

General aquarium maintenance-budget for setting up an aquarium fish farm as a cottage industry

Build a homemade aquarium?

First, decide the size of your aquarium. The aquarium must be big enough to house all the fish. Fishes must have enough space to swim in the fish tank. Congested living space will negatively affect the health of the fish. After deciding the size of the aquarium, you may buy aquarium glass. Aquarium glass of different width and length are available in many stores. Assemble the glass pieces together with water-tight glue. The aquarium must also have a beautiful roof. They are available at pet shops. Choose a roof with a sliding window so that fish can be fed.

Now fill the bottom of aquarium with sea-sand for about 3 inches deep. Find some aquarium plants and embedded them deeply in the sand. Cover the bottom with ornate stones. Most of the aquarium fishes are pure-water fishes. Do not use chlorinated water in the aquarium. It will be better to use the water from a well or a bore well. Pour the water gently to the aquarium, without disturbing the sand at the bottom. Fill the tank up to 4 inches below the surface.

Don't put the fish directly to this aquarium. Change the water regularly for two days. This is to wash away any unwanted elements in the tank. During these two days, introduce the fish gently to a sample of aquarium water in another tank or bowl. This will help the fish to be habituated to the water in the aquarium. After two days, gently transfer the fish from the bowl to new aquarium. The fishes are disinfected with 2% potassium permanganate solution before introducing into the tank.

Now-a-days, acrylic fish tanks and aquariums, which are cheaper and more efficient than glass aquariums, are available.

Which fish to choose for aquarium?

This is the part where an aquarium becomes most difficult business. There are some of the most popular fishes in the market. Remember to choose some aquarium fishes that add light to your aquarium and economic.

Gold fishes are bright orange in colour. They are fluffy and cute, perfect companions to any aquarium. They are an inevitable part of many beautiful aquariums.

Angel fish is multicoloured. They have a wide and diamond body that often resembles an angel with wings. They are elegant and noble members of any aquarium.

Eel fishes are famous for their snake-like appearance. They have pride and elegance in an aquarium. Some species can produce electricity, so do not put other poor fishes along with eel.

Cat fish have nosy appearance and long whiskers. They are normally black or grey in colour.

Guppy is another popular aquarium fish, which can adopt well with the artificial eco- system within the aquarium. They come in many colours, and belong to the group of inexpensive aquarium fishes.

Betta are blue, electric and feathery. They are a cute and vibrant companion to your aquarium.

There are many other varieties of fishes to choose from. Before buying small family of fishes, make sure they contrast each other in appearance. Different types of fishes make an aquarium lively. But don't put dangerous fishes like fighter fish with other innocent fishes! Also, stick to your budget.

How to take care of aquarium?

Taking care of an aquarium is an important process. An aquarium is an artificial ecosystem created by man. A small error can disrupt the whole aquarium. Common aquarium maintenance tips are:

Adding filter pumps

Filter pumps are placed in an aquarium to purify water. Filter pumps expel excess carbon dioxide and pump oxygen to the water. Thus they help to maintain the oxygen level in the water at an optimum. Once you install efficient filter pumps in an aquarium, you have to change the water only once in a week. If more than one efficient filter pumps are added, you may change the water only once in two weeks.

The aquarium filter should be serviced monthly. A densely stocked aquarium may require more frequent filter cleanings. Do not use soap, bleach or chemical cleaners, because they will kill the beneficial bacteria required for healthy aquarium life.

Keeping ammonium content at a minimum

Increasing ammonia content should be checked in an aquarium. Many small leaves and plant residues decay and produce ammoniac content. This will affect the health of the fishes, especially their vision. If you recognize a pungent smell arising from the aquarium, you can assure increasing ammoniac content. You can shift this by changing the water.

Checking fungal infection

If the plant leaves experience yellowness before their ageing, it indicates fungal infection in aquarium plants. This too affects fishes adversely. If you spot fungal infection in aquarium plants, carefully uproot them.

Clean water and keep aquarium crystal clear

Aquarium always looks good when the water is crystal clear. Clogged and clouded water give a suffocating look. They are unhealthy to fishes as well. To keep the water clear, avoid dropping excess food in the water. Remove decayed plants regularly and any fungus that may creep up on the walls of the aquarium.

Aquarium maintenance: General tips

- 1) Do not put mutually fighting fishes and carnivorous fishes with other fishes in the same tank.
- 2) Gold fishes are the best in social behaviour.
- 3) Do not place aquarium in dangerous places, high altitudes, places where children can reach etc.
- 4) Do not place the fish tank where direct sunlight falls. This will cause fungus growth.
- 5) Do not use chlorinated water in aquarium.
- 6) Before planting plants, dip them in potassium permanganate solution.
- 7) Do not touch fishes with bare hand. Always use fish net.
- 8) Make sure to keep the aquarium water crystal clear and clean. Do not put excess food, decayed leaves etc.

Aquarium Maintenance Routine

A complete aquarium maintenance schedule includes daily, weekly, bi-weekly and monthly tasks

Daily

- Make sure the equipment is running properly.
- Watch your fish during feeding. Behavioral changes are a good indicator of a potential problem.

Weekly

- Count your fish. In case of fish death, smaller species can decompose quickly, resulting in ammonia and nitrite spikes and eventually high nitrate levels.

Every other Week

- Test your water for vital parameters: pH, carbonate hardness, nitrite, and nitrate.
- Clean the aquarium walls. Filter floss is fairly cheap and very efficient. Start from the bottom upward and rinse filter floss or scrubber frequently.
- Vacuum the gravel.
- Change 10-15% of the water.
- Rinse filter inserts with the extracted water.

Monthly

- Replace filter inserts, cartridges, floss, carbon, and Algone. Rinse entire filter if needed.
- Inspect tubing, connections, airstones, skimmers and other parts for proper operation.
- Clean aquarium top to assure your lighting is not affected.
- Check the expiration dates printed on the boxes and bottles of the aquarium supplies you use. Do not use after the imprinted date. Expired test kits will give false readings and may prompt you to take unnecessary action.

Goodies and accessories for the aquarium

There are a large number of goodies and accessories for aquarium that are available in the market. Some of them are for purpose, whereas some are for luxury. However, since the main purpose of keeping an aquarium is leisure, you may like to add some goodies to your aquarium. Here are some of them:

Aquarium tanks: Standard glass aquarium tanks have little market nowadays. Most people prefer acrylic, wall and corner aquariums. They range from about 100 \$. Test the tanks for any leak before installation.

Filter Pumps: The function of filter pumps is to purify the water. They are available in many interesting models. Filter pumps shaped like oysters, scuba-divers, wrecked ships, treasure chests, sea horses etc are available in the market. The price of a filter pump is around 18\$.

Thermometer: Thermometer helps to understand the temperature within the aquarium. This is important if you are keeping temperature-sensitive fishes. Price – around 3\$ (150 Rs.). maintain the temperature of the aquarium at its natural level *i.e.*, 24°C.

Eclectic heater: raise the water temperature whenever the water temperature is goes down. A thermostat is connected to the electric heater and senses the water temperature of tank.

Lighting proper way.

Fish nets: Fishnets are used for transferring fish from one fish tank to another. They are inexpensive and their price starts from 0.5 \$ (25 Rs).

Water Pumps: The use of water pumps is to avoid the manual changing of water. Water pumps pump pure water from one corner while expelling used water from another corner. They can cost around 15 \$.

Plastic plants: Live plants are always better, because they oxygenate the water. But plastic plants have some merits – they don't decay and cause ammoniac infection.

Coloured and ornate gravels and rocks: They are available in the market in various shapes and size. They help in beautifying the aquarium, they protect the sand from disruption and also fix the root of the plants. The bottom of the tank have slope slightly towards the front for better vision.

Backgrounds: Aquarium backgrounds are merely for entertainment. Picture backgrounds with seashells, sponges and treasure chest adds to the beauty of aquarium, in every way.

The aquarium glass is cleaned of from algae and other dirt by steel wool or a razor blade.

Stocking density of aquarium

Stocking density refers to the number of fishes in a tank can support the long life and survival. It is based on:

- Length of fish
- Volume of water (volume of the water is measured by multiplying the length, width and height of the tank).

The ideal stocking density is as follows:

1 cm long fish /1L of water or 2 Inch long fish /1 gallon of water.

The recommended space is 75 cm² for every 2.5 cm of fish body length.

Aquarium water changes

Water changes are the most important part of routine aquarium maintenance. An average water change of 10 – 15% is every two weeks. Maximize your efforts by using a siphon to extract aquarium water while “vacuuming” the gravel. This will remove uneaten fish food, fish excreta and other harmful waste settled at the bottom of the aquarium. When performing aquarium maintenance, test the water parameters of both, the aquarium and replacement water.

Tap water (municipal water) contains chlorine or chloramine. Chlorine will air out if kept in an aerated bucket for 24 hours. Chloramine will not. Chloramine = chlorine + ammonia. Either way, it is best to use a water conditioner to neutralize the chlorine. Ammonia will remain in the water if it contained chloramine, even after treatment with a conditioner. Nitrifying bacteria will break down the ammonia after adding the water to the aquarium.

Other elements of municipal water may be phosphates, iron and other heavy metals. Generally, well water is harder than municipal water, but it should be chlorine and chloramine free.

Do not overfeed or over stock the aquarium. The increased waste will result in difficulty maintaining a healthy fish tank.

Testing the Aquarium Water

Vital parameters to test as part of routine aquarium maintenance include nitrate, nitrite, pH, carbonate hardness and salinity (saltwater only).

Nitrates should be kept below 10 ppm in freshwater and 5 ppm or lower in saltwater and reef aquariums.

Nitrites should be undetectable at all times (except during cycling). If nitrite is detectable, be sure to test for ammonia as well.

pH must remain stable. pH in the range of 6.5 – 7.5 is suitable for most species, but they should be fine if it's slightly out of range.

KH (carbonate hardness) is a measure of pH stability. If KH drops close to 4.5 dH (degree hardness) or 80 ppm, you should monitor it frequently. If hardness drops below 45 dH, the pH of the aquarium water will crash. A half teaspoon of baking soda per twenty-five gallons of water, raises kH by approximately 1 dH (17.8 ppm).

Fish food and how to feed them?

Pet fishes should be fed twice in a day. Do not feed aquarium fishes too much. Usually fish food bought from pet stores is used to feed fishes. Sometimes, small plants like azola are used to feed fishes. Feeding other food items may cause pollution of aquarium water. Similarly, never drop fish food for 3-4 days in the aquarium all at once. This also will cause clogging of water.

The feed may be placed in a **feeding ring** fixed on the surface of the water. The cup device is usually for holding *Tubifex*.

Fish diseases and how to cure them

Fish diseases are extremely contagious. Therefore, whenever you spot a fish with symptoms of a disease, shift it to another tank and provide treatments for the fish immediately.

Usual fish diseases, symptoms and treatments

- 1. Bacterial infection:** A rash-like appearance in the gills and outer skin of the fishes indicate bacterial infection. To prevent bacterial infection, dissolve oxytetracycline (500 ml) in two litre water and add this water to the fish tank.
- 2. Fungal infection:** The main symptoms of fungal infection are wounded and bulging body. Some fishes also experience a loss in scales.
- 3. Ulcerative enteritis** infection occurs through water. This can be prevented only by ensuring that the water is 100% pure each time. Once spotted, shift all the fish to a tank filled with clean and pure water.
- 4. Columnaris:** Bacterial disease, the main symptom is grey patches in the body, especially around mouth. Medicines against bacteria should be provided.
- 5. Gill disease** is easy to recognise. The fish will flutter its gills as if it is rushing. This is a parasitic disease. Water should be cleaned fast. Chlorine and impure water is a major reason.
- 6. White spot disease (Ick disease):** Parasitic disease. Ash spots on the body of the fish are the main symptom. Ick is a kind of protozoa that grows within fish skin. Later they will be shed and this will multiply. This disease is highly spreading. Proper medicine should be given.
- 7. Fin-rot disease:** As the name suggests, the fin of the fish will gradually become hard and will decay. Anti-bacterial medicine can help.
- 8. Pop-eye disease:** The eyes of the fish become protruding. The reason for the disease can be over-oxygenated water. This disease can't be really cured. However, shifting the fish to less oxygenated water and treating with anti-bacterial medicines is generally done.

Aquarium fish farm as a cottage industry

A small-scale ornamental fish farming is a profitable business and any one can start this business as home-based. Ornamental fish farming is a financially lucrative project and also self-rewarding. In addition, keeping aquarium fishes is one of the oldest and most popular hobbies in the world. However, need some basic skill and knowledge about the breeding and rearing. Broadly, there are 2 categories according to the breeding behaviour: egg layers (oviparous) and livebearers (ovo-viviparous). The growing interest in aquarium fishes has resulted in a steady increase in aquarium fish trade globally.

The growing interest in aquarium fishes has resulted in a steady increase in aquarium fish trade globally. The top exporting country is Singapore followed by Honking, Malaysia, Thailand, Philippines, Srilanka, Taiwan, Indonesia, and India. However, the largest importer of Ornamental fish is the USA followed by Europe and Japan. The growth of ornamental fish trade globally is very much encouraging. Most of the ornamental fishes cultured and marketed are exotic species.

Basic requirement to start ornamental fish farming business

Tanks

The tanks can be of reinforced cement concrete water tank or brick masonry work having flat bottoms with inlet and outlet pipes. Now a day clay, cement, fiberglass or plastic tanks are also used. The size of the tanks varies according to space, the number, and type of fish culture. Rearing of fishes are in large tanks.

Aquariums

Glass tanks of varying size are required for breeding. Small glass bottles of 250 ml for keeping individual male fighter fishes are used. Number and size of the glass tanks depend on the specific breeding/spawning behavior of the species selected.

Overhead tank

An overhead tank of suitable size for storing and to enable sedimentation of water is required.

Water Supply

Deep tube wells are the best source of water. Users can try recycling water through bio-filters or another sort of filtering mechanism. Other sources like dug wells, municipal water if available can also be used. Furthermore, need a small pump to lift the water to the overhead tank and a network of pipes to feed the culture tanks.

Work Shed

Work shed should be designed in such a way that the tanks get filtered sunlight. Translucent high-density polyethylene sheets can be used. This also protects the culture tanks from falling debris and bird dropping etc.

Aeration equipment

A blower pump with a network of tubes for aeration is necessary. Additionally, you must ensure continuous power supply through generator set or UPS or inverter.

How to start ornamental fish farming business

Like any other livestock farming, ornamental fish farming may attract financial losses because of poor management and disease attack. Therefore, it is very important to handle the farm carefully. The basic requirements for successful breeding and rearing of ornamental fish are adequate space, quality water and sufficient feed.

Business plan

This is the first of any business. There are several factors you must determine before the business plan. Determine whether you want to initiate a breeding and rearing farm or only rearing farm. Because you will need to put the other things on the basis of this. Then select the fish species. It is advisable to start with small. Create a financial projection and of course, determine the marketing plan. Where to sell the fishes and how you would go to compete with other sellers.

Select farm location

First, fix a location. You can start from your backyard. You can also initiate the business from a rental location. However, try to ensure a location nearby a market. Therefore, you can access easily the market and transportation facility both.

Prepare fish tank or Pond

You can start ornamental fish farming with the tank. You can use plastic, cement or glass tank. If you want to offer, retail sale from your farm, then it advisable to use a glass tank. However, you can also use the pond. You will need to procure small and big tanks. Generally, small tanks are used for growing fish fingerlings. In addition, you can use a large tank or pond for rearing big fishes.

Select fishes

According to the local market demand select the fishes carefully. However, you can also initiate a fully export-oriented fish farm. In addition, for that, you must depend on the international market demand. However, some of the most popular aquarium fish species are Molly, Guppy, Platy, Swordtail, Blue Gourami, Pearl Gourami, Rosy Barb, Gold Fish, Fighter, Angel etc.

Fish rearing

In ornamental fish farming, you must manage the farm efficiently. Generally, you can use cement tanks. Cement tanks are easy to maintain and durable. You can sock one species in one tank. However, in the case of compatible species, two or three species can occupy the same tank. Groundwater from dug wells / deep tube wells/ bore wells is the best for rearing fish. The fishes reach marketable size in around 4 to 6 months. You can harvest eight to ten crops in a year.

Feeding

Young fish are fed mainly with infusoria, *Artemia*, *Daphnia*, mosquito larvae, *Tubifex* and Bloodworms. For rearing, you can use formulated artificial or prepared feed. However, try to develop a feed that has a low polluting effect, cheap to prepare and easy to store.

Promote ornamental fish farming business

Proper promotion of the product is important. Aquarium shop is a very good option. You can sell you fishes from your own shop. In addition, you can also distribute the fishes to the other retail outlets. Register your business with local b2b directories. Create your business website and join the fish farming associations. Finally, try to build a wide and strong distribution channel to promote your ornamental fish farming business.