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A Case Study: Fish seed nursing by farmers of Udaipur, South Tripura, India

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ABSTRACT

Seed nursing is a useful and economically viable practice through which fish farmers are able to make adequate amount of profit in very short period of time. In Tripura many fish farmer livelihood is dependent on seed nursing and its marketing and they get a good amount of profit out of that. The study was performed for a period of 6 months to understand and highlight the seed nursing practices whether a profitable venture or not. After 60 days of seed rearing period farmers are getting around 2-3 lakhs of fish seed from 4 lakhs of spawn with a survival rate of more than 50%. Farmers gets around 75- 80 thousand Rupees as gross income from the selling of fish seed and they are making a profit of 45-50 thousand Rupees from each seed nursing cycle after excluding all the expenses incurred in the form of buying fish spawn, feeds, netting materials, harvesting cost etc. As seed nursing don't require large water bodies it can be a better option for small fish farmers who are having small water holdings. Farmers can do three to four harvesting in a single year so from a limited space of water body they can earn more money in a very short period of time. Seed nursing can ultimately solve the problem of seed availability in market and leads to increase the overall fish production.

Keywords: Seed nursing, Harvesting, Biodiversity

1. Introduction

Aquaculture is fast developing in most of the northeastern states owing to high demand for fish in the region. This growth is not uniform in all the NE states because of the differing food habits of the people, though all states have excellent potential for aquaculture. Among the states in the region, Assam, Manipur and Tripura have large percentage of population as well as fish eating people. It is important to recognise that the literacy rate in most of the NE states is high as compared to the rest of the country and in particular those states wherein fish is not a commonly consumed item, the literacy rate is very high. With the increasing research evidence that demonstrate the health benefits of eating fish and also the ill effects of eating red meat, it is likely that the literate people in rest of the NE states will also gradually increase intake of fish (Buttner *et al.* ^[1])

Seed nursing is a very useful and economic venture, farmers are able to make adequate amount of profit in very short period of time, that's way seed nursing activity is gaining attention in many fish farmers (FAO ^[2]). Fish farmer of Udaipur (South Tripura, India) have been studied to know more about their seed nursing and marketing of the fish seed. In this case study we have try to highlight that how the seed nursing is a profitable venture. In Tripura so many farmers are involved in this occupation and their livelihood is fully dependent on seed nursing and marketing and they are making a good amount of profit also.

2. Socio-economic status of farmers

A survey format was designed and used to gather information from fish farmers in Tripura. The average age was 46.5 years with all of them having a family with 6.25 members. All the farmers were educated with most of them having education up to higher secondary level, except one farmer who had degree level education. Nine farmers were having agriculture as the primary occupation and two of them were in Government service and one farmer indicated aquaculture as his primary occupation.

Most the farmers belonged to Bengali and except one farmer all others were classified as scheduled tribe. While eight farmers had tin roof shed, rest four had concrete house (Wikipedia [3]). All the farmers, except one farmer were classified as above poverty line and the one belonged to below poverty line. Interestingly all of them use gas for cooking purpose. In addition, nine of the farmers had television and ten farmers had telephone connectivity. This reflects the opportunity to reach these farmers through television as well as phone. The land holding of some of the farmers was quite high and as a result the average land holding was found to be about 2 ha.

3. Prevailing culture practices

The size of ponds used by farmers was generally small in size with some farmers having ponds even with an area of up to one 0.5 ha. Some farmers had more than one pond and total area of such farmers exceeded to nearly one ha in size.

a. Pond preparation & Stocking

Before stocking of spawn they do netting several times. After that they use poison i.e. Endosulfan@ 100 gm/0.16 ha to kill the weed fishes. After that they harvests all the dead fishes from the pond and sell it into the market. 3 days later they do liming in the pond @ 48 kg/ 0.16 ha. After 7 days they apply Potash (KMNO₄) @ 250 gm/0.16 ha. Potash is mainly used to reduce the effect of poison. Then after 2 days they puts 10 piece of fingerling into the pond to see the water condition of the pond i.e. fishes are dying or not in the pond water. Then after 2 days they harvest the pond to see that the stocked fingerlings are dead or alive. If they are alive it shows that pond water condition is good for stocking, then he uses cleaner @ 25 gm/ 0.16 ha to remove insects. 2 day later netting is done and then they stocks spawn in the number of 1.5 lakhs/0.16 ha.



Fig 1: Farmers doing netting

b. Post stocking management

After stocking till 3 days they are not feeding the spawn and after 3 days they use liquid feed like Ostovet which they are getting @ 300 Rs/litre. After 5 days they start feeding with MOC (Mustard Oil cake). Before using MOC as a feed it is

soaked in water before 3 days in to a tank and after 3 days it is used as feed. After 15 days of stocking of spawn it is then transferred into another pond to get a better growth. And almost after 60 days of rearing carp spawn they are getting a survival of 1.5 lakh from total stock of 2.5 lakh/0.16 ha.



Fig 2: Common chemicals used by farmers

c. Harvesting and selling

Farmers use to harvest 5-6 times and sell 5-6 times during 60

days of rearing period and in each harvesting they spend around 200 Rs and engaging 6-7 labours for transportation of seed from pond to market. They are taking help of bhars (People who carry two pot full of fingerlings in this shoulder with the help of one bamboo stick) for which they has to pay 60 Rs for each bhar and for each selling they are using 8-10 bhars. The place where they sell the seed has to pay a charge

@ 12% of the total sale. After 60 days of rearing period they are getting around 2-3 lakh of seed from 4 lakh of spawn and by selling 2-3 lakh of seed they are getting around 75-80 thousand of Rs in each cycle and from this gross return they are making profit of 45-50 thousand Rs in each seed nursing cycle.



Fig 3: Man carrying bhar with fish fingerlings



Fig 4: Market place where farmers sell their fish seed



Fig 5: Farmer doing rigorous aeration in two pot with hand

Table 1: Details of rearing of spawn

S. No.	Name	Stocking	Feed Used	Weight of fish During harvesting	Fish species stocked
1	Gopal db.	1.5 lakhs/0.16 ha	Cow dung, goat dung pig manure.	20-24 gm	<i>Labeo rohita, Catla catla</i>
2	Jodu miyan	1.4 lakhs/0.16 ha	MOC, Rice bran, cow dung.	20-25 gm	<i>Labeo rohita, Catla catla, Silver carp</i>
3	Bhola Das.	1.6 lakhs/0.16 ha	Wine extract, duck manure	25-28 gm	<i>Labeo rohita, Catla catla</i>
4	Chintamani das	1.3 lakhs/0.16 ha	MOC, Rice bran, cow dung	18-20 gm	<i>Labeo rohita, Catla catla, Cirrhinus mrigala</i>
5	Vikram das	1.5 lakhs/0.16 ha	MOC, Rice bran, pig dung.	22-25 gm	<i>Labeo rohita, Catla catla</i>

4. Potential steps to increase fish production

(a) Improve pH of fish ponds

The site is reported to have more acidic soils. The pH of water is an important criterion to produce adequate amount of natural food in the water through effective release of nutrients for the production of such organisms. Application of lime is essential to rectify pH of water. In general, 200-500 kg/ha can be applied to all ponds, irrespective of the pH status. In ponds with low pH, higher level application would be necessary. In rural areas, availability of lime may be a constraint. Hence, in

place of lime, ash produced at home by burning fire wood or various other sources can also be used. Ash produced from Banana is reported to be having very good impact in improving pH of water. As a general rule, in place of using one kg lime, three kg of ash would be required to have the required effect. Ash is also a good fertilizer and hence, farmers can be advised to use all the available ash for application in to fish pond.



Fig 6: Man collecting ash from burned wood and banana leaves

(b) Keep water green

Green water is essential to increase the growth of fish based on the natural food produced in the pond. Most carps depend on the natural food produced in the pond and this is eaten by the fish through the filtration process. Northeast has plenty of greenery and vegetation that is rich in nitrogen, particularly

(*Eupatorium spp*). All such plants can be composted in various corners of ponds by creating bamboo fence and dumping the vegetation in such enclosures. Adding manure to vegetation pit would stimulate the process of composting in aquatic environment and increase productivity. Make sure that you do not over dump vegetation in the pond and cause oxygen

depletion. Repeated applications are far more efficient than

dumping at a time.



Fig 7: Fish Farmer adding manure to vegetation pit

(c) Application of manure and fertilizers

In addition to vegetation, it is useful to add various types of manures available. Farmers generally have cattle and cattle manure is popularly used in fish culture, though its efficacy is far lower as compared to pig or poultry waste. The amount of manure applied could be even being up to 30 tons/ha/year. The amount required to keep the water green would depend on the soil and water quality and this must regulated based on experience. In addition to organic manures, chemical fertilizers like nitrogen and phosphorous fertilizers need to be applied. Application of up to 200 kg/ha, each of nitrogenous and phosphorous fertilizers would be useful, though farmers now use increased levels in Andhra Pradesh and Punjab to get the higher level of productivity. As a general rule, apply the manure and inorganic fertilizers to keep the water green and prevent over application by carefully monitoring water quality and fish movement. In over fertilized ponds, oxygen will be a key factor.

(d) Provide adequate amount of supplementary feed

When the fish are stocked at higher density, it is essential that they are provided with proper amount of supplementary feed. Rice bran is commonly used in many places as supplementary feed combined with oil cakes. In eastern part, mustard cake is the most commonly available and farmers use this oil cake along with rice bran to feed fish. However, the cost is the key factor in feeding fishes and farmers have to regulate the level of oil cake in such a way that best results are obtained without wastage. For example, in winter, the food conversion efficiency is low and farmers in Andhra Pradesh avoid using oil cakes in winter season or reduce its percent to low level. As a general rule, with good amount of natural food, if the farmer provides 1.5-2.0 kg of rice bran and oil cake mixture as a supplementary feed.

5. Conclusion

The state of Tripura has embarked on providing adequate amount of fish and rice to all the people by 2012. It may be stated here that the State has more than 90% of the population that consumes fish. Nearly 70% of population of the state comprises Bengalis in whose diet fish is an important component on almost all days of the year. Though the state government is aiming to supply at least 12 kg/person/year, the actual requirement of fish is almost 2-3 times of this quantity. In view of the food habits of people with high demand for fish, fish is imported from other states of India including the neighboring countries like Bangladesh.

Moreover seed nursing don't require large water bodies; they can be culture in small water bodies also. As a result, culturing fish seed can provide a better option for farmers because they don't have to spend the whole year to get the harvest and in a single year they can do three to four harvesting of fish seed and make money in a very short period of time (which is the most common problem of the farmers). Seed nursing can ultimately solve the problem of seed availability in market and leads to increase the overall fish production.

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7. Reference

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