

## 1. RESOURCES, EXPLOITATION, CONSERVATION AND MANAGEMENT OF HOLOTHURIANS

### MANAGEMENT OF *BECHE-DE-MER* INDUSTRY IN INDIA

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#### ABSTRACT

Strategies for the management of the *beche-de-mer* industry in India are the extension of fishing to new areas, processing of more valuable species, collection of biological information to regulate exploitation, restriction on size for capture, imposition of closed seasons, farming and sea-ranching and developing the industry in an organised manner which are discussed in detail in this paper.

#### INTRODUCTION

The *beche-de-mer* industry is very ancient in India and it is essentially a cottage industry. At present it is restricted to a narrow strip on the southeast coast of India along the Gulf of Mannar and Palk Bay on the mainland. It was introduced to India by the Chinese and it is a must for them on festive occasions such as the Chinese New Year which falls in February and the prices normally go up in January. *Beche-de-mer* has no internal market and the whole product is exported. India at present exports *beche-de-mer* worth of nearly one crore rupees per year. James (1987 b) gave an account of the history, present status, problems facing the industry and also future prospects for the industry in India.

#### HISTORY OF THE INDUSTRY

According to Hornell (1917) the Chinese had trade with Southern India and Sri Lanka for the past one thousand years. He is of the opinion that *beche-de-mer* and pearls figured among the Indian products in exchange for porcelain, silk and sweetmeats. Custom records are available for the export of *beche-de-mer* from

1898 onwards from the Madras Presidency. The history of the industry is of great functions on the mainland. According to Mannadiar (1977), in Lakshadweep the industry flourished once, but there is no industry there now. Kloss (1902) stated that Andaman is known for *beche-de-mer* in olden days which later died down. In recent years it is revived by persons from Tamil Nadu who are processing chiefly around Port Blair. James (1981, 1987 a, 1988) gave an account of the resources, processing, utilization, problems and prospects of *beche-de-mer* industry in the mainland and Andaman and Nicobar Islands.

#### LOCATION OF THE INDUSTRY

There are more processing centres and higher magnitude of fishing along the Palk Bay than on the Gulf of Mannar. The important centres on the Palk Bay side are Rameswaram, Devipatnam, Tirupalakudi, Karangadu, Mullumonai, Thondi, Pasipatnam, Pudupatnam, Kottaipatnam, Ammapatnam, Kattumavadi, Sethubavachatram and Mallipatnam, and Pamban, Mandapam, Seeniappa Darga, Pudumadam, Muthupettai, Periapatnam, Kilakkarai and Tuticorin along the Gulf of Mannar. In the Andaman and Nicobar Islands processing is chiefly done around Port Blair and also at Rangat in Middle Andamans, Mayabunder

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and Diglipur in North Andamans, to some extent.

### CRISIS FACING THE INDUSTRY

*Beche-de-mer* industry is not an organised one. Since the holothurians are sluggish and harmless, they are indiscriminately fished and the stocks are alarmingly depleted. Also the whole fishing pressure is restricted to a narrow zone due to the concentration of the divers in particular places and due to ignorance, the whole fishing effort is directed towards a single species. This has resulted in overfishing which is clearly indicated in recent days by the fall in the size of the specimens fished and also in the decrease in the catch per unit of effort. At this juncture the Government of India has rightly imposed a ban on the export of processed

The fishermen stated that (i) it is not possible to estimate the size of holothurians under water, (ii) the material once removed from water cannot be put back to sea as they die and (iii) the Palk Bay holothurians do not grow beyond a particular size. All these were not found to be tenable. They also argued that while there is ban on exporting material below 3" size there is no ban on fishing small holothurians and there is heavy demand only for smaller forms in foreign markets. Government of India recently constituted a Committee to examine the problem and give recommendations. The matter is still pending as can be seen from the nil figures for sizes between 2-3" and below 2" from 1984 onwards given in Table 1. Even material between 3-4" size formed over 80% from 1984 onwards.

TABLE 1. Size-wise export of beche-de-mer in kg (Percentage in parenthesis)

Size	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86
4"-6"	7031 (16.9)	4756 (14.21)	2054 (3.06)	3596 (7.48)	3051.5 (3.8)	2851 (18.52)	2123 (19.5)
3"-6"	13987 (13.7)	9332 (27.89)	6986 (10.4)	19192.5 (39.93)	22643 (28.22)	12545 (81.48)	8765 (80.5)
2"-3"	18301 (44.0)	15867 (47.42)	45675 (66.59)	22370.5 (46.54)	39021 (48.64)	-	-
Below 2"	2182 (5.25)	3502 (10.46)	13373 (19.95)	2906 (6.04)	15495 (19.31)	-	-
Total	41501	33457	67088	48065.0	80210.5	15396	10888

Source : Data compiled from the invoices registered in the MPEDA Regional Office, Madras.

material below 3" in length in 1982 as a measure of conservation. The industry which was already facing difficulties in procuring adequate number of holothurians was hard hit by the ban since it could not export the smaller forms which formed the bulk of its catch due to overfishing, restored to clandestine methods to dispose off the material on hand. Their problems were further aggravated since the material has no internal market and also cannot be retained for longer periods due to its hygroscopic nature. With these problems on hand the industry brought in pressure on the Government to scrap the ban by putting forward many arguments.

The ban did not have the desired effect as there is ban to export material less than 3" length, but not for catching of small forms. Also there is some demand for smaller forms at much lower rates in countries like Taiwan as shown below.

4 to 6" (Large size 25-35 per kg) US \$ 17 per kg.

3 to 4" (Medium size 35-50 per kg) US \$ 15 per kg.

2 to 3" (Small size 90 to 100 per kg) US \$ 7 per kg.

Added to the above two problems, due to the ethnic disturbances in Sri Lanka the Export of *beche-de-mer* practically stopped since 1985. So more pressure was put on India for material and the only way left out to the fishermen was to indulge in smuggling small forms from the country thus depriving the valuable foreign exchange.

#### STRATEGIES FOR THE MANAGEMENT OF THE INDUSTRY

##### *Extension of fishing activities to new areas*

The export figures from 1898 to 1916 and again from 1963 to 1987 speak out for the erratic nature of the industry. The first world war had its impact on the exports and again in recent times the ban imposed by the Government of India had an effect on the exports (Table 2). The Government imposed ban in 1982, but permitted the export the undersized material on hand and this accounts for the high export figure during 1987. The exports picked up due to the extra effort put by the industry to procure material from various places due to the higher price of *beche-de-mer*.

TABLE 2. Export figures of *beche-de-mer* (kg) and value (Rs) during 1898-1987

Year	Weight	Value
1898-1899	25,601	15,380
1899-1900	1,260	1,140
1900-1901	-	-
1901-1902	-	-
1902-1903	-	-
1903-1904	-	-
1904-1905	14,523	15,203
1905-1906	30,845	24,300
1906-1907	3,125	3,100
1907-1908	9,992	8,460
1908-1909	12,758	7,020
1909-1910	8,609	5,039
1910-1911	1,222	655
1911-1912	2,820	800
1912-1913	504	596
1913-1914	1,360	600
1914-1915	-	-
1915-1916	2,167	1,426

Year	Weight	Value
1963	3,049	7,529
1964	1,275	2,550
1965	24,974	21,125
1966	21,886	39,631
1967	38,422	43,672
1968	64,535	1,03,820
1969	69,051	5,77,898
1970	58,293	5,48,444
1971	57,614	3,66,003
1972	37,089	2,44,761
1973	29,255	2,47,911
1974	67,871	6,51,077
1975	91,268	20,71,561
1976	62,578	18,96,777
1977	66,934	19,46,633
1978	24,537	10,76,580
1979	31,231	15,22,941
1980	34,013	18,72,314
1981	47,841	26,28,757
1982	37,143	17,23,558
1983	71,853	36,96,765
1984	20,715	17,97,948
1985	11,933	11,68,213
1986	32,864	38,03,858
1987	53,755	79,37,977

The industry has to be extended to areas such as the Lakshadweep where there is no processing today and where first grade holothurians are available for processing (James, 1989). It is significant to note in this connection that there is an industry in Maldives. James (1989) has estimated 1882 tonnes at Kadamath, 209 tonnes at Chetlat, 172 tonnes at Kiltan and 165 tonnes at Ameni for *Holothuria (Microthele) nobilis* which is the best holothurian for *beche-de-mer*. Estimates for other valuable species such as *Actinopyga mauritiana* are also made. Other valuable species are *A. echinites* and *Thelenota ananas*. These have to be exploited in a rational manner. In 1968 a person from Madras came to Androth and processed nearly seven tonnes of *Holothuria (Microthele) nobilis* by paying a royalty of Rs. 1 per kg to the Administration. He purchased specimens paying

five or ten piase for each specimen. He processed *beche-de-mer* at Kavaratti also. Fisheries Department restricted the collection of specimens below 150 mm size. After two years he wanted to return to Lakshadweep, but the Administration did not give him permission.

In Andaman and Nicobar Islands also hardly any industry worth the name exists. Some processing is done chiefly around Port Blair for *Holothuria (Metriatyla) scabra* leaving other valuable species like *Actinopyga mauritiana* and *A. echinites*.

Even on the mainland it is restricted to only some places like Tirupalakudi, Devipatnam, Kilakkarai and Periapatnam. There is no reason for the absence or limited quantity of the holothurians between widely separated curing centres, since the nature of the bottom and the hydrographical conditions are the same all along the Palk Bay and the Gulf of Mannar. A point to prove this fact is the introduction of the industry at Tuticorin which was not there some 18 years ago. Not a single holothurian was fished and people were not even aware of this resource. Today it has a flourishing industry and during peak season holothurians worth of Rs. 10,000 to 15,000 are auctioned on a single day. The main reason for processing the holothurians at particular centres is due to the availability of divers at those places. Devipatnam, Tirupalakudi, Karangadu and Mullimonai form the core area for the divers and these divers go to other places when the season is favourable. More fishermen should be trained in skin diving for holothurians. Local fabrication of the masks has given a new impetus to diving. In recent years divers are using Aluminium plates as 'flippers' to give them greater mobility under water. With these 'flippers' they are able to cover greater areas and collect more material.

#### **Processing of other species**

In an export trade like this it is always desirable to go in for diversification. Market trends change with the tastes. If we specialise only on one or two species there is a possibility of closing down the industry when the demand for a particular species falls, as it has happened in Australia for *Thelenota ananas* which once

commanded highest price. James (1973, 1986 a) gave an account of *beche-de-mer* resources of India. At present on the mainland of India *Holothuria (Metriatyla) scabra* and *Holothuria (Thelothuria) spinifera* are processed the former accounting for more than 90% of the specimens fished. In Andamans *Holothuria (Metriatyla) scabra* is exclusively fished so that the fishing pressure falls on a single species and the stocks are depleted due to overfishing. In recent years due to the high price offered for *beche-de-mer* at the rate of US \$ 18/- per kg, people have taken to processing another species *Bohadschia marmorata* especially at Kilakkarai. Yet another species is also tried in the Palk Bay. Because of the high price they started processing even *Holothuria (Halodina) atra* which is not a very valuable species for *beche-de-mer* preparation. The tragedy is that the more valuable species in the Andaman and the Lakshadweep Islands are left untouched due to ignorance. Some samples of *beche-de-mer* of *Actinopyga* sp. were shown at Kilakkarai, but the trade seems to be a mystery as they are not willing to reveal the actual value of the species. They neither know the value nor the correct processing methods for these species. Therefore the people have to be taught about the value and processing methods for these species.

#### **Need for biological information to regulate exploitation**

If the industry has to survive, the resources should be judiciously exploited without over fishing the same. This becomes all the more important since we are ignorant of several aspects of their biology such as age and growth, longevity, spawning and fecundity, recruitment, distribution, size at first maturity and other aspects. Unless these aspects are known it is not advisable to exploit the species indiscriminately. In case of holothurians, over exploitation can easily take place as the animals are defenceless with sluggishness and offer no resistance when caught.

#### **Restriction on size for capture**

To conserve the resource regulation regarding the size at collection should be insisted. This can be strictly implemented as the

Tamil Nadu Fisheries Department does in the case of chanks. Since the area of fishing is same for both this can be easily monitored. The landing centres for holothurians are also limited and therefore it can be easily regulated. Material below the size of 200 mm in length may be banned from catching. Even if they are caught and brought to the shore they can be put back into the sea since they live out of water for a long time.

#### **Imposition of closed seasons**

There should be closed seasons for the collection of holothurian especially during the peak spawning months in July and October. The diving should be closed down by the end of June. The water in the Palk Bay also becomes somewhat turbid and rough preventing the divers to conduct their operations effectively. In fact the season in the Gulf of Mannar starts from October when the sea is calm. From November onwards the NE monsoon sets in and drying becomes a problem and therefore the processing is not in full swing. It is worth mentioning that the Lakshadweep Administration took the first conservation measure for holothurians when it restricted the collection of *Holothuria (Microthale) nobilis* below the size of 150 mm when processing was done during 1968 at Androth and Kavaratti Islands.

#### **Farming and sea-ranching to be stepped up**

Apart from the size restrictions and closed seasons which have to be strictly adhered, attempts should be made to culture the species in enclosed areas to augment production and boost up export. James (1983) made an attempt to culture *Holothuria (Metriatyle) scabra* at Port Blair by collecting juveniles and stocking them in enclosed areas. In this type of work the first step is to locate the beds where juveniles are in large numbers. One such area could be Kundagalgut near Pamban where juveniles of *Holothuria (Metriatyla) scabra* were seen buried during low tide.

Another important step to sustain the industry is the sea-ranching of seeds in large scale. Success has been achieved recently by James *et al.* (1988) at the Tuticorin Research Centre in inducing *Holothuria (Metriatyla) scabra* to spawn in the laboratory to produce viable seeds. Now intensive seed production has to be taken up and when once the larvae settle down to the bottom as *Pentactula* stage and grow to 20-30 mm size they can be sea-ranched.

#### **Development of organised beche-de-mer industry**

As mentioned earlier the *beche-de-mer* industry is not in an organised manner. *Beche-de-mer* processing factories can be opened on the Gulf of Mannar and Palk Bay side. Hornell (1917) mentioned about a Government factory at Tirupalakudi with economics worked out. He suggested that another factory can be opened at Vedalai. In Sri Lanka a *beche-de-mer* factory was opened in 1974 at Mannar under the Fisheries Co-operative Society. Paramananthan (1974) has given the advantages of processing *beche-de-mer* in a factory and has also given the cost analysis. He has also clearly shown that in order to run the factory successfully they have to process atleast 1.2 tonnes of *beche-de-mer* per month. The processing by selected and trained staff to ensure uniformity, hygienic conditions, greater care for better standard and quicker production are primary requisites for the success of the industry. Bad weather conditions will not affect the processing, individual suppliers of raw material will find continuous employment, society can afford to expand and improve operations and finally society can pursue action for promoting better sale in quality and quantity. James (1986 b) suggested several methods to improve the quality of *beche-de-mer*. It is worth making an effort under co-operative sector by opening one or two factories along the Gulf of Mannar and Palk Bay. The *beche-de-mer* industry can thus be managed in a better and organised manner.

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