

PRODUCE FISH FEEDS

UNIT CODE: AQ/OS/AT/CR/02/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce fish feeds. It involves conducting fish feed food safety risk assessment, developing fish feed food safety risk management plan, producing natural fish feeds, producing on-farm formulated fish feeds and monitoring and evaluating fish feed performance.

ELEMENT These describe the key outcomes which make up workplace function.	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. <i>Bold and italicized terms are elaborated in the Range</i>
1. Conduct fish feed production food safety risk assessment	1.1 Hazards at each fish feed production stage are identified and documented. 1.2 Possible <i>sources</i> of physical, chemical and microbial contamination are identified as per the hazards 1.3 Level of risk is assessed and established as per Kenya fish feed standards
2. Develop fish feed production food safety risk management plan	2.1 Preventive measures are established as per identified source of contamination and manual of standard operating procedures 2.2 Corrective measures are established as per identified source of contamination and manual of standard operating procedures 2.3 Standard operating procedures for preventing and correcting fish feed safety risks are developed based on the identified risks. 2.4 Fish feed food safety status is evaluated based on <i>statutory requirements and standards</i> 2.5 Risk is communicated as per policies for internal and external communication 2.6 Approval and certification of fish feed is sought from relevant certification bodies based on statutory requirements and standards
3. Produce natural fish feeds	3.1 <i>PPE's</i> are identified and gathered as per task requirements 3.2 <i>Materials and equipment for producing natural fish foods</i> are identified and gathered based on task requirements while observing food safety

	<p>3.3 Pond is cleaned, limed, dried and flooded with water fit for aquaculture as per standard operating procedures</p> <p>3.4 Natural productivity of pond is determined based on secchi depth</p> <p>3.5 Fish pond is fertilized based on pond's natural productivity and recommended rates of fertilization</p>
<p>4. Produce on-farm formulated fish feeds</p>	<p>4.1 On-farm feed production materials and equipment are identified and gathered based on quality, food safety status, cost and availability</p> <p>4.2 Feed ingredient samples are collected and subjected to proximate analysis</p> <p>4.3 Feed premixes are identified and procured while observing Kenya fish feed standards</p> <p>4.4 Feed composition is formulated using Pearson's Square Method or computer software, based on available ingredients and nutrient requirements of target species</p> <p>4.5 Feed ingredients are subjected to appropriate treatments to inactivate anti-nutritional factors</p> <p>4.6 Feed ingredients are milled to fine particles of uniform size while observing food hygiene standards</p> <p>4.7 Feed additives where required are added as per standard and statutory requirements</p> <p>4.8 Formulated feed proportions are weighed and mixed uniformly</p> <p>4.9 Feed mixture is pelletized and/or dried to a moisture content of 10% or less</p> <p>4.10 Fish feed is weighed and packaged in sealed bags with clear label details</p> <p>4.11 Dry fish feeds are stored in cool and dry areas</p> <p>4.12 Moist fish feeds are properly refrigerated as per the identified food safety risks</p> <p>4.13 Fish feed is stored as per recommended storage conditions</p>
<p>5. Monitor and evaluate fish feed performance</p>	<p>5.1 Samples of produced feed are subjected to analysis to ascertain nutritional content and food safety status.</p> <p>5.2 Feeds are tested for suitability based on physical parameters, palatability and feed conversion ratio</p> <p>5.3 Produced feed is fed to target fish at recommended rates</p> <p>5.4 Fish growth rate is monitored according to sampling plan</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
1. Sources may include but not limited to:	<ul style="list-style-type: none"> • Chemical <ul style="list-style-type: none"> ○ Heavy metals ○ Ingredients used for formulation of feeds ○ Agricultural chemicals • Physical • Microbial • Poor storage conditions • Pests • Rodents
2. Statutory requirements and standards may include but not limited to:	<ul style="list-style-type: none"> • Compliance to standards and regulations • Kenya Fisheries Service • County Government • The Fisheries Management and Development Act No.35 of 2016. • The Codex Alimentarius Food Hygiene Basic Texts; • The Food Drugs and Chemical Substances Act Cap. 254 of the Laws of the Kenya; • The Pest Control Products Act, Cap. 346 of the Laws of Kenya; • The Public Health Act, Cap. 242 of the Laws of Kenya; • The Environmental Management and Co-ordination Act, 1999.
3. PPE's may include but not limited to	<ul style="list-style-type: none"> • Safety goggles, gum boots, helmets, gloves, dust coats, first aid kits, mouth piece
4. Materials and equipment for producing natural fish foods may include but not limited to:	<ul style="list-style-type: none"> • Fertilizers, secchi disk, weighing scale • Buckets, gunny bags, sticks, stakes, sample containers • Personal computers
5. Natural productivity include but not limited to:	<ul style="list-style-type: none"> • Phytoplanktons • Zooplanktons

6. On-farm feed production materials and equipment may include but not limited to:	<ul style="list-style-type: none"> • Meat mincer, blender/ grinder, weighing scale, dryer, mixer, containers, bag sealer, oven, burner, drying racks • Packaging bags, drying canvas/ polythene •
7. Feed ingredients may include but not limited to:	<ul style="list-style-type: none"> • Plant protein • Animal protein • Cereals and by-products • Mineral and other additives
8. Feed premixes may include but not limited to:	<ul style="list-style-type: none"> • Vitamin, mineral, lysine and methionine
9. Nutrient requirements may include but not limited to:	<ul style="list-style-type: none"> • Proteins, • Lipids/fats • Ash • Carbohydrates • Moisture • Mineral and vitamin
10. Treatments may include but not limited to:	<ul style="list-style-type: none"> • Roasting • Boiling • Fermentation • Sun-drying
11. Label details may include but not limited to:	<ul style="list-style-type: none"> • Date of manufacture, name of manufacturer, date of expiry, storage conditions, protein level, pellet size, target species.
12. Storage conditions may include but not limited to:	<ul style="list-style-type: none"> • Humidity, temperature, ventilation, FIFO
13. Physical parameters may include but not limited to:	<ul style="list-style-type: none"> • floatability • bulk density • water stability • feed fines/ dust • size • shape • Texture
14. Sampling plan may include but not limited to:	<ul style="list-style-type: none"> • Sampling frequency • Sample size • Sampling time

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:

- Food safety risk assessment and communication
- Training skills
- Use of tools and equipment
- Measurement
- Mixing ingredients
- Communication
- Basic first aid
- Numeracy
- ICT
- Record keeping

Required Knowledge

The individual needs to demonstrate knowledge of:

- Food safety Standards
- Food Safety Hazards in Aquaculture
- Good aquaculture practices
- Good hygiene practices
- Safety precautions
- National legislations and regulations in fish sector
- Types of tools, equipment and PPEs
- Budgeting
- On-farm fish feed formulation
- Locally available raw materials
- Nutritional composition of the raw materials and their properties
- Fish nutrition

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Developed fish feed food safety risk management plan 1.2 Determined natural productivity of the fish pond 1.3 Identified and calculated quantities and types of fertilizers to be used 1.4 Formulated feed composition correctly as per target species
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	<ul style="list-style-type: none"> 1.5 Applied the correct fertilizer at right amounts using appropriate method 1.6 Applied the right treatment to inactivate anti-nutritional factors in selected feed ingredients 1.7 Weighed accurate amounts of feed ingredients based on feed formulation 1.8 Mixed feed ingredients uniformly 1.9 Tested feed for bulk density, water stability and floatability 1.10 Stored produced feed under recommended storage conditions 1.11 Feed composition is formulated using Pearson's Square Method or computer software, based on available ingredients and nutrient requirements of target species 1.12 Subjected feed ingredients and finished feed to proximate analysis 1.13 Maintained proper records on fish response to the feed produced
2. Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 2.1 Workplace or assessment location 2.2 PPEs 2.3 Materials and equipment 2.4 Feed ingredients 2.5 Writing materials
3. Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Observation 3.2 Oral questioning 3.3 Projects 3.4 Written tests 3.5 Portfolio of Evidence 3.6 Interview 3.7 Third party report
4. Context of Assessment	<p>Competency may be assessed:</p> <ul style="list-style-type: none"> 4.1 On-the-job 4.2 Off-the –job 4.3 During Industrial attachment
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>