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3. CHARACTERISTICS OF CLAM RESOURCES OF VEMBANAD LAKE - A CASE STUDY

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ABSTRACT

The Vembanad lake, covering about 200 sq. km, is supporting a rich fishery of clams mainly constituted by *Villorita cyprinoides* var *Cochinensis* and the total production is around 25,000 t/year. The lake is divided into six zones for studying the pattern of exploitation and seed production and the results are presented in the paper.

The effect of manual exploitation of subsoil deposits ranging from 41,000 to 70,000 t/year and of dredging on the clam beds is also presented with comments on the development possibilities in the sector based on this case study.

INTRODUCTION

Vembanad lake, having about 200 sq km waterspread, is one of the major estuaries in India, and is supporting two major industries and a large industrial network in Kerala and Tamilnadu for their requirement of lime shell as raw material. The supply of lime

shell from this lake is exclusively from clam shells in the form of dead subfossil deposits and also from the harvest of live *Villorita cyprinoides* var *Cochinensis*. As this important resource has been threatened to the level of depletion because of the high rate of consumption, the Central Marine Fisheries Research Institute has initiated a detailed

investigation in 1979 on the exploitation of clam resources of Vembanad lake and its socio-economic implication and a detailed report (Achary 1986) has been made on this subject and some of the major findings on the resource are presented in this paper. At this context, the earlier studies made by Kunjupanicker (1957) and Rasalam and Sebastian (1976) are worth mentioning.

FISHING AREAS OF THE LAKE

For studying the production potential of the lake, it was felt necessary to divide the lake into six zones having certain characteristics such as the exploited size of clams, the grouping of fishermen etc. since they belong to different co-operative societies functioning in the respective locality. The following are the areas included in each zone.

Zone I. Thevara, Kumbalam, Thekkumbhagam, Manakkunnam, Chembu, Kulasekha-

ram, Arobr, Aroblcutty, Vaduthaia, Mattathilbhagam, Kuthiathodu.

Zone II. Thycattusseri, Pallipuram east, Pallipuram west, Chenganda, Vayalar.

Zone III. Thannirmukkon North, Thannirmukkon South, Kokkothamangalam, Shertallay Municipal area Ward VI.

Zone IV. Mannamcherry, Aryad north, Aryad south, Alleppay, Kainakarl, Pulimkunnu.

Zone V. Neduvila, Vaikom, Thalayazham, Vechoor north (north of bund),

Zone VI. Vechoor south (south of bund), Kaipuzha, Ayimanam, Kumarakom, Tiruvarpu, Nattakom.

The above zones are shown in Fig 1 in detail.

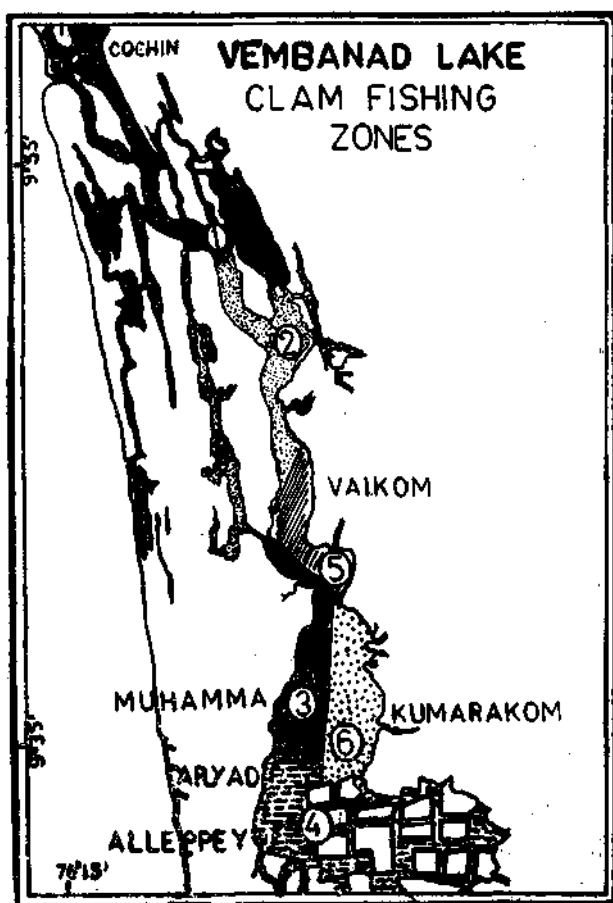


Fig. 1 Map of Vembanad lake showing the clam fishing zones

METHODS OF STUDY

Fishermen belonging to the above zones collect their daily harvest of clams and dispose the catch through the societies to which they belong. So it was possible to get the realistic estimate of the clam production by periodically visiting these societies and to collect the data on the different size groups exploited daily. In addition samples from the fishermen were taken directly from the canoes for the biological studies. Similarly the factories were visited periodically to collect information on their consumption of lime shell and other details. A socio-economic survey also was conducted to evaluate the impacts of this fishery and to suggest measures for improvement. The results are summarised and presented in this paper.

EXPLOITATION OF LIVE CLAMS

Clams are harvested as an annual crop from this lake as well as the small islands known as "Thuruthu". It was observed that the average annual production of *ViUorita cyprihoides* from the lake was 21,490.5 t during 1979 to 1984. The details of production during different years are

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TABLE - 1. *Harvest of live clams from Vembanad lake by fishermen*
(Figures in tonnes for calendar year)

Centre of collection Zone of Collection	Kuthiathoda I	Thycattusseri II	Muhamma III	Aryad IV	Vaikom V	Vechoor VI	Total for the year	Remarks
1979	2591.75	5661.96	3255.86	3619.56	4153.50	195.50	19478.13	
1980	4087.36	6527.52	4061.86	3241.50	4195.00	512.26	22625.50	
1981	3508.34	4421.62	5727.20	5369.30	4742.00	610.18	24378.64	Mass
1982	3519.96	4937.50	5275.02	5344.24	4856.00	1052.34	24985.06	mortality and heavy collection
1983	4283.60	4265.80	4650.42	4499.30	4373.00	1599.28	23671.40	
1984	4126.80	3644.00	1507.46	1524.94	2529.00	472.28	13804.48	"^ ^'^" sized clams (for
1985Ja.to March	672.00	314.50	220.00	612.50	400.00	85.52	2304.52	Jan. to Mar. 85)

presented in Table I. The lowest production of 13,804.5 t in 1984 is found to be due to mass mortality and also due to heavy exploitation of small sized clams. Except in zone VI the production is more or less stable but in zones III, IV and VI which are south of the Thannirmukkon bund the clam production has gone down considerably in 1984 due to the mixing of sub soil acidic water.

The exploitation of smaller size groups of clams is more than 50% in the northern most zone (zone I) and this group is supposed to be of the seed clam size. It is also one of the major reasons for low production in this zone and these clams can be utilized for culture by transplantation as practised in Thailand and other countries. Similar practice of fishing is observed in zone II also and these two areas are found to be highly productive for the seed clams. However, in zone III and IV which are south of the Thannirmukkon bund, clams above 15 mm size only are harvested and seed clam fishing is very rare.

EXPLOITATION OF SUBSOIL DEPOSITS

The subsoil deposit is known as "white shell" and the annual landings range from

41,445.04 to 69,305.98 t. The harvest is made by the fishermen from zones I, III, IV, V and VI and the details of annual exploitation is presented in Table 2 for the respective zones. The maximum collection of shells is recorded at zone III ranging from 13,029.3 to 26,499.7 t. and the minimum at zone I ranging from 719.4 to 1012.5 t.

In addition to collection of shell directly from the lake, from paddy fields also huge quantities are exploited at zones IV and VI. At zone IV a maximum of 88,784. t. of shells were collected in 1984. However, the landing from zone VI by members of one of the societies is exclusively from paddy fields which are reclaimed and it ranges from 9,390 to 17955t. This adds as a subsidiary income for the fishermen in addition to their income from paddy and coconut plantation.

EXPLOITATION BY FACTORIES AND EFFECT OF DREDGING IN VEMBANAD LAKE

The Travancore Cements Ltd., Nattakom, Kottayam, the Travancore Electrochemicals, Chingavanam and the Pallathra Bricks and Tiles Ltd, Shertallai (at present the Kerala Construction Components Ltd) are the three factories utilising lime shell at an annual

TABLE 2. Harvest of subsoil deposits of clam shell from Vembanad lake by fishermen (Figures in tonnes for calender year).

Collection Centre Zone of collection	Keinalcari IV	Muhamma III	Kumarakom VI	Vechoor V 6 V I	Mattathil Bhagom 1	KaiPuzha-Vechoor VI	Grand total for the year
1979	3950.80	15988.88	6541.46	7549.70	N. A.	17955.00	51985.84
1980	3605.74	17318.08	7531.56	8467.16	719.40	9390.00	47031.94
1981	4098.98	16305.46	6420.94	6763.26	837.74	13007.00	47469.75
1982	6161.54	22376.56	7939.70	7193.80	835.86	14836.00	59343.46
1983	3043.82	13029.26	6419.54	7293.16	727.76	10931.50	41445.04
1984	12941.74	26499.70	6816.06	6956.02	1012.46	15080.80	69305.98

average of 95,0001. The first two factories are collecting lime shell by dredging from the lake and the third factory is depending on contract labour. However the major consumption is by the Travancore Cements (about 50,000 t) followed by the Travancore Electrochemicals (about 41,000 t) and by the Pallathra Bricks and Tiles (4,0001.)

A study on the effect of dredging in Vembanad lake is also made during this period and heavy silting condition is noticed around the dredging area which is found to spread around 1.5 km radius from the dredge due to mixing of water, drift current and by wind actions. The suspended silt which does not settle within 24 h is found to be 0.155 g/l around the dredged area. For complete sedimentation, if undisturbed, it takes 40 h in the laboratory and it may take more time in the lake for settlement because the water is always disturbed. The penetration of light ranged from 15 to 25 cm during bright sunny days around the dredged area and in other localities it ranged from 50 to 80 cm. Observations also indicated that clam are surviving well beyond 0.5 km radius from the dredge area. The washed out sand and silt during the dredging make the lake's bottom uneven and also the superficial layer formed by the settlement of silt makes the layer very smooth, covering the settled larvae of clam which may lead to mortality of the larvae also. However, this is not affecting the total production of clam in the lake because the larvae are capable of moving to favourable conditions and are selective in forming the clam bed and when the total area of the lake is considered, the silted area due to dredging is negligible.

DEVELOPMENT POSSIBILITIES

The scope of improving clam production of the Vembanad lake is presented in detail in the study report (Achary 1986). The activities of the present Co-operative societies working in this area can be expanded by diversification and by channelising the development programmes of the state to these societies also. The details of diversification are presented elsewhere in one of the management papers presented in this seminar by the author. There is also the scope for starting additional societies at the northern parts of the lake and the practice of exploitation of undersized clams can be discouraged by creating a general awareness among the concerned which will help increasing the production of live clams.

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REFERENCES

- ACHARY, G.P.K. 1986. (MS) Exploitation of clam resources of Vembanad lake and its socio economic implications.
- KUNJUPANICKER P. O., 1957. Notes on the progress of lime shell industry on cooperative basis in Travancore Cochin state and suggestions for improvement *Kumarakam Lime Shell Coop. Society Kumarakom*:1-85.
- RASALAM. E. J. AND M. J SEBASTIAN. 1976. Tiie lime shell fisheries of the Vembanad lake, Kerala. *J. mar. Biol. Ass, India. iB (2)* 322-355.