SET
Skills for Employment Tanzania

Trainer Guide

Fish Farming

July 2025

Funded by:

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Embassy of Switzerland in Tanzania

Authored by:

swisscontact

DISCLAIMER

This publication is a product of the Skills for Employment Tanzania (SET) Project, Phase II (2022-2026), funded by the Swiss Agency for Development and Cooperation (SDC) through the Embassy of Switzerland in Tanzania. The contents of this publication are the sole responsibility of Swisscontact and do not necessarily reflect the views of the Swiss Government.

CONTACT

tz_info@swisscontact.org

Swisscontact

Swisscontact works in Tanzania as a facilitator in skills development to complement government efforts in youth empowerment.

Economic, social, and academically disadvantaged youth are supported through tailor-made vocational skills development opportunities to increase their employment chances and entrepreneurship opportunities. Projects are guided by a unique youth and market-driven learning group model, which is focused on sub-sectors and jobs which have a potential to offer (self-)employment opportunities. These are agriculture/agribusiness, and other rural trades or services.

Swisscontact projects in Tanzania employ an Inclusive Markets system approach which considers the limits and opportunities of the existing vocational skills development system. Projects seeks to improve the prospects of self-employment among the youth through a sustainable and systemic contribution to improved access, relevance, and quality of vocational skills development. Since ownership is critical for sustainability, our projects apply a participatory approach which involves joint action planning with partners.

Introduction to the Small-Scale Fish Farming Course

This training course is designed to guide participants in small-scale fish farming, a growing opportunity for income generation in Tanzania. The course targets young people from rural and peri-urban areas, especially those with limited formal education and income. Many of these learners have never had access to practical skills training and may have little experience with structured learning.

The training equips them with practical, hands-on knowledge to become fish farmers or to work on existing fish farms. It also opens up related business opportunities, such as providing fingerlings, feed, or offering basic advice to other small-scale farmers.

This course is part of Swisscontact's effort to support self-employment and livelihood improvement through skills development that is simple, practical, and market-oriented. The emphasis is on learning by doing—80% of the training is practical and takes place on a fish farm, using real tools and resources to ensure the skills are job-ready and useful.

Contents

Training Objectives 1
Learning Outcomes 1
Training Plan 1
Course Content 2
Assessment 3
Training Programme 3
Module 1: Introduction 5
Module 2: Pond Design and Construction 12
Module 3: Pond Preparation 15
Module 4: Fish Nutrition and Feeding 21
Module 5: Natural Fish Feed Production 28
Module 6: Stocking 32
Module 7: Fish Farm Management 38
Module 8: Fish Health Management 50
Module 9: Harvesting and Processing 54
Module 10: Fish Preservation 57
Module 11: Sales and Marketing 63
Module 12: Fish Farming as a Business 68
Training Resources 73
Classroom facilities 73
Technical equipment 73
General fish farming equipment 73
Module 2: Pond Design and Construction 74
Module 3: Pond Preparation 75
Module 4: Fish nutrition and feeding 75
Module 5: Natural Fish Feed Production 76
Module 7: Fish Farm Management 77
Module 8: Fish Health Management 78
Module 9: Harvesting and Processing 78
Module 10: Fish Preservation 78
Activity Resources 81
Activity 1: 81
Activity 2: 81

Activity 3: Fish Farming Value Chain Flashcards 82
Activity 9: Flashcards 83
Activity 31: Fish Feeding Schedule 84
Activity 33: Feed Records 86
Activity 41: Case Study: Flash Floods in Kilosa 88
Activity 44: Fish Behaviour Checklist 89
Activity 46: Fish Disease Flashcards 90
Activity 48 : Team Quiz questions 91
Activity 49: Harvesting Record Sheet 92
Activity 57: Fish Product and Price Survey 93
Activity 60: Sales Record Sheet 94
Activity 62: Fish Farm 3-Month Operational Budget 95

Training Objectives

This training will equip participants to become fish farmers or to work on fish farms. They could also potentially participate in secondary, related economic activities such as:

- Provide farming inputs for fish farming (suppliers)
- Provide basic extension services e.g. advice on fish farming and feeding
- Brokering between seller and buyer

Learning Outcomes

By the end of this course, the learner will be able to:

1. Make a conscious decision to become a fish farmer with a full understanding of the benefits and risks
2. Conduct the business of fish farming.
3. Design and construct fishponds
4. Prepare ponds for stocking
5. Stockfish ponds with good-quality fingerlings
6. Produce natural fish feeds
7. Feed fish correctly with a full understanding of their nutritional needs.
8. Manage a fish farm using a range of management activities
9. Manage fish health and diseases
10. Harvest and process fresh fish for market
11. Preserve fish to extend shelf life by using a range of preservation methods
12. Conduct sales and marketing to sell fish to different markets or consumers

Training Plan

Training model: 5,5 weeks full-time training on a fish farm, with light theory (classroom-based) lessons and all practical work conducted on the fish farm.	
Practical: 80%	**Theory:** 20%
Group size	Maximum 25 trainees who work in groups.
Training location	This training may be delivered in peri-urban and rural areas.

Training venue	This training must be conducted at an existing fish farm in good condition. Different ponds will be required to conduct the different activities in the training
Course duration	This course requires 5.5 weeks of training being 32 days (6 hours per day = 192 hours total) of training which includes both classroom-based and practical training delivery. It may be offered in different ways such as full time or part time.
Trainee profile	This training is open to any participants, but the content was developed with youth with low income and education levels in mind.
Attendance	80% needed for certificate of attendance

Course Content

Course content	Days	Theory hours	Practical hours	Total training hours
Module 1: Introduction	1	2	4	6
Module 2: Pond design and construction	3	3	15	18
Module 3: Pond preparation	2	2	10	12
Module 4: Fish nutrition and feeding	4	4	20	24
Module 5: Natural fish feed production	3	2	16	18
Module 6: Stocking	2	2	10	12
Module 7: Fish Farm management	5	6	24	30
Module 8: Fish health management	2	4	8	12
Module 9: Harvesting and processing	3	3	15	18
Module 10: Fish preservation	2	2	10	12
Module 11: Sales and marketing	1	3	3	6

Course content	Days	Theory hours	Practical hours	Total training hours
Module 12: Fish farming as a business	2	3	9	12
Assessment	2	2	10	12
Total time	**32**	**38**	**154**	**192**

Assessment

There are two assessment points, being halfway through the training and at the end of training consisting of both theory and practical checkpoints. Scoring and recording of scores is up to the training provider. The objective is to check if the trainees have acquired the relevant knowledge and skills to operate (on) a fish farm.

1. **First assessment**: short progress test questions (may be verbal); practical test e.g. ID test of fish farm equipment or feed ingredients, etc.
2. **Final assessment**:
    - **Theory**: final, short theory test questions to test knowledge and understanding, may be verbal or written.
    - **Practical**: e.g. water quality testing and analysis with all hygiene and biosecurity principles followed.

Training Programme

The following training programme is an example of how to deliver this curriculum. Different training providers may have different models of delivery.

This practical training programme is trained over a period of a 5.5 weeks.

- This training requires a suitable piece of land (as per pond selection criteria) to construct a new pond (Module 3), as well as a ready-constructed pond to jump from **Module 2** to Module 3 to prepare a pond. The new pond will not be ready in time for pond preparation and the training needs to be continuous, thus needing an existing pond to work with for Module 4.
- After the pond is prepared (M3), it requires a day or so to fill and for the water to settle; during this time, Module 4 on Fish Nutrition and Feeding, then Module 5 on natural fish feed production can be presented. Note: for 7 days after delivery of **Mod 5**, the trainees need to have a little time every day to check their fish food production/growth.

- **Mod 4**: Nutrition and Feeding: the trainees will apply the feeding practices to existing ponds throughout the rest of the training days/weeks to gain daily practice and experience.
- **Mod 8**: trainees will continue to test and manage water in the new and other/existing ponds every two days after they have learned how to do this. This is in addition to the daily feeding.
- **Mod 9:** the training provider must have a pond that is ready for harvesting and to practice both partial and total harvesting techniques.

Week	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1	M1: Intro	M2: Pond Design & Construction	M2: Pond Design & Construction	M2: Pond Design & Construction	M3: Pond Preparation	M3: Pond Preparation
2	M4: Nutrition & Feeding	M4: Nutrition & Feeding	M4: Nutrition & Feeding	M4: Nutrition & Feeding	M5: Feed production	M5: Feed Production
3	M5: Feed Production	M6: Stocking	M6: Stocking	Mid-course assessment	M7: Fish Farming Management	M7: Fish Farming Management
4	M7: Fish Farming Management	M7: Fish Farming Management	M7: Fish Farming Management	M8: Fish Health	M8: Fish Health	M9: Harvesting & Processing
5	M9: Harvesting & Processing	M9: Harvesting & Processing	M10: Fish preservation	M10: Fish preservation	M11: Sales & Marketing	Mod 12: Fish Farming as a business
6	Mod 12: Fish Farming as a business	Final Assessment				

Module 1: Introduction

Topic	Time	Training Instructions	Resources

Introduction	30 min	• Ask learners: "*What do you think fish farming means?*"
		• Guide learners to define: **Fish farming (aquaculture)** is the raising of fish (like tilapia or catfish) in ponds or tanks for food and income.
		
		Activity 1: Discussion: Fish Farming Activities
		
		1. Break into small groups.
		2. Each group lists:
		  • What activities are involved in fish farming.
		  • What skills they think are needed.
		3. Groups present back to the class.
		4. Trainer helps fill in any missing ideas and corrects where needed.	

1.1 Benefits and risks	30 min	**Activity 2: Debate: Fish Farming: Yes or No?** 1. Break the learners into two groups.	Presentation on the reasons and risks of fish farming.

Topic	Time	Training Instructions	Resources
		2. Each group must develop an argument about fish farming: 1 group must make the case that fish farming is an excellent opportunity/occupation, and 1 group must argue against fish farming. 3. Each group gets 3 minutes to present its case then the whole group can discuss whether it is desirable or not. 4. **Trainer:** make sure you guide the discussion in favour of fish farming and generate interest and excitement in it as a commercial and income-generating opportunity! 5. Present a slide show with content on the reasons and risks of fish farming, confirming what they have raised in the debate.	
1.2 Fish Farming Value chain	30 min	• Ask learners: "*What happens before and after fish are raised on the farm?*" • Explain that a **value chain** includes all the people, activities, and products involved in producing and selling fish—from **inputs to consumers**. **Activity 3: Fish Farming Value Chain Flashcards** 1. Prepare flashcards, each with one element of the value chain (e.g. "Hatchery", "Feed", "Farm", "Processing", "Local Market", "Labour", etc.). 2. Work in small groups. 3. Arrange the flashcards in the correct value chain sequence from input to final product sale. 4. Discuss what happens at each step.	Sets of flashcards of the elements of the value chain

Topic	Time	Training Instructions	Resources
		5. Present their value chain layout to the class.	
1.3 Types of fish farming systems	120 min	Present a lesson on fish farming systems, using many photos and images to demonstrate the different types. **Activity 4: Field Visit to Fish Farm** 1. Take learners to a real fish farming site (if accessible). 2. Ask them to observe and note: • Type of system used. • Materials and structures. • How feeding, aeration, or water is managed. 3. Discuss observations after the visit.	
1.4 Innovation in fish farming	30 min	• Ask learners: "*What new tools or methods have you heard of that can make fish farming easier or more productive?*" • Briefly introduce the concept of **innovation** as using **new or improved tools, equipment, or ideas** to improve fish farming results. **Activity 5: Demonstration or video of innovations in fish farming**	Fish farming innovations: equipment, tools, videos

Topic	Time	Training Instructions	Resources
		1. If possible, show the actual tools (sensor, aerator, feeder, etc.). 2. Alternatively, use videos or online demonstrations. 3. Watch the demonstration. 4. Discuss the purpose, benefit, and possible challenges of each innovation. 5. Learners share which tool or method they would like to try and why.	
1.5 Fish species that are farmed	30 min	Deliver a lesson on fish farming fish species common in Tanzania. **Activity 6: Discussion on Fish Species, Buyers and Forms of Fish for Sale** 1. Divide learners into small groups. 2. Each group discusses: • Which species is more popular in their area? • Who buys the fish (households, markets, restaurants)? • What form is preferred (live, fresh, smoked)? • What challenges are faced in selling each species? 3. Groups present their answers.	Presentation

Topic	Time	Training Instructions	Resources
1.6 Permits & permissions	45 min	Explain the requirement for permits and permissions from the authorities, and why these are required. **Activity 7a: Land and Water Rights** 1. Work in small groups to discuss: 2. Where in their area could water come from? 3. What land could be used, and who owns it? 4. What permissions or support would be needed to begin? 5. Use a simple **checklist** to map out what they would need to secure before starting a fish farm. **Activity 7b: Guest Speaker: Permit Issuing Authority: Land and Water Use** Invite a guest speaker to talk to the learners about the permits and permissions needed for fish farming. This includes the process, applications, fees and location of where to apply. Ask a learner to thank the speaker afterward and give them a small gift of thanks.	Guest speaker invitation and briefing. Small gift of thanks.
1.7 Responsible fish farming	20 min	Discuss the concept of 'responsibility' as it applies to fish farming – particularly with regard to communities and the environment.	Board or flipchart

Topic	Time	Training Instructions	Resources
		Activity 8: Discussion on Responsibility in Fish Farming 1. Ask: "*How can fish farming affect nature and other people around us?*" 2. Write answers on the board and group them under two headings: • Environmental responsibility • Community responsibility 3. Divide learners into small groups. 4. Each group: • Chooses one environmental issue and one community issue related to fish farming. • Discusses how to prevent or reduce the problem. • Writes down or draws their solution. 5. Each group presents their idea to the class.	
1.8 Family Health	25 min	Start with a **brief talk** about how human waste, poor hygiene, and mosquito breeding areas can harm fish and people. • **Pros** of proper practices: better fish health, reduced disease risk, safer food for humans. • **Cons** of ignoring them: fish diseases, water contamination, malaria risk, loss of income.	

Topic	Time	Training Instructions	Resources
		Activity 9: Flashcard activity: Family Health on a Fish Farm 1. Distribute the cards randomly to the learners and instruct them to read and interpret their cards, then decide if it is a good practice or a bad practice. 2. 'Good practices' must stand on one side of the room, and 'bad practices' must stand on the opposite side. 3. Ask each learner with a card to explain their card, and why it is good or bad, and if it could be done better.	**Flashcards** of good and bad practices on a fish farm found in Activity Resources section of this guide

Module 2: Pond Design and Construction

Topic	Time	Training Instructions	Resources

2.1 Types of ponds	2 hours	• Use images to explain each pond type.
		• Point out the structure, location, materials, advantages, and limitations.
		
		Activity 10: Site Visit: Types of Ponds
		
		1. On-site: Walk through each pond type.
		2. Classroom alternative: Use labelled photos or model layouts.
		3. Ask learners to point out key features:
		  • For earthen ponds: Where is the inlet? Where is the dyke?
		  • For concrete tanks: How is water added or removed?
		  • For movable tanks: What makes them suitable for small spaces?	

2.2 Site evaluation and selection	2 hours	Use pictures or a map to explain what makes a good or poor site. Give examples from local areas: poor roads, steep slopes, dry soil, etc. Explain soil types and how to test for different types of soil. **Activity 11: Practical Application: Site Evaluation Sheet**	Maps Samples of different types of soil – a shopping bag of each so there is enough for everyone to practice.

Topic	Time	Training Instructions	Resources
		1. Divide learners into small groups. 2. At each sample site, ask them to complete a **Site Evaluation Sheet**, noting: • Is the soil sticky or sandy? • Is water nearby? • Are there signs of predators or human activity? • Where would water drain to? **Activity 12: Practical Activity: Testing Soil Samples** 1. Show learners how to take a soil sample and test by hand: 2. Take a handful of moist soil 3. Squeeze into a ball 4. Open hand – does it stay together or fall apart? 5. Rub between fingers – is it sticky (clay), gritty (sand), or smooth (silt)? 6. Allow each learner to test their own soil sample and record results.	
2.3 Pond design and construction	14 hours	Introduce pond design and construction with a lesson on the different types of ponds, the pros and cons of each, and how they are constructed. Explain that the group will be designing and constructing an entire pond as part of their training programme.	**Pond construction materials and tools shovels,** : piping, mesh sizes, valves, etc.

Topic	Time	Training Instructions	Resources
		Activity 12: Demonstration and Practice: Marking and Pegging a pond **Location:** Outdoor area or field space with soft soil 1. **Measure** a sample pond (e.g. 10m x 5m) 2. Show how to **mark corners** using pegs and string 3. Explain **excavation depth** and pond shape (gentle slope, flat base) 4. Learners practise **marking and pegging** the pond outline in pairs or groups 5. Engage learners in the full pond construction process with all materials – demonstrate and guide students to construct their pond. This will take a lot of time! **Activity 13: Costing a pond** 1. Provide simple costing tables with blank columns 2. List basic materials and labour for both pond types 3. Learners work in small groups to estimate the cost (Trainer provides local example prices) 4. Groups present their estimates and compare answers.	See list for Mod 2 Pond design and Construction Cost of building materials for ponds

Module 3: Pond Preparation

Topic	Time	Training Instructions	Resources
3.1 New Ponds	6 hours	Explain the preparation of new ponds before stocking. The practical activity will depend on whether the class is building an earth pond (Activity 14) or a concrete pond (Activity 15). **Activity 14: Preparation of a new earth pond** (Use a real pond site or a training pit) 1. **Removal of debris** • Show how to remove: o Leaves, grass, branches, dead animals o Any plastics or rubbish • Let learners help clean a section 2. **Liming** • Show **how to apply lime** (e.g. agricultural lime) • Explain why it is used (raises pH, kills harmful organisms) • Learners practise spreading lime evenly **3. Lining**	See list for M3 Pond Preparation

Topic	Time	Training Instructions	Resources
		• Working` with the team of participants, line the pond with HDPE plastic, following all guidelines 4. **Filling** • Demonstrate controlled filling with clean water • Explain importance of filling slowly to check for leaks • Learners open/close water supply and check level 5. **Fertilising** • Show how to apply **organic manure** or **chemical fertilizer** • Explain how it helps plankton grow (food for fish) • Let learners apply a small measured amount **Activity 15: Preparation of a new concrete pond** (Use a training tank or model pond if a real pond is not available) 1. **First filling and draining** • Show how to fill the concrete pond for 3–4 days • Explain the purpose: reduce toxic chemicals and test strength • Drain the water fully after standing • Learners practise opening and closing valves, observing water flow 2. **Liming**	

Topic	Time	Training Instructions	Resources
		• Show how to apply lime evenly across walls and floor • Discuss the role of lime in balancing water pH and cleaning • Let learners apply lime with scoops or gloved hands 3. **Refilling** • Refill pond with clean water and explain how to check water level • Discuss when pond is ready for fish stocking (after 2–3 days) 4. **Fertilising** • Apply well-rotted manure or fish-safe fertilizer • Explain how fertilizer helps natural plankton to grow • Learners participate by adding and mixing fertilizer carefully 5. **Debris removal** • Inspect the pond for fallen leaves, plastic, or tools • Learners practise using nets or scoops to remove debris	
3.2 Existing Ponds	6 hours	Explain the preparation of new ponds before stocking. The practical activity will depend on whether the class is building an earth pond (Activity 14) or a concrete pond (Activity 15). **Activity 16: Preparation of an existing earth pond**	See list for M3 Pond Preparation

Topic	Time	Training Instructions	Resources
		1. Draining and drying • Show how to safely open outlet or pump water out • Explain that drying helps kill parasites and allows repairs • Learners assist with draining and observe drying progress 2. Removal of vegetation and feed waste • Use tools (rakes, hoes) to remove grass, algae, and feed residue • Explain how leftover material rots and harms water quality • Learners practise clearing a section of the pond 3. Inspection and maintenance • Check the dykes for cracks, holes, erosion • Inspect inlet and outlet pipes for blockages or leaks • Let learners mark damaged areas and suggest repairs 4. Liming • Demonstrate lime application across pond bottom and sides • Learners apply lime with basic tools (buckets, hands) 5. Refilling and fertilising • Refill pond with clean water once lime has set (after 1–2 days) • Apply manure or fertilizer carefully and explain correct amount • Learners practise both actions under supervision	

Topic	Time	Training Instructions	Resources
		6. Final debris removal • Walk through pond area and collect all leftover tools, rubbish, or fallen material **Activity 17: Activity 16: Preparation of an existing concrete pond** 1. Draining the pond • Show how to open valves or use a pump to drain water • Let learners help monitor the draining process 2. Maintenance and inspection • Check walls and floor for cracks or damage • Inspect inlets and outlets for leaks or blockages • Learners assist in noting areas needing repair 3. Cleaning • Demonstrate how to scrub walls and floor with brushes or brooms • Remove fish feed waste, algae, and dirt • Learners work in small teams to clean a section of the pond 4. Liming • Spread lime across dry surfaces • Explain why lime is important for water pH and pond hygiene	

Topic	Time	Training Instructions	Resources
		• Learners apply lime safely using buckets or gloves 5. Refilling • Slowly refill pond using clean water • Monitor water level and check for leaks • Learners open and close valves as part of the activity 6. Fertilising • Add manure or fertilizer after refilling • Explain how this supports natural food growth • Learners add measured amounts and stir gently if needed 7. Final debris removal • Walk through the site and collect any tools, waste, or materials left behind	

Module 4: Fish Nutrition and Feeding

Topic	Time	Training Instructions	Resources
4.1 Nutritional needs of fish	2 hours	Use posters, samples, or pictures to explain each nutrient type. • Use local examples of feed ingredients • Show samples of protein- and carbohydrate-rich feeds if available Ask learners: • "Which feeds do you use on your farm?" • "Have you seen signs of fish growing slowly or looking weak?"	Sample of feed and feed components
4.2 Feeding considerations	1,5 hours	Present a lesson on feeding considerations for fish. **Activity 18: Group Activity: Fish Feeding** Divide learners into small groups and instruct the to discuss and answer the following questions: 1. What type of fish are most common in this area? How do they feed? 2. What types of feed are easy or cheap to get locally? 3. How often do local farmers feed their fish? Why? 4. What happens if fish are overfed or underfed?	

Topic	Time	Training Instructions	Resources
		5. How can a farmer know when fish are full? Each group shares their ideas. Trainer writes key points on the board or flipchart. Present lesson on the issues to consider when feeding fish.	
4.3 Feed ingredients	3 hours	Prepare **real samples or clear pictures** of each ingredient. Display them in bowls or trays with labels covered. Explain each category with examples. **Activity 19: Identification Test** 1. On a table or clean floor, lay out a selection of feed types and ingredients. 2. Put a small number next to each item. 3. Give each learner a sheet of paper and ask them to write numbers down the left margin. 4. Instruct them to try to identify each of the items laid out and write their name and their use on their sheet of paper. 5. Give them 10 minutes to do this. 6. After 10 minutes, starting with number 1, ask them what they think the item is. 7. Make it fun like a TV quiz. If they identify it correctly, they get a point; if they understand and have noted its use in feed, they get another point. 8. Go around asking and explaining, showing what all the items are.	• **Identification test**: physical samples of different feeds including additives, fish meal, BSF, seedcake, etc. • Bags or small dishes/plates to place the different samples in or on. • Samples of labels from different types of feed and different brands of feed. Collect

Topic	Time	Training Instructions	Resources
		9. Allow learners see, touch, smell or even taste some items to become familiar with them. 10. At the end, ask who got the highest number of points, and give them a small prize e.g. some wrapped sweets. If commercial feed is used, explain feed labels and how they are composed. Hand them out to the learners and take them through how to read and interpret the contents of feed. They can compare different feed brands or types to each other.	a lot of empty feed bags
4.4 Forms of feed	1 hour	Prepare **samples of each feed form**: • **Pelleted feed:** Farm-made or commercial, floating or sinking • **Non-pelleted feed:** Flakes, powder, ground bran, or mash **Activity 20: Demonstration: Forms of Fish Feed** 1. Place different feed samples in labelled bowls: 2. Let learners touch, smell, and observe texture and form 3. Place small amounts in water to observe floating, sinking, or disintegration 4. Ask learners: • Which feed looks easier to handle? • Which one may cause water pollution?	Range of different types of fish feed, with labels and bowls.

<table>
<tr><th>Topic</th><th>Time</th><th>Training Instructions</th><th>Resources</th></tr>
<tr><td></td><td></td><td>• Which feed would be better for young fish?</td><td></td></tr>
<tr><td>4.5 Feed formulation</td><td>2 hours</td><td>Explain that fish feed is made according to a recipe that meets the nutritional needs of the fish.

Activity 21: Demonstration: Fish Feed Formulation

1. Gather all equipment, materials and ingredients.
2. Provide a simple, clear feed recipe
3. Use the ingredients to demonstrate:
• Measuring using a scale, bucket, or cup
• Mixing dry ingredients evenly
• Optional: add small amount of clean water to bind (if making moist mash)
4. Explain the role of each ingredient and why proportions are important.</td><td>Fish feed formulation: ingredients and equipment: measuring tools: scale, bucket, cup

Bags to store the fish feed.</td></tr>
<tr><td>4.6 Feed application</td><td>10 hours (ongoing practical)</td><td>Show learners a simple feeding schedule with columns for: (this can be drawn on a board or flipchart, or handed out as a printed handout)

<table><tr><th>Day</th><th>Time</th><th>Feed Quantity</th><th>Method</th><th>Location</th><th>Notes</th></tr><tr><td>Mon</td><td>08:00</td><td>500g</td><td>Station</td><td>Shallow end</td><td>Good response</td></tr></table></td><td>Feeding schedule in the Activity Resources section of this Training Manual</td></tr>
</table>

Topic	Time	Training Instructions	Resources
		Explain: • **Time of day:** Early morning and late afternoon are ideal (cooler, better feeding response) • **Feeding location:** Use the same spots daily to condition fish • **Notes:** Record fish behaviour, leftover feed, or weather conditions **Feed Measurement and Quantity** • Show how to measure feed using a scale or calibrated cup • Explain feeding rate (e.g. 3% of fish body weight per day) • Adjust based on fish size and appetite **Activity 22: Demonstrate and Practice Fish Feed Application** 1. Mix feed (if needed) and measure correct quantity. 2. Choose feeding method (broadcast or station). 3. Apply feed while learners watch. 4. Watch fish response and adjust if necessary. 5. Fill in a sample feeding schedule for that day. 6. **Long term:** learners must conduct fish feeding every day after stocking the pond.	

Topic	Time	Training Instructions	Resources
4.7 7 Packaging and storage of fish feed	1,5 hours	Use pictures, real items, or sides to show: • Key storage conditions • Types of packaging (show examples of feed packaging or containers such as bags, drums, sacks) **Activity 23: Visit to fish feed store** 1. If possible, take learners to a local feed store or storage area. 2. If not, set up a mock store at the training site with examples of correct and incorrect storage practices. 3. Show them the storage conditions and how feed is managed and controlled to ensure quality of fish feed, and no stock losses that will lead to financial losses.	Feed store with feed
4.8 Record keeping	3 hours	Use a **sample feeding chart** and **feed store record** to explain: **Feed store record:** • Used to track how much feed is stored • Helps monitor when to buy more • Must update daily after feeding **Feeding Chart (Daily Feed Record)**	Fish feeding schedule and record form found in Activity Resources section of this manual

Topic	Time	Training Instructions	Resources
		• Records feeding details by pond or group • Helps monitor fish appetite and avoid wastage • Important for cost control and fish health **Activity 24: Practice completing feed records** **Provide learners with:** • A sample scenario (e.g. 100 kg feed in store, 3 ponds fed 2 kg each) • Blank copies of both record forms: feeding chart and feed store record **Learners practise:** 1. Recording feed issued and balance remaining 2. Filling out daily feeding chart with pond, quantity, and method	

Module 5: Natural Fish Feed Production

Topic	Time	Training Instructions	Resources
5.1 Types of natural fish feed	1 hour	Use simple visuals, drawings, or photos of: • **Aquatic plants** – algae (green slimy layer), Azolla (small floating plant) • **Insects and larvae** – mosquito larvae (wigglers), fly larvae, small worms • **Other sources** – fallen leaves, small terrestrial plants, microorganisms (not visible but explained) Explain: • These natural foods provide protein and energy for growing fish • Healthy ponds with natural food reduce the cost of extra feed • Overgrowth of some (like too much algae) can be harmful	
5.2 Azolla	6 hours	Use **pictures or samples** of Azolla and explain: **Characteristics:** • Very fast growing – can double in size in 3–5 days • Perishable – spoils quickly if not dried or used • Can be affected by strong sun, pests, or poor water quality **Equipment needed:** • A shallow container, basin, or small pond • Clean water (not flowing)	All resources listed in Mod 5 List for Natural Fish Feed Production

Topic	Time	Training Instructions	Resources
		• Shade net or partial shade area • Bucket or scoop for harvesting **Activity 25: Practical: Raising a batch of Azolla** 1. This is a ***long-term activity*** that will take place with initial digging and making the azolla pond, then daily monitoring and eventual harvesting. 2. Each group constructs a mini-Azolla bed, monitors it daily, and harvests a small sample after a few days.	
5.3 Black Soldier Flies	9 hours	Deliver an explanatory lesson on Black Soldier Flies and the principles and advantages of producing them as fish feed. **Activity 26: Practical: Raising a batch of BSF** 1. This is a ***long-term activity*** that will take place with initial making the BSF cage, then daily feeding, monitoring and then eventual harvesting and processing of the larvae. 2. Each group sets up a **small BSF tent and bin** using waste, checks progress daily, and processes a small amount of larvae into dried or powdered form.	All resources listed in Mod 5 List for Natural Fish Feed Production

Topic	Time	Training Instructions	Resources
5.4 Pond fertilising for algae growth	2 hours	Use pictures or posters to explain: **Objective and process**: • Adding nutrients to pond water encourages algae (phytoplankton) to grow • Algae become natural food for fingerlings and small fish • Proper fertilisation improves fish health and reduces feed costs **Sources of fertilizer**: • Organic: Well-rotted manure (chicken, cow, pig) • Inorganic: Artificial chemical fertilizers (e.g. urea, NPK) **Activity 27: Practical Demonstration and Practice: Pond Fertilization** 1. Mix manure or fertilizer with water in a bucket 2. Stir and apply evenly to pond or basin surface 3. Observe water colour over the next day 4. If using manure, remove residue after 3–5 days if water becomes too green or smelly 5. Learners practise: • Measuring the right amount • Mixing and applying fertilizer	All resources listed in Mod 5 List for Natural Fish Feed Production

Topic	Time	Training Instructions	Resources
		• Checking water colour and smell • Removing old manure with nets or baskets	

Module 6: Stocking

Topic	Time	Training Instructions	Resources
6.1 Sourcing fingerlings	4 hours	**Use pictures or posters** to explain: 1. What a **reputable hatchery** looks like (clean, healthy fish, proper tanks) 2. What to avoid (sick fish, poor water, overcrowding) 3. The risks of buying from untrusted sources (diseases, poor growth, death) **Activity 28: Hatchery Visit** 1. Visit a nearby hatchery or arrange a talk with a local fingerling supplier. 2. Prepare a worksheet for learners to complete while at the hatchery so that they know what to look for and learn from at the hatchery. On the worksheet ask question that they can learn from such as: a. What feed is given to the fingerlings b. What is the water temperature c. What bio-controls are in place? d. How are fingerlings conditioned for transport? e. How are fingerlings packed for transport?	Hatchery visit worksheet

Topic	Time	Training Instructions	Resources
6.2 Quality assessment of fingerlings	1,5 hours	Explain how to assess the quality of fingerlings provided by a hatchery. **Activity 29: Assess the quality of fingerlings** 1. Divide learners into small groups. 2. Each group observes a **sample batch of fingerlings** (real or photo set) and fills in a **report sheet**, noting: • Uniformity in size • Colour appearance • Level of activity • Any visible deformities or illness • Overall behaviour 3. Ask each group to answer: • Would you buy this batch? Why or why not? • What problem signs did you see?	Fingerlings in a bag or photos/video of fingerlings
6.3 Conditioning at the hatchery	1 hour	Videos or photos from a hatchery showing: • Conditioning steps (not feeding 24 hours before transport) • Collection of fingerlings • Visual checks before transport	See list for M3 Pond Preparation Videos taken at hatcheries.

Topic	Time	Training Instructions	Resources
		Explain key points: • Fingerlings should not be fed just before transport to reduce waste and stress in the water. • Fish must be active, healthy, and ready for the journey. • Poorly conditioned fingerlings may die during transport or perform poorly in the pond.	
6.4 Packaging and transport	2,5 hours	**Live demonstration** (preferred) or **videos/photos** showing: • Clean, clear plastic bags • Oxygen added to the bag • Sealing method (rubber bands or knots) • Double-bagging using fertilizer bags for extra strength Explain: • Why clean water and oxygen are important • What can go wrong if bags are not sealed properly • The importance of keeping fingerlings cool and calm during transport **Activity 30: Packaging practice** Learners practise the full process in pairs.	Plastic bags Clean water Small air pump Fingerlings

Topic	Time	Training Instructions	Resources
		1. Fill plastic bags halfway with clean water (Optional: Add a small air pump or demonstrate with pre-oxygenated water) 2. Place fish or substitutes in the bag 3. Tie or seal bags securely 4. Place sealed bags inside fertilizer sacks for protection	
6.5 Acclimatisation and release	1 hour	Explain the reasons for and principles of acclimatisation and releasing fingerlings into a pond. **Activity 31: Demonstration and Practice: Acclimatisation and Release of Fingerlings** 1. Temperature acclimatisation: • Float the sealed plastic bag with fingerlings on the pond surface for 15–30 minutes • Do not open the bag yet • This allows the water inside the bag to reach the same temperature as the pond 2. Water mixing: • After floating, slowly open the bag and add a little pond water to the bag (about ¼ at a time)	Bag of fingerlings Prepared pond

Topic	Time	Training Instructions	Resources
		• Repeat every 5–10 minutes until about half of the bag's water has been replaced • This helps fingerlings adjust to water chemistry (pH, oxygen, etc.) 3. Release process: • Gently tip the bag to let the fingerlings swim out on their own • Avoid pouring or splashing • Release them near the pond edge in calm, shaded water if possible 4. Let learners observe and then practise the process	
6.6 Record keeping	2 hours	Use a **sample stocking record form** (printed or on a poster) showing: • **Date of stocking** • **Source of fingerlings** (e.g. hatchery name) • **Number received** • **Cost per unit and total cost** • **Mortality during or after transport** • **Remarks or notes** (e.g. condition, transport time, water temperature) Explain: • Why recordkeeping is important for farm planning and traceability • How stocking records help track farm performance and fish health Demonstrate how to fill in each section with a simple example.	Blank stocking forms

Topic	Time	Training Instructions	Resources
		Activity 32: Practical Application: Record Keeping for Fingerlings 1. Give each learner or group a simulated batch scenario with details such as: • **Hatchery**: Lakeview Hatchery • **Date**: 31 February 2025 • **Quantity**: 2,000 fingerlings • **Cost**: TZS per fingerling • **Mortality**: 50 dead on arrival • **Comments**: Transported in the morning, good condition 2. Learners use this data to complete a blank stocking record form.	

Module 7: Fish Farm Management

Topic	Time	Training Instructions	Resources
7.1 Water quality management	4 hours	Use **real equipment** or **training kits** to introduce: **Equipment for Water Quality Testing Explain:** • Clean equipment before and after use • Take samples from 20–30 cm below the surface • Test at the same time each day (preferably morning) **Activity 33: Practical Activity: Testing water and recording results** **Demonstrate:** 1. How to take a water sample correctly 2. Use of pH strips or pH meter 3. Use of DO (dissolved oxygen) kit 4. Reading and recording values 5. Checking temperature with a thermometer 6. Use of secchi disk to test water turbidity Split learners up into groups, Each group:	Resources as listed in the resource section for Module 7.

Topic	Time	Training Instructions	Resources
		1. Tests sample water (real or simulated values) 2. Records results on the sheet 3. Suggests one action to correct any poor value 4. Presents their plan to the class	
7.2 Fish handling practices	1 hour	Use pictures or demonstrations to explain: • Humane handling of fish • Correct handling techniques • Biosecurity measures Show learners: • How to prepare a **clean container with oxygenated water** • How to **wet hands/nets** before touching fish • How to move fish safely between ponds or tanks • How to use **foot baths**, wash stations, and sanitise tools **Activity 34: Practice handling fish correctly** **Each learner or group:** 1. Prepares a handling station (clean net, basin, foot bath)	Clean nets, basins, foot baths, fish (real or simulated), cleaning and disinfecting materials

Topic	Time	Training Instructions	Resources
		2. Handles fish or simulated fish (e.g. rubber fish or models) 3. Demonstrates proper entry, handwashing, and fish transfer 4. Cleans and disinfects the area afterwards	
7.3 Growth performance management	8 hours	Use posters, real fish (or models), and a sample pond/tank to teach the following: • Daily visual observation • Sampling and weighing • Recording • Feed Conversion Ratio (FCR) calculation • Action based on findings **Activity 35: Practice: Growth Performance Management** **Each group must:** 1. Weigh fish 2. Compare to growth chart 3. Make adjustments to feeding if needed 4. Makes a simple recommendation (e.g. reduce feed, check water, isolate sick fish)	Growth standard charts Scale, buckets fish

Topic	Time	Training Instructions	Resources
		5. **Note**: This is a long-term, ongoing activity once the pond is stocked, and time has been allocated accordingly	
7.4 Equipment maintenance and storage	1 hour	**Teach and show how to check equipment condition**: • Look for signs of damage (holes in nets, cracked handles, broken pipes) • Test if items work properly (e.g. switches, valves, meters) • Check batteries or cables for wear Let learners inspect items and report findings. **Teach and show secure storage:** • Store equipment in a **locked, dry, and labelled** area • Use hooks or shelves to organise tools • Return tools after use • Keep hazardous or sharp tools away from children Use a simple **Inventory Sheet** to demonstrate**:** • How to update the inventory after using or repairing an item • How to record when new tools are received or existing tools or equipment are damaged. **Activity 36: Equipment inspection, maintenance and recording**	Fish farming equipment as listed in the resources for Module 7 Inventory sheets

Topic	Time	Training Instructions	Resources
		Each group: 1. Inspects 5 or more items of equipment 2. Records them on an inventory sheet 3. Suggests a storage location 4. Identifies any needed repairs or servicing	
7.5 Integrated fish farming	2 hours	Explain that integrated farming means combining fish farming with other farm activities for greater efficiency. Use photos, drawings, or video clips to show each type. **Activity 37: Integrated fish farming** 1. Show slides, diagrams or posters with different integrated fish farming systems 2. Ask learners to: • Identify the type (e.g. poultry + fish) • Describe how each part supports the other • Point out one benefit and one challenge 3. **Questions (oral or written):** 1. What are two benefits of integrated fish farming?	Slides, diagrams or posters with different integrated fish farming systems

Topic	Time	Training Instructions	Resources
		2. Name one crop suitable for growing with fish water. 3. What is one risk of mixing poultry with fish? 4. How can goat manure help fish farming?	
7.6 Waste management and disposal	3 hours	Use posters, samples, or pictures to introduce: • Types of waste • Waste disposal methods **Activity 38: Demonstration and practice: Waste Disposal** 1. Set up a mock waste disposal station or use a real one on the fish farm 2. Show proper tools (shovel, bucket, gloves) used in safe waste disposal 3. Prepare examples of each type of waste (real or simulated) 4. Show how to: ○ Bury organic waste (e.g. dig a pit) ○ Drain wastewater safely ○ Sort plastic waste for recycling or disposal 5. Give time for the learners to practise disposing of each item correctly; they must continue to do this during ongoing fish farming activities and operations.	Waste disposal site Examples of different types of waste Shovel, wheelbarrow, bucket, gloves (as needed)

Topic	Time	Training Instructions	Resources
7.7 Health and safety in fish farming	3 hours	Lesson on the responsibility of health and safety for family, community, and fish. Emphasise the importance of health and safety as shared responsibilities – to protect the family, community, fish, and environment. Show and explain: • How to measure safe distance from pond to latrine • Where and how to bury dead fish • How to set up a foot bath, wear gloves, and clean tools • Proper fencing materials and simple warning signs • How to put on and adjust a life jacket **Activity 39: Practice: Identify health and safety risks on a fish farm** 1. Learners walk around training site/fish farm and point out: o Safety risks – areas where people could potentially harm or injure themselves o Warning signs or fencing that is needed or requires attention o Hygiene risks 2. Groups suggest improvements and explain why during a discussion session afterwards.	

Topic	Time	Training Instructions	Resources
		Activity 40: ID Test: First Aid Kit 1. On a table or clean floor, lay out a selection of items contained in a well-stocked first aid kit that could address a range of injuries or accidents on a fish farm. 2. Put a small number next to each item. 3. Give each learner a sheet of paper and ask them to write numbers down the left margin. 4. Instruct them to try to identify each of the items laid out and write their name and their use on their sheet of paper. 5. Give them 10 minutes to do this. 6. After 10 minutes, starting with number 1, ask them what they think the item is. 7. Make it fun like a TV quiz. If they identify it correctly, they get a point; if they understand and have noted its use in feed, they get another point. 8. Go around asking and explaining, showing what all the items are. 9. Allow learners see, touch, or handle some items to become familiar with them. 10. At the end, ask who got the highest number of points, and give them a small prize e.g. some wrapped sweets.	First aid kit Small numbers
7.8 Natural disasters and extreme weather	2 hours	Use flipcharts or pictures to guide a group discussion about "What Disasters Can Affect a Fish Farm?"	Copies of the Case Study (found un the 'Activity Resources'

Topic	Time	Training Instructions	Resources
		Discuss: • **What can go wrong?** (e.g. fish escape, pond breaks, water becomes dirty) • **What has happened locally in the past?** **Activity 41: Case Study: Natural Disaster** 1. Hand out copies of the case study to the learners. (Develop your own case study if you have a better story) 2. Give the learners 20 minutes to read and discuss the questions. 3. Facilitate a discussion on the answers by asking each group one question each until all questions have been answered. **Experience Sharing: Trainer and Learners** Ask: • Has anyone here experienced flooding or a storm? • What happened to your ponds, fish, or equipment? • What did you do to prepare or recover? The trainer shares a brief personal or collected experience to encourage participation.	section of this Training Guide.

Topic	Time	Training Instructions	Resources
7.9 Fish farm security	3 hours	Use group discussion, diagrams, or pictures to introduce: • Theft prevention • Predator control Show learners how to: • Fix and stretch **bird nets** across a pond using poles and rope • **Apply lime** along pond edges using buckets or a scoop (wear gloves) • Check and replace **inlet/outlet mesh** to block frogs and small animals • Inspect fencing for holes or weak points **Activity 42: Practical Application Installation of bird netting and predator proofing** Divide learners into small groups. Each group: 1. Installs a section of **bird netting** 2. Applies lime along a sample pond edge 3. Checks and replaces mesh on a mock outlet pipe 4. Points out weak points in sample fencing and suggests fixes	Bird nets, lime and application tools, mesh for outlet pipes

Topic	Time	Training Instructions	Resources
7.10 Cost recording	3 hours	Discuss why cost recording is important: • Helps understand if the farm is making a profit • Shows which items cost the most • Helps plan future batches better • Supports loan or grant applications Use a **sample farm scenario,** walk learners through filling in both the per-batch and monthly record sheets using this data. **Activity 43: Practice cost recording** Give each group: 1. A template sheet 2. A set of realistic farm data cards (e.g. “April – 200 kg feed at R6.50/kg”) Groups will: 3. They must: o Fill in the template o Calculate totals o Share findings with the class	Cost recording sheets Farm data on feed, costs, time. Phone calculators

Topic	Time	Training Instructions	Resources
		4. Facilitate a discussion on the findings, and how difficult or easy it was for the learners to conduct the cost recording and calculations	

Activity 40: Case Study: Flash Floods in Kilosa

A small-scale fish farmer named Asha runs a tilapia pond in Kilosa, a region of Tanzania that receives heavy rains during the long rainy season. One March, after several days of intense rainfall, a flash flood swept through her area. Her pond overflowed despite a basic spillway being in place. Many of the fish escaped into nearby streams, and muddy water carrying debris and waste entered the pond. The flood also caused damage to the pond walls, weakened the dykes, and blocked the outlet pipe with leaves and litter.

Asha had just stocked the pond with fingerlings the previous week and was expecting to begin natural feed production with Azolla. After the flood, she discovered that many fingerlings were gone, the water quality had deteriorated, and all her Azolla was washed away. She had not prepared an emergency plan and had no insurance or backup stock.

Discussion Questions:

1. What could Asha have done differently to prepare for this kind of extreme weather?
2. How can fish farmers reduce the risk of flood damage to their ponds?
3. What are the signs of poor water quality that Asha should look for after the flood?
4. If Asha wants to restart her fish farm, what steps should she take to recover and avoid future losses?
5. Why is it important for small fish farmers in Tanzania to understand local weather patterns and climate risks?

Module 8: Fish Health Management

Topic	Time	Training Instructions	Resources
8.1 Fish behaviour	1 hour	Use photos, diagrams, or videos to explain: • Behaviour of a healthy fish • Behaviour of an unhealthy fish • Fish stress: causes and signs At a real pond or simulated setup: • Show examples of normal swimming and feeding • Show video clips or describe observed stress behaviours • Demonstrate how to approach fish gently without causing stress • Discuss when action is needed (e.g. aeration, changing water, reducing feeding) **Activity 44: Observation and reporting on fish behaviour** **Each learner or group:** 1. Observes fish behaviour during feeding and general movement 2. Uses a checklist to note:	Fishpond with fish Fish behaviour checklist (found in Activity Resources section in this guide)

Topic	Time	Training Instructions	Resources
		• Activity level • Feeding response • Unusual movements • Visible signs of stress or illness 3. Writes a short report or shares findings: • What did they observe? • Were there signs of stress or disease? • What action would they recommend?	
8.2 Treatment methods	4 hours	Show learners: • How to measure and mix a treatment solution • How to catch and handle fish gently for dipping or bathing • How to time the treatment • Signs that the fish is stressed and should be removed • Safe disposal of treatment water (do not pour back into ponds) **Activity 45: Practice Fish Dipping** **Each group:**	Water, salt or food colouring, basin/bath 'fish' object Treatment record sheet

Topic	Time	Training Instructions	Resources
		1. Mixes a mock practice solution (using coloured water or salt instead of real chemicals for training) 2. Dips or bathes a model fish or harmless object (e.g. plastic toy) 3. Times the dip or bath 4. Records the dosage, time, and fish reaction 5. Practices safe disposal of used solution	
8.3 Fish diseases	4 hours	Lesson on fish diseases: names, photos, symptoms, prevention and treatment. **Activity 46: Application: Flashcard activity: Identify fish diseases** 1. Hand the flashcards out to individual learners, or to give a few cards to groups of learners to discuss. 2. Each flashcard has a symptom scenario (e.g. “fish has cotton-like growth”) 3. Learners must identify: o The type of disease (bacterial, viral, etc.) o The name of the disease o Likely cause o One prevention method o One treatment (if available)	Flashcards (found in Activity Resources section of this Training Guide)

Topic	Time	Training Instructions	Resources
		4. Each group shares their answer and posts their card under the correct disease category on a board or table.	
8.4 Biosecurity measures (Ghana Ch7)	3 hours	**Demonstrate the following:** • Correct PPE wearing • Proper handwashing technique using soap and clean water • How to prepare and use a foot bath (disinfectant in shallow container) • How to clean equipment (buckets, nets) with soap or disinfectant • How to set up a clean, tidy work area and handle rubbish properly • Show first aid box and basic safety items **Activity 47: Demonstrate and practice biosecurity measures on a fish farm** Each group or individual will: 1. Enter the farm area using the foot bath 2. Wear appropriate PPE 3. Wash hands before handling tools 4. Select one item (e.g. scoop net or feed container) and clean it 5. Sweep or tidy a section of the work area 6. Identify a safety risk and explain how to fix it (e.g. sharp object, fire risk)	Items of PPE: gloves, boots, masks, first aid box

Module 9: Harvesting and Processing

Topic	Time	Training Instructions	Resources
9.1 Types of harvesting	1 hour	Use, presentation with photos and discussion to explain: • Purpose of harvesting • Partial harvesting • Total harvesting **Activity 48: Harvesting Quiz** 1. Divide the group into two teams. 2. Each team gets a chance to answer a question in turn. 3. Each person in each team must get the chance to answer the question – the whole team must not shout out at once as it gets loud and confusing, and some learners will dominate. 4. If one team cannot answer a question, it goes to the other team. 5. Keep score and at the end the team with the most points wins a small, shared prize like a packet of treats/sweets.	Quiz questions (found in Activity Resources section in this guide) Small prize for the winning team
9.2 Harvest preparation	1 hour	Use real or simulated tools and a sample pond/tank to teach the following: • Equipment checks and preparation • Labour planning	Equipment and tools as listed for Module 9.

Topic	Time	Training Instructions	Resources
		• Sampling and fish size check • Conditioning fish before harvest • Reduce water level for easier netting	
9.3 Harvesting	8 hours	Use a **short video**, **diagram**, or **live demonstration** to show: • Harvesting process – key steps • Partial harvesting • Total harvesting **Activity 49: Harvesting Practice** At the pond (or simulation tank), learners work in teams to: 1. Reduce water levels 2. Position and drag the net correctly 3. Scoop out selected fish 4. Handle fish carefully for **sale or treatment** 5. Weigh and count fish 6. Complete a **Harvest Record Sheet**	Harvest Record Sheets (found in Activity Resources section)
9.4 post-harvest processes	8 hours	Use diagrams, real tools, and discussion to introduce:	Fish cleaning tools and equipment as

Topic	Time	Training Instructions	Resources
		• Cleaning and gutting • Packing methods • Chilling and cold storage **Activity 50: Post Harvest Processing: Cleaning Fish** **Demonstrate**: 1. How to clean and gut a fish properly 2. How to handle and dispose of waste hygienically 3. How to pack fish in head-to-tail position in crates or sacks 4. How to apply ice for effective chilling **Practice: Each group or learner:** 1. Cleans and guts 2 – 3 fish using proper tools and techniques 2. Packs the fish correctly in a container 3. Applies ice (real or simulated) for chilling 4. Cleans the work area and disposes of waste properly	listed in Mod 9 resources list.

Module 10: Fish Preservation

Topic	Time	Training Instructions	Resources
10.1 Types of preservation	1 hour	Begin with a group question: "What happens to fish if they are not sold or eaten quickly?" Use simple pictures or a board discussion or presentation to explain: • **Fish spoils quickly** without cooling or processing • **Preservation extends shelf life**, allowing fish to be sold over a longer period • It **prevents waste** and **adds value** to the product • Preserved fish can be **transported** or stored for later use Use real samples (if available), photos, or diagrams to explain each method.	
10.2 Freezing	2 hours	**Activity 51: Demo and Practice Fish Freezing** Demonstrate the following **Steps:** 1. **Clean and gut** the fish properly 2. Rinse fish in **clean cold water** 3. **Drain or pat dry** to remove excess water 4. Place fish in **plastic bag** (remove air if possible)	Tools and equipment for freezing fish as listed in Mod 10 resource list.

Topic	Time	Training Instructions	Resources
		5. Label with **date, weight, and type** 6. Lay flat in freezer (not stacked) 7. Store at **–18°C or lower** **Each group or learner:** 1. Cleans and prepares fish for freezing 2. Packs fish correctly in plastic bags 3. Labels fish and places it in freezer or mock freezer box 4. Prepares a market-ready frozen product sample	
10.3 Frying	3 hours	**Activity 52: Demonstrate and Practice Fish Frying** Demonstrate the following **Steps:** 1. **Clean and gut** the fish thoroughly 2. **Season or marinate** if desired (optional) 3. Heat oil in the pan to the correct temperature (about 180°C) 4. **Gently place fish** in hot oil using tongs 5. Fry until golden brown on both sides (8–10 minutes, depending on size) 6. Remove and place on **draining tray or paper towel** 7. Let cool before packing	Tools and equipment for frying fish as listed in Mod 10 resource list.

Topic	Time	Training Instructions	Resources
		Each group or learner: 1. Cleans and prepares 1–2 fish 2. Fries them using proper safety and hygiene 3. Let's fish drain and cool 4. Packs fish in suitable packaging for sale 5. Presents the finished product for feedback	
10.4 Drying	2 hours	**Activity 53: Demonstrate and Practice Fish Drying** Demonstrate the following **Steps:** 1. **Clean and gut** fish properly 2. Optionally **split open** larger fish for faster drying 3. Rinse and drain fish 4. Lay fish neatly on drying rack, skin side down 5. Cover with **fine mesh or netting** 6. Dry in **sunlight for 2–4 days**, depending on size and weather 7. Turn fish once per day for even drying 8. Check that fish is dry (firm, no moisture inside) before packing	Tools and equipment for drying fish as listed in Mod 10 resource list.

Topic	Time	Training Instructions	Resources
		Each group or learner: 1. Cleans and prepares fish for drying 2. Places fish correctly on drying racks 3. Uses netting to protect fish 4. Checks or simulates fish dryness (if using pre-dried samples) 5. Packs dried fish for sale in clean packaging	
10.5 Salting	2 hours	**Activity 54: Demonstration and Practice: Fish Salting** Demonstrate the following **Steps:** 1. **Clean and gut** the fish thoroughly 2. Optionally **split fish** open for better salt absorption 3. Rinse and drain fish 4. Rub fish with **dry salt** or soak in **strong saltwater (brine)** 5. Layer fish and salt in container: fish → salt → fish → salt 6. Leave for **1–2 days** (or more for heavy salting) 7. Drain liquid and let fish dry slightly before packing 8. Pack fish in clean containers or bags for sale **Each learner or group:**	Tools and equipment for salting fish as listed in Mod 10 resource list.

Topic	Time	Training Instructions	Resources
		• Cleans and prepares fish for salting • Applies salt (dry or brine method) • Layers fish in a container correctly • Drains and inspects fish for firmness • Packs fish in appropriate market-ready packaging	
10.6 Smoking	2 hours	**Activity 55: Demonstration and Practice: Fish Smoking** Demonstrate the following **Steps:** 1. **Clean and gut** the fish properly 2. Optionally **split** the fish open to speed drying 3. Rinse and drain 4. **Arrange fish** on hooks or mesh trays 5. **Prepare smoker** with clean hardwood and light fire 6. Place fish in the smoker and **smoke for 6–12 hours** (light or heavy smoking) 7. Remove fish, cool completely before packing **Each learner or group:** 1. Prepares and cleans fish for smoking 2. Places fish in smoker or simulated setup	Tools and equipment for smoking fish as listed in Mod 10 resource list.

Topic	Time	Training Instructions	Resources
		3. Observes or assists with the smoking process 4. Cools fish and checks for correct texture (dry, firm, fragrant) 5. Packs smoked fish in suitable packaging for market	

Module 11: Sales and Marketing

Topic	Time	Training Instructions	Resources
11.1 Markets	45 min	Present a lesson on the concept of 'Markets' and that they will have to sell their fish/find people to buy their fish. They have various options. Guide learners with questions: • Which of these market types exist near your farm? • What fish form and size do they prefer? • What challenges might arise when selling to them? • Which market fits best with your farm size and resources? Write answers on flipchart grouped by market type.	Presentation with info and questions
11.2 Simple marketing tools	120 min	Show: • Photos or printed examples of well-designed **farm signs** • Simple **business cards** with readable fonts and basic contact info • A sample **Facebook post** or **WhatsApp group message** • A short **audio clip or script** for a local radio promo **Activity 56: Simple Business Marketing Practice** 1. Use cardboard or paper to draw a bold, clear sign that:	Examples of simple marketing materials: photos of business signs, leaflets/flyers, business cards, use of logos. Paper and drawing materials

Topic	Time	Training Instructions	Resources
		• Says what is sold (e.g. Fresh Fish, Fingerlings) • Includes a phone number or directions • Is easy to read from far away 2. Design a Business Card-Each learner creates a sample with: • Farm name • Products offered • Contact name and number • Location or collection point 3. Oral and Written Questions: • Why is it helpful to have a farm sign? • What information must be on a business card? • Name two benefits of using social media for fish sales. • Where would you place a farm sign for most visibility? • Who are three people you could personally talk to about your fish?	
11.3 Tracking market trends	45 min	Discuss and explain the options for selling fish and fish products in different forms. Identify any new or emerging market trends – or changes in the market e.g. changing demand in dried fish vs smoked fish, for example.	Fish product and price survey sheets

<table>
<tr><th>Topic</th><th>Time</th><th>Training Instructions</th><th>Resources</th></tr>
<tr><td></td><td></td><td>

Activity 57: Conduct a Price Survey

Each group or pair visits or phones a nearby:

- Central market
- Street vendor
- Local shop
- Hospitality outlet (if possible)

Record this info in a table:

Fish Product	Selling Price/kg	Market Location	Fish Form	Notes

Activity 58: Identify Where to Sell

Each learner or group:

1. Lists **3 potential sales points** in their area
2. Describes the **fish form and size** needed for each
3. Suggests which product they could sell there and when.

</td><td></td></tr>
</table>

Topic	Time	Training Instructions	Resources

11.4 Prices and negotiations	60 min	Use discussion and simple examples to introduce:
		• Selling to Agents or Vendors
		• Price Negotiation Principles
		• Example Negotiation Dialogue
		
		Activity 59: Role Play: Price Negotiations
		
		Set up pairs or small groups. Assign roles:
		• **Seller (farmer)** – decides what product, price, and quantity they are offering
		• **Buyer (agent/vendor)** – tries to negotiate a lower price
		
		Role Play Instructions:
		1. Each pair negotiates the price of one fish product (fresh, smoked, etc.)
		2. After 3 minutes, switch roles
		3. Encourage learners to use phrases like:
		  ○ "My cost price is..."
		  ○ "This fish is high quality because..."
		  ○ "Can we agree on...?"
		  ○ "If you buy more, I can give you a discount."	

<table>
<tr><th>Topic</th><th>Time</th><th>Training Instructions</th><th>Resources</th></tr>
<tr>
<td>11.5 Sales records</td>
<td>90 min</td>
<td>
Use a flipchart or show a sample sales record book. Discuss the following:
• Data to record for each sale
• Benefits of keeping sales records

Use a simple, clear Sales Record Sheet:
<table>
<tr><th>Date</th><th>Customer</th><th>Product</th><th>Quantity</th><th>Unit Price</th><th>Total</th><th>Payment Type</th><th>Balance</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Walk learners through each column using real or mock sales figures.

Activity 60: Practice: Sales Recording

1. Provide each learner or group with a worksheet of sales figures (realistic examples)
2. Include multiple products, different buyers, and mixed payment types
Task:
3. Fill in a blank sales record sheet using the provided data
4. Double-check calculations
5. Share or present one line of their record to the class
</td>
<td>Data for the sales record: real or fictitious sales figures

Copies of Sales Recording Sheet (in Activity Resources in this Training guide)</td>
</tr>
</table>

Module 12: Fish Farming as a Business

Topic	Time	Training Instructions	Resources
12.1 Business principles	60 min	Present a lesson on business principles for fish farming using real-life examples related to farming or fish sales. Ask: • What are some things you spend money on in your fish business? (Expenses) • What do you sell, and for how much? (Revenue) • How do you know if you made a profit? Use a flipchart to write their examples.	
12.2 Costs	240 min/ 4 hours	Use flipcharts, posters, or real examples from a small-scale fish farm. **Explain:** • **Start-up costs** are usually paid only at the beginning • **Operating costs** happen regularly (weekly, monthly, or per production cycle) **Activity 61: Calculate start-up costs of a fish farm** **Scenario:** *A farmer wants to start a fish farm with 2 small ponds (each 10 × 5 m), raising 2,000 tilapia fingerlings.*	

<table>
<tr><th>Topic</th><th>Time</th><th>Training Instructions</th><th>Resources</th></tr>
<tr><td></td><td></td><td>Task: Learners calculate:
1. Start-up costs (e.g. pond digging, mesh, buckets, nets, storage tank)
2. Operating costs for one cycle (e.g. fingerlings, feed, water, labour, transport)</td><td></td></tr>
<tr><td>12.3 Budgeting</td><td>120 min</td><td>Explain the concept of budgeting and discuss:
• Monthly budget for a fish farm
• Cost reduction strategies

Activity 62: Fish Farm 3-Month Operational Budget

1. Provide learners with a scenario of a small farm
2. Learners must plan their monthly costs for 3 months of production.
3. Provide copies of the blank table for learners to fill in:
<table><tr><th>Cost</th><th>Month 1</th><th>Month 2</th><th>Month 3</th></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>Total</td><td></td><td></td><td></td></tr></table>4. Encourage learners to use rough estimates if unsure – the goal is to practise thinking ahead.</td><td>Copies of operational budgeting form in the Activity Resources section of this Training Guide</td></tr>
</table>

Topic	Time	Training Instructions	Resources
12.4 Recording	120 min	Use real examples or printed templates to show how good records help: • **Monitor progress** over time • **Compare income and expenses** from different batches • **Improve decision-making** for future production • **Provide proof** of business performance (for loans or support) **Activity 63: Case Study: Fish Farm Operations and Performance** Provide each group with a **case study** showing expenses, sales, and fish performance over 6 months. **Learners must:** 1. Complete a **monthly record** for each month. 2. Fill out a **batch production record.** 3. Calculate total profit or loss. 4. Compare two sample batches and explain which was better and why.	The case study is not provided: the trainer must work this out themselves based on own operating experience and real, current costs and selling prices for fish products.
12.5 Analysis	90 min	Use real or example data to explain how to compare the budget to actual costs, and the concepts of 'variance'. **Activity 63: Calculate variances**	Calculators on phones

Topic	Time	Training Instructions	Resources
		1. Use the data from previous budget and actual records (or a new case study) 2. Calculate the variance for each item: **Variance = Actual Cost – Budgeted Cost** 3. Decide if it's an *over-spend* (positive variance) or *under-spend* (negative variance) 4. Suggest one practical action per item where cost is higher than planned	
12.6 Access to finance	90 min	Present a lesson to explain the different options to access funding to fund the establishment and initial operation of a fish farm. Include description, pros and cons. Ask: • What funding options are available in this community? • Who has used one of these options before? • What would be the best option for a small new fish farm? Why? • What are the risks if someone takes a loan and the fish die? Encourage learners to share their experiences or opinions. **Activity 64: Guest Speaker: Funding Organisation**	Brief for guest speaker. Small gift for guest speaker.

Topic	Time	Training Instructions	Resources
		Invite a guest speaker from one of the funding organisations to come and address the learners on the criteria, conditions and process of applying for funding for a fish farm.	

Training Resources

Classroom facilities

Item	Description	Quantity
Whiteboards	Wall mounted, minimum 2 x 1m	4
Desks/tables	Table or desk for 2 trainees	1 per 2 trainees
Chairs	Comfortable chairs, may be plastic	1 per trainee
Flipchart paper (for activities)	Flipchart pads: A1 paper; 25 sheets per pad	5
Permanent and temporary markers	Different colours: black, blue, green, red: 12 per box; 2 boxes of each colour	8 boxes
Exercise books (for trainee notes)	A4 lined (feint & margin); 72 or 96 pages	1 per trainee
Pens	Ballpoint, black or blue	1 per trainee
A4 lined paper	A4 exam pads of 100 sheets, punched	5 A4 pads
Printing paper	80gsm white, reams of 500 sheets	2 reams
Masking tape	Narrow	4 rolls
Scissors	Medium to large size	5 pairs

Technical equipment

General fish farming equipment

Item	Description/specification	Quantity
Buckets	Plastic, 25 litres	4
Manila rope	12mm x 200m	1 roll

Item	Description/specification	Quantity
Tape measure	20m	4
Tape measure	3m	4
Weigh balance (scale)	Digital; 50kg capacity	2
Scoop net		4
Bamboo poles	2m length	8

Module 2: Pond Design and Construction

Earth ponds: 10 x 20m pond

Item	Description/ specification	Quantity
Hand hoe		8
Pick axe		8
Shovel	Pointed tips;	8
Wheelbarrow	Metal, 75litre/150kg	3
PVC pipes	Schedule 40; 4" inch/110mm	6 metres
Elbow connector	Class C (4"/110mm)	2
Gate valve	3"/ 7,62cm	1
Inflow filter	3" net screen	Half metre
Predator net		12 x 22m^2

Concrete ponds: 10 x 20m

Item	Description/ specification	Quantity
Sand	Fine sand	1 truckload
Portland Cement	42.5 R, 50kg bags	22 bags

Item	Description/ specification	Quantity
Gravel	1, 5 – 2” gravel	1 truckload
Waterproof cement	50kg	30 bags
Iron bars (rebar)	6mm	10 bars
Welded wire mesh	2 x 4” (80 square feet)	8m^2
Bricks	5”	1000
Masonry nails	3”	2kg
PVC pipes	Schedule 40; 4” inch/110mm	6 metres
Elbow connector	Class C (4”/110mm)	2
Gate valve	3”/ 7,62cm	1
Shade net	Pcs	2

Module 3: Pond Preparation

Item	Description/specification	Quantity
Liming material	Salt and ash; 25kg	1 bags
Artificial fertilizer	DAP, 25kg	1 bag
Natural fertilizer	Chicken, duck, and cattle manure; 50kg	3 bags

Module 4: Fish nutrition and feeding

Item	Description/ specification	Quantity
Hapa nets	Size 4m^2 small gauge	2 nets
Plastic bags	Transparent; size: 50litre	24
Fertilizer bags (to safeguard fingerling bags)	100kg volume bags	24

Item	Description/ specification	Quantity
Fingerlings	Monosex Nile Tilapia	2 000

Module 5: Natural Fish Feed Production

Item	Description/ specification	Quantity
Gloves	Rubber	1 pair per trainee
Face masks	Disposable, 3-ply	2 boxes
Azolla ponds		
Nylon/plastic sheeting	Any colour; 100 microns	9 meters
Azolla seeds		10 kg
Manure	Cattle/cow dung or poultry	
Black Soldier Fly (BSF) tent		
Timber (for frame)	2 x 2" timber; length: 12 feet/ 4m	10 pics
Netting	1,5 x 33m fine gauge	1 roll
Wood nails	3 inches	1 kg
Corrugated iron sheeting	1 x 4m	2 sheets
Crates	Plastic, solid (no drainage)	4
Organic waste	Mixture of food waste, manure, other	10kg
Fish food ingredients		
Fish meal		1 240kg
Blood meal		93kg
Bone meal		557kg
Rice polish		930kg

Item	Description/ specification	Quantity
Vegetable oil		248litre
Vitamin premix		31kg
Mineral salt		34kg
Ginger powder		31kg
Nylon/plastic sheeting	Any colour; 100 micron	9 meters

Module 7: Fish Farm Management

Item	Description/ specification	Quantity
Dissolved Oxygen meter	For measuring the level of dissolved oxygen in the pond.	4
Secchi disc		4
Integrated fish farming:		
Timber (for frame)	2 x 4" timber; length: 12 feet/ 4m	10 pics
Chicken wire	120cm	1 roll
Wood nails	3 inch	1 kg
Corrugated iron sheeting	1 x 4m	4 sheets
Feeders & drinkers		5 each
Chicks		100
Horticultural farming:		
Horticulture seeds	Chinese cabbage; broccoli, tomatoes, onions, other	1 kg total

Module 8: Fish Health Management

Item	Description/ specification	Quantity
Potassium permanganate		500g
Copper (II) Sulphate		500g

Module 9: Harvesting and Processing

Item	Description/specification	Quantity
Harvesting nets	8 x 15m	1
Scoop net		4
Fish grader		4
Fish crates or buckets	Plastic 25 litre	8

Module 10: Fish Preservation

Item	Description/specification	Quantity
Fresh fish		24 kg
Knives (cleaning, scaling, chopping)	Filleting and paring	8
Freezing		
Plastic bags	Zip seal, different sizes for different fish	100
Labels	Large, rectangular address labels	100
Marker pens	Blue or black	5
Frying		
Frying pan/karai		4
Stove	Charcoal stove/jiko	4
Spider spoon/jalo		4

Item	Description/specification	Quantity
Spoons	Large mixing spoons	4
Tongs	Long handled, metal	4
Basin	Plastic, large (min 4 litre)	4
Wire gauze	Sheet, 1m^2	1m^2
Cooking oil		8 litres
Drying		
Fine mesh racking	Stainless steel, 3-tier drying rack	2
Hanging hooks	Stainless steel, for fish drying	20
Shade net	UV-resistant, for drying area	1
Trays	Plastic, perforated drying trays	4
Salting	—	—
Salt	Coarse	10 kg
Plastic containers	Large, rectangular crate size	4
Wooden spatula	For mixing salt with fish	2
Smoking	—	—
Smoking kiln	Traditional drum kiln with chimney	1
Firewood	Dry hardwood	50 kg
Wire mesh grill	Stainless steel, for smoking chamber	2
Charcoal	Lump charcoal	20 kg
Grilling/BBQ	—	—
Fish flavourings	Ginger, lemons, garlic, carrots, soya sauce, tomatoes, and onions	1 kg each

Item	Description/specification	Quantity
Table salt	Fine	2 kg

Activity Resources

Activity 1:

Sample of skills needed is important as to have common understanding among participants.

Activity 2:

Have a list of benefits of fish farming.

Activity 3: Fish Farming Value Chain Flashcards

Input supplies	Fish Feed
Fish Production	Fish fingerlings
Processing	Water and other resources
Logistics	Equipment
Marketing and Sales	Hatchery
Consumers	Fish farming
Harvesting	Cleaning and gutting
Smoking	Drying
Freezing	Frying
Wholesale markets	Hotel and Restaurant markets
Local fresh markets	Local people and families
Transport	Vendors selling street food

Activity 9: Flashcards

Clean latrine far from water	Rubbish dumped beside pond
Covered rubbish bin	Broken latrine near pond
Handwashing with soap	Standing water with mosquito larvae
Sealed water container	No handwashing after toilet
Mosquito netting over containers	Plastic bottles in pond
Clean area around pond	Uncovered water containers
Sloped ground away from pond	Children near dirty water
Compost pit far from pond	Open defecation near water

Activity 31: Fish Feeding Schedule

Nile Tilapia feeding schedule (example):

Stage	Age	Feed type	Frequency	Feed size	Total daily feed	Feeding times	Kind of monitoring
Stage 1	Fry (0 – 2 weeks)	High-protein starter feed (crumbles or powder)	4 – 6 feedings per day	Appropriate for the size of the fry	5 – 10 % of body weight	Spread evenly throughout the day	Monitor closely for any signs of stress or overfeeding
Stage 2	Fingerlings (2 – 8 weeks)	Transition to a grower feed with balanced protein and energy	3 – 4 feedings per day	Larger pellets suitable for fingerlings	5 – 8 % of body weight	Morning, afternoon, and evening	Adjust feeding amounts based on growth rates and observe fish behaviour.
Stage 3	Juveniles (8 – 16 weeks)	Grower feed with balanced protein, energy, and essential nutrients	2 – 3 feedings per day	Larger pellets appropriate for juvenile size	4 – 6 % of body weight	Morning and evening	Monitor growth and adjust feed amounts accordingly
Stage 4	Sub-adults (16 – 24 weeks)	Transition to an adult maintenance feed	Two feedings per day	Suitable for sub-adult size	3 – 5 % of body weight	Morning and evening	Continue to monitor growth and adjust feed amounts as needed.
Stage 5	Adults (24 weeks onwards)	Adult maintenance feed with lower protein content	1 – 2 feedings per day	Appropriate for adult tilapia	2 – 4 % of body weight	Once in the morning and optional feeding in the evening	Adjust feeding frequency and amounts based on fish size and environmental conditions.

Feeding schedule (template):

Stage	Age	Feed type	Frequency	Feed size	Total daily feed	Feeding times	Kind of monitoring
Stage 1							
Stage 2							
Stage 3							
Stage 4							
Stage 5							

Activity 33: Feed Records

Feed store record:

Date	Feed Type	Quantity In (kg)	Quantity Out (kg)	Balance (kg)	Notes

Feeding chart _____ Name of the fishpond: _____

Date	Fish quantity	Amount of feed required per day			Type of feed (pellets/powder/crumbles)	Amount of feed fed per day	Amount of remained feed per day
		Morning	Afternoon	Evening			

Activity 41: Case Study: Flash Floods in Kilosa

A small-scale fish farmer named Asha runs a tilapia pond in Kilosa, a region of Tanzania that receives heavy rains during the long rainy season. One March, after several days of intense rainfall, a flash flood swept through her area. Her pond overflowed despite a basic spillway being in place. Many of the fish escaped into nearby streams, and muddy water carrying debris and waste entered the pond. The flood also caused damage to the pond walls, weakened the dykes, and blocked the outlet pipe with leaves and litter.

Asha had just stocked the pond with fingerlings the previous week and was expecting to begin natural feed production with Azolla. After the flood, she discovered that many fingerlings were gone, the water quality had deteriorated, and all her Azolla was washed away. She had not prepared an emergency plan and had no insurance or backup stock.

Discussion Questions:

1. What could Asha have done differently to prepare for this kind of extreme weather?
2. How can fish farmers reduce the risk of flood damage to their ponds?
3. What are the signs of poor water quality that Asha should look for after the flood?
4. If Asha wants to restart her fish farm, what steps should she take to recover and avoid future losses?
5. Why is it important for small fish farmers in Tanzania to understand local weather patterns and climate risks?

Activity 44: Fish Behaviour Checklist

Observation Question	Findings	Action Needed
1. How are the fish swimming?		
2. Are the fish moving together in groups?		
3. Do the fish eat when feed is given?		
4. Are the fish gasping or breathing fast?		
5. What do the fish look like?		
6. Are the fins and tails healthy?		
7. How do the fish react when disturbed?		

Activity 46: Fish Disease Flashcards

Fish has cotton-like growth on its mouth or fins	Fish is not eating and swimming slowly
Fins are torn, frayed, or rotting at the edges	Fish has pale or discoloured gills
Fish is covered in small white spots like grains of sand	Fish has bulging eyes and swims in circles
Fish has a swollen belly and raised scales	Fish is lying still at the bottom of the pond
Fish has thread-like worms sticking out of its skin	Fish has small holes or ulcers on the skin
Fish is floating upside down or struggling to swim straight	Fish has black marks or dark patches on its body
Fish is breathing heavily and staying near the surface	Fish shows signs of stress when touched or fed
Fish has red patches or blood spots on its body	Fish has one side more swollen than the other
Fish keeps scratching itself against the pond wall	Fish has a twisted spine or unusual body shape
Fish appears to be gasping for air	Fish is shaking or darting around quickly

Activity 48 : Team Quiz questions

1. What is the difference between **partial** and **total** harvesting?
2. What is one reason a farmer may choose **partial harvesting** instead of total?
3. When should you use a **total harvest** method?
4. What is the **main goal** of harvesting fish?
5. What **equipment** is most commonly used for harvesting?
6. Name one **risk** of harvesting fish without a proper plan.
7. What is the best **time of day** to harvest fish to reduce stress?
8. Why should the **water level** in the pond be lowered before harvesting?
9. What can happen if harvesting is done **too fast or roughly**?
10. Why is it important to **sort fish** during harvesting?
11. What kind of **net** is best for total harvesting?
12. What is the purpose of using a **holding tank or hapa** during harvesting?
13. Why is it important to **count the fish** after harvesting?
14. What does a farmer need to do **before harvesting** starts?
15. What should be done with **injured or weak fish** after harvesting?
16. Name one way to **avoid stress** to the fish during harvesting.
17. What does it mean to do a **"dry harvest"**?
18. What is the **best size** for harvesting tilapia?
19. What does a **partial harvest** allow the farmer to do?
20. After a total harvest, what is the **next activity** on the fish farm?

Activity 49: Harvesting Record Sheet

HARVEST RECORD TEMPLATE			
Pond name:		**Harvesting date:**	
Batch #	**Weight Harvested**	**Number of Fish**	**Avg Weight**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Activity 57: Fish Product and Price Survey

Fish Product	Selling Price/kg	Market Location	Fish Form	Notes

Activity 60: Sales Record Sheet

Date	Customer	Product	Quantity	Unit Price	Total	Payment Type	Balance

Activity 62: Fish Farm 3-Month Operational Budget

Cost	Month 1	Month 2	Month 3
Total			