal system <ul style="list-style-type: none"> • Types of wastes • Disposal facilities • Waste recycling • Basic civil works <ul style="list-style-type: none"> • Landscaping • Walkways • Gate installation • Parking area • Perimeter fencing • Access roads • Installation and testing of RAS components <ul style="list-style-type: none"> • Water intake structures • Piping • Overhead tanks • Drainage systems 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Oral presentation • Practical tests • Projects

4. Install bio-security and safety measures	<ul style="list-style-type: none"> • Foot baths <ul style="list-style-type: none"> • Purpose • Designs • Disinfectants used, • Preparation of stock solutions • Hand wash and sanitizers <ul style="list-style-type: none"> • Types • Siting • Operation • Filtration systems for incoming water • Construction of fences and quarantine facilities • Intruder control facilities and devices e.g. nets, meshes, screens, cover nets 	<ul style="list-style-type: none"> • Oral questioning • Written tests • Practical tests • Projects • Portfolio of Evidence
5. Exit project site	<ul style="list-style-type: none"> • Cleaning e.g. tools and equipment • Storage of materials e.g. recyclable, supplies • Disposal of non-recyclable materials • Project report prepared and disseminated • Financial accounts settled 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Practical tests
6. Maintain RAS facility	<ul style="list-style-type: none"> • Maintenance procedures <ul style="list-style-type: none"> • Water flow rates • Cleaning • Disinfection • Water quality maintenance • Waste disposal 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Practical 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

- RAS is assessed and established as per manual standard operating standards

- Statutory requirements and standards for installing RAS

Tools and equipment

- Tape measure, spirit level, jembes, spades, pangas, plumbing tools, masonry tools,
- Compactors and rollers, wheelbarrows, aeration equipment, filtration
- Water testing kits and equipment, beakers, water circulation pumps, water flow structures, power back up, generator

Materials and supplies

Ropes and strings, liners, pegs, nets, meshes, screens, cover nets, gates, plumbing materials, lime, cement, sand, roofing materials, fencing wire, fittings, assorted screens, netting materials, disinfectants, chlorine, water storage tanks, fish culture tanks, , cement, sand, fish growing tanks,

Personal protective equipment (PPEs)

Safety goggles, gum boots, helmets, gloves, overalls, first aid kits, mouth piece

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