

#2. Income Generating Activity Information Sheet

Catfish Farming in Tanks

Start-up & running costs for raising 800 fish for 6 months: UGX 3,301,000 (USD892.1)

Profitability: UGX 699,000 (USD188.9)

Needed: Capital investment in pond, tanks, tools, equipment: UGX 3,120,000 (USD843)

Issues: Fluctuating operational costs, inadequate fish care and management

Introduction



With the decrease in available land, prospective fish farmers have investigated varying ways to grow fish, such as man-made dams, ponds or tanks especially in spaces that are largely unused for any productive ventures. This document explains how an income can be made from fish farming, focusing on rearing catfish in tanks.

Overview of market conditions

Fish are a popular source of protein in many parts of East Africa. However, the gap between supply and demand for fish is widening as the population continues to increase. Fish is sold through various channels such as, wholesale agents, middle men, outside markets and direct sales to individuals from the farm.

Large fish farms not only raise fish but also sell fish farming inputs and buy fish from smaller fish farmers. These larger farms are also a potential sales channel for smaller producers. Catfish is sold in kilograms, and the wholesale price for a kilogram of catfish is UGX 5,000 (USD1.3, 2018). The most profitable ways of selling fish are retail selling and selling small amounts of fresh/live fish.



Why farm catfish?

Catfish is one of the most known and demanded types of fish on the market; its price is relatively affordable; meat is nutritious and is a source of protein and vitamin D; matures fast; and with modern technology you can farm fish in a variety of locations.

Investment & Start-up Equipment needed



To establish and run a small fish farm, the following items are needed: plastic/metallic tanks, dam line paper, timber, wheelbarrows, measuring tapes, wooden pegs, fingerlings, weighing scale, scoop nets, test tubes, baskets and aerators. Capacity development for the farmer is also key in order to match the basic minimum standards for fish farming.

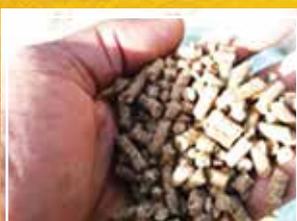
The farmer needs to be updated with fish farming knowledge especially on feeding, water, space and stress management. *The photo shows a sample of a 3m x 2m x1 dam line pond (6000ltrs) – this has the capacity to accommodate between 800 – 1000 catfish).*

Productive Process



The daily activity chart for a fish farmer includes: measuring levels of oxygen, water quality and temperature, on-going purchase of fish farm equipment and supplies (fish fingerlings, fish foods, fishing nets etc.), measuring feeds, feeding, grading fish, harvesting fish, marketing and keeping records. While undertaking the daily routine, the most challenging part of the process is managing the feed, oxygen and water levels; fluctuating feed prices as well as other running costs such as for oxygenating water.

Fish feeding



Feeding is the biggest cost of fish farming and largely determines the profits. Fish mostly feed on small organisms and plants that grow in green water. When the quality of fingerlings and feeds is good, catfish mature at 8 months and weigh up to 3kgs. However, at 6 months, on average, a farmer will have raised catfish to weigh 1kg. Catfish prefer sinking feeds making pellet feeds the most appropriate. Pellets are produced in different sizes for different stages of fish (fingerlings, juvenile, mature).

Feeding chart

Level of fish	Feed type	Cost per unit (Kg in UGX)	Cost per unit (Kg in USD)
Fingerlings (10gms)	40% Proteins	5,000	1.35
Juvenile stage (20-200gms)	35% Proteins	3,000	0.81
Mature (200gms- 3kgs)	30% Proteins	2,800	0.76

- Note:**
- Consider feeding your fish at the same time in the day
 - Calculate the body weight of fish to get the correct formula for calculating feed requirement

Fish Growth



The growth of fish depends on the conditions in which they live. It is necessary to provide them with the optimal conditions so that their metabolic energy is invested in proper growth. These conditions include:

Factor	Details
Water & its quality	Changing water is key as fish waste is a key contaminant and contains toxic ammonia. Tap water can be used but needs to be de-chlorinated. Water hyacinth can be planted to filter the water and rock salt applied to water to kill fungus and bacteria (parasites).
Oxygen	At least 70% oxygen circulation in water (3-5mg/litres) is required. Oxygen increases as the sun rises and reduces as the sun sets. With oxygen, fish are more active. An aeration system should be used or water hyacinth planted to oxygenate the pond.
Feeding	Feeding is the biggest cost of fish farming and controls profits. Cat fish feed on sinking feeds as they are bottom feeders. The average weight of about 5-10 fish gives an estimate for weight per fish. This should be multiplied this by the total number of fish to calculate the total weight of all stock. For instance, at the fingerling and juvenile stage, multiply total average weight by 0.05 to establish kg of feeds needed a day. At the mature stage, the average total weight should be multiplied by 2% to get the total feed per day.
Temperature	Fish grow 3 times faster at a temperature of 28°C as compared to below 20°C. At 23°C fish will not eat, food is wasted and lowers water quality. From that point, fish get stressed and later die.
Space	Fish need space for swimming and exercise; about 60 liters/fish in a tank system. Fish will fight for oxygen if packed into a smaller space.
Light	Catfish like darkness and eat more at night, as they are more active. Dark materials should be put in the pond e.g. dam line paper

Harvesting your catfish



Fish can be harvested partially or totally at the age of six to eight months after stocking. At the time of harvesting, use a scoop net to catch the fish from water.

Any underweight fish should be returned to the pond. Any remaining harvested fish can be preserved by salting, smoking or sun-drying.

Risks and mitigation measures

Risk	Likelihood of occurrence	Level of Impact	Mitigation measure
Stunted growth	Medium	High	Regular measuring of live fish weight, feeding with recommended feeds.
Loss of fish due to parasites	Low	Low	Clear the pond site, fertilise the pond to make water green, add water hyacinth to cover the water surface.
Theft of fish and farm inputs/assets	Low	Medium	Fence the farm area, keep watch on fish when mature, harvest and sell off mature fish, restrict entry, label each asset, lock all storage facilities, record keeping.
Fish dying from lack of oxygen	Low	High	Daily check-up, test and keep water quality, change water regularly, tighten security, control stocking density.
High operational costs	High	High	Buy feeds in bulk when prices are lower, use substitutes i.e. greens, kitchen waste etc., conduct survey on market prices for fish and feeds.
Cannibalism	Low	Low	Feed according to the weight and on time, grade fish.
Poor management of business operations	Low	High	Management training.
Competition	Medium	High	Continued marketing, following up enquiries, market research and competitor analysis.

Note: Stress is the major disease and killer of fish. This can be addressed by providing quality water, oxygen, proper feeding, space, regulated temperature and lighting system.

Financial Analysis and Projections

The figures below are a rough estimate of the costs for the first 6 months of production of 800 kilograms of catfish in a single above ground tank. This assumes keeping catfish for only 6 months and then start to harvest for sale. Remember, the fish market prefers fresh fish, therefore harvest fish to be sold off in a single day. This is because your fish will quickly get spoilt when out of water.

Note: a) Figures are in UGX and US dollars and are estimates based on figures from a Ugandan fish farmer who has been in the sector for over 8 years.
b) Figures are divided into 3 sections: investment, startup/running costs and production, profit and loss c) The blank 'Your Total' column gives space for your own calculations.

a. Investment Budget

Item	Qty	Unit Cost	Total Cost	Total USD	Your Total
INVESTMENTS					
Dam Line tank/pond	1	2,500,000	2,500,000	676	
Spare plastic tank	1	250,000	250,000	67.5	
Basket	2	25,000	50,000	13.5	
Scoop net	2	25,000	50,000	13.5	
Gumboots – pairs	2	15,000	30,000	8.1	
Fingerings	800	300	240,000	64.9	
Total Cost Investments			3,120,000	843.2	

b. Start-up / running costs

Item	Qty	Unit Cost	Total Cost	Total USD	Your Total
Transport	6 trips	30,000	180,000	48.6	
Feeds - month 1	13.8kg	5000	69,000	18.6	
Feeds - month 2	32.2kg	3000	96,600	26.1	
Feeds - month 3	84kg	3000	252,000	68.1	
Feeds - month 4	168kg	3000	504,000	136.2	
Feeds - month 5 (2 weeks)	117kg	3000	351,000	94.9	
Feeds - month 5 (2 weeks)	61.6kg	2800	172,480	46.6	
Feeds - month 6	191.4kg	2800	535,920	144.8	
Water	144,000ltr	5	720,000	194.6	
Labour	6 months	70,000	420,000	113.5	
Total			3,301,000	892.1	

Note:

- The above feeds will enable a farmer to raise a catfish with at least 1 kilogram when mature
- Month 1 feeds are called 40% proteins
- Month 2-5 are called 35% proteins
- Month 6 are called 30% proteins
- You will need 6000 litres of water every week in the time period of 6 months (6000x4x6)

c. Production, Profit and Loss projections (based on 6 months production)

Item	Unit	Freq	Unit Cost (Ugx)	Total (UgX)	Total (USD)	Your Total
Production						
Fish	Kilo	1.0	800	800		
Sales						
Fish	Kilo	800	5,000	4,000,000	1081.	
Income				4,000,000	1081.	
Expenses						
Running cost	Month	6	3,301,000	3,301,000	892.1	
Net profit/loss				699,000	188.9	

Profitability Analysis

From the above, it is imperative for a fish farmer to understand the food conversion ratio (FCR). If all catfish needs are met, the FCR will be 0.83kg - that is: raising 1kg of fish will require 0.83kg of feed. The Conversion Rate (CR) will be the average feeds price (UGX3,600) multiplied by FRC (0.83kg) which gives us Ugx2,988. If all fish needs are not met, the FCR will be higher resulting in lower profitability. Using this formula, a fish farm would provide the following return on investment:

Scenario 1 - FCR of 0.83kg: Sales price per kilo (UGX 5,000)–cost of feeds per kilo (UGX 2,988) = UGX 2,012 profit per kilo.

Scenario 2 - FCR of 1.33kg: Sales price per kilo (UGX 5,000)–cost of feeds per kilo (UGX 4,788) = UGX 212 profit per kilo.

Keeping business records

Record keeping is essential to allow the fish farmer track the major activities undertaken from the start of the fish farming business. Keeping simple records of costs and income from sales will allow determination of the profitability of the fish-farming business. Records such as fish stock, spend, income, deaths, harvested, etc. need to be maintained. At the end of the year (and at intermediate periods), the above records will provide information, the quantity of fish harvested, sales as well as profit and loss. For a farmer to run a legitimate business enterprise, it is important to register with the relevant authorities so as to obtain lawful operational license and to enable the business to comply with tax easily.

Other relevant resources

- Fish pond management 1- what you need to know: <https://www.youtube.com/watch?v=EpuCvFByVzk>
- How to build a fish pond/fish farming in the back yard: <https://www.youtube.com/watch?v=uiCIDaapAGQ>
- The ACP-EU Technical Centre for Agricultural and Rural Cooperation (CTA) (2007). Making a living through fish farming: CTA Practical Guide Series, NO.9. Available on <https://publications.cta.int/en/publications/publication/1388/>

Point of Reflection – Think through the following:

- How can you add value to your product? Do you sell live or can you process (dry, smoke, salt) and sell for a higher price?
- Who is your market? Do you sell to wholesalers or can you sell directly to the public?
- How can you grow your brand, what unique selling point can you bring to your brand/product?
- Is there any value to fish waste, can you process enriched water to grow your own vegetables?
- Additional tanks will increase yields and reduce time between harvests.
- Alternatively consider tilapia.

Further Information

For further information, please contact Teach A Man To Fish (www.teachamantofish.org.uk;
info@teachamantofish.org.uk) or see Agripreneurship Alliance (www.theagripreneur.org; info@theagripreneur.org)

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