Step 9: Fish harvesting, storage and preservation

Harvesting
Fish can be harvested partially (leaving at least ten fish in the pond to breed) or totally (harvesting all fish and cleaning the pond) six months after stocking.

• Lower the fishing net into the pond at the deep end. Ideally, have two people on either side of the pond holding the net.
• Press the net to the bottom of the pond to ensure you catch all the fish. This can best be done by having three people in the pond.
• Gradually pull the net towards the shallow end.
• Gather the net to one corner, making sure you retain all fish captured.
• Pull out the net.
• Place the fish in a container of clean water.
• Sort the fish. Return any underweight fish to the pond.
• Depending on demand, market all fish or return some to the pond.

Fish storage and preservation
• Immediately cut the fish open along the underside and pull out the guts. The guts can be dried, mixed with bran and fed to livestock, including chickens.
• Wash the fish with clean water and place in cooler boxes.
• Sell or cook and eat fresh fish as soon as possible, otherwise preserve fish by salting, smoking or sun drying.

Record Keeping
Record keeping helps the fish farmer to track the major activities undertaken from the start of the fish-farming business. Keeping simple records of costs and income from sales will allow you to work out whether your fish-farming business is profitable.

What can go wrong Cause What to do
Contaminated water Pollution at water source Ensure water is clean and safe before building pond Contact your local water authorities
Stunted growth of fish Underfeeding Feed regularly with recommended foods
Fish poisoned Tephrosia bark Clear Tephrosia trees from area around pond Add more water to dilute poison as soon as possible
Loss of fish to: snakes and monitor lizards Fish pond size too small Fish-eating birds (kingfisher, herons) Remove the pond size Make the pond to make water green
Loss of fish to: theft Unprotected ponds Fence the pond Keep watch on pond when fish mature
Fish deaths Leaches Apply lime at the pond bottom before stocking Turkey Parakeets Keep watch on pond when fish mature
Fish washed away by floods Fished washed away by floods Ensure that maximum water level in the pond does not exceed 1.5 metres
Long dry spells – shortage of water supply Harvest the fish and sell before drought.
Make a Living through Fish Farming

Why farm fish?
• Fish grow quickly and you get a return on your investment fast: a tiny fingerling is ready to eat in as little as six to eight months when it can fetch around US$0.70 – 25 times more than the cost price.
• There is a ready market both locally and internationally.
• You do not have to be next to an ocean, lake, river or stream to farm fish although a constant source of clean fresh water is essential for fish survival.

Why farm tilapia?
• Fish is very nutritious, providing a good source of high-quality protein and other essential nutrients.
• Once established, fish farms are easy to maintain leaving you with more time for other tasks.
• The pond should be in full sun and not surrounded by trees as this invites predators, such as birds and snakes, to see and catch your fish. To fertilize your pond you may use almost all natural animal manures or chemical fertilizers.
• Rectangular ponds are easier to build and the fish are easier to catch compared to round ponds.

Requirements
• Land unsuited to other productive uses – even small plots – can be used for fish farming.
• Clear the site of vegetation.
• The pond should be rectangular or square (not circular) with a minimum size of 10 metres by 10 metres. Bigger ponds, up to 50 metres by 100 metres, are easier to manage. The pond sides should slope outwards.

Step 1: Pond site selection
• Select gently sloping land, large enough to allow construction of the pond.
• The pond should be in full sun and not surrounded by trees so that it matures faster whereas fish in shaded ponds. The pond should not allow water to seep away (check this by digging a test hole, filling it with water and watching the next day to see whether the water has seeped away).

Step 2: Pond construction
• The pond should be 0.5 metres deep at the shallow (water inlet) end and 1.5 metres at the deep (water outlet) end and have a sloping floor.

Step 3: Pond fertilization
• Pond fertilization encourages the growth of tiny plants called algae and tiny animals that provide food for your fish. A thin layer of agricultural lime to the bottom of the pond will help to eliminate pests like leeches.
• The soil should not allow water to escape (check with sticks by dragging a rake tines, filling it with water and watching the next day to see whether the water has seeped away). Sources of water include underground springs, streams and river diversions (make sure you have permission from your local authority). Use of borehole and piped water is unlikely to be cost-effective. Chlorinated water is poisonous to fish.
• Chemical fertilizers
• Chemical fertilizers

Step 4: Seed selection
• A fingerling seed is a tiny newly hatched fish weighing between 20 and 80 grammes.
• Purchase tilapia fingerlings from an established fish farm within your area. Place the fingerlings into a bucket of water. Move the fingerlings to your fish pond as soon as possible (within 6 hours).

Step 5: Pond stocking
• Add three tilapia fingerlings for each square metre of pond area. A pond 10 metres by 10 metres has an area of 100 square metres and so would need 300 fingerlings.
• To stock the pond with fingerlings, gently lower the bucket containing the fingerlings into the shallower end of the pond. If fingerlings are not introduced into the pond gently they may die from exhaustion.

Step 6: Supplementary feeding
• You do not have to be next to an ocean, lake, river or stream to farm fish although a constant source of clean fresh water is essential for fish survival.

Step 7: Fish sampling
• Check on your fish regularly and weigh them monthly to see how they are growing. Catch some fish using a scoop net by placing some suitable foods include rice, maize or wheat bran (a quarter of a kilogramme fed twice daily). Other foods include:
• Sliced kale (sukuma wiki) or chopped sweetpotato vines
• Chemical fertilizers

Type of fertilizer How much to use for every 100 square metres of pond area
Natural
Cow, goat or sheep dung 6 kg
Chicken, duck or goose droppings 2.5 kg
Chemical
Urea 1 kg
DAP (diammonium phosphate) 1 kg
TSP (triple superphosphate) 1 kg
Step 1: Pond site selection
1. Select gently sloping land, large enough to allow construction of the pond.
2. The pond should be in full sun and not surrounded by trees as this invites predators, such as fish-eating birds.
3. The pond should be 0.5 metres deep at the shallow (water inlet) end and 1.5 metres at the deep (water outlet) end and have a sloping floor.
4. Ponds should be rectangular or square (not circular) with a minimum size of 10 metres by 10 metres. Bigger ponds, up to 50 metres by 100 metres, are easier to manage. The soil should not allow water to seep away (check this by digging a test hole, filling it with water and checking the next day to see whether the water has seeped away).
5. A reliable and convenient source of clean, unpolluted water is essential as water should continuously flow through the pond. Sources of water include underground springs, streams and river diversions (make sure you have permission from your local authority).
6. Do not dig ponds in the path of a river to avoid flooding and washing away of the soil.
7. The soil should be well-drained.
8. Chemical fertilizers are preferred to animal manures or chemical fertilizers.

Step 2: Pond construction
1. Clear the site of vegetation.
2. Measure the pond area and mark it out with sticks and string so you can see how big it will be before you start construction.
3. Ponds should be rectangular or square (not circular) with a minimum area of 10 metres by 10 metres. Bigger ponds, up to 50 metres by 100 metres, are easier to manage. The sides should slop upwards.
4. The pond should be 0.5 metres deep at the shallow (water inlet) and 1.5 metres at the deep (water outlet) end and have a sloping floor.
5. Dig out the pond using hoes, spades and shovels and pile the soil around the pond to form a dyke.

Step 3: Pond fertilization
1. Fill the pond with water so that the shallow end is 0.5 metres deep and the deep end is 1.5 metres deep.
2. Apply a thin layer of agricultural lime to the bottom of the pond. This will help to eliminate pests like leeches.
3. Do not dig ponds in the path of a river to avoid flooding and washing away of the fish.
4. Tip:

Tips
- Rectangular ponds are easier to build and the fish are easier to catch compared to round ponds.
- Do not dig ponds in the path of a river to avoid flooding and washing away of the fish.
- Apply a thin layer of agricultural lime to the bottom of the pond.
- Fill the pond with water so that the shallow end is 0.5 metres deep and the deep end is 1.5 metres deep.

Step 4: Seed selection
1. A fingerling seed is a tiny newly hatched fish weighing between 20 and 80 grammes.
2. Purchase tilapia fingerlings from an established fish farm within your area.
3. Fence the pond to keep out children and animals.
4. Move the fish to your fish pond as soon as possible (within 6 hours).

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1. Add three tilapia fingerlings for each square metres of pond area: A pond 10 metres by 10 metres has an area of 100 square metres and so would need 300 fingerlings.
2. To stock the pond, gently lower the bucket containing the fingerlings into the shallow end of the pond.
3. Gradually tip the bucket to allow the fingerlings to swim into the pond.

Step 6: Supplementary feeding
1. For the first month, the young fingerlings will eat the natural food in the pond.
2. After the first month, feed the fingerlings twice daily.
3. Suitable foods include rice, maize or wheat bran (a quarter of a kilogramme fed twice daily). Other foods include:
   - Local fishmeal (dust)
   - Small lake shrimps
   - Sliced kale (sukuma wiki) or chopped sweetpotato vines
   - Termites and ants
   - Small left-over fish caught by fishermen
   - Cottonseed (aristolochia toke or kovake) dust

60cm

Step 7: Fish sampling
1. Check on your fish regularly and weigh them monthly to see how they are growing. Catch some fish using a net and plot them based on the breed part of the scoop net to see at least.
2. The fingerlings should have increased in weight by 10 grammes in the first month.
3. The fish should continue to grow steadily each month.

Step 8: Pond maintenance
1. Keep area around pond clear of weeds.
2. Fence the pond to keep out children and animals.
3. Keep water levels between 0.5 and 1.5 metres deep.
**Step 9: Fish harvesting, storage and preservation**

**Harvesting**
Fish can be harvested partially (leaving at least ten fish in the pond to breed) or totally (harvesting all fish and cleaning the pond) six months after stocking.

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- Wash the fish with clean water and place in cooler boxes.
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**What can go wrong**

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Make a Living through Fish Farming

For more information contact:

Kajjansi Aquaculture Research and Development Centre
P.O. Box 530, Kampala, Uganda
Tel: +256-41-308325 or 200716, Fax: +256-41-200746

Lake Basin Development Authority
P.O. Box 1516, Kisumu, Kenya
Tel: +254-(0)57-2027227, Fax: +254-(0)57-2027228
Email: Lake_basincf@yahoo.com; lakebasin@kwthikena.com

The ACP-EU Technical Centre for Agricultural and Rural Cooperation (CTA)
P.O. Box 380, 6700 AJ Wageningen, The Netherlands
Tel: +31(0)317-460000, Fax: +31(0)317-460167
Email: cta@cta.int, Website: www.cta.int

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