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Ministry of Labor and Skills

FISHERY AND AQUACULTURE Level – IV

ATVT Curriculum Version-I

Based on July 2022, Version- I Occupational Standard

November, 2022

Addis Ababa, Ethiopia

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Preface

The reformed ATVT-System is an outcome-based system. It utilizes the needs of the labor market and occupational requirements from the world of work as the benchmark and standard for ATVT delivery. The requirements from the world of work are analyzed and documented – taking into account international benchmarking – as occupational standards (OS).

In the reformed ATVT -System, curricula and curriculum development play an important role with regard to quality driven comparable ATVT-Delivery. The Curricula help to facilitate the training process in a way, that trainees acquire the set of occupational competences (skills, knowledge and attitude) required at the working place and defined in the occupational standards (OS).

This curriculum has been developed by a group of professional experts from different Regional ATVT Bureaus, colleges, Industries, Institutes and universities based on the occupational standard for **Fishery and Aquaculture Level IV.** The curriculum development process has been actively supported and facilitated by **Ministry of Labor and Skills.**

1 ATVT-Program Design

1.1 ATVT-Program Title*:* Fishery and Aquaculture -Level IV

1.2 ATVT-Program Description

The Program is designed to develop the necessary knowledge, skills and attitude of the trainees to the standard required by the occupation. The contents of this program are in line with the occupational standard. The Trainees who successfully completed the Program will be qualified to work as **Fishery and Aquaculture managerial** with competencies elaborated in the respective OS. Graduates of the program will have the required qualification to work in the **Agriculture Sector** in the field of **Fishery and Aquaculture**

The prime objective of this training program is to equip the Trainees with the identified competences specified in the OS. Graduates are therefore expected to establish integrated fish farm, Operate fish nursery pond, cconduct Hatchery Management, Monitor and Manage Fishery Resources, Conduct waste disposal and management, Manage Fish Farm and Develop value chain analysis in accordance with the performance criteria and evidence guide described in the OS.

1.3 Training Program Structure

Unit of Competence		Module Code & Title		Learning Outcomes	Duration (In Hours)
AGR FAQ4 01 0722	Establish integrated fish farm	AGR FAQ4 M01 1122	Establishing integrated fish farm	• Select site for integrated fish farm establishment • Prepare for integrated farm construction • .Establish integrated fish farm • Manage integrated fish farm • Complete integrated fish farm activities	75
AGR FAQ4 02 0722	Operate fish nursery pond	AGR FAQ4 M02 1122	Operating fish nursery pond	• Prepare nursery ponds • Stock fish in nursery pond • Perform feeding operations • Complete nursery operation	50
AGR FAQ4 03 0722	Conduct Hatchery Management	AGR FAQ4 M03 1122	Conducting Hatchery Management	• Prepare for fish hatchery • Collect and care brood stock • Maintain spawn tank • Harvest and distribute progeny • Complete hatchery activities	55

AGR FAQ4 04 0722	Monitor and Manage Fishery Resources	AGR FAQ4 M04 1122	Monitoring and Managing Fishery Resources	• Prepare for monitoring • Perform monitoring and management activities • Finalize monitoring and management activities	60
AGR FAQ4 05 0722	Conduct waste disposal and management	AGR FAQ4 M05 1122	Conducting waste disposal and management	• Identify precondition of waste treatment and disposal • Conduct wastes treatment and disposal • Complete work activities	40
AGR FAQ4 06 0722	Manage Fish Farm	AGR FAQ4 M06 1122	Managing Fish Farm	• Prepare to manage fish farm • Manage fish farm • Perform fish farm stock handling	70
AGR FAQ4 07 0722	Develop value chain analysis	AGR FAQ4 M07 1122	Developing value chain analysis	• Understand concepts of value chain • Identify Value chain analysis • Develop value chain • Upgrade value addition	40

1.4 Duration of the ATVT-Program

The Program will have duration of **400** including the on school/ Institution training and on-the-job practice or cooperative training time. Such cooperative training based on realities of the industry, nature of the occupation, location of the ATVT institution, and other factors will be considered in the training delivery to ensure that trainees acquire practical and workplace experience.

S. No	Module title	ATVT Institution training		Cooperative training	Total hours	Remark
		Theory	Practical			
1.	Establish integrated fish farm	23	42	10	75	
2.	Operate fish nursery pond	15	30	5	50	
3.	Conduct Hatchery Management	16	33	6	55	
4.	Monitor and Manage Fishery Resources	18	35	7	60	
5.	Conduct waste disposal and management	15	30	5	50	
6.	Manage Fish Farm	21	40	9	70	
7.	Develop value chain analysis	12	23	5	40	
Total hour		**120**	**233**	**47**	**400**	

1.5 Qualification Level and Certification

Qualification is a formal certificate issued by an official agency in recognition to that an individual has been assessed as achieving learning outcomes or competencies to the standard specified for the qualification title. A qualification confers official recognition of value in the labour market and in further education and training. Based on the descriptors elaborated on the Ethiopian National ATVT Qualification Framework (NTQF) the qualification of this specific ATVT Program is Certificate IV according to the level. The trainee will be awarded transcript and the institutional certificate after successfully completing all the modules in the level.

1.6 Target Groups

Any citizen who meets the entry requirements under items 1.7 and capable of participating in the training activities is entitled to take part in the Program.

1.7 Entry Requirements

In principle everyone should be able to access training based on the labor market. Hence the prospective participants of this program are any citizens who possess the entry requirement directive of the Ministry of Labor and Skills.

1.8 Mode of Delivery

This ATVT Program is characterized as a formal Program on middle level technical skills. The mode of training delivery is in the institution and co-operative training. Cooperative training is a model of training by the cooperation of enterprises/industries and ATVT institutions whereby trainees spend much of their time in the enterprises/industries to acquire industrial knowledge, skills, experiences, and attitudes of the industrial environment and the remaining time in ATVT institutions to acquire basic skills and theoretical concepts. Therefore, it is necessary to make the ATVT sector more effective by strengthening a system of cooperative training accepted by the industry.

The program will employ different alternatives of cooperative training such as apprenticeships, internship and traineeship based on the nature of the occupation, location of the ATVT institutions, and interest of the industry. In addition, in the areas where industry is not sufficiently available the established production and service centers/learning factories in ATVT institutions will be used as cooperative training places. The Training-Institution and identified companies should have to take an agreement to cooperate with regard to the implementation of this program.

1.9 Institutional Assessment

Two types of evaluation will be used in determining the extent to which training outcomes are achieved. The specific training outcomes are stated in the modules. In assessing them, verifiable and observable indicators and standards shall be used.

The ***formative assessment*** is incorporated in the training modules and form part of the training process. Formative evaluation provides the trainee with feedback regarding success or failure in attaining training outcomes. It identifies the specific training errors that need to be corrected, and provides reinforcement for successful performance as well. For the teacher, formative evaluation provides information for making instruction and remedial work more effective.

Summative Evaluation the other form of evaluation is given when all the modules in the program have been accomplished. It determines the extent to which competence have been achieved. And, the result of this assessment decision shall be expressed in the term of institutional Assessment implementation guidelines.

Techniques or tools for obtaining information about trainees' achievement include oral or written test, demonstration and on-site observation. Therefore, a trainee is required to earn at least 60% to be theoretically qualified. This result should be 18% or more when converted to 30%. Regarding performance appraisal results, it must score at least 80% or at least 32% or more when converted to 40%. Must cooperate at least 80% out of 100% in cooperative training; When converted to 30%, it must register 24%.

1.10 ATVT Teachers Profile

The trainers conducting this particular ATVT Program are **A Level** and above who have satisfactory practical experiences or equivalent qualifications.

1.11 Training and Assessment methodology

The program is delivered using a variety of training methods. The table below shows training and assessment methodology for non-impaired trainees and with reasonable adjustment for impaired trainees. In addition, as per the nature of the module title the trainer can use recommended and possible training and assessment methodology.

Learning Methods:				
For none impaired trainees	**Reasonable Adjustment for Trainees with Disability (TWD)**			
	Low Vision	**Deaf**	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Provide large print text ❖ Prepare the lecture in Audio/video ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

Lecture-discussion	❖ Provide large print text ❖ Prepare the lecture in Audio/video ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop
Demonstration	❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation	❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ provide tutorial support (if necessary)	❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ provide tutorial support (if necessary)	❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ provide tutorial support (if necessary

Group discussion	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work	❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group members to speak loudly	❖ Introduce the trainees with their peers
Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training	❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	❖ prepare the assignment questions in large text ❖ Encourage the trainees to prepare and submit the assignment in large texts ❖ Make available recorded assignment questions ❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy	❖ Use sign language interpreter ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	

Assessment Methods:				
Interview		❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration /Observation	❖ Brief the instruction or provide them in large text ❖ Time extension	❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension	❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension	❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

2. Learning Module Design

Module Code and Title	AGR FAQ4 M01 1122 : Establishing integrated fish farm
Nominal Duration :	75 Hours

Module Description : This module covers the skills, knowledge and attitude required to perform integrated fish farming, identify types of integrated fish farm, Fitting the matrix and standards, integrated fish farm construction, maintenance operations, select healthy food and fish feeding practice.

Learning Outcomes

At the end of the module the trainee will be able to:

LO-1 Select site for integrated fish farm establishment

LO-2 Prepare for integrated farm construction

LO-3 Establish integrated fish farm

LO-4 Manage integrated fish farm

LO-5 Complete integrated fish farm activities

Module Contents:

LO-1. Select site for integrated fish farm establishment

1.1 Site selection criteria

1.2 Components and characteristics of integrated fish farm

1.3 Construction techniques

LO-2. Prepare for integrated farm construction

2.1. Construction plan

2.2. Importance of integrated fish farm

2.3. Types of integrated fish farming

2.4. Personal Protective Equipment (PPE

2.5. Identifying equipment, tools and materials

2.6. Set Bill of quantity

2.7. Design, prepare and undertake layout

LO-3. Establish integrated fish farm

3.1 Measuring, Cleaning and excavating site

3.2 Construct integrated fish farm

3.3 Fitting of farms

3.4 Animal raising and plant cultivations

LO-4. Manage integrated fish farm

4.1 Maintenance operations in fish farm

4.2 Select healthy food

4.3 Feeding fish

4.4 Fish diseases

4.5 Fish farm sanitation

4.6 Observation of integrated fish farm

LO-5. Complete integrated fish farm activities

5.1 Handle Waste materials

5.2 Handling material, tools, equipment and machinery

5.3 Reporting organized document

Learning Methods:

- Lecture
- Group discussion
- Demonstration
- Brainstorming
- Hands on exercise

Assessment Methods:

- **Written test**
- **Observation/Demonstration with Oral Questioning**

ASSESSMENT CRITERIA

LO 1: Select site for integrated fish farm establishment

- Site selection criteria are understood and identified .
- Components and characteristics of integrated fish farm are identified and understood
- The construction techniques of integrated fish farming identified and understood.
- Sites are selected for integrated fish farm establishment
- Suitable conditions for integrated fish farming are understood and identified.

LO 2: Prepare for integrated farm construction

- Construction work plan is prepared for integrated fish farm establishment
- Types of integrated fish farming are identified
- Personal Protective Equipment (PPE) are identified and used for integrated fish farm establishment
- Equipment, tools and materials are identified for integrated fish farm establishment
- Bill of quantity are set for construction of integrated fish farm
- Brief layouts are designed, prepared and undertaken to establish the integrated fish farm

LO 3: Establish integrated fish farm

- Sites are properly measured, cleaned and excavated
- Farms to be integrated are constructed
- Fitting of farms are performed based on the standard
- Integrated fish farms are constructed based on the design plan.
- Animal raising and plant cultivations are conducted in the integrated fish farm

LO 4: Manage integrated fish farm

- Maintenance operations in fish farm are carried out.
- Healthy food for fish reared is selected.
- Fish feeding are practiced.
- Fish diseases through visible symptoms in integrated fish farms are recognized.
- Fish farm sanitation are carried out
- Integrated fish farms are attentively observed

LO 5: Complete integrated fish farm activities

- Waste material produced during fish by product processing is handled according to rules and regulations
- Material, Tools, equipment and machinery are cleaned, maintained, handled, transported and stored according to the industry guidelines..
- Documents are organized, documented and reported for the responsible body

Module Code and Title	AGR FAQ4 M02 1122 : Operating Fish nursery pond
Nominal Duration :	**40 Hours**

Module Description : This module covers the knowledge and skills required to prepare and operate fry nursery in ponds, stock fry, monitor water quality and feeding the fry.

Learning Outcomes

At the end of the module the trainee will be able to:

LO-1 Prepare nursery ponds

LO-2 Stock fish in nursery pond

LO-3 Perform feeding operations

LO-4 Complete nursery operation

Module Contents:

LO-1. Prepare nursery ponds

1.1. Site selection
1.2. Tools, Equipment and materials
1.3. Personal protective equipment(PPE)
1.4. Drying and harrowing the pond
1.5. Fry harvesting schedule
1.6. Liming and fertilizing pond
1.7. Predator control
1.8. Natural food
1.9. Set up aerators/agitators
1.10. Maintain water quality

LO-2. Stock fish in nursery pond

2.1. Amount and quality of fry
2.2. Handling, transporting and stocking fry
2.3. Common fish diseases
2.4. Symptoms moribund fish

LO-3. Perform feeding operations

3.1. Types of feeds
3.2. Aanalyze fish feed ration
3.3. Feeding
3.4. Checking water quality

LO-4. Complete nursery operation

4.1. Cleaning work area ,tools, equipment and materials
4.2. Documenting and reporting

Learning Methods:
• Lecture • Group discussion • Demonstration • Brainstorming • Hands on exercise
Assessment Methods:
• Written test • Observation/Demonstration with Oral Questioning

ASSESSMENT CRITERA

LO-1: Prepare nursery ponds

- Select and prepare site in order to install and construct nursery pond
- Check and prepare Tools, Equipment and materials
- Personal protective equipment(PPE) selected and prepared according to occupational health safety(OHS) standard
- Pond is dried until cracking stage
- The soil is harrow and allow to dry
- Fry harvest schedule are identified
- Lime to be used are selected and computed for amount based on soil ph
- Predator control is selected, amount computed and applied
- Fertilizer are selected and computed the rate of application
- Natural food is allowed to bloom
- Aerators/agitators are set-up
- Perform water quality parameters are performed

LO-2: Stock fish in nursery pond

- The amount and quality of fry are determined to be stocked
- Fry are Properly handled, transported and stocked
- Common *diseases* are periodically monitored and implemented control measures
- Diseased or moribund fish is sampled and brought to the laboratory for diagnosis based on *symptoms* observed

LO-3: Perform feeding operations

- Feeds are identified and prepared according to stock
- Required feed is sampled and analyzed for feed ration
- Daily feed need is calculated
- Provide feed based on the requirement of fish
- Regularly check water quality to be maintained

LO-4: Complete nursery operation

- work area ,Tools, equipment and materials are cleaned fand sanitized according to the working producers
- Report disease observed and monitored to the veterinary
- Regular accomplishment reports on all aqua farm activities will be done

Module Code and Title	AGR FAQ4 M03 1122: Conducting Hatchery Management
Nominal Duration :	**48 Hours**

Module Description : This module covers the skills knowledge and attitude required to manage hatchery through collect and brood stock, production and raising progeny and prepare stock for distribution.

Learning Outcomes

At the end of the module the trainee will be able to:

LO1. Prepare for fish hatchery

LO2. Collect and care brood stock

LO3. Maintain spawn tank

LO4.Harvest and distribute progeny

LO5. Complete hatchery activities

Module Contents:

LO1. Prepare for fish hatchery

1.1. Hatchery management

1.2. Tools, materials and equipment

1.3. Personal protective equipment(PPE)

1.4. Risk factors for stock progeny

LO2. Collect and care brood stock

2.1. Stock Sanitation

2.2. Stock behavior

2.3. Identify source of brood stock

2.4. Collecting and grading brood stock

2.5. Quality and quantity requirements of brood stock

2.6. Handling and transporting brood stock

2.7. Transfer brood stock into culture

2.8. Fed brood stock

2.9. Conditioning brood stock

LO3. Maintain spawn tank

3.1 Monitoring Spawning tanks

3.2 Collect, wash and count spawn

3.3 Assessing quality of eggs and sperm

3.4 Caring fertilized and hatched eggs

3.5 Post-spawning husbandry practices

3.6 Monitoring Progeny

3.7 Grade, sort and transport Stock

LO4. Harvest and distribute progeny

4.1 Select and harvest progeny

4.2 Grade, sort and transport progeny

4.3 Packing selected progeny

LO5. Complete hatchery activities

5.1 Handling tools, materials and equipment

5.2 Collect and dispose moribund or dead stock

5.3 Reporting documents

Learning Methods:
• Lecture • Group discussion • Demonstration • Brainstorming • Hands on exercise
Assessment Methods:
• Written test • Observation/Demonstration with Oral Questioning

Assessment Criteria

LO 1: Prepare for fish hatchery

- Hatchery management activities are identified
- Tools, materials and equipment are identified
- Personal protective equipment(PPE) selected and prepared according to occupational health safety(OHS) standard
- Risk factors that could affect the quality of the end cultured or held stock progeny are identified.

LO 2: Collect and care brood stock

- Sanitation conditions of stocks are carried out according to workplace procedures and hygiene requirements
- Source of brood stock are identified
- Brood stock is collected and graded according to quality and quantity requirements
- Brood stock is handled and transported to the farm in a manner which minimizes stress or damage.
- Brood stock is transferred into culture or holding structures.
- Brood stock is fed according to the requirement
- Brood stock is conditioned to induce maturation or breeding and spawning behavior

LO 3: Maintain spawn tank

- Spawning tanks are monitored regularly for signs of imminent spawning.
- Spawn are collected, washed and counted and assessed for quality of eggs and sperm
- Fertilized and hatched eggs are cared for according to biological requirements.
- Post-spawning husbandry practices are applied, as required
- Progeny are regularly monitored to ensure that individual needs are met by appropriate post-hatch-rearing procedures.
- Stock is graded, sorted and transported to new culture according to workplace procedures.

LO 4: Harvest and distribute progeny

- Progeny is selected through quality requirement and harvest progeny
- Progeny is graded, sorted and transported to new on-farm culture or holding structures
- Selected progeny is harvested and packed

LO 5: Complete hatchery activities

- Tools, materials and equipment are cleaned, repaired and stored
- Moribund or dead stock are collected and disposed
- Report is prepared, documented and communicated

Module code and title	**AGR FAQ4 M04 1122: Monitoring and Managing Fishery Resources**
Nominal duration:	**60 hours**

MODULE DESCRIPTION: This module covers the skills and knowledge required to data on fishing operations, catches fish species, quantities produced fish and collect data tools for resource management purposes. Evaluate fish catches against standards for specific species that may include size, quantity and types of fishing gears used in the fishing activities.

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

LO1. Prepare for monitoring

LO2. Perform monitoring and management activities

LO3. Finalize monitoring and management activities

MODULE CONTENTS:

LO1. Prepare for monitoring

1.1. Data collection format
1.2. Fishery resource management tools
1.3. Approaches to fisheries management
1.4. Monitoring schedule
1.5. Types of monitoring
1.6. Identifying materials, tools and equipment

LO2. Perform monitoring and management activities

2.1 Problems identification
2.2 Monitoring, controlling & surveillance strategy
2.3 Data collection procedures
2.4 Monitor fishery resources
2.5 Legislation and regulation of environmental impact
2.6 On-board safety procedures
2.7 Stock recovery measures
2.8 Resource management tools
2.9 Analyze collected data
2.10 Decision making and techniques

LO3. Finalize monitoring and management activities

3.1 Functionality of equipment, tools and materials

3.2 Maintenance and repairing schedule

3.3 Organize, document and report collected data

Learning Methods

- Lecture
- Group discussion
- Demonstration
- Role playing
- Brainstorming

Assessment Methods

- Written test
- Oral questioning
- Practical demonstration
- Individual and group discussion

ASSESSMENT CRITERIA

LO.1 Prepare for monitoring

- Data collection format is developed
- Fishery resource management tools are identified for sustainable yield of production
- Approaches to fisheries management are identified
- Monitoring activates are scheduled
- Types of monitoring are identified for fishery resource management
- Materials, tools and equipment are identified and prepared for monitoring.

LO.2 Perform monitoring and management activities

- Problems are identified related to fishery resource utilization
- Monitoring, control & surveillance strategy are understood and applied
- Data are collected according to data collection procedures
- Monitor the availability of resource related to fishery
- Relevant legislation and regulation that impact on workplace environmental practice
- Follow all on-board safety procedures during observations
- Stock recovery measures for at risk‟ fish stocks are undertaken

- Resource management tools for sustainable yield of production are identified

LO.3 Finalize monitoring and management activities

- Functionality of Equipment, tools and materials are identified
- Malfunctioned equipment, tools and materials are maintenance and repairing schedule are prepared
- Collected data and monitoring activities are properly documented
- Collected data are organized and reported

Module Code and Title	AGR FAQ4 MO5 1122 : Conducting Waste disposal and management
Nominal Duration :	**50 Hours**

Module Description : This module covers the competence required to cover the Understanding of the concept of land administration, principles of land administration and good governance in land administration.

Learning Outcomes

At the end of the module the trainee will be able to:

LO-1: Identify precondition of waste treatment and disposal

LO-2: Conduct wastes treatment and disposal

LO-3: Complete work activities

Module Contents:

LO-1: Identify precondition of waste treatment and disposal

1.1. Types of waste and treatment programs
1.2. Labor and resources requirements
1.3. Personal protective equipment
1.4. Risk factors and adverse environmental impacts
1.5. Plan treatment and disposal options
1.6. equipment inventory, maintain and repair

LO-2: Conduct wastes treatment and disposal

2.1. Ooccupational health safety procedures
2.2. Nature and types of waste
2.3. Sorting, reusing and recycling waste materials
2.4. Waste handling and disposal
2.5. Waste management policy
2.6. Waste treatment programs
2.7. Monitoring waste disposal sites

LO-3: Complete work activities

3.1. Handling equipment, tools and materials
3.2. Recording disposed and recycled wastes
3.3. Recomending effectiveness of treatment and disposal
3.4. Reporting documented data

Learning Methods:
• Lecture • Group discussion • Demonstration • Video show • Brainstorming
Assessment Methods:
• Quiz, Written test, Oral questioning, Written exam (assessment) • Individual and group assignment • Practical demonstration

ASSESSMENT CRITERIA

LO-1: Identify precondition of waste treatment and disposal

- Types of waste and treatment programs are identified according to working procedure.
- Labor and resources requirements for treatment and disposal are determined and arranged.
- Suitable personal protective equipment (PPE) is selected and checked prior to use.
- Risk factors which could result in adverse environmental impacts are identified and minimization or contingency plans selected.
- Strategies to achieve desired treatment and disposal options are planned and communicated effectively.
- Equipment is inventoried, maintained and repaired in accordance with manufacturer's specifications.

LO-2: Conduct wastes treatment and disposal

- Suitable personal protective equipment (PPE) are used according to occupational health safety(OHS) procedures
- Waste material are sorted for reuse and recycling based on the nature and types
- Sorted waste are correctly handled and disposed based on rules , regulation and environmental policy.
- Waste treatment and disposal is completed in accordance with
- Enterprise procedures and waste management policy.
- Disposal sites are regularly monitored to ensure non-bio-hazard waste materials are contained.

LO-3: Complete work activities

- Equipment, tools and materials are cleaned and stored
- Repairs and maintenance are undertaken on equipment
- Disposal and recycled wastes are recorded according to their nature and types
- The effectiveness of treatment and disposal operations and recommendations are made for improvements.
- Data are documented and reported to the responsible body.

Module Code and Title	AGR FAQ4 MO6 1122: Managing Fish Farm
Nominal Duration :	**70 Hours**

Module Description : This module covers knowledge, skill and attitude required to handle stock and mange fish farm through assessing the condition for fish production.

Learning Outcomes

At the end of the module the trainee will be able to:

LO-1: Prepare to manage fish farm

LO-2:Manage fish farm

LO-3:Perform fish farm stock handling

Module Contents:

LO-1: Prepare to manage fish farm

1.1. Tools, materials and Equipment

1.2. Occupational health and safety

1.3. Harvesting schedule and production level

1.4. Labor and resource requirements

1.5. Fish farm management plan

LO-2: Manage fish farm

2.1 Types of fish species and fish farm

2.2 Fish farm condition

2.3 Risks and their control measures

2.4 Fish farm management

2.5 Fertilization of water

LO-3: Complete work activities

3.1 Handling activities

3.2 Stocking time

3.3 Fish stocking density

3.4 Transport and holding arrangements

3.5 Stock handling and culture

3.6 Handling of equipments, materials, tools and wastes

3.7 Documenting and reporting recorded data

Learning Methods:
• Lecture • Group discussion • Demonstration • Role playing • Video show
Assessment Methods:
• Quiz, Written test, Oral questioning, Written exam (assessment) • Individual and group assignment • Practical demonstration

ASSESSMENT CRITERIA

LO-1: Prepare to manage fish farm

- Tools, materials and Equipment are identified
- Personal Protective Equipment (PPE) are prepared based on occupational health and safety (OHS) and fish farm management standards
- Harvest schedule are identified and production level are identified.
- Labor and resource requirements for stock handling are confirmed and arranged.
- Plan for fish farm management is prepared and communicated at work place

LO-2: Manage fish farm

- Types of fish species and fish farm are identified for fish pond management
- The condition of fish farm are assessed
- Risks and their control measures are identified
- Fish farm management activities are identified, planned and undertaken
- Over fertilization of water are protected

LO-3: Perform fish farm stock handling

- Handling activities are planned to minimize stock damages and stress.
- Time of stocking are identified
- Fish stocking density are calculated and measured
- Transport and holding arrangements are confirmed.
- Stock handling and culture of fish are identified and undertaken
- Equipments, materials, tools and waste materials are properly handled
- Recorded data are reported and documented

Module Code and Title	AGR FAQ4 MO7 1122: Developing value chain analysis
Nominal Duration :	**70 Hours**

Module Description : This module covers the knowledge, skills, and attitude needed to Understand value chain, Identify concepts of value chain ideas Develop the value chain and Upgraded value addition

Learning Outcomes

At the end of the module the trainee will be able to:

LO-1: Understand concepts of value chain

LO2. Identify Value chain analysis

LO3. Develop value chain

LO4. Upgrade value addition

MODULE CONTENTS:

LO1.Understand concepts of value chain

1.1. Concept of value chain
1.2. Scope of value chain
1.3. Principle of value chain
1.4. Characteristic of value chain
1.5. Importance of Value chain
1.6. Concept of value addition

LO2. Identify Value chain analysis

2.1. Dimension and structures of Value chain
2.2. Value chain actors
2.3. Value chain maps for fish product
2.4. Value chain techniques for value addition
2.5. Contract farming system

LO3. Develop value chain

3.1. Value chain parameters
3.2. Constraints and gaps to develop value chain
3.3. Steps of value chain development
3.4. Value Chain selection techniques
3.5. Potential interventions for value chain development

LO4. Upgrade value addition

4.1. Environmental considerations to upgrade value addition
4.2. Identifying Value chain actors for Value addition

4.3. Upgrading Value chain for fish products

4.4. Ways of collecting Customers feedbacks in value chain analysis

Learning Methods:

- Lecture and Discussion
- Démonstration
- Simulation
- Roleplaying

Assessment Methods:

- Quiz, Written test, Oral questioning, Written exam (assessment)
- Individual and group assignment
- Practical demonstration
- Case analysis

ASSESSMENT CRITERIA:

LO.1. Understand concepts of value chain

- Concepts of value chain are understood.
- Value chain scopes are understood and identified.
- Principle of value chain are understood and identified.
- Value chain characteristic are understood and identified.
- Value chain Importance are discussed and understood.
- Concept of value addition are understood and determined.

LO.2. Identify Value chain analysis

- Dimension and structures of Value chain are identified and interpreted
- Value chain actors are identified according to the objective and interest or need of chain actors
- Value chain maps are illustrated for different agricultural products
- Value chain techniques for value addition are identified and analyzed
- Contract farming system is established to promote value chain.

LO.3. Develop value chain

- Value chain parameters are analyzed to compare the gaps between the existing and the benchmark.
- Constraints and gaps are collected, analyzed and ranked according to the priority used to develop value chain
- Steps of value chain development are identified
- Value Chain selection techniques are identified to develop value chain
- Potential interventions for value chain development are identified

2. Required resources

Item N	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	**Learning Materials**			
1.	TTLM	TTTLM prepared by the trainer	25	1:1
2.	Reference Books			
2.1	Aquaculture and Fisheries Biotechnology: Genetic Approaches,	Rex A. Dunham, 2014. 2nd Edition	5	1:5
2.2	Aquaculture Farming, Aquatic Animals and Plants	Ichiro A.*et al.*, 2013.	5	1:5
2.3	Fish Population Dynamics, Monitoring, and Management		5	1:5
2.4	Aquaculture and fish farming	Brendan Marshall (2017)	5	1:5
2.5	Aquaculture nutrition, gut health, probiotics and prebiotics,	Arun Kumar *et al.* (2014)	5	1:5
2.6	Aquaculture Technology, Flowing Water and Static Water Fish Culture	Richard W. Soderberg (2017)	5	1:5
2.7	Digital technology for agricultural and rural development in the global south	Amanda Caine (2018)	5	1:5
2.8	Fish processing sustainability and new opportunity	George M. Hall *et al*, (2012)	5	1:5
2.9	Infectious disease in aquaculture prevention and control	C. J. Secombes *et al*. (2012)	5	1:5
2.10	Sustainable aquaculture techniques	Krishna R. Salin *et al*. (2014)	5	1:5

2.11	Trends in fish processing technologies	Javier Borderías *et al*, (2018)	5	1:5
2.12	Water quality requirements and management strategies for fish farming	Warish Khan, Adil Masood (2017)	5	1:5
2.13	Waste water management through aquaculture	B.B. Jana and R.N. Mandal (2018)	5	1:5
2.14	Supply chain management strategy, planning and operation	Sunil Chopra. (2018) 6th ed. Pearlon.	5	1:5
B.	**Learning Facilities & Infrastructure**			
1.	Class room	31.5 m^2	1	1:25
2.	Laboratory room	100 m^2	1	1:25
3.	Internet room	100 m^2	1	1:25
4.	Library room	Per section 105 – 180 m^2	1	1:25
5.	Duplication room	20m^2	1	1:25
C.	**Consumable Materials**			
1.	A4 papers	80gms	5 reams	1:5
2.	Boots	Plastic made or rubber of different size	25	1:1
3.	Sunhats	Made from straw	25	1:1
4.	Sunglass	Made from glass	25	1:1
5.	Sunscreen creams	Form: Lotion Block more than 90% ultraviolet radiation	5	1:5
6.	Gown	Made from canvas or kaki cloth	25	1:1
7.	Overall	Made from canvas or kaki cloth	25	1:1
8.	Raincoat	100% water proof	25	1:1
9.	Wader	Chest Waders	25	1:1
10.	Gloves	Made from Synthetic rubber	25	1:1
11.	Life saver jacket	• Material: Nylon+TPU and • Buoyancy: 85N/150N/275N	25	1:1
12.	Helmets	• Material: ABS+EPS • Top shell material: ABS • oven tape: Nylon	25	1:1

13.	Aprons	• Fabric: Polyester, Nonwoven, Cotton • Material: Cotton • Style: Sleeveless	25	1:1
14.	Polyethylene bag	• Bag Type: Shrink Bag • Thickness: 30-200mic • Color: Clear transparent	25	1:1
15.	Lime	• Agricultural lime • Hydrated lime • Industrial lime	As bill of quantity	
16.	Fish feed	• Natural feed (phytoplankton, zooplankton, Annelids, worms and Insects) • Artificial feed: (bone meal, meat meal, oil seed meal)		
17.	Fertilizer	• Organic fertilizer (Chicken manure and dung) • Inorganic fertilizer (Urea and ammonia phosphate)	As required	
18.	Cement	• Main Raw Material-Silicate • Customization: Customized logo and Customized packaging	As required	
19.	Sand	As bill of quality	As required	
20.	Ballast	• Lamp Body Material: Aluminum • Input Voltage(V): AC100-240V • Power: 18W	As required	
21.	Stones	Quarry stones	As required	
22.	Concrete block	Typically, concrete masonry units have nominal face dimensions of 8 in. (203 mm) by 16 in. (406 mm)	As required	
23.	Bricks	Concrete bricks	As required	
24.	Timber	Common Dimensional Lumber Sizes ; Two-by-four or 2 x 4, 1 1/2 inches x 3 1/2 inches ; Two-by-six or 2 x 6, 1 1/2 inches x 5 1/2 inches	As required	
25.	Corrugated iron sheets	Corrugated galvanized iron sheet, G-32 or 0.25mm,	As required	

26.	Nails	• Material: Iron • Standard: GB • Type: Common nail • Head: Flat or round head	As required	
27.	Wire mesh	• Type: Weave Wire Mesh • Material: Stainless steel wire • Micron: 1micron to 15mm • Length: 30m/roll, customized	1roll	1:25
28.	Nose protector	• Material: PP, Meltblown, Non-woven • Size: 21*8cm • Filter Rating: 98% - 99.9% • Type: medical mask	25	1:1
29.	Face mask	better bacteria filtration and air permeability	25	1:1
30.	Pipettes	Lab disposable yellow blue 200ul 1000 1.5 ml gilson micro transfer pipet pippete pipette tip of different types	25	1:1
31.	Syringes	2ml 3ml 5ml 10ml 20ml plastic medical vaccine syringe disposable sterile safety syringe with needle	25	1:1
D.	**Tools and Equipments**			
1.	Desktop Computer	64-bit OS; 8 GB RAM; Intel core i7 (Processor)	25	1:1
2.	Smart phone	• RAM+ROM: 8GB+128GB / 8GB+256GB, • Front Camera: 32.0 Mp • Screen Resolution:1080 x 2400 • Display Type: LCD	5	1:5
3.	Test tube	• Material: Glass • Capacity (ml): 5-30 • Color: Transparent	25	1:1
4.	Sample kit	• Material: 100% nylon • Tube size: 5ml-10ml • Sample holding capacity:30	5	1:5
5.	Sensitive balance	• Power: AC/DC 9V/150MA or 6xAA battery • Resolution: 1/60000-1/30000 • Large LCD display • Auto calibration from key pad	1	1:25

6.	Scoop nets	• Type: Hand Net • Material: Aluminum Alloy • Mesh Size: 5mm • Depth:35cm	5	1:5
7.	Dredge bottles	• Material: Plastic • Capacity: 15ml 30ml 50ml 80ml 100ml 120ml • Shape: Cylinder	25	1:1
8.	Traps	• Material: Nylon multi net • Shape: Circle • Diameter: 210D/10PLY and 210D/12PLY	1	1:25
9.	Cages	• Material: stainless steel • Diameter: 50cm/customized • Size: 50*20cm/customized • Mesh size: 1.5*1.5cm • Frame: 6mm, 7mm, 8mm, customized	5	1: 5
10.	Plankton nets	• Material: 100%nylon • Size: 90*30cm	5	1: 5
11.	Micropipettes	• Material: PPO • Volume: 100ul-1000ul • Autoclavable: semi autoclavable • Application: Chemical Laboratory	1	1:25
12.	Microscope	• Drawtube: Trinocular • Nosepiece: Quadruple Nosepiece • Light Source: Built-in 3W LED Illumination, Brightness Adjustable • Eyepiece: Plan Eyepiece 10x/20, Diopter Adjustable	5	1:5
13.	Secchi disk	• Material: Plastic • Size: 9 inches • Application: Teaching	5	1:5
14.	Soil analysis kits	• Power: 72W • Operation: touch screen • Memory: 4G • System: Android system	1	1:25
15.	Spectrophotometer	• Wavelength range: 190-1020nm • Wavelength accuracy: ± 2nm • Focal length: Null	1	1:25

		• Display: 40*70mm backlit LCD		
16.	Chlorinometer	• Measuring range: 0.005~20ppm(mg/L) • Electrodes: glass bulb, Platinum • Cable length: 5 m silver-plated three-core cable • Accuracy: ±2% or ±10 ppb • Working pressure:10bar at 20 ℃	25	1:1
17.	PH meter	• Working voltage: 220V±22V,50Hz±0.5Hz • Temperature range: 0-99.9° • Measuring range: 0-14pH • Accuracy:±0.05 • Working condition: • ambient temperature:0~60℃	5	1:5
18.	Thermometer	• Power: Battery • Measuring Range: -50℃-300℃/-58 ºF-572ºF • Resolution: 0.1℃/℉ • Display: LCD • Operating temperature: -10~50℃ • Operating humidity: 10~90RH	25	1:1
19.	Refractometer	• Brix Range: 0 – 10% • Brix: 0-10% • Measurement Range: 0-100%, 0-100(%) • Measurement Accuracy: ±1 ppt/±0.1%	1pcs	1:25
20.	Oxmeter	• Temperature Range: 0-65 degree Celsius • Permeable membrane: fluorine plastic • Electrode insertion length: 80,150,200,250,300 mm • Measuring range: (0~20.0)mg/L • Electrode body material: stainless steel	1	1:25
21.	Electric generators	• Voltage: 220 / 380v • Speed: 3000/3600RPM • Engine type: Air-cooled 4-stroke • Fuel tank capacity:15L	1	1:25

22.	Gutting knives	• Blade Material: Stainless steel • Material: Metal • Blade Material:2cr13 stainless steel • Blade length: 16.5cm/6.5 inch	5	1:5
23.	Gutting table	• Material: Stainless Steel • Surface: Polished Glossy • Thickness:0.8mm • Type: Kitchen Work Table	1	1:25
24.	Fish boxes	• Material: Plastic • Style: Solid Box • Size: Customized Size • Loading Capacity: 20kg	5	1:5
25.	Weighing balance	• Type: Hanging scale • Capacity: 100kg	1	1:5
26.	Deboning machines	• Power source: Electric • Power: 2.2KW • Voltage: 220V/230V, 50/60 Hz • Production Capacity: 180-500kg/h • Function: Remove Fish Scale • Material: stainless steel	1	1:25
27.	Ice boxes	• Material: PE Outer + PP Inner + PU Foaming • Feature: Waterproof, insulated • Capacity: 65L	5	1:5
28.	Hand cart	• Wheel: Four-wheel • Material: Steel, plastic and rubber • Load Capacity: 10-50KGS • Body size: 1260*840*330MM	1	1:5
29.	Chiller	• Voltage/Frequency:220~240v/50 hz/110v/60hz • Temperature:2~8°C • Refrigerant: R404a/R134/R22a • opening for optional: glass door/lifting glass door/sliding glass door • cooling system: compressor inside/outside	1	1:25
30.	Plastic tanks	• Material: Plastic • Capacity: 1000L, customized	1	1:25

31.	Measuring cylinder	• Material: Glass • Size: 10ml, 25ml, 50ml and 1000ml	25	1:1
32.	Filtration	• Material: Stainless steel • Design vessel pressure :0.6-1.0Mpa • Operate temperature:-20-140°C • Filtering accuracy: 0.1-20um • Productivity:500L/Hour	1	1:25
33.	Pumps	• Horsepower: 1HP • Pressure:150Kpa • Voltage:110V/220V, 110V/ 220V • Outlet Size:25mm • Power: 750W	1	1:25
34.	Siphons	• Material: Plastic, ABS Plastic • Usage: Aquarium Cleaning • Application: Water Circulation	1	1:25
35.	Sieves or screens	• Material: Stainless steel • Technique: woven • Sieve Diameter: 20cm 30cm • Usage: Testing Filter	5	1:5
36.	Nets	• Material: PE net + Plastic coated steel • Mesh size: *1cm, 1.5*1.5cm, 2*2cm, customize • Size: 25*45cm, 30*60cm, customize • Frame: 4mm, 6mm, customize	5	1:5
37.	Autoclave	• Power: AC220V.50/60Hz • Dimension(L*W*H): 410*410*750 mm • Working temperature: 126℃ • Timer range: 0-99 min • Max. safety pressure: 0.165Mpa	1	1:25
38.	Bucket	• Material: Plastic or stainless steel • Capacity: 5-20L • Features: Non-toxic, odorless, durable, moisture proof, temperature resistance	5	1:5
39.	Refrigerator	• Voltage (V):220v/110v • Refrigeration Type: direct	1	1:25

		Cooling • Temperature: Ambient temp • Capacity: ≥150L, 178L • Door Type: Double Reversible Door		
40.	Needle	• Type: Net repair needle • Material: Metal and plastic		
41.	Conductivity meter	• Power supply: 220V • Temperature range: 0 ~ 50 • Range: 0-2000us/cm • Dimension: 48*96*80(H*W*D) • Accuracy: 1.5%FS • Hole Size: 44mm*92mm	1	1:25
42.	Benthic sampler	• Material: Stainless Steel • Feature: Viscous Liquid Sampler • Length: 1M/1.5M/,customize • Capacity: 100/200/300/500ml	1	1:25
43.	Spade	• Handle Type: Straight • Blade Length:13 3/4in, 13 1/2in • Length:150cm	5	1:5
44.	Fork	• Material: Aluminum • Size: 150cm	5	1:5
45.	Hoe	• Handle material: Wooden/fiberglass • Type: Flat hoe • Hoe body width: 120mm • oe body length: 218mm	5	1:5
46.	Racks	• Material: Metal, Stainless Steel • Accessory Type: Meshes • Size: 15" • Feature: Dustproof, Easily Cleaned, Heat Resistance, Non-stick, M	5	1:5
47.	Spray equipment	Knapsack and hand held sprayer	5	1:5
48.	Pipe	Plastic pipe	As required	
49.	Breathing equipment	• SCBA cylinder material: Carbon fiber cylinder • SCBA exhalation resistance: ≤1000pa • SCBA use time: about 60 minute • SCBA cylinder volume:	5	1:5

		6.8L,9L,12L for option		
50.	Oven	• Material: Stainless steel • Power:1200w • Voltage: 220v • Dimension(L*W*H): 420*450*350(mm) • Display: LCD	1	1:25

3. Developers Profile

No	Name	Qualification (Level)	Field of Study	Organization/ Institution	Mobile number	E-mail
1	Alemayehu Tolera	MSc	Animal Production	Bako PTC	0994132626	toleraalex@gmail.com
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3	Mezgebu Abate	MSc	Biotechnology	Woreta ATVTCC	0937705931	mezgebuabate16@gmail.com
4	Mathewos Kussa	BSc	Animal Production	Wolaita Sodo ATVT	0913889302	matkusa.mk@gmail.com
5	Dereje Delena	MSc	Animal Production	Asosa ATVTC	0920894660	derejed28@gmail.com

4. Coordinators profile

No	Name	Qualification (Level)	Field of Study	Organization/ Institution	Mobile number	E-mail
1	Milion Bulo	MSc	Animal production	Ministry of labor & skill	0912253251	milionbulo@gmail.com
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