RAISE FISH IN PONDS LOCATED IN COCONUT GARDENS

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KERALA is known for its abundant production of coconut and fish. About 70 per cent of India's coconut production and 35 per cent of the country's fish production are from Kerala. Apart from the rich marine fishery resources, Kerala also possesses fairly good potential of inland fisheries in having about 11 backwater bodies along its coast, 40 rivers, many reservoirs and numerous freshwater ponds. Small ponds scattered in coconut gardens are characteristic of southern Kerala, especially of Onattukara area in Karunagappally, Karthikappally and Mavelikara taluks of Quilon and Alleppey districts. In Krishnapuram village of Quilon district alone there are as many as 600 ponds ranging from 0.01 to 0.1 ha. The ponds are of two types,one with outlets to paddy fields and the other, not having any. The former type is well suited for the traditional culture of local species of fishes like *Channa striatus* (murrel), *Clarias batrachus* and *Anabas* sp. (climbing perch). The advantage here is that even grown-up fishes enter these ponds after the heavy rains and continue to grow in them. It is advocated to manure the pond and provide the fishes with supplementary feeds like rice bran, oil cake and powdered prawn shells or trash fish for augmenting their growth. The disadvantage of these ponds is that the fishes entering the ponds can also escape through the outlet. However, the growth of these predacious fishes is comparatively slow.

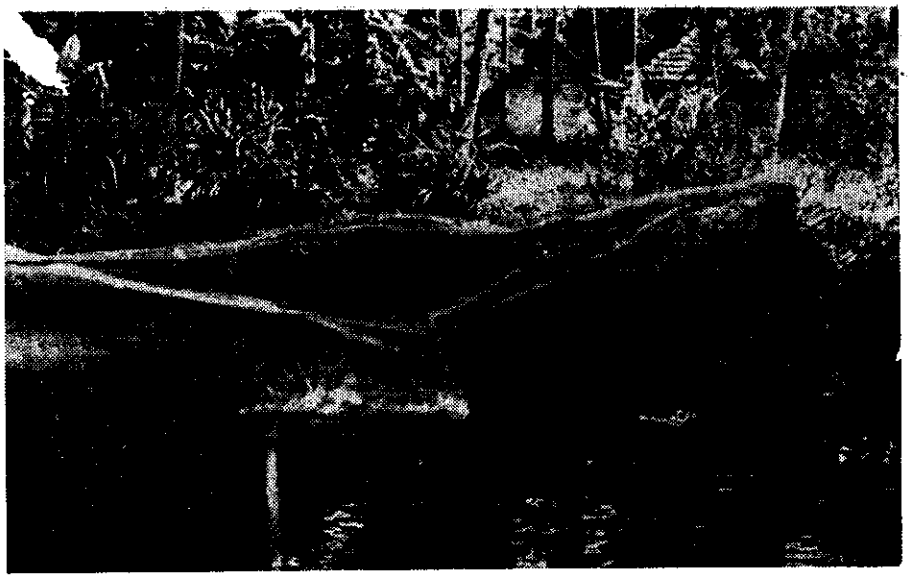
These ponds can also be used for culturing pearl-spot (*Etroplus suratensis*), tilapia (*Tilapia mossambica*) or carps, after closing the exit completely or fitting it with a close-meshed net. In such a closed pond, a pure culture of murrel or *Clarias* sp. can also be done, the seed being collected from the paddy fields.

Catla, Rohu, Mrigal and Common Carp (eight months old)

The second type of ponds, not having any outlet, are ideal for polyculture of the fast growing plankton feeding carp varieties. In polyculture, popularly known as the composite fish culture, food materials available in different ecological niches of the pond are utilised by different compatible species.

Management

Before the onset of the south-west monsoon, the ponds are prepared by de-watering, de-silting, removal of fish predators and competitors and strengthening the bunds. Liming of the pond is done, one month before stocking, at the rate of 300 kg/ha for correcting the acidity and for increasing the efficiency of manures. Stocking of the pond is done at the rate of 5,000 to 75,000 fingerlings/ha, 15 days after the initial application of cowdung (5,000kg/ha). Monthly doses of cowdung (2,000 kg/ha) are applied alternating with chemical fertilizers (ammonium sulphate, 75 kg/ha and superphosphate,



Cast netting in a pond of coconut garden

50 kg/ha). This will help continuous production of plankton which forms the natural food of the carps. Supplementary feeding with a mixture of oilcake and rice bran at 1:1 ratio by weight, at 2 per cent body weight of the fishes present in the pond is also done. To avoid wastage of food, feeding platforms can be used. The rate of fertilizers and supplementary feed should be reduced with the lowering of water in the pond or stopped totally when there is a heavy plankton bloom in water. The harvest of the pond is either done when the water depth reduces to less than one metre or just before the commencement of monsoon. It is advisable to partially harvest the pond when the volume of water reduces in summer. In large perennial ponds multiple stocking and multiple harvesting can be adopted to get a continuous supply of fish. Sampling at monthly intervals would help assessing the growth and for taking necessary remedial measures.

Operational Research Project

Development of fish culture is one of the programmes under the Operational Research Project at Krishnapuram village, Quilon district, Kerala, implemented by the Central Plantation Crops Research Institute, Regional Station, Kayangulam. From 1975 onwards five fast growing species of fishes have been introduced in the project area. They were catla (*Catla catla*), the surface feeder, rohu (*Labeo rohita*) and fimbriatus (*Labeo fimbriatus*), the column feeders and mrigal (*Cirrhinus mrigala*) and the common carp (*Cyprinus carpio*), the bottom feeders. From 1975 to 1980, the number of farmers adopting carp culture has increased from 33 to 89, indicating the gain in popularity of these varieties in the local region. Even though the ponds were small in size, an average production rate of 1,320 kg/ha/year, with an individual maximum of 3,840 kg/ha/year could be achieved. This is quite an impressive production rate in farmer's pond as compared to the national average pond production of only 600 kg/ha/year. From 1978 onwards the practicability of scientific carp culture was being demonstrated in two ponds in the village.

Of all the five species of carps introduced, common carp is the most popular among farmers because of its easy domestication, adaptability to local conditions, colour variations and its easy breeding nature in ponds.

Breeding of the common carp has already been taken up by a few farmers in the village and a few interested farmers have been trained in induced breeding of other carps. Production of carp seed will be a profitable proposition as there is an ever increasing demand for quality fish seed.

An estimate of the economics of carp culture in a pond of 0.02 ha for a period of 10 months from August is furnished below. This is based on the data collected during the period 1978-80 from carp culture demonstration ponds.

A catch of carps

EXPENDITURE	Rs
1. Preparation of pond	20
2. Lime (10 kg)	5
3. Cowdung (600 kg in split doses)	40
4. Fingerlings (150 nos)	15
5. Fertilizers: i) ammonium sulphate (15 kg)	20
ii) superphosphate (10 kg)	10
6. Supplementary feed (rice bran and oil cake, oil cake, 40 kg) (The quantity may be reduced or stopped if sufficient amount of kitchen waste is given as substitute)	50
7. Harvesting charges	20
Total expenditure	180

INCOME

With 80 per cent survival and with an average individual fish weight of 700 g each the harvested fish will weigh 84 kg. The gross income, at the rate of Rs 5 per kg of fish is Rs 40, leaving a net profit of Rs 240 from a 0.02 ha pond.

During 1980, the freshwater prawn (*Macrobrachium rosenbergii*) was also introduced in the project area. This can be either cultured alone or in combination with carps. The production rates realised were 315 kg prawn/ha/100 days in monoculture and 101 kg prawn and 1,200 kg fish/ha/5 months in polyculture under farmer's conditions.

Pearl-spot culture, short duration paddy *cum* fish culture and culture of air breathing fishes in canals and derelict waters are the additional fishery aspects contemplated in the project area.

Besides the utilization of the freshwater ponds available in the area, fish culture in ponds located in coconut gardens provides additional engagement to farmers, adds to their income and contributes towards improving the dietary standards of the villagers. Coconut, fish and tapioca are not only items which could be easily produced in Kerala, but also make an ideal food combination for the rich and the poor alike.

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CALF MORTALITY

lost its follower at initial stage of lactation. It is noteworthy to find that when a calf died at birth, the cow gave milk only for 51 days during which the total yield was 31 kg. In the case of a buffalo, the lactation yield was 277 kg during the period of 148 days.

It is generally observed that the male buffalo calves are not taken care of properly and are allowed to die. The available data were examined to see the effect of the sex of the calf when survived or died on its dam's performance. Irrespective of the sex of the calf, the buffaloes whose calves survived had longer lactation length and higher yield as compared to those who had lost their calves. A buffalo with a male calf at heel had the lactation length 366 days and lactation yield 1035 kg as compared to the figures 288 days and 432 kg respectively for a buffalo which had lost its male calf. The lactation length of a buffalo having a female calf was 379 days with calf and only 197 days without it. There was marked difference in lactation yield in these two cases, 856 kg when the follower survived and 432 kg when died. Among the buffaloes whose followers survived, the lactation yield of those having male calves was higher than that with female calves although there was not much difference in lactation length in these two cases. This may be due to the fact that the male calves are allowed to suckle for a very short time whereas the female ones in which the farmers are interested, continue to suck longer so as to gain better health. The average milk yield per day of lactation was 2.8 kg in the former and 2·3 kg in the latter case.

TABLE. PRODUCTION CHARACTERISTICS OF ANIMALS WITH/WITHOUT CALVES

Category	*Group*	*No. of animals*	*Lactation length (days)*	*Lactation yield (Kg)*	*Yield per day of calving intervals (kg)*	*Persistency*
Cow	With calf	75	362	381	0.66	2.80
	Without calf	19	99	86	0.19	0.25
Buffalo	With calf	20	374	929	1.47	2.48
	Without calf	20	263	450	0.80	1.42

The study has shown that calf mortality adversely affects the lactation yield and other production traits. Even in the case of buffaloes which are considered to be the main dairy animals in the country, there is substantial difference in the yield between the animals with and without calves. It was observed that of the total calf mortality about one-sixth in the case of cattle and one-third of the buffaloes, died at birth resulting in substantial reduction in yield. One would realise the tremendous loss due to calf mortality to the owner who fed and took care of the animal throughout the period of pregnancy with the hope that he would reap the fruits of his labour by getting a good calf, more milk yield and longer lactation period. If adequate health care is taken, calf mortality could be prevented and thereby the productivity of milch stock would be enhanced resulting in an improvement in the economic condition of the rural people.