Aquaculture

Guidebook



Tilapia Nirotshica **Hybrid Red Tilapia** **Fresh Water Shrimp**

<Introduction>

Aquaculture is the process of rearing fish and shrimps (prawns) in ponds. The animals grown in St. Lucia are: 1. freshwater fish e.g. Tilapia nilotica and red hybrid Tilapia and 2. a freshwater shrimp /prawns called Macrobrachium rosenbergii. Aquaculture has the potential to bring in more monetary returns per acres per year than more common forms of agriculture eg. Banana farming.

<Pond construction>

Soil content:

It must be verified that the soil content is made up of clay mixed with sandy soil (at least 20% of clay).For the soil content to be fully determined, test holes must be dug at various points on the land. Such test hole should measure approximately 4 feet maximum in depth, 1 foot wide. Each test hole is then filled to the top with water and left covered for one week. After one week each test hole is to be uncovered and examined to determine if it has retained its full content of water. A simple test is to wet a sample of soil in your hand and squeeze tightly. If the soil keeps the shape when squeezed it has the required amount of clay.

Water source:

It must be sufficiently clean and void of contamination, e.g., agrochemicals and it must flow consistently throughout the year in sufficient quantities and situated at a higher elevation to the land in question. Any water source located above a water intake cannot be used as this is restricted by WASCO to avoid contamination of public water supply. Pipe-borne water is also unsuitable as it is chlorinated and would be costly.

These are the steps in pond construction:

*clear the land of all vegetation and tree covers;

*survey the land to identify low areas and comparatively higher areas ;

*mark out the exact area for each pond to be constructed;

*measure and mark out the width for the pond walls;

*excavate the pond bottom (using appropriate heavy equipment);

*build the water inlet;

*build the drainage system;

*build the walls;

*properly seal the pond bottom with the surrounding walls;

*build a dam at some higher point to the pond and close to the existing water source

The pond bottom must be constructed with a slope created from a higher, shallow end to a deeper, drainage end. The pond bottom usually has a slope of 2-5%. For a slope of 2 %: for every 100cm change in length on pond bottom, there is a 2cm change in height

<Stocking>

After conditioning the pond, the same must now be filled allowing water from the inlet pipe to fall down in the pond slowly. The pond should not be filled following heavy rains as the water used in filling must have been given time to settle and be clear from silt and other solid materials.

The process of stocking a pond refers to the placement of the appropriate number of fish or shrimp needed to grow in a particular pond. The number is calculated based on the area of the pond in square meters.

The stocking rate is 10 per square meter for shrimp and 1per square meter for fish.

The stocking cost is @$0.10 for shrimp and @$0.10 or $0.25 for fish.

Both fish and shrimp are best transported in the absence of sunlight: either early morning or late evening. The presence of sunlight can be very stressful to the young fish and shrimp and can easily lead to their death.

Fish fingerlings (or young fish) and post larval (or young shrimp) can be transported from the hatchery to an external (farmer or hatchery) pond using plastic bags filled with oxygen.

On arrival at a pond site, the bag carrying young fish or shrimp is placed into the pond water and kept stationary for five minutes so that the animals can gradually acclimatize to the pond water temperature. The bag is then opened, and some water from the pond is placed into the transport bag with the animals and again kept stationary and floating in pond water for another five minutes for proper temperature adjustment.

After the second five minutes, the bag is opened and one can use their hand to feel if the temperature of the water in the bag is similar to the pond water. If good, the bag is slowly opened and immersed fully in the pond water, so that the young fish or shrimp can easily swim out.

<Feed>

This is the most important factor in growing the animals. Without good feeds and feeding practices a commercial venture is doomed to failure.

Fish and shrimp need to eat properly and therefore must be fed at least twice a day, once in the early morning and then at about 4:00pm and feed must be sprayed all over. The types and quantity of feed used is calculated as a feed schedule to be provided to the owner by the Aquaculture Unit. The feed schedule is important because it avoids under or over feeding of the fish/shrimp stock. Required contents protein for fish is 25% and for shrimp is 35% to achieve maximum growth rate. Recommended feed is pullet from CAMIL in Vieux-Fort but natural local stuff such as banana ,breadfruit, taro and coconut can be used use with chopped fish or fish meal added to them.

<Water Quality>

In management apart from feeding being the key to success, one has also has to maintaining good ph and oxygen.

Water pH is measured on a scale of 1 to 14, o-7 being acidic, 7 being neutral, and 8-14 being basic or alkaline. Fish and shrimp grow best in a pH of 6.5-8.0.

If the pH is out of optimum range, water must be drained 1/3-1/2 and filled back immediately. Water pH is checked by The Aquaculture Unit once a month then advice is given to the farmer.

Enough oxygen in pond is important as well. If many fish are seen coming to surface and gulping air and shrimp are seen jumping and trying to leave the pond then oxygen levels are too low. Fresh water should be added immediately, ensuring that the water splashes from a height as it enters the pond to aerate the water. At least two feet of water in the pond should be changed every week to maintain optimal water quality in the absence of gravity flow (water flowing in and out constantly.) Even with gravity flow the drainpipe needs to be lowered to the bottom at least once a week to flush out waste from the pond bottom.

Water quality problems can be prevented with the proper drying and liming of ponds after a grow-out phase. This procedure kills harmful elements and improves the soil quality which in turn improves the water quality.

<Sampling>

It allows the owner an opportunity to see his animals and assess their growth. Information gained from the sample will enable the farmer to adjust his or her feed schedule to prevent wastage of food and optimize growth. The amount of food fed is a percentage of the total weight of animals in the pond. This is determined by a mathematical formula. At each sample the average body length or body weight of shrimp or fish taken using a sample of 50 individuals (compare the average obtained to the expected average weight based on the relevant growth chart showing the relationship between age to expected weight)

It is advised to sample in the early morning and once a month because sampling stresses the shrimp and fish.

Another method of monitoring is to visit the pond at night with a flashlight to view the shrimp as they crawl along the side of the pond and observe their size. In this manner at least a rough idea of their grow rates can be determined.

<Harvesting and Marketing>

The timing and level of harvesting is determined by the particular needs of the pond owner. The following must be available to ensure a good harvest:

*A market ready for the purchase of the fish and/or shrimp harvested

*Acceptance by the potential purchaser based on a pre harvest sample to ensure that the stock meets all market requirements before a total or partial harvest is undertaken.

*Access to ice for preservation of the product once removed from the pond.

*Access to appropriate transportation for the product to be brought to market.

*Sufficient man power to conduct harvest.

*In general, about 2 persons are required for harvesting ponds of 1/8th acre or less, and about 4 persons for ponds of ¼ acre or over.

At present the expected survival rate is @60% for shrimp and @80% for fish.

Harvest should be carried out from early morning when the effects of sunlight are less and therefore

quality of the product can be preserved most effectively. In a harvest, a farmer can remove either all or some proportion of the animals within the pond.

For a total harvest, the activity should ensure the full removal of all cultured animals. For a partial harvest, 1/3 to 1/2 of the water content of the pond is removed then a net is passed through the pond to ensure only partial removal of the total animals stocked.

A farmer can be instructed as to the proper method of selecting individuals for harvest, and this is somewhat related to the needs of the market. Normally a fish weighing 1 Lb or ½ kg, and 15 shrimp weighing 1Lb (1/2 kg) are acceptable.

(approximately 10 to 12 individual shrimp weigh a pound). If the aquaculture products are sold directly to the hotels and restaurants, a farmer should be able to get about EC$ 6.00 -10.00 per pound for fish and about EC $ 25.00 – 30.00 per pound for shrimp.