



Production and marketing of the black clam (*Villorita cyprinoides*) in Perumbalam Island, Alappuzha District, Kerala

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ABSTRACT

The black clam, *Villorita cyprinoides* is abundant in the Vembanad estuarine system. Perumbalam Island in Alappuzha District is part of the Vembanad estuarine system and black clam fishing has been an important livelihood activity in this region. The resource has been long exploited for its shell, and presently the meat also has a growing domestic market. This paper presents the existing production to marketing chain of black clam in the island. Clam fishing, processing and marketing has been a family centric activity in the region. The operational cost of harvesting and processing clam was ₹ 24,500/-. The gross and net returns were ₹ 82,720/- and ₹ 58,220/- respectively per family per year. The marketing efficiency was highest for the direct marketing channel *i.e.*, producer to consumer. The harvest of small sized clams had been in vogue earlier, but now the fishers resort to culturing of the clams to bigger sizes before harvesting it. Since the clam fishing activity is having a degree of concentration in the island with a number of households being engaged in it, the possibility of clustering and organising the activity for sustainable harvesting and better processing as well as marketing needs to be explored.

Keywords: Black clam, Clam picking, Cluster, Marketing margin, Processing, *Villorita cyprinoides*

Introduction

Clams form one of the widely distributed and abundant bivalve resource and Kerala has one of the country's richest clam resource bases. Clam resources are most abundant in the Vembanad Lake of the state, with annual estimated landings of 66,000 t in 2008-09. The dominant species in the state is black clam *Villorita cyprinoides* which accounted for 70% of the clam fishery (Laxmilatha and Appukuttan, 2002) with an annual production of 50,275 t (Suja and Mohamed, 2010). The average monthly production of black clam from the Vembanad Lake was over 2,500 t (Laxmilatha, 2002). Harvesting of clam from backwaters has been a traditional fishing activity and the fishing as well as processing have been household centric. The levels of investment in the clam fishery are low both for harvesting and processing. Clam meat and shell are the two important products of the fishery and in fact, the clam resources have been exploited more for the shell than for the edible meat (Laxmilatha *et al.*, 2005). The clam meat is mainly consumed locally and a small portion is utilised as feed in shrimp farms (Laxmilatha and Appukuttan, 2002). This paper presents the channel from harvest to marketing of black clam (*V. cyprinoides*) from Perumbalam Island in Alappuzha District of Kerala.

Materials and methods

The work was undertaken as a diagnostic study for a Farmers Club funded by the National Bank for Agriculture and Rural Development (NABARD) and located at Perumbalam Village, in Alappuzha District, Kerala, as part of a cluster development initiative. The location of the study was Perumbalam Village, which is an island, and has about 250 fisher families engaged in harvesting, processing and marketing of black clam (*V. cyprinoides*). The activity is family based, with the fishermen engaged in harvesting while the fisherwomen undertaking processing and marketing of the harvested clams.

Data was collected during March-July 2011, using focus group discussions as well as interviews using questionnaires formulated for the study. Two meetings were held with clam fishers during March to get an overview of the fishing practices and identifying the issues and problems of the clam fishers. The initial interactions helped in identifying the main issues and also in formulation of the questionnaire. Field data collection was carried out during April-July, 2011 after preparation of a questionnaire. Detailed information was collected from 30 fisher families with 45 respondents. Since not much

difference was observed in the scale of operation of the fishers, information generated from the sample adequately represents the population. Information pertaining to harvesting, processing and marketing of black clam were collected. The data collection was carried out through participatory means with local contact persons assisting in the process. Besides data from fishers, information was also collected from four shell traders who buy shells from the fishers and market it. This was done to validate the resource availability of the village.

Data was tabulated and descriptive statistics was used for presenting the results. The major marketing channels were identified, and the producer's share in the consumer's rupee was estimated. The marketing cost and marketing margin at producer, wholesaler and retailer levels was calculated for all the five marketing channels observed. Costs and returns from clam fishing, processing and marketing were also computed.

Results and discussion

The black clam fishery spreads across an area of 1855 ha (Laxmilatha and Appukuttan, 2002) in the Cochin Estuary. In Perumbalam (9°51'N, 76°22' E, total geographical area 16.32 km²), this activity became wide spread as a result of the accumulation of sediments and silt creating a conducive environment for growth of clam, after the construction of Thannermukkam bund during the 1970s (Thomson, 2009). Out of the 13 wards in the island, eight are along the coast and fishers in these areas are engaged in clam picking activity. The live clam beds are estimated to have an average depth of one feet and the white clam beds (the dead clam deposits) are around eight feet deep. The clam resources are harvested from a depth of around 3-5 m.

General socio-economic characteristics of clam fishers

The average age of the respondents was 48 and the fisher family had on an average 4 members. At least two members in a family were employed. As it is a seasonal activity, they are also involved in fishing in the backwaters during other periods or off season. The average family income was around ₹ 6000/-. On an average, the fishermen have been involved in the clam picking activity for 25 years. More than half of the respondents lived in houses that had tiled roofs and the rest had concrete houses or thatched roofs. Almost 85% of the respondents had access to clean drinking water and sanitation facilities. Almost 100% of the households in the Island have electricity connection. Of the total respondents, 47% studied up to primary level and 43% up to secondary level.

Ten percent of the respondents had education up to higher secondary level. Children of most of the respondents were educated and 70% of the respondents expressed that their sons were not interested in doing clam fishing in near future. Access to educational and health facilities were also good as the island has all these facilities as mentioned elsewhere in the report. Distance to educational institutions ranged from 0.5 to 5 km, but for seeking college level education they had to commute to nearby cities or towns. Almost 80% of the respondents were associated with one social group or the other, especially with SHGs. Of the total clam fishers in the island, 40% had approached the bank for their credit needs (Fig. 1). Even though a nationalised bank is operational in the village, 36.67% of respondents still approached private money lenders for credit because they felt that it was the easy and all-purpose credit source.

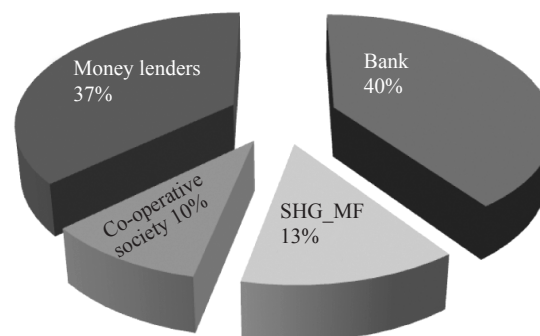


Fig. 1. Credit sources of cluster members

There was evidence for multiplicity of credit sources with 26.67% availing credit from bank and co-operative society, 20% from bank and moneylenders, 30% of respondents associated with SHGs and 43.33% of respondents opened bank account only for the purpose of availing credit. Saving habit was found to be limited.

Harvesting

The harvesting of clam or clam picking is usually done by fishermen. Small canoes are used by almost all the fishers. Canoes are made of traditional boat building materials like *anjili* (*Artocarpus hirsuta*) wood or *punna* (*Calophyllum inophyllum*) wood. The canoes have also undergone motorisation with a 2 hp fitted on them. This has helped the fishers to venture farther in the backwaters to harvest clams. The area of operation has extended up to Cochin region.

The peak season is April-May and the lean season June-July. Kripa and Joseph (1993) observed that the period January to May is the peak season. The number

of fishing days on an average is 15 to 20 days in a month and fishing is carried out for nearly 10 months in a year. Harvesting is unselective using a hand held dredge. While the recommended harvestable size is 15mm, there is no selective harvesting and very small sizes are also harvested.

Earlier, the picking was done entirely by hand with the fishers reaching the site by swimming or by canoes, and wading or diving into the shallow waters and collecting the clam by hand and depositing them in bags tied to their waists or floating vessels (made of Aluminium) which they drag along or are placed in canoes (Kripa and Joseph, 1993; Laxmilatha and Aloycious, 2001). Even now some fishers practice this and they dive up to 5 m and collect the clams with a hand held scoop net. The scoop net is made of a rectangular iron frame of 2' x 1' with a handle in the middle. A netting of 20 mm mesh size made of HDPE is attached to this frame. This net is lowered into the clam bed and the clam is manoeuvred into this bag using the legs.

The hand dredge is commonly used, locally called *kolli/varandi* (Laxmilatha and Aloycious, 2001). The gear has a long bamboo pole of approximately 36', to one end of which is attached a rectangular metal structure 22" x 4" which holds a bag net. One side of the rectangular metal structure has spikes of 2" which are used to dredge the clam into the net. The bag is made up of two twines, the top portion which is attached to the iron frame is made of nylon multifilament twine of 10 no. thickness and the mesh size is 30 mm. Locally this portion is called *chenkalli*. The rest of the bag is made up of 25 mm HDPE mesh (8 no.). The length of the bag is 1.5 to 2 m. The long end of the handle can be held by the fisher standing on the canoe. The clam harvesting is carried out for 20 days, on an average by each fisherman and around 200 trips are undertaken annually.

In Perumbalam, both men and women are involved in picking clam and there are 224 men and 38 women involved in the activity. Fishing is carried out in the morning or evening. In the morning, picking starts from 05.30 hrs onwards, though some fishers start anywhere up to 09.00 hrs. The total time spent on harvesting can last upto 10 h depending on the quantity of harvest. About 54% of the respondents spent 6 to 7 h in picking clam (Fig. 2). The quantity harvested per day can vary from 150-320 kg per person.

After collecting sufficient quantity of clam, they return to shore, the clams are shucked and the meat separated for marketing. The shell is generally collected

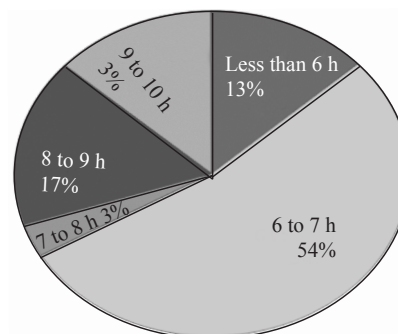


Fig. 2. Time spent in clam picking and percentage of respondents

from the households by shell traders. Before shucking, the clams are washed and separated based on size into small, medium and large (Table 1).

Table 1. Average dimensions of black clam in Perumbalam

Size group	Length
Malli kakka (seed clam)	: Less than 15 mm
Small	: 15-20 mm
Medium	: 20-30 mm
Large	: Above 30 mm

Ravindran *et al.* (2006) reported that the major size groups of black clam from this region varied from 14 to 30 mm during various months with the maximum sizes recorded during July-September. Kripa and Joseph (1991) reported sizes of 11-41 mm while Suja and Mohamed (2010) have reported lengths of 29 to 59 mm contributed to the fishery.

The larger sized clams are boiled while the smaller ones are either sold whole to the shell traders or are relaid. Collection of small sized clams or seed clam locally called *mallikakka* (*malli* is the vernacular for coriander seed) has been observed during the present study. However, there are many fishers who release small sized clams or seed clams in the backwaters near their residences and rear them to a bigger size. This process of transplanting the under sized seed clam in the nearby water bodies is called as relaying or semi-culture. This is a good conservation option practised by most fishermen in the area, which has also been reported earlier (Kripa and Joseph, 1993). A specific area is demarcated in the near shore waters with wooden sticks or poles, usually adjacent to the fisher household. Fishers not having accessibility to the coast, lease out certain portion from persons staying near the shore. The period of culture varies from 6 months to one year depending on the size at the time of initial harvest. Culture of black clam has been studied and optimum stocking densities for maximising the yield have also been assessed (Kripa *et al.*, 1999).

Processing

The harvested clam is generally cooked by the fisherwomen at household level and the clam meat is shucked out of the shell. This has for decades been a small scale, household activity and has remained unchanged. The whole clam is boiled in aluminium vessels of 3’ dia having 1.5’ depth. Around 50 to 60 kg raw clam can be boiled in this vessel at a time. Around 100 ml of water is added in the beginning, but afterwards water from the clam percolates into the vessel and aids in the cooking process. The clam is boiled over a firewood hearth in the household yard. The activity is generally carried out in a small shed made of wooden poles and thatched roof. The processing is usually carried out by the fisherwomen, sometimes assisted by the men and other members of the family (Suja and Mohamed, 2010). The whole-clam is boiled for about half an hour, by which time the meat detaches from the shell, and it is separated using iron sieves having mesh sizes of 1 cm, 1.5 cm and 2 cm depending on the size of the clam. The shucked meat is washed a few times to remove any dirt attached to the surface while sieving or shucking. The meat is stored in Aluminium containers until it is marketed.

Marketing

The processing and marketing of clam meat are exclusively done by the fisherwomen. There are two major products, clam meat and clam shell and both have got distinct market. While the clam meat goes for human consumption, the shell goes into the lime making industry, which sustain clam fishery in the region (Rasalam and Sebastian, 1976; Laxmilatha and Aloysius, 2001; Suja and Mohamed, 2011). The shell is usually collected from the households by shell traders. The major marketing channels for the clam meat are as given in Fig 3.

The processed clam meat is marketed in different wholesale markets like Champakkara, Paravur, South Paravur, Vaikom and Ernakulam, which are located at distances ranging from 2 to 35 km from the island. It is also sold locally (Suja and Mohamed, 2010). About 77% of the clam pickers at Perumbalam Island sold the meat to wholesalers located in these markets. Sixty percentage of the respondents depended on Chambakkara market (17 km away) alone, mainly as it was the nearest accessible wholesale market. The market commission agent charges 10% of the sales. The fisherwomen spend about 3 h in processing, boiling and shucking the clam and another 2-4 h for marketing the processed clam.

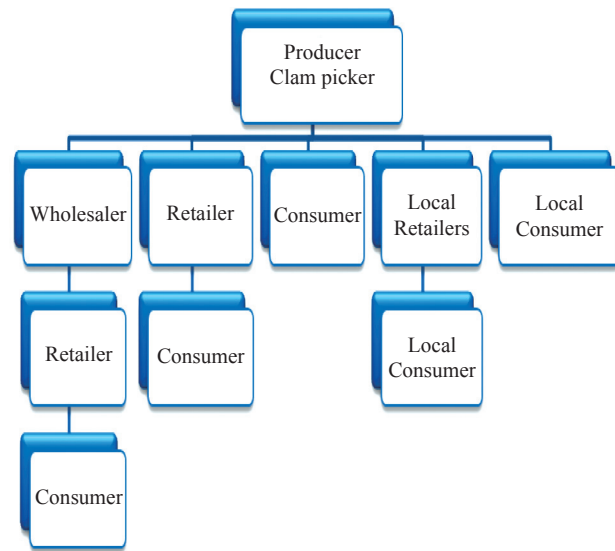


Fig. 3. Major marketing channels of clam meat

Marketing costs, margins and income from clam meat

The average consumer price ranged between ₹43 to 72 per kg over the marketing channel (Table 2). On an average the selling price ranges from ₹40-50 per kg of meat. Meat from bigger sized clams fetches higher prices. The marketing margins tended to be low when more number of intermediaries were present in the marketing channel. In cases where direct selling has taken place, the margins accruing to the fisherwomen have been high. The producer’s share in consumer’s rupee ranged from 30% in channel 4, where a local retailer was involved) to 100% where they were able to sell to the consumer directly (Fig. 4).

Though a domestic market exists for clam and clam meat is liked by consumers, the consumer is not satisfied

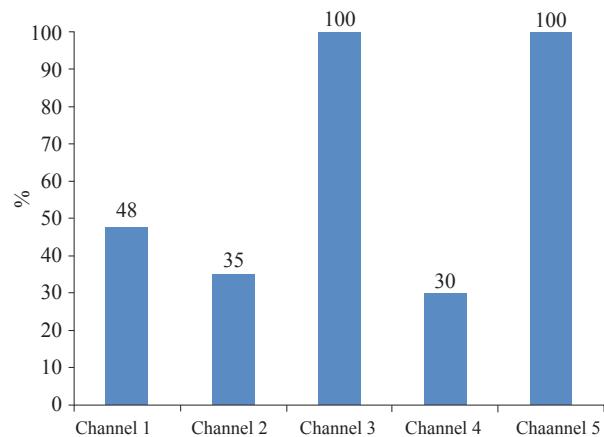


Fig. 4. Producer’s share in consumer’s rupee (%)

Table 2. Marketing cost and marketing margin in the marketing of clam meat (₹ kg⁻¹)

Level of marketing	Particulars	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5
Producer	Average cost of production	43	51	54	38	40
	Average marketing cost	8	9	8	4	0
	Average selling price	43	48	72	52	62
	Average marketing margin	-7	-11	10	9	12
Wholesaler	Average purchase price	43	*	*	*	*
	Average marketing cost	4	*	*	*	*
	Average selling price	58	*	*	*	*
	Average marketing margin	11	*	*	*	*
Retailer	Average purchase price	58	48	*	52	*
	Average marketing cost	5	5	*	4	*
	Average selling price	83	73	*	74	*
	Average marketing margin	20	20	*	18	*

with the product as he is aware of the poor hygienic conditions of processing and will go in for cleaning of the clam once again after purchase. If the clam is processed and packed properly it can gain consumer confidence and create a good market.

The fixed cost for clam picking and processing on an average was ₹46450/-, with the expenditure being on craft, gear and vessels required for processing. The annual operational cost was ₹24500/- (Table 3) and the returns per household ₹88800/-. The net income from this activity was ₹6300/- per household.

Table 3. Costs and returns from clam meat (₹)

Particulars	Year
Costs	
Annualized fixed cost	4460
Annual maintenance	2000
Annual operational cost	18040
Total Annual operational cost	24500
Returns	88800
Profit/income	64300

Around 5000-7000 persons are engaged in clam picking (Appukuttan, 2007) from various water bodies in Kerala and are engaged in processing and marketing of the shell as well as meat. The potential of clam meat for human consumption has remained underutilised but, as has been observed in the present study, there exists a domestic market. Since a large number of fishers are involved in a similar activity in the island, it is an ideal location for the formation of a clam cluster, to facilitate organised and scientific harvesting (including culture), processing and marketing. Proper harvesting and utilisation of clam meat will enhance the livelihood opportunities of the fishers dependent on the fishery for their livelihoods, instead of merely concentrating on the income accruing from the shell trade.

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References

- Appukuttan, K. K. 2007. The molluscan fishery of India and its livelihood enhancement potential *IFP Souvenir 2007*, <http://ifpkochi.nic.in/IFPS2.pdf>, accessed on August 17, 2011.
- Krripa, V. and Joseph Mathew 1993. Clam fishery of North Vembanad Lake. *Mar. Fish. Inf. Serv., T & E Ser.*, No. 119.
- Kripa, V., Velayudhan, T. S. and Aloycious, P. S. 1999. Experimental culture of black clam, *Villorita cyprinoides* (Grey) in Vembanad Lake, Kerala. *The fourth Indian fisheries forum proceedings*, 24-28 November 1996, Kochi, p. 183-184.
- Laxmilatha, P. and Aloycious, P. S. 2001. A report on the organised fishing for the black clam (*Villorita cyprinoides*) in Aryad, Vembanad Lake, Kerala. *Mar. Fish. Inf. Serv., T & E Ser.*, No. 169.
- Laxmilatha, P. and Appukuttan, K. K. 2002. A review of the black clam (*Villorita cyprinoides*) fishery of the Vembanad Lake. *Indian J. Fish.*, 49(1): 85-91.
- Laxmilatha, P., Velayudhan, T. S., Kripa, V., Jenny Sharma and Alloycious, P. S. 2005. Biology of the black clam, *Villorita cyprinoides* (Gray) in the backwaters of Vembanad Lake. *Indian J. Fish.*, 52(3): 361-366.
- Rasalam, E. J. and Sebastian, M. J. 1976. The lime-shell fisheries of the Vembanad Lake, Kerala. *J. Mar. Biol. Ass. India*, 18(2): 323-355.
- Ravindran, K., Appukuttan, K. K., Pillai, V. N. Sivasankara and Boopendranath, M. R., 2006. *Report of the committee of experts on ecological and environmental impact of dredging at Vaduthala Kayal and Vaikam Kayal, Kerala*, Submitted

- to The Government of Kerala, Thiruvananthapuram, September 2006.
- Suja, N. and Mohamed, K. S. 2010. The black clam *Villorita cyprinoides*, fishery in the state of Kerala, India. *Marine Fish. Rev.*, p. 48 – 61.
- Suja, N. and Mohamed, K. S. 2010. A model for responsible black clam fisheries at R-Block in Vembanad Lake, Kerala. *Mar. Fish. Inf. Serv., T & E Ser.*, No. 203.
- Suja, N. and Mohamed, K. S. 2011. Role of co-operative societies in black clam fishery and trade in Vembanad Lake. *Mar. Fish. Inf. Serv., T & E Ser.*, No. 207.
- Thomson, Kaleekal 2009. Development policies, state interventions and struggles for livelihood rights in coastal communities in Kerala, India: A case study of the Cochin clam fishery. *Ocean Coastal Manage.* 52(11): 586-592.

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