A model for responsible black clam fisheries at R-Block in Vembanad Lake, Kerala

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Kuttanad is a stretch of low-lying land of about 110,000 ha along the banks of Vembanad Lake and Pamba River tributaries. It encompasses vast stretch of backwaters, bordering human settlements, mangrove forests and rice fields. Four major rivers such as, Pamba, Meenachil, Achankovil and Manimala discharge into this region. It has the distinction of being one of the few areas in the world, where paddy farming is carried out below the sea level. The area is quite famous for its fishery for clams, pearlspot (*Etroplus suratensis*), snakehead (*Channa* spp.) and freshwater prawns (*Macrobrachium* spp.).

The black clam, *Villorita cyprinoides,* is the major clam resource in Vembanad Lake with an annual production of 50,275 t. The clam meat is locally consumed and also used as a feed supplement in animal feeds while the shell is largely used in the lime and cement based industries.

R-Block is an island in Kuttanad Taluk (Fig. 1) reclaimed from the Vembanad backwaters with mudwall embankments. About 200 fishermen from Kavalam village are involved in the black clam fishery of Kuttanad backwaters surrounding R-Block.

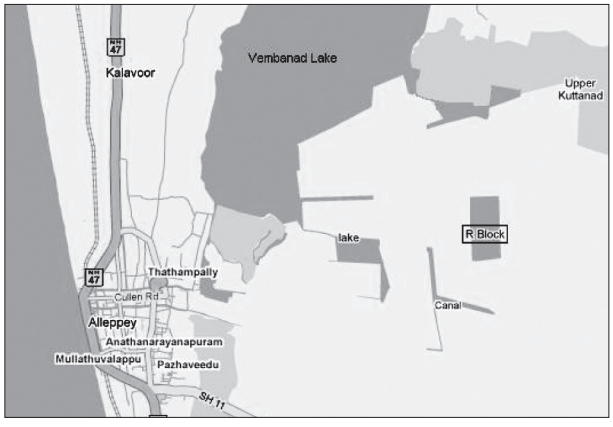

Fig. 1. Map showing R-Block

Fishery of *V. cyprinoides*

Fishery of *V. cyprinoides* exists in R-Block region since 1950. Clam fishery is done throughout the year with peak fishing season from February to May. The Kavalam Black Clam Industrial Co-operative Society was established in 1994 to co-ordinate the clam fishing and trading activities of R-Block. During 2006-'08, an estimated total 2,100 t of black clam shells were collected at the society. According to the records maintained by the society, the total shell production during 2008 was estimated as 690 t with the highest production of 84 t recorded in May and lowest of 35 t in July. The average shell production per month during 2008 was 58 t. The number of fishing days varied from 12 in July to 26 in May 2008 with an average of 22 fishing days per month. Details of the black clam shell production at R-Block during 2008 are given in Table 1. A random assessment revealed that black clams of length 29-59 mm APM (Antero-Posterior Measurement) contribute to the fishery. Besides black clams, pearl producing freshwater bivalves such as *Lamellidens marginalis* and *Parreysia corrugata* also contribute to the bivalve fishery of R-Block.

Table 1. Shell production and number of man days involved at R-Block in 2008

Month	Shell production (kg)	Number of man days
January	46000	1760
February	51000	2046
March	58000	2100
April	76000	2300
May	84000	2548
June	39000	1292
July	35000	996
August	53000	1659
September	54000	1968
October	81000	2325
November	51000	2093
December	62000	1914

Fishing method

The crafts engaged in clam fishing are plank-built canoes of about 26 feet length. At times, two or three canoes are tugged together by a mechanised boat to the fishing site. Clam fishing is usually done by hand picking or hand dredging with scoopnets having small mesh sizes, in other areas of Vembanad Lake. However, the method of fishing followed at Kavalam is unique and is efficient in screening out the young seed clams. The fishermen use a special type of basket locally called "kakkakoodu". The clams are wedged out using two iron spades and collected into the "koodu" (Fig. 2). The fishermen themselves make the "koodu" with galvanised iron frames and split bamboo. There are separate "koodu" for shallow and deep waters. The "koodu" used in shallow water is either cylindrical or conical. The basic shape is framed by welding 8 mm GI pipes together. The basket-like basic frame consists of two GI rings interconnected by two GI rods welded opposite to each other. The cylindrical "koodu" has a height of 25 cm with a diameter of 24 cm. GI square mesh of 2 cm is welded to the bottom ring, which remove seed and juvenile clams. Bamboo splits of 1 cm width are placed 2 cm apart and attached around the base frame using nylon twines. The conical "koodu" (Fig. 3) has a height of 38 cm with an upper and lower diameter of 21 and 13 cm respectively. Two splits are tied together at the bottom, which spread apart at the top thus making the conical shape. It also has GI square mesh at the base. The fishermen tie these "koodu" with the help of nylon/coir ropes around their waist into which they collect the clams. The "koodu" used in deeper waters

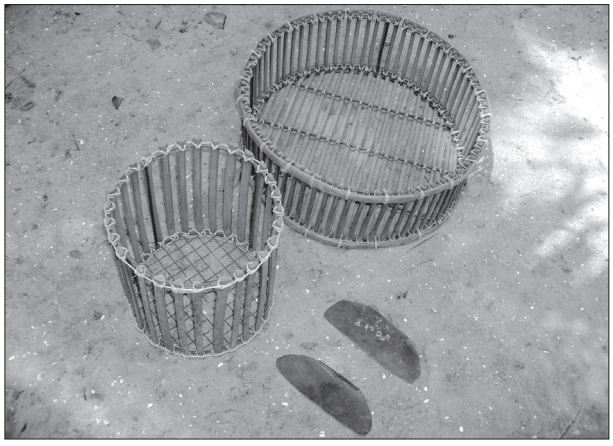

Fig. 2. Cylindrical "koodu" with spades

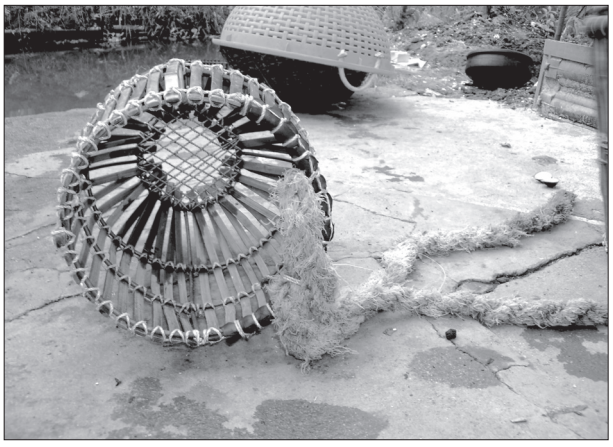

Fig. 3. Conical "koodu"

at a depth of 15 ft or more is 16 cm high with a diameter of 45 cm. The splits are of 5-6 mm thickness and are placed at a gap of 2 cm on the sides and at the bottom. One "koodu" costs around Rs. 400/-. The collected clams are washed to remove the seed clams and other waste materials before transferring to the canoe.

The fishermen go to the clam beds as early as 4 am and return home at about 2 pm. Once the catch is brought, further cooking and meat separation is mostly done on the same day in their households.

Utilisation

Women are actively involved in the processing of clams. The clams are washed thoroughly once again in the backwaters. Then the clams are boiled in large aluminium containers for 15 min using firewood or dry coconut leaves. Afterwards, the cooked whole clams are transferred to "koodu" once again and shaken in a revolving fashion to separate the meat and shell (Fig. 4). The meat is collected below the "koodu' on a plastic sheet while the shells remain in the 'Koodu'.

The meat costs around Rs. 50-60/kg and is sold directly to consumers on the same day. The major customers are resorts, home stays and toddy shops in Kuttanad area. The meat is also sold to households. The shells are sold through the Kavalam Black Clam Lime Shell Industrial Co-operative Society at Rs. 1,350-1,500/- per tonne.

The use of large meshed implements by R-Block fishermen to fish black clams ensures that small juvenile clams are not caught and they have an opportunity to

Fig. 4. Separation of cooked clam meat

grow and reproduce before capture. This ensures sustainability of the fishery, besides assuring fishermen a higher average price for the uniformly large size clams fished. Other black clam fishing communities in Vembanad Lake have to follow similar measures for sustainable management of black clam fishery of the entire lake. However, these fishermen at R-Block need the assistance of scientific and fishery management organisations to scale up their activities. Training programmes in depuration, hygienic processing and value addition need to be imparted among the fishermen to uplift their social as well as economic status.

Prevailing problems of black clam fishing in Kuttanad

Though the clam fishery exists in R-Block area since last few decades, the fishermen encounter various problems associated with their resource, environment and trade. The fishers are unable to meet the consumer demand for clam meat, especially during tourist season. Various factors adversely affect the recruitment levels and catch per unit effort of black clams in this region. They are detailed in their order of importance in Table 2.

Table 2. Problems affecting black clam fishery at R-Block and suggestions for improvement

Rank	Problems	Suggestions
1.	The pollution levels of Kuttanad backwaters pose serious threat to the resource and act as an occupational or health hazard to the fishermen at multitude levels. Pollutants range from pieces of glass bottles thrown from resorts and house boats, slaughter and hotel wastes, waste discharge from coir factories and pesticide runoff from paddy fields	Massive awareness programmes should be arranged to educate general public and visitors about protecting the delicate environment of Vembanad Lake. Kerala Pollution Control Board should set up a monitoring cell to check the pollution levels of Kuttanad and Vembanad Lake. Proactive awareness campaigns may be taken up by the Kavalam Black Clam Industrial Co-operative Society.
2.	Thannermukkom barrage was constructed to promote two crops of paddy cultivation in Kuttanad by preventing the influx of saline water. This has led to profound changes in salinity patterns of Vembanad Lake, especially in the regions south of the barrage. As a result, the survival and abundance of the black clams are affected	State agricultural department shall formulate an agricultural calendar in consultation with the fisheries department, so as to regulate farming and fishing season. The opening and closure of barrage could be decided based on the same. This will bring benefits to both clam fishermen as well as paddy farmers.
3.	Dredging for lime shell destroys the clam beds	Indiscriminate and illegal dredging practices of Kuttanad area should be controlled strictly through enforcement. Dredging licenses may be issued only after proper assessment of impact on biological and fishery resources avoiding potentially rich fishing areas and breeding grounds.
4.	Heavy infestation by aquatic weeds such as *Salvinia* and *Eichornia* affects the total ecological conditions and fishing activities	Mechanical de-weeders should be deployed in R-Block and Kuttanad for control of the aquatic weeds. Biological control methods also may be explored by the society. Proper closure and opening of Thannermukkom barrage is also helpful to control the aquatic weeds to a certain extent.