Marketable Fish Production: Perennial Ponds

Most of the freshwater aquaculture in India takes place in perennial ponds. Existing ponds come under the Panchayats, Zilla Parishads, Forests, Fisheries and Revenue Departments.

Also, many derelict ponds have been renovated and reclaimed and many new ponds dug especially for aquaculture.

For 30 years, the Fish Farmers Development Agency (FFDA) has promoted ‘Composite Fish Culture’ - the technology of growing a mixture of species in semi-intensive pond fish culture. An FFDA office is found in almost every district under the direct administrative control of the Collector.

Perennial ponds are commonly used for many purposes including washing, laundry, animals and sometimes even drinking.

Perennial ponds suitable for carp polyculture

Pre-stocking includes clearing unwanted plants, removing predatory and weed fishes, and supporting the development of lots of natural food by adding lime and manure.

Marketable fish production in perennial ponds has three phases: Pre-stocking, Stocking and Post-stocking. Pre-stocking includes clearing unwanted plants, removing predatory and weed fishes, and supporting the development of lots of natural food by adding lime and manure.

Remove these plants by hand

Pre-stocking

Grass carp will eat all these plants

Lotus

Water hyacinth

Water fern

Water lettuce

Grass carp
Stocking

The pond can be stocked with carp fingerlings when the toxicity from the bleaching powder or mahua is lost. This should be tested by fixing a hapa in the pond and putting in 20-30 fingerlings. If they survive, the toxicity is gone and the pond could be stocked.

There should be enough plankton in the pond so that the color of pond water is brown. You can test this by pushing the hand in water up to the elbow. If the fist disappears, then the amount of plankton is enough. (See below.)

The pond should now be stocked with advanced fingerlings (>150 mm), stunted fingerlings (125-150 mm) or just fingerlings (100 mm). If advanced or stunted fingerlings are stocked, two crops could be harvested in a year, providing a quick return, higher production and greater profits.

The stocking density should not be more than 5,000 fingerlings/ha.

Post-stocking

Post-stocking management of perennial ponds includes supplementary feeding, adding manure, health care and harvesting.

Predatory and weed fishes

Predatory and weed fishes compete for food and space with the carps that are cultivated. There are three ways to remove them:

- If ponds are used for other purposes where a farmer cannot use toxicants to remove fish, the only option is repeated netting and angling which may reduce their population.

Otherwise, there are two main toxicants:

- Add urea at 100 kg/ha followed a day later by bleaching powder at 150 kg/ha for 1-m deep water, or
- Add mahua oilcake at 2,500 kg/ha (which will not only kill all the fishes but also other organisms and later act as a fertilizer once its toxic effect is lost).

The deeper the water, the more toxicant you need to add. So it is best to act when the water is at its lowest or could be drained to a satisfactory level. The fish killed by bleaching powder or mahua can be safely consumed.

Development of natural food

Fish grow well on natural feed. For good growth of natural food and fish, the soil should not be acid (the pH should be 7.0). To raise and stabilize the soil pH, add lime at 200-300 kg/ha. It is better to use lime after the application of mahua as it reduces the toxicity period.

To produce natural food, we need to fertilize. No manure need be used for the first month of culture if mahua oilcake is used. However, application of raw cow dung at 2,000 kg/ha or a mixture of raw cow dung (1,000 kg) and poultry manure (500 kg/ha) is necessary one week after adding bleaching powder.

Post-stocking

If bleaching powder is used for eradication of weed or predatory fishes, the quantity of lime could be reduced. If mahua is used, this reduces the toxicity period.

Post-stocking management of perennial ponds includes supplementary feeding, adding manure, health care and harvesting.
To keep a good level of nutrients in the pond, add raw cow dung (500 kg/ha) or a mixture of cow dung (250 kg/ha) and poultry manure (125 kg/ha) every two weeks. If biogas slurry is available, you can use it in place of cow dung or poultry manure at 100 kg/ha/day. The slurry does not use much oxygen and the bacteria in it is a good food for the zooplankton.

### Supplementary feed

The best supplementary diet is equal weights of groundnut or mustard oilcake and rice bran or wheat bran.

Fingerlings are fed daily at 3% of their body weight.

To work out how much to feed, we need to know the weight of the fish and how many are in the pond each month.

As the fingerlings grow, their weight increases, so the amount we feed increases. To work out how much to feed we can:

- Catch a sample of fish (perhaps using a cast net)
- Weigh the fish
- Count the fish
- Work out the average weight by dividing the weight by the number of fish

Example: If I catch 20 fish and their total weight is 500 g, then 500/20 = 25 g average weight.

Over time in the pond some fish will die, so the numbers of fish needing feed will be less.

It is difficult to measure how many fish remain in a pond so we can assume that maybe 5 fish in 100 will die each month.

Example: If I stock 5,000 fish, after 1 month I might have 5,000 x 0.95 = 4,750 fish. After 2 months, I might have 4,750 x 0.95 = 4,512 fish.

Example:

<table>
<thead>
<tr>
<th>Month</th>
<th>average weight</th>
<th>number of fish</th>
<th>total weight</th>
<th>Feed (3%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25 g</td>
<td>5,000</td>
<td>125 kg</td>
<td>3.75 kg/day</td>
</tr>
<tr>
<td>2</td>
<td>40 g</td>
<td>4,512</td>
<td>180 kg</td>
<td>5.4 kg/day</td>
</tr>
<tr>
<td>3</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

When the temperature drops fish eat less so the amount of feed should be reduced. Always check that the feed placed in baskets is being eaten. If feed remains, then reduce the feeding and check for oxygen and fish health.

Grass carp eat plants. When those in the pond are gone, we should add from outside. When the temperature is high they eat more and produce a rich fertilizer of partly digested plants.

### Periodic manure application

To keep a good level of nutrients in the pond, add raw cow dung (500 kg/ha) or a mixture of cow dung (250 kg/ha) and poultry manure (125 kg/ha) every two weeks. If biogas slurry is available, you can use it in place of cow dung or poultry manure at 100 kg/ha/day. The slurry does not use much oxygen and the bacteria in it is a good food for the zooplankton.
Routine care and harvest

- Try to watch the fish regularly. Tell a fisheries officer if you see any odd behavior, like scraping along the bottom or scales flashing. You can then decide together what has to be done.

- Measure the water pH level and if it falls below 8.0, add lime at 200 kg/ha. Lime must be dissolved in water and the solution cooled before it is sprayed over the pond surface.

- If the fish are gulping air in the early hours of the morning, the surface water could be agitated by beating with sticks or swimming and splashing to add more oxygen. Adding 5 g/m³ potassium permanganate in the evening and again in the morning - if the fish are found to be gulping at the surface - will also add oxygen.

- Regularly test the plankton - put an arm in the water to the elbow and if the fist is not seen, the pond is rich enough in plankton (check that the color is due to plankton and not cloudiness due to silt and clay or any coloring material). If there is not enough plankton, add manure (see “Development of natural food” on page 2).

Fish that are above 1 kg by November may be harvested. Then the quantity of feed required is reduced and the fish have more space to grow. Stocking could be done again with as many fingerlings of each species as are removed. A second harvest should be done by March when fish above 1 kg are removed again. The remaining fish should be finally harvested when the pond would be prepared again for the next crop.

A production of 4 t/ha could be expected.

Useful Contacts

Other Better-Practice Guidelines

There are many more Better-Practice Guidelines in this series.

You can get more copies of this and other Better-Practice Guidelines from your local One-stop Aqua Shop, STREAM India Communications Hub, from the STREAM Regional Office or from the STREAM Website.

www.streaminitiative.org

We would like your feedback about these Better-Practice Guidelines. You can let us know by phoning, emailing or writing to the Communications Hub Manager at your STREAM Country Office.

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