

A comprehensive
manual on catfish
farming business

CATFISH FARMING AS A BUSINESS



All you need to know about catfish farming
as a beginner

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CHAPTER 1:

REQUIREMENTS FOR STARTING A CATFISH FARM

1. A Deep and Wide Pond with Provision for Adequate Inflow and Outflow of Water

To ensure adequate growth of your catfishes, two things are essential:

- A pond with the right depth and width to ensure adequate comfort and growth of fishes
- Consistent inflow and outflow of good quality water to ensure optimal growth of fishes.

The optimal depth of a pond, that will actually contain water, should be at least 4 feet deep.

The width of your pond; ponds come in many shapes, including as a rectangle, a square, often as a triangle or a circle. Try not to overstock your pond as that can affect the growth of your fishes.

An ideal pond to stock 1,500 – 2,000 fishes for me will be a pond that is square in shape, 50ft x 50ft wide and that has a depth of at least 4 feet.

A pond designed for 1,500 fishes, can be used to raise 3,000 fishes if you can guarantee 24/7 inflow and outflow of water. That's how important water is.

The more your catfishes can eat, the more they will grow, and the more profit you will make. Not having good quality water can cut the feed consumption rate of catfish by up to 70%, leading to potential loss for a farmer since your fishes won't grow when they aren't eating well.

2. A Waterlogged Land

This is the ideal option if you will be digging your own pond, especially if you are to do this on a large scale,

Ideally, you want your land in an area close to a stream, where you can be assured water is available and flowing 24/7.

This makes it easy to consistently channel water into the pond, thereby neutralizing and refreshing the polluted water in the pond consisting of waste from your fishes, feed remnants etc.

Some people prefer to use a concrete pond system, or tanks to raise their fishes; in that case, they are able to retain water without having to worry that the earth will absorb it. If you go this route, your location doesn't really matter as long as you can get adequate supply of water.

3. Water

Ensuring optimal quality of water for your fishes will not only guarantee that they eat and grow well, but it will also reduce the chances infection or diseases.

Catfishes often get sick through dirty and polluted water, and if their water isn't constantly being refreshed with high quality, natural, clean water.

4. Good Juveniles from a Reliable Source

In an attempt to rush things, some breeders will use fishes that are not mature enough to hatch their fishes, or they will sell juveniles that are not up to standard to their clients. The result is often weak fishes that die when they experience little stress, or fishes that do not eat and grow well.

A great way to get good quality juveniles is by looking for farmers with impressive results around you, and asking them where they get most of their fishes; if a reliable fish farmer has gotten his juveniles from the same source for years, that source is likely very good.

Fishes that eat well are also almost good fishes; if you see a source of catfish where the fishes are responding well to feeding, it is most likely a good source.

Good juveniles should be anything from 7 – 9 weeks old from scratch, and should average anything from 7 – 15 grams per fish depending on the source.

5. Protective Nets

Whether you stock in an earthen pond, a concrete pond or a tank, you want to be sure to net your pond as soon as you stock your juveniles.

Birds, snakes, monitor lizards and other predators really enjoy eating baby catfishes, and if you're not careful you'll be lucky to meet one third of what you really stocked at the end of the day.

Be sure to net your pond until your fishes are at least 2 months old from juvenile stage; you can decide to later remove the net later.



2 months catfishes being fed

6. Adequate Fish Feed

Besides getting your fishes from the right source and ensuring they have good quality water, it is essential to make sure they have adequate feed.

You start with floating feed for 1 – 2 months, then switch to local/sinking feed.

CHAPTER 2:

POND PREPARATION BEFORE STOCKING

1. Dig Your Pond

If you already have a pond, or plan to rent a pond, skip to point 2. If you'll be using a tank or a concrete pond, you can skip steps 1 through 5 altogether and just jump to step 6.

If you're yet to dig your pond, an ideal pond for stocking 1,500 fishes from Juvenile till 6 months maturity should be about 15m x 15m, or approximately 50ft by 50ft.

This will take the shape of a square and should be at least 3ft deep, and could be up to 5ft deep if possible.

Give this information to your contractor; tell him the shape of the pond, the width/length as well as the depth.

Exactly how much this will cost will differ depending on what part of the world you are in. Over here in Nigeria, depending on your area, you could have manual laborers dig a 15m x 15m pond that is 4ft deep for around N120,000 – N150,000; that's around \$333 – \$416 at the time of writing this.

You can also use excavators to dig your pond; an excavator can easily dig two 15m by 15m ponds in a day, depending on the capacity of the machine and the skillfulness of the operator.

Manual labor with an average of 4 – 5 people working daily, take at least 5 days to complete a 15m x 15m pond that is 4ft deep.

2. De-mud Your Pond

This is basically removing the mud from your pond to make it more suitable for your fishes.

When a fish pond is being used, due to rain falling and washing sand from the dike of the pond back into the pond, mud will gradually start to accumulate in the pond; catfishes are also very strong and rugged, so sometimes their activity against the wall of the pond will lead to sand falling from all sides of the pond into the pond.

In order to make things much easier for you when it is time to harvest, you'll need to de-mud the pond.

When de-mudding your pond, you can go about it in two ways:

Ask your contractor to just remove the mud in your pond; this is the easiest way out.

Ask your contractor to remove the mud in your pond and add to its depth; instead of asking for a de-mud, you can ask your contractor to make your pond 1ft deeper; this is the best option, since a deeper pond is always better for catfishes.

If it is a pond that has been used before, you can easily find big fishes (I'm talking 1 – 2kg big) hiding inside the mud in the pond; these are potential predators to your juvenile fishes if you just stock without de-mudding your pond.

3. Ensure Your Dike/Embankment is Very High

Catfish farmers often have to deal with a lot of problems, and a common problem during the rainy season is flood that can carry away your fishes.

Since I'm recommending having your pond in an area close to a stream/river, I can't overemphasize the importance of having really big dikes/embankments for your pond; you want something at least 2 to 3ft higher than the highest water level of your pond; it is better if your dike is a bit taller.

Here's a picture of one of my ponds with a "good enough" dike:



By ensuring the dike/embankment of your pond is big/tall enough, you can ensure that it will be very difficult for your pond to become so filled that water starts to carry your fishes away, especially during the rainy season.

If you're wondering how you can make your dikes taller; this can be done automatically while de-mudding your pond or while digging to make it deeper. Sand removed from the pond can be thrown at the various sides to make your dikes taller, you can also use sandbags to make your dikes taller.

Here's a picture of a pond I did some serious "sandbag work" on; you'll easily see the arrangement of the sandbags at one side of the pond:



4. Ensure there's an Inlet and Outlet

The next step is to make sure there is an inlet and outlet for your pond; this often comes in form of a pipe through which water can enter and go out of your pond.

Here's a picture of an inlet that links directly to a small stream.



An outlet; this links to another gutter outside, and water flows out automatically once it reaches the level of the outlet.



The inlet can be placed slightly higher than the outlet to ensure maximum water inflow and outflow; if you're sure of the water pressure from where water will be entering into your inlet (assuming water is coming from a stream with 24/7 water

flow), then it is okay to have your inlet at the same level as your outlet or even slightly lower than your outlet. The water pressure will take care of things and ensure water is still being pushed into your pond. However, water could be returning to the inlet, if the outlet is higher, should water stop coming in through the inlet or should water pressure go down drastically.

It is usually better for your outlet to be slightly lower than your inlet, so water keeps flowing in and going out irrespective of the abundance, or absence, of external pressure.

There are several advantages to ensuring there's a functioning inlet and outlet for your pond:

- It takes care of your pond in case of heavy rain or slight flood; the last thing you want is for water to just be entering your ponds during periods of heavy rain without a way to go out. A good inlet and outlet ensures water is escaping your pond just as it is entering it, thus preventing overflow of your pond.
- It ensures the quality of your water; bad/polluted water can reduce the response of your catfishes to feed by up to 70%, which in turn affects their growth. A lot of things can pollute stagnant pond water; this includes fish activity and excrement, particles of the feed and a sudden increase in the number of fishes that die if they aren't quickly taken care of.
- A pond with good inflow and outflow of water will always yield bigger fishes.

5. Treat Your Pond

Once your pond is prepared and ready, the next step is to treat it.

This applies only to earthen ponds, whether you just dug them or whether you are de-mudding them. The last thing you want is big snakes, tortoises, monitor lizards and other predators to start feasting on your baby catfishes as soon as they are introduced into the pond. Treat it with chemical that can kill all the organisms in it.

Available chemicals might differ depending on your location, and this is something you probably want to look into. You can use Phostoxin (a variation of which is Justoxin) to treat ponds.

Also, lime can be effective for killing off organisms in a pond before stocking.

Before treating your pond, block water from going in or coming out for at least two weeks, the duration of which you will be unable to use your pond.

Assuming you are using a pond that is 15m by 15m wide and 4ft deep, you can use 3 tubes of Forcetoxin to treat it; a tube usually contains 30 tablets, making it a total of 90 tablets you'll be putting into the pond.

Pour all the tablets into the pond, ensuring you cover all angles, and make sure you wear protective gloves before applying the tablet, wash your hands carefully after; you also don't want to ingest it in any way, as Phostoxin can be very poisonous.

Once your pond has been treated, don't use it for up to 2 weeks; although it takes around 5 days for the effect of most chemicals used to treat ponds to wear off, but you don't want to take any risk since we're talking about thousands of fishes here.

To be safer, even after waiting, you can pump out water from the pond and introduce new water to ensure the effects of the chemical has been completely wore off.

Once your pond is treated, you will see most of the predators in it dead and floating on the water surface within a day or two of treatment.

6. Concrete ponds preparation

The concrete ponds need preparation before catfish is introduced into the pond. This type is built with sand, gravel and cement.

When you have finished building and installing the piping then you prepare the pond. The inner part of the pond should be screed and made smooth.

Then the pond is left to dry for one week before introducing water. The water is left in the pond for two days, changed and then refilled.

When the alkaline level (hardness) is reduced and eliminated the pond is refilled with fresh water. While you may suspect that your pond has high or low pH levels, the only way to truly know is to test your pond with a pond water test kit. (pH, also known as the potential for hydrogen, is the scale used to determine the basicity or acidity in a liquid.) The fish farmer can check the inlet and outlet to see if they work.

7. Plastic tank preparation

Plastic tanks need little preparation before introducing your fish. The manufacturers have already taken precautions by using well formulated plastic.

The fish farmer after installing the pond with a concrete base and piping fills the pond with water. The plastic pond only needs to keep water for a few hours before you change it and add fresh water.

When can you put fish in your pond?

You need to test your pond to see if there is any leakage before adding fish. To know if the pond can sustain life place just a few catfish in the pond.

Keep them in the pond for 48 hours if they survive then your pond is ready. After all this preparation you can now clear any debris in the water and add your catfish.

8. Net Your Pond

The final step in the preparation stage is to net your pond.

There are different types of net like, “double fingers”, “four fingers” or “single finger”, etc. Go to any fish equipment store near you, and ask for pond nets.

Following the 7 steps, hopefully, you now have your pond ready to be stocked with fishes. The next step is to stock your pond with catfishes

Terms Used:

De-mud; this means to remove mud from a pond to make it more suitable for your fishes.

Dike; a mound of earth/soil that is built round your pond to prevent water from overflowing; it is also called an embankment.

Water pressure; this is the force that pushes water through your pipes. If a lot of water is coming from an external source, maybe a stream or river, then the water pressure is usually high due to the continuous flow of water pushing it forward. This means your pipe can be easily submerged by water in your pond, yet water will keep flowing into your pond, instead of going back out, due to the external pressure pushing the water in.

Stocking; this basically means introducing juvenile catfishes into your pond.

Alkaline level: Alkalinity is typically related to the amount of dissolved bicarbonate, carbonate in the water and as such, alkalinity tends to be higher in "harder" water.

CHAPTER 3:

STOCKING YOUR POND

It's important to realize that there are different stages of catfish growth. There are a lot of stages but, while being practical, here are the four main types you can stock in your pond:

- Fingerling (3 to 4 grams)
- Post-fingerling (4 – 6 grams)
- Juvenile (6 – 10 grams)
- Post-juvenile (10 grams and above)

To ensure the information is applicable to you irrespective of where you are, I included information about fish size in grams; an average, good fingerling catfish should be at least 3 – 4 grams in weight while an average, good, juvenile catfish should be at least 6 – 10 grams in weight.

Risk of Stocking Smaller Catfishes

It is very important to note that the smaller the catfish you stock, the higher the risk factor. By “risk factor” I'm referring to the following:

- Mortality rate: Smaller catfishes are not as stable as more matured ones, which can be really rugged, so their mortality rate is higher.

I've seen a pond where 5,000 fingerling catfishes were stocked, only to come one day and find at least 500 of them dead and floating on the water; this rarely happens with juveniles, but it is more common with fingerlings.

As a rule, expect at least 20% mortality within 6 months if you stock fingerling catfishes, with most of them dying within 3 weeks of stocking, while you can be sure of less than 10% mortality in 6 months if you stock juvenile or post-juvenile catfishes.

- Maintenance: You also have to consider other factors such as changes in water quality, water pollution, predators as well as other factors when the

fishes are smaller. The bigger a catfish is, the more mature it becomes and the smaller the risks you have to deal with.

So, if you want to stock, ensure you get the biggest fish you can get; by “biggest”, I’m referring to something in the juvenile/post juvenile stage.

Putting the Juvenile Catfishes into Your Pond

Once you’ve gotten your juvenile catfishes, make sure they are not stressed too much from the point of transportation to being introduced into your pond.

This means:

- Avoid exposing them to heat
- Avoid completely covering the container you put them into before they get to your farm
- Avoid shaking the container too much; if you have to transport them on bad road, drive slowly

Once the fishes get to your farm, the next step is to introduce them into your ponds.

Now, the worst way to go about this is to just pour/empty the container into your pond; that is faster but it stresses your fishes. If you do this, you could get to farm the next day to find dead fishes floating on your pond.

The best way to go about this is to slowly put the container into the pond (that’s if it is small; if it is big, look for a small container and do this slow and steady), let the natural pond water mix a bit with the water you brought the fishes in for a while before finally releasing them into the pond.

Doing this ensures they don’t suddenly get introduced to the water, which probably has different temperature and qualities from the one they were brought in; remember that there were possibly thousands of them in a small container just a while ago, only to be suddenly released into a large body of water that will seem like an ocean to them.

They get some time to adapt before being finally introduced into the massive water in the pond.

By following the above instructions, not only will you reduce the mortality rate of your baby catfishes you'll also position yourself to more efficiently take care of them.

CHAPTER 4:

FEEDING YOUR FISHES



Good feed is on the same level with quality water, and it is often what determines the profitability of a farmer.

While most fish farmers focus only on getting inexpensive feed for their fishes, feeding your fishes should be less about the cost but more about the profit margin; so, you might be spending 3 to 4 times more than the average farmer on feed, but there's nothing wrong with that if it makes your fishes 5 to 6 times bigger than their fishes, significantly increasing your profit margin.

In the last lecture on stocking your pond, I said you can stock your pond with mainly 4 types of catfishes:

- Fingerlings (3 to 4 grams)
- Post-fingerlings (4 – 6 grams)
- Juvenile (6 – 10 grams)
- Post-juvenile (10 grams and above)

When it comes to feeding catfishes, there's a lot of variations and factors to be considered depending on the size of your fishes.

There are different stages of catfish growth, and there are different stages of fish feed; fish feed are often denoted in “mm” for example, 1.5mm feed, 1.8mm feed, 2mm feed, 4mm feed, 6mm feed etc.

There is extruded (or floating) and non-extruded (or sinking) feed.



Extruded (floating) catfish feed

What I recommend is to give your fishes extruded (or floating) feed for up to 2 months before switching to the non-extruded (or sinking) feed.



Non-extruded (sinking) catfish feed

Catfishes are mostly bottom feeders, so by their very nature they are designed to be eating non-extruded (or sinking) feed, but the reason I recommend giving them floating feed at the early stage is because they are more fragile then.

With floating feed, you can put the feed on the pond gradually and let them eat it; the risk of overfeeding is significantly reduced, thereby ensuring there is no water pollution that can lead to high mortality in your very fragile juveniles.

Furthermore, due to their fragile nature, giving your juveniles feed that isn't rich with the right nutrients can affect their long-term growth. Floating feed from recognized producers like Durante, Cargill Aqua Feed, Raanan, and Coppens will ensure optimal growth of your fishes, even when you later switch to sinking feed comprising of your own formula.

The top feed producers that I recommend and have used are Aqua Feed, Durante, Raanan and Coppens. From my research, I have also noticed that Aqua Feed, Coppens and Raanan are available internationally, so my recommendation isn't restricted to just Nigeria.

What Feed Size to Give Your Catfishes

There are various fish feed sizes, whether you go for floating or sinking feed; sinking feed is usually bigger, and longer, than floating feed.

Here are the different sizes:

1.5mm, 1.8mm, 2mm, 3mm, 4mm, 6mm, 8mm, 10mm, etc.

The bigger your fishes, the bigger the feed size they can pick.

Here's what I recommend if your fishes fall into the following categories:

- Fingerlings (3 to 4 grams): 1.5mm feed size
- Post-fingerlings (4 – 6 grams): 1.8mm feed size
- Juvenile (6 – 10 grams): 2mm feed size
- Post-juvenile (10 – 50 grams): 2mm feed size

As your fishes grow, the size of feed they can pick will increase. Here's the feed size I recommend for bigger fishes, based on their size/weight, if you're to give them floating feed:

- 10 – 50 grams: 2mm feed size
- 50 – 150 grams: 3mm feed size
- 150 – 400 grams: 4mm feed size

Your fishes should be around 200 – 300 grams in 2 months with floating feed if they are being fed properly, you can then switch to sinking feed with the following feed sizes:

- 200 – 300 grams: 2mm feed size
- 300 to 600 grams: 4mm feed size
- 600 grams to 1kg+: 6mm feed size

If your fishes exceed 1kg in weight, and you're able to get bigger feed sizes, then you can consider giving them 8mm, or even later 10mm. 3 to 4kg fishes eat 6mm sinking feed just fine, though, so don't worry too much if you can't find bigger feed sizes.

How Often Should You Feed Your Fishes?



2 months old catfishes eating

How often you feed your fishes will differ depending on a lot of factors. To get an average of 1.5kg to 2kg fish size in 6 months – here's what I recommend:

- Fingerlings (3 to 4 grams): twice daily
- Post-fingerlings (4 – 6 grams): twice daily
- Juvenile (6 – 10 grams): twice daily

- Post-juvenile (10 grams and above): twice daily

Anything above post-juvenile: once daily

Types of Catfish Feeding

There are two feeding types commonly used:

- Broadcast Feeding: This basically involves going round the pond, spreading floating feed all over the pond to ensure all the fishes in the pond can eat. Use this from fingerlings to post-juvenile stage, because they just got introduced into a large body of water, often from somewhere significantly smaller, and not all the fishes can come to the same spot to eat.

Once the fishes become more mature, often this is in the post-juvenile stage or around 30 – 50 grams, you can switch to spot feeding.

- Spot Feeding: Spot feeding is less time-consuming and more effective, since it is less stressful and you can carefully monitor how your fishes are eating. Spot feeding is basically feeding fishes in one spot. Get the fishes to eat in one spot once they reach 30 – 50 grams, or after 2 – 3 weeks of stocking them from juvenile stage.

At first, if they are used to eating using the broadcast style, most of the fishes won't come to a particular spot to eat; however, by ONLY feeding them on that spot for a few days, they'll be conditioned to come to that spot and eat.

Buying Catfish Feed vs. Making Your Feed

In catfish farming business, it will be more profitable if you make your own feed as opposed to buying feed from major producers.

Some farmers rely on floating feed from producers like Durante and Aqua Feed to grow their fishes, but due to the expensive nature of these fishes, it can be unprofitable on the long term.

If you learn how to make your own feed, you'll save a lot more money and you can have more impact on your fishes since you can easily control what they are eating.

I recommend buying feed from feed producers like Raanan or Aqua Feed until your fishes reach 200 – 300 grams, and then giving them local feed.

Protein is the main ingredient in fish feed, and every good feed formula contains a significant amount of protein; however, fishes still need energy, mainly found in carbohydrate, to process and digest the feed so a protein-only feed isn't going to be best.

FISH FEED FORMULA

Here's the formula I have used for my fishes depending on the stage they are at; this formula uses the Hhanstholm 72% fish meal; I use local fish that can be gotten here in Nigeria depending on availability, but there is a lot of fluctuations in their availability, so I'm giving a formula based on the Hanstholm 72% fish meal, since this is always available:

Feed Formula for 200 – 600 Grams Catfish

Your catfishes are still very small and tender at this stage, so they need quality nutrient in their feed; this formula results in a feed rich in good protein but it is a bit expensive; it is not as expensive as using floating feed, though.

You should only have to use this feed formula for around 1 – 2 months.

- Fish meal (Hanstholm, 72%): 25%
- Soya Meal (or full fat soya): 30%
- GNC (Groundnut cake): 20%
- Dough/Maize/Biscuit (or other main forms of energy/carbohydrate): 20%
- Molasses: 5%

Based on this formula, 1 ton of fish feed will have:

250kg fish meal

300kg soya meal

200kg GNC

200kg Dough

50kg molasses

The above are the main ingredients; you can then use other ingredients such as DCP (Dicalcium Phosphate), Methionine, Lysine, Salt, Vit. C, Fish Premixes, Antibiotics, etc. according to your preference.

Feed Formula for 600 Grams and Above

- Fish meal (Hansthalm, 72%): 10%
- Soya Meal (or full fat soya): 40%
- GNC (Groundnut cake): 20%
- Dough/Maize/Biscuit (or other main forms of energy/carbohydrate): 25%
- Molasses: 5%

(Based on this formula, 1 ton of fish feed will have:

100kg fish meal

400kg soya meal

200kg GNC

250kg Dough

50kg molasses)

The above are the main ingredients; you can then use other ingredients such as DCP (Dicalcium Phosphate), Methionine, Lysine, Salt, Vit. C, Fish Premixes, Antibiotics, etc. according to your preference.

For 1 ton of feed you can use the following:

DCP (Dicalcium Phosphate): 10kg

- Methionine: 1kg
- Lysine: 1kg
- Salt: 2 – 3kg
- Vit. C: 1kg
- Fish Premixes: 5kg
- Antibiotics: Optional, unless my fishes are sick (in which case the quantity depends on the antibiotics used; it's often around 500g to 2kg for 1 ton of feed)

How to Know When to Stop Feeding Your Catfishes

Knowing when to stop feeding is something the inexperienced catfish farmer has to deal with. Knowing when your catfishes are okay becomes a bit tricky once you switch to spot feeding, but you don't have much to worry about.

If using floating feed, try to avoid having excess feed on the surface of the water; carefully observe your fishes to see what will satiate them.

If floating feed must remain on the water, it should be something that the fishes can finish within 5 minutes of stopping their feeding; anything more is potentially a waste.

For sinking feed, carefully observe the response of your fishes; they will eat excitedly while their reaction reduces as they start get satiated, but it's safe to stop if you can barely see them pop their heads out of the water to eat. If you stocked 1,000 fishes into a pond and can only see 5 – 10 fishes eating after a while, it is safe to stop; with sinking feed, anything more could be a waste.

I tried to include everything I believe you need to know about feeding, that can help you grow your catfishes from fingerlings stage to several kilograms.

CHAPTER 5:

IMPORTANT RULES OF CATFISH FARMING

There are rules that are essential when building a catfish farming business.

If you're doing this for fun or as a hobby, feel free to ignore the rules. If, however, your aim is to build a successful catfish business; whether you're in Nigeria, china or in the USA, these rules are universal.

1. YOUR NUMBER ONE AIM SHOULD BE PROFIT

When running a catfish farming business, the most important metric is profit; the size of your fishes doesn't matter, their age doesn't matter, and what they are being fed doesn't matter. What matters most is profit.

It's not about your fish size or age, but about how much profit you return on your investment.

So, ultimately, your goal as a commercial fish farmer is to maximize your investments; at the end of the day, when you calculate feeding costs, logistics costs, maintenance and payment to employees/contractors, you should make a profit.

To me, anything above 50% within a 6 months period after deducting every expense is impressive. Though, I have seen 100% profit or more depending on the market situation.

2. GET YOUR FISHES FROM THE RIGHT SOURCES

Most catfish farmers will ignore this point but it is absolutely essential.

A good way to know how well your fishes will perform is by observing how well they respond to feeding; if they eat a lot, they will most likely grow a lot.

- Look for major suppliers: Ask farmers around you who the major suppliers are. If a company could succeed well enough to be recommended by local farmers for the quality of its fishes, you can be sure that the company has

quality fishes. The only caveat to this approach is that the wait time for getting fishes from major suppliers is usually longer compared to smaller suppliers

- Go with a verifiable individual: If you see a fish farmer around you doing really well, ask him where he got his juveniles from and tell him to recommend the source to you. If someone contacts you directly, ask the person for the kind of results his clients are getting and try to verify his claims; if his clients are getting average results, or even slightly above average results, you can go with this supplier.

Out of a round of stocking 5,000 – 10,000 fishes, you can give a new supplier a try by going for 1,000 – 2,000 fishes, putting it in a special pond and seeing how well it performs. This ensures you don't miss out on potentially good sources, while at the same time ensuring you are not significantly affected if a new source is bad.

- The Growth of Your Fishes Correlates with the Quality of their Water: While the quality of catfish feed is essential, it is also one of the “most important factors” when running a fish farm. The most important factor contributing towards the growth of your fishes is the quality of the water they are in. You need to realize that they aren't necessary in their “natural” environment, so water quality should be given special attention.

Personally, I use and prefer the earthen pond system to the “concrete” or “artificial” pond system, so my catfishes have as much of a natural environment as possible. However, they are still restricted in terms of space and inflow and outflow of water, so a lot needs to be done to ensure adequate water quality.

One of the best ways to ensure adequate water quality is to make sure quality “natural” water is entering and going out of your pond on a consistent basis. Also make sure the water entering into your ponds isn't being polluted by other environmental activities.

3. FEEDING IS ESSENTIAL TO YOUR FISH GROWTH (NOT JUST QUANTITY OF FEED, BUT QUALITY)

Mainly, fish growth is dependent on the quality of the feed, their feed needs to have the right taste and flavor.

This is why you can give your fishes certain feed today and they will easily eat 30kg of feed, while the same fishes struggle to eat 5kg the next day. If your feed doesn't taste and smell right, they won't eat it.

While feed quality is essential, feeding pattern and quantity is just as important.

When you feed your fishes, especially with local feed, which is what I'll be recommending, you need to realize that this is basically what happens:

- 1/4 of the feed is wasted in the process of feeding them
- 1/4 of the feed is wasted through metabolic activities and as through waste released by the fishes
- 2/4 of the feed is converted into flesh and increase in size/mass of the fish

Your aim is to give them enough feed to ensure they are able to grow, as that's what ultimately leads to profit for you.

If you do not feed your fishes well, most of the feed you give to them will just serve as maintenance feed and what they really need to convert into mass that yields you profit will not be there.

Due to this consideration, I have two recommendations besides ensuring adequate feed quality:

a) Feed your fishes daily

b) Feed your fishes optimally; If you can manage to curtail the 1/4 wasted in the process of feeding your fishes, you'll be saving a lot. As a result, feed your fishes until they are almost satisfied and you can only see a few number of them coming up.

Don't stop feeding them when dozens of fishes are still visibly eating, and don't keep feeding them when you can only see a few fishes coming up to eat.

4. FISH MEAL

Every quality fish feed has ample amount of fish in it; while this is a fact, there's a time when "more" becomes a waste, though

Having the right quantity of fish in their feed will ensure they eat the feed well and grow.

Having little or no fish in their feed will result in very lackadaisical response to feed.

5. BE CONSISTENT

You shouldn't feed your fishes a lot today and not feed them the next day, doing that is a recipe for disaster. Feed them every day without fail

This is especially critical at their early stages.

Until fishes are at least 4 months old from the juvenile stage, don't stop feeding daily, the result of not been consistent in feeding is usually stunted growth even if you eventually decide to feed them well after missing few days.

CHAPTER 6

MAGGOT PRODUCTION

Production of maggots is a solution to the high cost of feed in fish and livestock production.

Importance of maggot production

- Simple and cost effective for farmers.
- Provides a source of nutrient for fish and poultry
- Provides fertilizer for crop production.
- Wastes are concentrated and decomposed.

To produce maggots, you need the following:

- * House fly (*Musca domestica*)
- * Suitable substrate
- * Fly attractants

Substrate: Rice hull/brewer dry grain

The fly attractants include poultry manure, animal offal from the abattoir, dead lizards, birds, rats and other animals.

You can also use decaying fruits like mangoes.

Procedures:

- * In a clean substrate tank/big bowl, place 4 shovel full of fresh animal manure and 6 shovel full of fresh rice hull/brewery spent grain. Mix them together.
- * Cut the animal offal into small pieces and other fly attractants spread them in the middle on top of the substrate.
- * The flies are attracted immediately to lay eggs.
- * During dry weather, water the prepared tank/big bowl, using a watering can.

- * Small maggots are observed about 6 hours later (after first contact of flies with substrate)
- * Water the substrate daily. The drier the weather, the more frequent the watering. Avoid water logging of substrate.
- * The maggots attain optimal size in 3 - 4 days and are then ready to be harvested
- * During unfavorable weather, decomposition is slow and the substrates should be turned daily, before the first harvesting.
- * At about 6 days old, maggots become slow and relatively insensitive and are ready to be transformed into adult flies.

Harvesting of maggots

Harvesting of maggots begins on the 4th day after 1st contact of fly with substrate. The maggots are of the right size at this stage.

To harvest:



- You will see your maggots clustered as ant hill, so, you use a 'parker' or a tray, sweep the clustered maggots into a bowl containing water and a sieve. Place your maggots into the bowl and then sieve out the little substrate which will be floating.

- Decant the water and then you have your maggots left in the bowl. Now, after harvesting your maggots, you must feed them immediately to your fish or birds except you are preserving or processing. If you leave them fresh, they will turn to pupa which will later turn to housefly. Remember that the maggot is gotten in the life cycle of a housefly and if there is delay in feeding your animals with it, the lifecycle continues and then you end up having much housefly or you end up multiplying the houseflies in your maggotery.
- Harvesting is done once or twice daily (morning and or afternoon). A 1m x 1m substrate tank can yield 2.5-3.5Kg of maggot per day.

Things to consider:

- Production is low during harmattan and dry weather
- Production is better in humid conditions
- More the quantity of attractants, the more number of flies and the greater the number of maggots produced.
- Rats at night; lizards and birds in the day ; ants if not prevented cover the field of maggots.

Preserve maggots by sun drying of steamed maggots and placing in airtight containers.

CHEMICAL COMPOSITION OF MAGGOTS

Dry matter – 24.7%
 Crude protein – 47.5 – 60%
 Minerals – 9%
 Lipids – 93.2%
 Ash – 23.2%
 Ca – 1.5%
 P – 1.2%
 Mg – 0.3%

