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sharing knowledge, improving rural livelihoods

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CTA Practical Guide Series, No. 9

Make a Living through Fish Farming

Make a Living through Fish Farming

Fish are popular sources of protein and white-meat in many parts of Eastern Africa. However, the gap between supply and demand for fish is widening. Almost all natural fish stocks in the region, as elsewhere in the world have been over-exploited yet human populations and hence demand, continue to increase.

The best option for producing more fish in Eastern Africa is fish farming. This leaflet explains how you can make a living from fish farming, focusing on rearing tilapia.

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.
- 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 tilapia farming.
- There is a ready market both locally and internationally.
- You can meet demand in a timely and efficient manner, harvesting only what you can sell to avoid wastage.
- Fish rarely suffer from diseases unlike other types of livestock.
- Land unsuited to other productive uses – even small plots – can be used for fish farming.
- Once established, fish farms are easy to maintain leaving you with more time for other tasks.
- Fish is very nutritious, providing a good source of high-quality protein and other essential nutrients, which are especially important for mothers and growing children.

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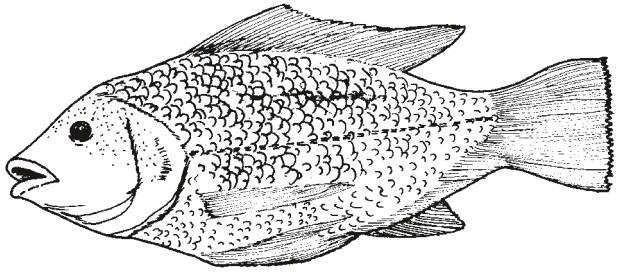
Why farm tilapia?

Tilapia is a good option because it is a fast-maturing fish, easy to keep, popular with consumers and nutritious. For information about other types of fish, consult your local extension officer.



Requirements

To establish and run a small fish farm you will need: labour, land, machetes (pangas), hoes, shovels, pickaxes, wheelbarrows, measuring tapes, wooden pegs, string, lime, fingerlings, fertilizer, weighing scale and scoop nets.

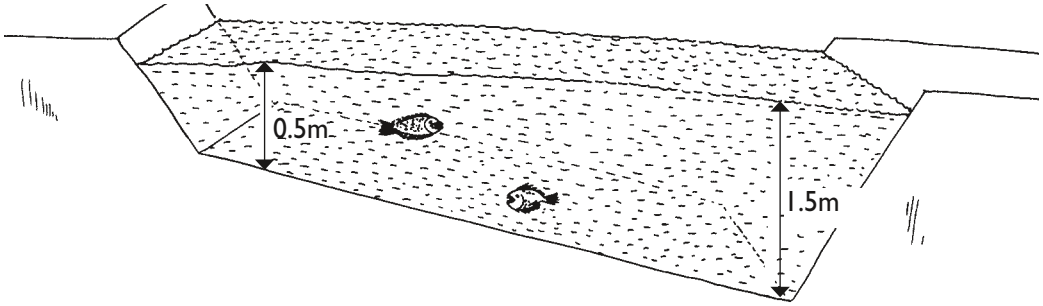
Tilapia do best when the water temperature is between 25 and 28˚C.

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 as this invites predators, such as fish-eating birds.
- 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).
- 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). Use of borehole and piped water is unlikely to be cost-effective. Chlorinated water is poisonous to fish.

Step 2: Pond construction

- Clear the site of vegetation.
- Measure the pond size and mark it out with sticks and string so you can see how big it will be before you start construction.
- 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 sides should slope outwards.
- 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.
- Dig out the pond using hoes, spades and shovels and pile the soil around the pond to form a dyke.



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. This will help to eliminate pests like leeches.
- 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 3: Pond fertilization

Pond fertilization encourages the growth of tiny plants called algae and tiny animals that provide food for your fish. Algae turn the water green, which makes it harder for predators, such as birds and snakes, to see and catch your fish. To fertilize your pond you may use animal manures or 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 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 fingerlings in a bucket of fresh water.
- Move the fingerlings to your fish pond as soon as possible (within 6 hours).

Step 5: Pond stocking

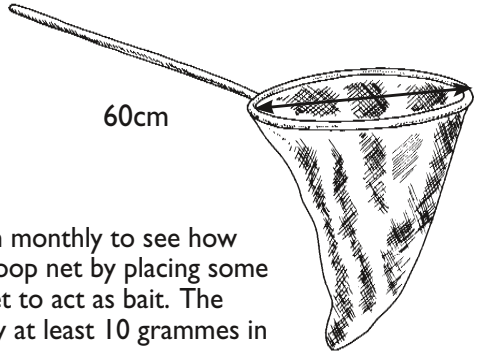
- Add three tilapia fingerlings for each square metre of pond area. A pond 10 metres by 10 metres has an area of 100 square metres and so would need 300 fingerlings.
- To stock the pond with fingerlings, gently lower the bucket containing the fingerlings into the shallow end of the pond.
- Gradually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

Tip:

If fingerlings are not introduced into the pond gently they may die from shock.

Step 6: Supplementary feeding

- For the first month, the young fingerlings will eat the natural food in the pond.
- After the first month, feed the fingerlings twice daily.
- 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
- Termites and ants
- Small lake shrimps
- Small left-over fish caught by fishermen
- Local fishmeal (*omena/dagaa/mukene* dust)



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 feed inside the bowl portion of the scoop net to act as bait. The fingerlings should have increased in weight by at least 10 grammes in the first month.
- The fish should continue to grow steadily each month.

Step 8: Pond maintenance

- Keep area around pond clear of weeds.
- Fence the pond to keep out children and animals.
- 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.

- 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 regular with recommended feeds
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-eating birds (kingfisher, herons) theft	Bushy pond site Water too clear	Clear the pond site Fertilize the pond to make water green
	Unprotected ponds	Fence the pond Keep watch on pond when fish mature
Fish deaths	Leeches	Apply lime at the pond bottom before stocking
	Fishes 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