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EXPLOITATION OF SHELL-DEPOSITS IN PULICAT LAKE

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ABSTRACT

A brief account on the molluscan shell deposits around Irakkam and Veynad Islands of Pulicat Lake, method and magnitude of exploitation during different seasons of the year, man-power engaged, per capita income, percentage composition of shell deposits, uses of shells in and around Pulicat Lake *etc.*, have been discussed.

INTRODUCTION

MOLLUSCAN shells form one of the important fisheries in backwaters and coastal waters of India. Hornell (1916) reported some of the important shell producing centres such as Pulicat Lake, islands between Keelakarai and Pamban, islands and swamps around Tuticorin, South Arcot, Malabar District and South Kanara backwaters, swamps of Surla and Sonapur in Ganjam district and creeks and swamps of the Krishna and Godavari deltas. Rai (1932) reported the shell fisheries of the Bombay Presidency and estimated the production of *Meretrix meretrix* and *M. casta* at approximately 4 million pounds. Ranade (1964) investigated the clam resources of 70 creeks from Thana to Ratnagiri District. Alagarswami and Narasimham (1973), and Nayar and Mahadevan (1974) reported about the landings of clams in different areas of India. Rasalam and Sebastian (1976) gave a detailed account on the shell fishery resources and commercial uses of lime shell of the Vembanad Lake, Kerala. James (1978) recorded the availability of vast sub-fossil molluscan shell deposits in the Vaigai estuary at Athankarai in Tamil Nadu. In Vellar, Cuddalore, Killai, Uppanar estuaries mostly *Meretrix* sp. shells are collected by scooping out with the basket from the bottom along with live ones. On Maharashtra Coast larger quantities of shells are gathered in the southern creeks and backwaters and sent to Bombay after meeting local demand for conversion into lime.

The present paper deals with the method of sub-fossil shell excavation, magnitude of exploitation, per capita income and the species composition of shell deposits of Pulicat Lake.

MATERIAL AND METHODS

The Pulicat Lake was surveyed for finding out the distribution of molluscan fauna. During January-May 1980 regular visits were made to the Irakkam and Veynad Islands and the distribution of shell deposits around the islands was studied. Total number of persons engaged in shell excavation was also noted when shell mining work was going on and income per day was collected by enquiry. Information on the details of lease and shell products were obtained from the records maintained by the Village Munsiff of Irakkam and Veynad. Shell production was estimated during weekly visits to the nearest shell industry at Pulicat. Sub-samples of shells were collected from five different localities of both Irakkam and Veynad islands and the shell composition of the deposits were noted.

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Results

Sub-Fossil deposits of Pulicat Lake

The Pulicat Lake which is 56 km north of Madras is a large centre of shell production. Extensive deposits of sub-fossil shells are available a few feet below the surface over a wide area of about 2,000 hectares in the heart of the lake (Fig. 1). The lake extends towards Madras and provides a cheap water transport through Buckingham canal which has brought about an enormous development of the exploitation of the shell deposits.

The sub-fossil shells are obtained from the shell bearing stratum which lie 1.0 to 1.5 m below the mean level of the lake. The shell stratum appears to be continuous along the banks of the main section of the lake from Mangodu to Sunnambukulam, and these shell mines also extend from Arambakkam to north of Tada. Continuous distribution of these shells was found around the large islands of Irakkam and Veynad.

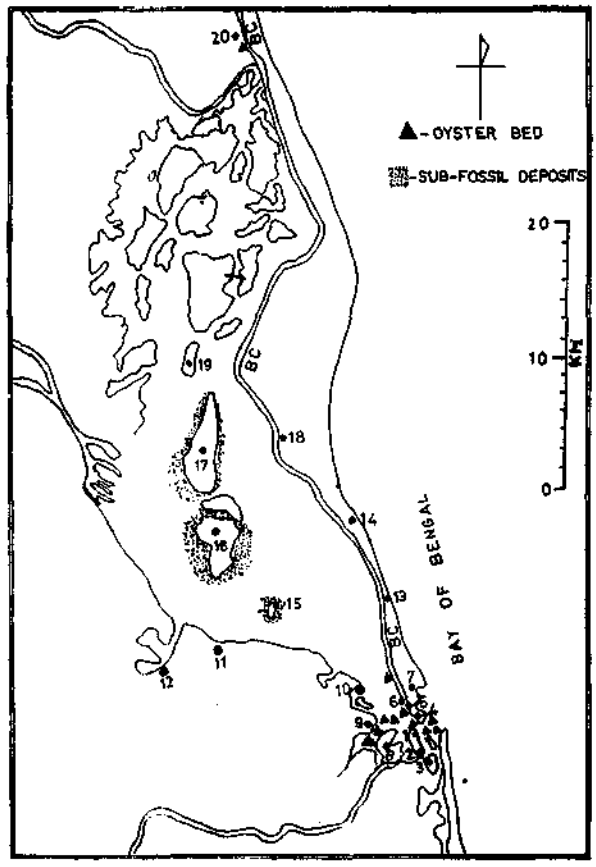

Fig. 1. Pulicat Lake showing the distribution of oysters and sub-fossil deposits.

The richest sub-fossil deposits are found in the two large islands of Irakkam and Veynad, and in all other places such as Mangodu, Kuruvithittu, Sunnambukulam, Arambakkam and Tada shells have scattered distribution. In the Pulicat Lake about 900 to 1,000 active

fishermen are engaged in the shell industry during the peak season and an average of 300 tonnes of shells are gathered every day and transported to Madras city, Pulicat village and other neighbouring places like Tada and Sullurpet of Andhra Pradesh for lime burning. These shells are considered to yield lime of good quality.

Irakkam has a total area of 2,880 hectares (7,200.40 acres). Of this about 1,000 hectares of land with sub-fossil deposits have been used for excavation of shells. The land with sub-fossil deposits was leased out by the Government of Andhra Pradesh to the private entrepreneurs at the rate of Rs. 12.50 for first 7 years and Rs. 20 from 7 to 15 years per acre. Shells are being excavated on all sides, but intensively on the east, west and northern sides of the island. During the peak period about 220 tonnes/day were exploited from this island. A total of 33,470 tonnes of shells were excavated from this island during the year 1980, which constituted to 53.7% of the shell production of the Pulicat Lake.

Veynad has an area of about 1,640 hectares, of which about 800 hectares of land surrounding the island is rich in lime shell deposits. There are four lease owners working in this island. Annual yield of sub-fossil deposits was estimated to be 23,745 tonnes during the year 1980, which constituted to 38.1% of the shell production of the lake. During the peak period of exploitation about 100 tonnes per day was collected from this island.

Apart from the above two islands, Kuruvithittu, Sunnambukulam, Arambakkam, Perumbakkam and Tada together account for 5,165 tonnes of lime shells constituting 8.3% of the shell production of Pulicat Lake.

Exploitation

Method

Excavation of shells is undertaken by men and young boys. The method adopted in shell mining is very simple. Excavation involves detection of shell stock in the ground by piercing a 2.2 m long iron rod of 6 mm thickness pointed at one end and with a wooden handle at the other (Pl. I A). After locating a layer of shells, mining is undertaken by means of a spade. Each pit is with the size of about 1.5 × 1.5 m and excavated to a depth of 2 m (Pl. I B). Usually water percolates into the dugout pit. After reaching a suitable depth a person goes to the bottom with the basket, collect the shells. The cane basket facilitates easy removal of mud and sand. Usually three-fourth mud and sand. Thus two persons can collect about ¾ of a tonne in a single pit (Pl. I C).

Collection of sub-fossil deposits is also carried out by active fishermen by mining and hand-picking at Sunnambukulam, Kuruvithittu and Arambakkam areas. Fishermen usually collect the shells which are scattered and washed ashore on the ground surface. They collect 5 to 10 tonnes of shells per day by scooping out with a cane basket and earn Rs. 4 to 8/fishermen/day. During the peak season about 25 tonnes of shells could be collected every day.

Season

Exploitation of sub-fossil deposits usually starts during the post-monsoon in the month of January or February and extends till the onset of north-east monsoon. The peak period of excavation was observed between April and June in both the islands. During this period larger number of piles of shells could be noticed everywhere.

Man-power and income

In almost all places about 250 active men and young boys are engaged in mining at the onset of the season, but it is furthermore intensified during April-July with 600 to 850 persons exploiting a total of about 350 tonnes of lime shells per day. The man-days employed during the month of January was 7,230 and quantity

PLATE I. A. Long iron-rod used for detection of shell stock. B. Method of mining. C. A heap of shells from a single mine and D. Shell landings at Pulicat lake.

of shells collected was 3,100 tonnes, which increased gradually to reach the peak during May to 23,250 man-days collecting 9,920 tonnes of shells and thereafter the production gradually decreased (Table 1). Production rate for different months showed a range between 47.9—57.1 kg/man-hour. Each man engaged in shell excavation was paid by the lease owners at the rate of Rs. 8 per ' pora ' (which is a measure of shells equal to 200 to 250 kg). Thus each man was earning between Rs. 15.32 and Rs. 18.25 per day. The woman engaged in collection of shells usually earn Rs. 4 to 8 per day at Sunnambukulam, Kuruvithittu, Mangodu and Arambakkam centres.

TABLE 1. *Exploitation of sub-fossil shells at Irakkam and Veynad islands of Pulicat Lake during* 1980

Month	Weight in tonnes	Manpower employed	Exploitation rate Kg/Man/hour	Per capita income/day Rs. P.
January ..	3,100	7,230	53.1	17.16
February ..	4,060	8,880	57.1	18.28
March ..	5,425	12,400	54.8	17.52
April ..	9,000	21,000	53.6	17.16
May ..	9,920	23,250	53.4	17.08
June ..	9,100	21,000	54.1	17.32
July ..	7,130	18,600	47.9	15.32
August ..	5,580	13,950	50.0	16.00
September ..	3,900	9,120	53.5	17.12
October ..	—	—	—	—
November ..	—	—	—	—
December ..	—	—	—	—
Total ..	57,215	1,35,430	—	—
Average/Month ..	4,767.9	11,286	—	—

Production

Shell landings at Pulicat Lake were observed between February and October 1980. Though the sub-fossil shells were excavated in good quantities in different parts of the Pulicat Lake, only 7.8%, 4,889.5 tonnes in 1980 of the production landed at Pulicat village (Pl. I D.) The rest was sent by boat to Ennore, Sullurpet, Tada and nearby villages for preparation of lime poultry grit and for various other purposes. The Pulicat Lake supports a lime shell industry with a shell production valued at Rs. 125 lakhs. The shell industry provides livelihood to about 900-1,000 fishermen who depend entirely on collection of shells.

PERCENTAGE COMPOSITION OF SUB-FOSSIL SHELLS

The percentage composition of shells in the sub-fossil deposits is given in the Table 2. In both the islands usually the shell layer profile consists predominantly of a single species, the most common one being *Meretrix*. This constituted 28.8% and 25.6% in Irakkam and Veynad islands respectively. The species of *Cardita* ranks second at Irakkam Island, whereas in Veynad island *Cardium* species ranks next to *Meretrix*. *Tellina* sp. in Veynad samples

TABLE 2. *Percentage composition of shells in the islands of Irrakkam and Veynad of Pulicat Lake*

Genera		Irakkam	Veynad
Meretrix	..	28.84	25.58
Cardita	..	26.20	—
Cardium	..	2.15	23.26
Tellina	..	6.95	20.97
Arca	..	4.81	2.38
Umbonium	..	9.63	—
Nassa	..	6.95	6.98
Bursa	..	2.67	4.65
Natica	..	1.08	4.65
Pitar	..	5.35	4.65
Pecten	..	—	3.49
Murex	..	—	2.23
Hemifusus	..	1.08	1.16
Solen	..	1.60	—
Oliva	..	1.60	—
Strombus	..	1.08	—

which constituted to 21% forming the third abundant shells, but it takes fourth place in Irakkam. The other molluscs are *Arca, Pitar, Pecten, Solen, Umbonium, Nassa, Bursa, Natica, Murex, Hemifusus, Oliva* and *Strombus* occur along with the sub-fossil deposits, but their percentage was very less. Occasionally shells of *Dolium, Fusus, Donax, Placenta, Crassostrea etc.*, were found in some areas of the lake. In a few mines, the shells of the chank *Turbinella pyrum* were also observed in large numbers.

USES OF SHELL DEPOSITS

A considerable quantity of shells burnt into lime are used for white washing or in building construction. Molluscan shells are also used in the manufacture of cement. Shells are used for giving shining to the leather. Shells are ground into 2 to 3 mm pellets and used as a poultry grit. Shells are used for cleaning the glass and for bleaching the sugar. Lime shells is also used in paper mills for giving shining to the paper and in small steel plants for preparation of cast iron.

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