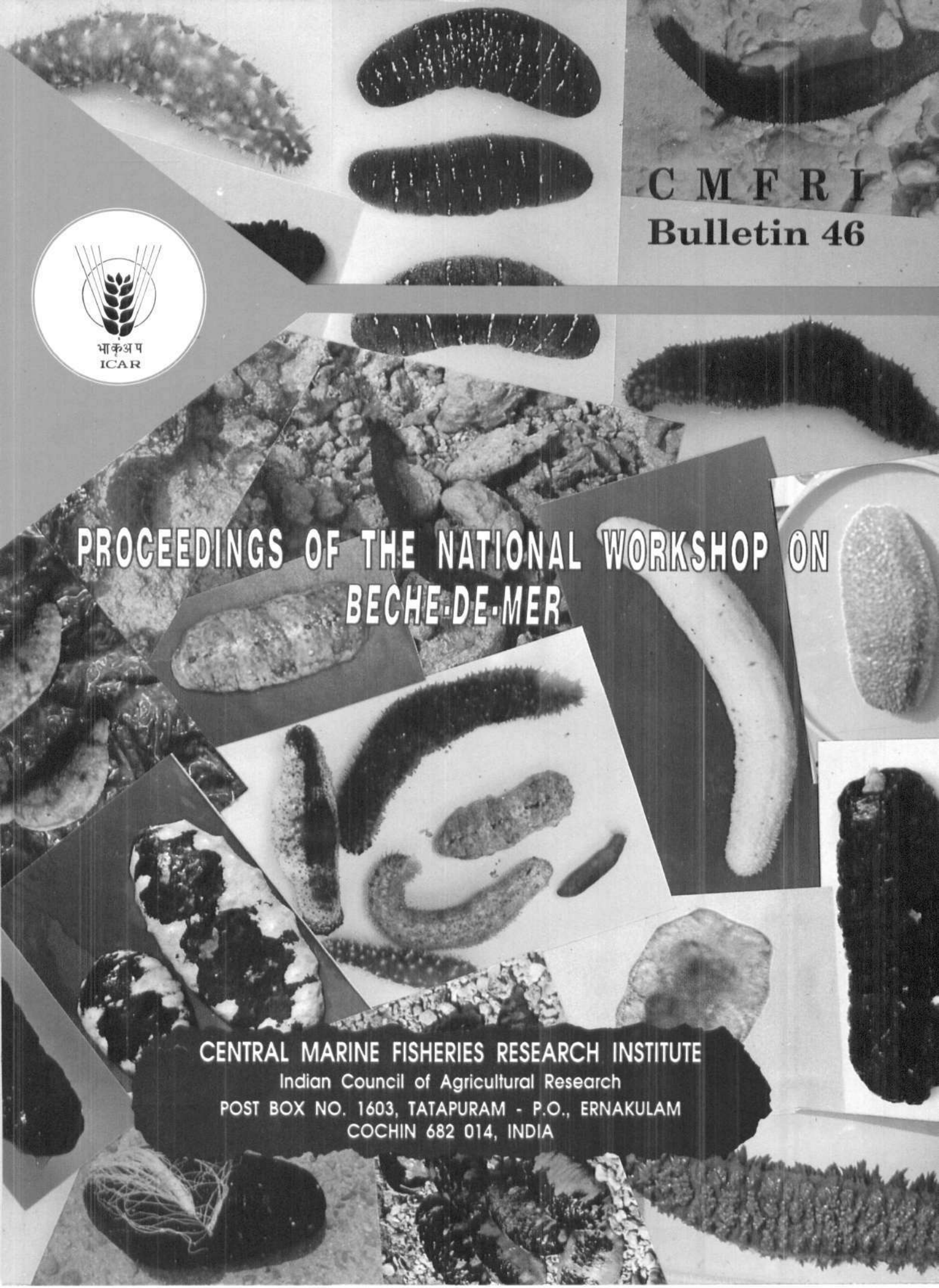

CMFRI
Bulletin 46

PROCEEDINGS OF THE NATIONAL WORKSHOP ON *BECHE-DE-MER*

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
Indian Council of Agricultural Research
POST BOX NO. 1603, TATAPURAM - P.O., ERNAKULAM
COCHIN 682 014, INDIA

C M F R I
Bulletin 46

PROCEEDINGS OF THE NATIONAL WORKSHOP ON *BECHE-DE-MER*

Dr. K. RENGARAJAN
Dr. D. B. JAMES

Editors

February 1994

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SUMMARY OF THE PROCEEDINGS OF THE NATIONAL WORKSHOP ON *BECHE-DE-MER*

PROCEEDINGS OF THE NATIONAL WORKSHOP ON *BECHE-DE-MER*

PRESIDENTIAL ADDRESS BY DR. P. S. B. R. JAMES

Our Chief guest Shri. M. R. Nair, Distinguished Scientists, Ladies & Gentlemen,

I have great pleasure in welcoming you all for the 'National Workshop on *Beche-de-mer*'. This is the first Workshop on *Beche-de-mer* to be conducted in India. Although *Beche-de-mer* industry is existing in India for the last 1000 years, many facts about this industry are not known. As you are aware, India is at present earning a foreign exchange of nearly one crore of rupees by exporting *Beche-de-mer*. The seas around India are rich in sea-cucumber fauna particularly in the Gulf of Mannar and Palk Bay, the Andaman and Nicobar Islands and Lakshadweep. At present the industry is restricted to the mainland along the Gulf of Mannar and Palk Bay. Lot of processing is going on in and around Mandapam and for this reason this place has been chosen as the venue for this National Workshop. In the Gulf of Mannar and Palk Bay, chiefly one species namely *Holothuria scabra* is processed, though other species can also be utilised. In the Andaman and Nicobar Islands and in the Lakshadweep more valuable species of sea-cucumbers for *Beche-de-mer* processing are available. Unfortunately these are now not tapped. There was once a flourishing industry in the Lakshadweep in the olden days. The most valuable species for *Beche-de-mer* processing *Microthele nobilis* occurs in the Lakshadweep in great abundance. There is an urgent need to extend this industry to the Lakshadweep since there is now a flourishing industry in Maldives.

The *Beche-de-mer* industry in India is today facing a crisis on account of several problems. As a result of over exploitation in the narrow strip in the Gulf of Mannar and Palk Bay, there is shortage of raw material. The Government of India imposed a ban in 1982 to export material less than 3" in size as a measure of conservation. The Andaman and Nicobar Administration has totally banned fishing of sea-cucumbers in the whole of Andaman and Nicobar Islands which is causing problems to the industry there. In order to focus attention on these vital issues and to make suitable recommendations for policy decisions, we have organised this first National Workshop on *Beche-de-mer*. Here we have a good cross section of people from the Government, industry, trade, fishermen, scientists, administrators and policy makers.

Although the *Beche-de-mer* industry in India is very ancient, it has undergone little or no change since the days the Chinese introduced the processing. The industry never took off the real sense and there was absolutely no innovation or diversification, with the result the industry today stands where it was nearly 1000 years ago. With the result the industry is ill organised and run on unscientific and unhygenic lines by unscrupulous people. Therefore there is an urgent need to bring to light all facts concerning the ancient industry so that it can be put on its feet again to compete in the international market. Our fishermen are ignorant of the value of the species and also the processing methods for different species.

On the last day of the Workshhop the fishermen and the persons from the industry will be taught about the commercial species of sea-cucumbers, correct methods of processing, drying and packing. A small exhibition is also arranged showing some of the important sea-cucumbers in live condition along with processed material from various species belonging to different grades. A number of photographs and charts have also been arranged to educate the delegates concerned with the industry.

We, at the Central Marine Fisheries Research Institutve have started work on sea-cucumbers 25 years back. Considerable amount of information has been collected on the commercial and non-commercial species along the mainland, the Andaman and Nicobr Islands and Lakshadweep, their abundance, their distribution

and their life habits. Detailed surveys have been conducted along the Gulf of Mannar and Palk Bay, the Andaman and Nicobar Islands and the Lakshadweep and resources have been estimated. At present work on the biology of two commercially important species is conducted. Last year we have achieved a breakthrough at the Tuticorin Research Centre in inducing *Holothuria scabra* to spawn for the first time in the laboratory. Perhaps work on this species is done for the first time in the world. This important piece of research by the Institute opens vast scope for the industry which is already reeling under shortage of raw material. We can see some of the juveniles produced in the hatchery at the exhibition.

I am happy that delegates from different organisations have come for this National Workshop and during the next three days we shall discuss all aspects concerning the *Beche-de-mer* industry and make suitable recommendations. Today we are releasing 2 special publications - one in English and the other in Tamil with colour plates specially for the benefit of fishermen on *Beche-de-mer*. I wish you all a very happy and useful time at this beautiful place.

Thank you.

INAUGURAL ADDRESS BY SHRI. M. R. NAIR

Dr. James, Distinguished Delegates and Friends,

I am happy to associate myself with this National Workshop on *Beche-de-mer* and I thank Dr. James for asking me to inaugurate this National Workshop. I congratulate the Director and the Institute for organising this timely National Workshop on *Beche-de-mer*.

As you all know the *Beche-de-mer* industry in India is very ancient one and introduced by the Chinese more than one thousand years back. In India at present it is restricted to the Gulf of Mannar and Palk Bay. The venue selected is the most appropriate one, since the whole industry revolves round this area.

The industry though it is ancient it is in doldrums and has not taken off despite the fact that the whole product is export oriented and the price offered in recent years is attractive. The industry has made little or no progress from the stage which was introduced by the Chinese. No attempt is made to streamline the industry. This is the first attempt made to bring all the concerned persons at one place to discuss the related problems.

There is vast scope to improve the industry from the processing point of view. The present day processing methods are unscientific and unhygenic, therefore the material from India commands poor price when compared to the products from other countries. Diversification of the industry is another important aspect. All these years the industry is restricted to a narrow region in the Gulf of Mannar. Vast areas even within the Gulf of Mannar are left untouched since there is no fishing for sea-cucumbers between Kilakkarai and Tuticorin, though the resources are known to occur. This industry has to be extended to other places like the Andaman and Nicobar Islands and the Lakshadweep where more valuable species of sea-cucumbers are known to occur. Also the industry has been depending mostly on one species all these years. There are atleast ten species which are commercially important in the Indian Seas and all these species can be used for processing. However, it is gratifying to note that in recent years another species of sea-cucumber has been discovered in the Gulf of Mannar for processing.

The most important aspect of this industry is the judicious exploitation of the resources since the sea-cucumbers can be exploited in no time from a particular place due to their sedentary habits. Therefore adequate thought should be given for the conservation and management of the valuable resources.

Another important lacuna is in the area of taxonomy, biology ecology and zoogeography. The CMFRI has done commendable work during the last 25 years in the field of taxonomy and zoogeography and brought to light many new resources as a result of surveys conducted along the Gulf of Mannar and Palk Bay, Andaman and Nicobar Islands and the Lakshadweep. Some valuable information on the ecology has been collected by the scientists using SCUBA diving. Now they have taken up studies on the biology of commercially important species. It is hoped that much light will be thrown on the life-history of the important species for rational exploitation.

The Central Marine Fisheries Research Institute has to be congratulated for achieving a breakthrough in 1988 in inducing the commercially most important sea-cucumber to breed in the hatchery and produce seed. It is hoped that this step will pave way for intensive seed production, for sea-ranching programmes and also for culturing them to marketable size. This is a new line of work and I hope the industry will be much benefited by the programmes launched by the CMFRI.

As I have already pointed out that our processing leaves much to be desired. We are happy to note that the former Processing Expert of the FAO Mr. Sachithananthan is here with

us today to teach the correct methods of processing. Different species of sea-cucumbers need different methods of processing. Correct methods of processing have to be domonstrated at different places for the benefit of the processors. Handouts should be brought out for the fishermen in local language. I am happy to note that Dr. D. B. James, Convenor for the Workshop has brought out a handbook on *Beche-de-mer* in Tamil and I congratulate him for the same. We are going to release the Handbook today.

As I stated earlier the industry is stagnant and this has to be streamlined. I am glad to know that the *Beche-de-mer* also now comes under Export Inspection Agency for quality control. This will go a long way to boost our exports. At present we are exporting our material chiefly to Singapore. We should diversify the industry and catch other foreign markets also for healthy growth and competition. At present India is earning a foreign exchange of more than one crore of rupees and there is vast scope to boost our foreign exchange earnings.

I one again congratulate the Director Dr. James for organising this three day Workshop at this beautiful place and also congratulate Dr. D. B. James, Convenor for the yeoman service rendered by him to the industry during the last 25 years. I hope the discussions will be very useful to draw meaningful recommendations. I wish the National Workshop on *Beche-de-mer* every success.

Thank you all.

KEYNOTE ADDRESS BY SHRI K. SACHITHANANTHAN

Chairperson and friends,

I am pleased to be here with you today. I am grateful to the organisers of this workshop for having invited me.

The *Beche-de-mer* industry in India has been active since the arrival of the Chinese for trading to the South Indian ports during the pre-christian era. Today this industry is facing a challenge; on the one hand, the known resources have to be conserved; on the other, the industry has to meet the increasing demand for the product. This challenge can be met only through scientific inputs and technological innovations.

Never before did the fishery and trade for *Beche-de-mer* (*Kadal attai* in Tamil) in the Gulf of Mannar (*Mannar valaikuda*) and Palk Bay (*Paakku toduvai*) face such crisis as it is facing today. Along the Indian Coast, the concentration of fishing within a limited area has led to dwindling stocks and the resultant regulation of the fishing effort. Whereas on the Sri Lankan side the export of the produce has been hampered due to unsettled political conditions in areas adjoining the traditional fishing grounds.

Trade statistics from Singapore and Hongkong reveal a steep decline in the arrival of *Beche-de-mer* into these markets from India and Sri Lanka since 1980.

Exports of *Beche-de-mer* from South Asia to the Far East is not a recent phenomenon. Chinese traders have been visiting trading ports in South Asia for more than 2000 years. They came with silk, fire crackers, pottery and other Chinese made goods to exchange them for *Beche-de-mer*, pearls, spices, elephant tusks, artwork, etc. from South Asia. *Beche-de-mer* was one of the items Chinese valued and procured for their home market. Also the Chinese went in search of this prized item to far away places in the world.

Chinese traders visiting South Asia did not fail to identify the edible varieties of sea-cucumber in the Gulf of Mannar and Palk Bay around which the trading ports were located. The Chinese introduced the method of fishing, processing and storage. Few Chinese chose to remain in Tamil Nadu and Sri Lanka. They had the benefit of the patronage of the Pallava, Chola, Chera, Pandiya and Yalppanam kings who gave them lands and facilitated construction of Buddhist temples. One such temple was located in Nakapaddinam. Another was located in Mantai port in northwest Sri Lanka. Such patronage, facilities and donations were inscribed in stone in these places.

Eventhough most varieties of sea-cucumbers living in Indian waters are edible, the fishermen chose for processing the sand-fish *Holothuria scabra*, because of its (1) availability in commercial quantities, in relatively shallow areas, in fishing grounds along with chanks and pearl oysters, (2) visibility even in poor weather conditions, being easily identifiable among the few toxic varieties, (3) capacity to withstand the prolonged post-harvest handling in the tropical heat and (4) methodology of processing and storage under normal conditions.

Even aftr restricting the fishery to a single species, the total volume of the trade and the number of persons engaged in the fishery in South Asia has been very small compared to that of the general fishery in the region. Fishermen counted on *Beche-de-mer* as an additional source of income rather than the main source of income. Like the pearl fishery and the chank fishery, *Beche-de-mer* fishery continued to be seasonal being restricted to few areas and few families.

The frequency of sailings between ports in the Far East and South Asia were low and the *Beche-de-mer* trade was not as lucrative then as it is today.

Beche-de-mer production increased only after the establishment of trading ports in

Penang, Singapore, Makao and Hongkong during the last century by the colonial rulers from the West. Trading ships from the West calling at South Asian ports scouting for cargo to these ports lured *Beche-de-mer* fishermen to produce more and the trade gradually picked up.

Indian traders establishing their own outposts in Singapore and Hongkong gave further impetus, that the flickering industry started glowing. Exports of *beche-de-mer* from the Gulf of Mannar and Palk Bay region became part of an established trade between Far East and South Asia. The fishery was looking forward to a brighter future. More fishermen were recruited to learn to dive. Mechanised boats replaced traditional boats. Areas further away from the coast were explored with ease and confidence. *Beche-de-mer* fishermen had smiles on their faces all the way. There was boom and a sudden awareness.

Fishing effort was intensified. The industry attracted the attention of the authorities. Scientific investigators took active interest in the development of the fishery. Foreign exchange crisis in the post independent South Asia induced the economists towards diversification of the products for export. The hitherto insignificant *Beche-de-mer* became a significant item. Thanks to the ever rising prices in the Singapore and Hongkong markets. *Beche-de-mer* found its rightful place in the export promotion effort.

That the 'recently discovered' commodity became so important, the speed of exploitation of the available resource overtook the speed at which recruitment took place in the natural beds to replenish the dwindling stocks. Depletion of the adult stocks, resulted in the collection and processing of the juveniles and a slow decline in the export trade. Despite heavy exploitation the stocks sustained the fishery till now due to high fecundity and faster growth rate. What happens to a product which is in excessive demand and which is in short supply also happened to *Beche-de-mer*. It became the proverbial 'golden goose'. Authorities stepped in to regulate the fishery. In 1975, Sri Lankan Government imposed a ban on exports of dried *Beche-de-mer* of lengths less than 6 cm. In 1982 Indian Government banned the export of dried *Beche-de-mer* below 7.5 cm in length. In recent years the administration in Andaman and Nicobar Islands have banned the fishery as a measure of conservation.

Scientific investigations were stepped up. *Beche-de-mer* fishery became a field of specialisation in the Fisheries Research Institutes in India and in Sri Lanka. Programmes were drawn to investigate the commercially important varieties, their locations, their abundance, stock assessment of the major species, culturing methodology, simplification and mechanisation of the processing methods, and improving the packing and storage methods. Whatever knowledge that was gained through these investigations were extended to the fishermen.

The Central Marine Fisheries Research Institute (CMFRI) in India has been devoting itself to the study of this fishery for the past twentyfive years. Studies on the biology, ecology and zoogeography of the sea-cucumbers in the Indian seas have been an ongoing programme during this period. Evaluation of the *Beche-de-mer* resources were conducted in the Gulf of Mannar, Palk Bay, Andaman Sea and in the seas around Lakshadweep. Studies on the reproductive biology and other aspects were conducted by the Madurai Kamaraj University under the guidance of late Professor S. Krishnaswamy. CMFRI has recently succeeded in inducing *Holothuria scabra* to spawn in the laboratory; the juveniles are being cultured.

Fisheries Research Station and its successor National Aquatic Research Agency (NARA) in Sri Lanka, has been conducting studies since 1968. A *Beche-de-mer* processing factory was installed in Mannar in 1974. Fishermen were trained to locate and collect teat-fish *Actinopyga nobilis* along Trincomalee Coast. A development project at Kalpitya induced the fishermen from that area to exploit the sand-fish resources in Kalpitya Lagoon and the neighbourhood. University of Jaffna conducted studies on the biology

and reproduction of *Holothuria scabra*. NARA is continuing with the work initiated in 1968.

Let us look at what happened in other parts of the world. The Chinese traders not only introduced the fishery to the South Asia, but also introduced it to other parts of the Far East, Asia and Africa. In the Far East, Chinese settlers were consuming the product in addition to producing them.

Most fishermen in the Arabian Gulf, Gulf of Aden, Red Sea, East African Coast, Zanzibar, Madagascar knew about the economic potential of the fishery even though the product was not consumed locally.

Shipping links with other parts in the Indian and Pacific Ocean to Singapore and Hongkong became frequent. Newly emergent regimes of the third world activated their interest in trading with Far East. One of the items which picked up in trading during the colonial days and which received the attention of post-colonial governments was *Beche-de-mer*.

East African Coast, Arabian Sea, Andaman Sea, South China Sea, Jawa Sea, Banda Sea, Celebes Sea, Sulu Sea, Timor Sea, Makassar Straits, Coral Sea, Arafura Sea, Torres Straits, Bismark Sea, seas around Caroline Islands, Marshal Islands, Mariana Islands, Soloman Islands, Fiji Islands, Loyalty Islands, Society Islands, Samoa Islands became the enquiry targets of traders in Hongkong and Singapore.

The post-colonial governments in these areas sought and received through regional co-operation programmes bilateral assistance projects and through UNDP assistance technical knowhow to exploit their national resources to improve the fishery and to increase the trade.

The Indo-Pacific region abounds with edible varieties of sea-cucumbers *Actinopyga nobilis* the teat-fish, which fetches the highest price per kilo for any variety of *Beche-de-mer* in any market in the world, is taken in commercial quantities by fishermen living in areas east of Makassar Straits to as far as French Polynesia. Fishermen in South Asia or East Africa occasionally locate this variety for fishing or export. Investigations have confirmed the availability of this species in commercial quantities along the Trincomalee Coast in Sri Lanka and Lakshadweep seas in India.

Holothuria scabra, the sand-fish, is located and exploited in most seas bordering the tropical Paific and Indian Ocean. Sand-fish is generally preferred and its price in the market is not very low. In 1987 it fetched US $ 18.00 per kilo in Singapore market. It is affordable to most middle class Chinese. It forms the largest single species imported into Singapore in quantity. Availability in large quantities, particularly from South Asia, accounting for a third of the total supplies to the Singapore market makes sand-fish popular amongst middle and low income groups.

Many other varieties are available in the market. Their prices and the country of origin vary. Processing methods also vary.

It will be of interest to note that the Japanese are keen on having fresh sea-cucumbers; preferably teat-fish, for their cusine. They may eat them raw as well.

Future of the *Beche-de-mer* industry in South Asia appear bright, thanks to the dedicated effort of the scientific community. Specialists are available in the region to cope up with the demands of the industry.

Biologists are concentrating on identifying edible varieties, assessing their stocks, determiniting the maximum sustainable yield, locating new fishing grounds and developing methods to culture some of the varieties. Post-harvest technologists are working on improved processing methods, mechanisation of cleaning, use of solar dryers, use of polythene packs, dehumidified storage and prevention of losses due to insect infestation. Marketing specialists are monitoring the trends, providing information on the price fluctuations and consumer preference.

It is noteworthy to mention few institutions which are actively involved in the

improvement of the fishery, industry and the trade in South Asia.

CMFRI has been playing a pioneering role in India since early sixties. During these years considerable amount of information, on the availability of commercial varieties, their distribution and abundance has been brought out through a number of publications. The National Workshop at which we are here today is the culmination of the untiring efforts of this institution.

NARA in Colombo, Sri Lanka, has been actively engaged in the biology, processing technology and marketing of *Beche-de-mer* since 1968; however *Beche-de-mer* has attracted the attention of the scientists during the early years particularly during the pearl fishery expeditions.

Northern Province Fishermen's Co-operative Societies Union Ltd., based in Jaffna, Sri Lanka enjoying the monopoly of the export trade for *Beche-de-mer* for a period of twenty years upto 1977 had during this period been conducting pioneering work in marketing of *Beche-de-mer*. Fishermen were able to bypass middlemen and reach the market for competitive prices for their produce through this institution.

INFOFISH, an FAO sponsored regional project based in Kulalumpur, Malaysia has been through its marketing Digest and Information Bulletin, providing extensive information on the *Beche-de-mer* trade to South Asian producers and traders in recent years.

In organising this Workshop, CMFRI has brought almost all persons and institutions dealing with this fishery and trade under one roof for the first time in India. It is a commendable achievement.

Science and technology is an integral part of the development process. This has been recognised by the Government of India as one of the basic factors. Third world countries are fascinated by the achievements in India in this sector. This Workshop is yet another example of the efforts by the Government of India in that praise-worthy direction.

I congratulate the organisers, especially Dr. D. B. James, Convenor of the "National Workshop on *Beche-de-mer*" for his dedication and untiring efforts and for his involvement in the preparation and planning of this workshop.

I wish all of you a pleasant time in Mandapam during the period of this Workshop.

Thank you.

NATIONAL WORKSHOP ON *BECHE-DE-MER*

MANDAPAM CAMP • 23 - 25 February 1989

RECOMMENDATIONS

The 'National Workshop on *Beche-de-mer*' organised by the Central Marine Fisheries Research Institute during 23-25, February 1989 at Mandapam Camp discussed the various aspects of this resource such as biology, fishery, culture, conservation and also aspects relating to utilisation, quality improvement and marketing. It reviewed the present status of the *Beche-de-mer* industry and the problems faced by it. On the basis of the deliberations the following recommendations were made to promote stabilized growth of the industry ensuring rational exploitation and management.

Resources

1. Although considerable information is available on the taxonomy and distribution pattern of the commercially important holothurians along the Indian Coast, data on the ecology, biology and population density are scarce. As this information is basic to understand the dynamics of the population, the Workshop recommends that a survey and assessment of the holothurian resources is undertaken along the Indian Coast, particularly in the Gulf of Mannar and Palk Bay.

2. Studies on the biology, ecology and population characteristics of the commercially exploitable holothurians may be intensified providing the necessary facilities and manpower.

3. Holothurians have been exploited for a long time. However, in recent years, wide fluctuations in the production has been noticed. Fishery dependent and independent factors influencing such fluctuations should be investigated so as to formulate strategies for ensuring sustained growth and development to meet the growing demands of the export market and for judicious management of the resources.

4. On the basis of the above studies and surveys, the potential resource available may be estimated for planning the expansion of the fishery on sound scientific basis.

5. Taking into account the recent advances made on the breeding and seed production of one of the commercially important holothurians, intensive seed production with appropriate facilities and inputs may be initiated and large-scale sea-ranching programme undertaken to supplement the natural stocks.

Holothurian fishery and industry

6. Improved and efficient methods of fishing with suitable gears and accessories may be developed and introduced for better exploitation of the resource. Training in the use of underwater diving equipments and accessories be imparted to fish farmers to achieve greater efficiency.

7. Similarly, improved methods of preservation and processing may be evolved, demonstrated and propagated through organised training and extension programmes.

8. The Workshop had an indepth discussion on the restriction of exploitation of holothurians below 7.5 cm. The effect of this restriction on the export industry as well as on the resource were deliberated in detail. It is recommended that this aspect may be reconsidered on the basis of the resource position now heavily exploited, the need for maintaining the resource; at the sustained level, without sacrificing the biological requirements of the population to maintain its balance, but at the same time ensuring an uninterrupted growth of the industry.

9. The total ban imposed on the exploitation of holothurians in the whole of Andaman and Nicobar Islands may be re-examined. Similarly, the *Beche-de-mer* industry may be extended to Lakshadweep and Andaman and

Nicobar Islands as these areas are now underexploited.

10. A joint Committee may be set up by the Government of India and the Govt. of Sri Lanka to promote greater regional co-operation for the rational exploitation of the holothurians stock in the Gulf of Mannar and Palk Bay.

11. Market survey may be conducted to identify prospective markets for the edible holothurians including non-conventional species for greater consumer preference.

Extension

12. Effective information service in regional languages may be established to educate the fishermen on collection and processing methods and on the need for the conservation of the resource.

13. It is recommended that undersized holothurians caught from the sea are put back in the ecosystem so as to ensure them further growth, reproduction and increased exploitation by number and weight.

NATIONAL WORKSHOP ON *BECHE-DE-MER*

MANDAPAM CAMP, TAMIL NADU

23 - 25 FEBRUARY 1989

PROGRAMME

Venue : Conference Hall of the Regional Centre of CMFRI

22 February 1989, Wednesday

Hours

1500 - 1700 - Registration

23 February 1989, Thursday

0830 - 0930 - Registration

0930 - 1100 - Inauguration

1100 - 1115 - Tea break

TECHNICAL SESSIONS

1115 - 1300	-	**Session I**	:	Resources, Exploitation, Conservation and Management of Holothurians
		Key-note address by	:	Shri K. Sachithananthan
		Chairman	:	Dr. P. S. B. R. James
		Rapporteurs	:	Dr. P. Bensam Dr. N. Kaliaperumal
		Papers	:	Abst. Nos. 1, 2, 3, 4
		Discussion		
1300 - 1400	-	Lunch break		
1400 - 1630	-	**Session II**	:	Systematics, Biology, Ecology and Zoogeography of Holothurians
		Chairman	:	Dr. P. V. Rao
		Rapporteurs	:	Shri P. E. Sampson Manickam Shri P. Livingston
		Papers	:	Abst. Nos. 6, 7, 8, 9
1530 - 1545	-	Tea break		
1545 - 1630	-	Papers	:	Abst. Nos. 10, 11, 12, 13
		Discussion		

24 February 1989, Friday

0930 - 1100	-	**Session III**	:	Culture of Holothurians Hatchery and Pro duction Techniques
		Chairman	:	Dr. D. B. James
		Rapporteurs	:	Shri M. E. Rajapandian Dr. C. P. Gopinathan
		Papers	:	Abst. Nos. 14
		Discussion		
1100 - 1115	-	Tea break		
1115 - 1300	-	**Session IV**	:	Processing, Quality control and utilization of *Beche-de-mer*
		Chairman	:	Shri M. R. Nair
		Rapporteurs	:	Shri N. N. Pillai Shri. A. A. Jayaprakash
		Papers	:	Abst. Nos. 16. 17, 18, 19
		Discussion		
1300 - 1400	-	Lunch break		
1400 - 1530	-	**Session V**	:	*Beche-de-mer* Industry and Export
		Chairman	:	Dr. M. Sakthivel
		Rapporteurs	:	Shri A. Raju Shri V. Gandhi
		Papers	:	Abst. Nos. 20, 21, 22, 23, 24, 25, 26.
		Discussion		
1530 - 1545	-	Tea break		
1545 - 1645	-	**Plenary Session**		
		Chairman	:	Dr. P. S. B. R. James
		Rapporteurs	:	Dr. P. Bensam Dr. D. B. James
		Discussion and Recommendations of the Workshop		
		Vote of thanks	:	Dr. D. B. James

25 February 1989, Saturday

1000 - 1100	-	Lectures in Tamil on commercially important holothurians
1100 - 1115	-	Tea break
1115 - 1300	-	Lectures in Tamil on correct methods of processing
1300 - 1400	-	Lunch break
1400 - 1700	-	Visit to *Beche-de-mer* processing centres and demonstration of improved processing methods.

NATIONAL WORKSHOP ON *BECHE-DE-MER*

COMMITTEES

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