Sea cucumbers

A resource in peril

Indiscriminate fishing of sea cucumbers in Indian seas has led to their overexploitation

Sea cucumbers or *Holothurians* are an interesting group of marine invertebrates under the phylum *Echinodermata.* They are worm-like animals with exuberant colour, inhabiting a variety of marine habitats like mud flats, sand flats, seagrass beds, coral reefs and abyssal plains. They are bestowed with the power of regeneration and are capable of growing into two separate individuals if cut into two equal halves. Ecologically, sea cucumbers are very important as 'bioturbators' reworking the grain size of the substratum and releasing nutrients from the substratum into the sea water. Sea cucumbers, by their repeated digging action, aerate the substratum.

Sea cucumbers are an important commercial fishery resource. They are boiled, dried or smoked to prepare a product known as *beche de mer.* In China and many Southeast Asian countries, *beche de mer* is a delicacy. In *beche de mer* production, only those species of sea cucumbers with thick body walls are used. Apart from its value as a delicacy, *beche de mer* also finds an important place in the traditional Chinese medicine. *Beche de mer* is a revenue-spinning product in many of the tropical countries around the globe.

About 200 species of sea cucumbers can be found in the Indian seas, of which only a dozen species are harvested for preparing *beche de mer.* Andaman and Nicobar islands have the richest diversity of sea cucumbers in India, followed by Lakshwadweep islands, Gulf of Mannar, Palk Bay and Gulf of Kachchh. In the southeast coast of India, Palk Bay and Gulf of Mannar are known for *beche de mer* resources. The most commonly exploited species for the *beche de mer* trade in Palk Bay and Gulf of Mannar are *Holothuria scabra* (sandfish), *Holothuria spinifera, Holothuria atra* (lolly fish) and *Actinopyga echinites* (deep-water redfish). All these species are available upto 20-m depth and are intensively collected by skindivers.

Chinese visitors to India brought the technique of processing sea cucumbers for the *beche de mer* trade. The Indian *beche de mer* industry is more than 1,000 years old. Palk Bay and Gulf of Mannar, with their potential sea cucumber resources, supported the *beche de mer* industry in India. Palk Bay was the hot spot area for sea cucumber collection, processing and export. It remains famous for its oldest *beche de mer* industry in the country. The industry grew at a tremendous rate in Palk Bay and Gulf of Mannar due to the attractive price and increasing demand for *beche de mer* in the international market. More *beche de mer* processing units were established in Palk Bay than in any other region of the country. A *beche de mer* industry also existed in Andaman and Nicobar and Lakshadweep islands, but not as successful as in Palk Bay and Gulf of Mannar. In the 1980s and 1990s, the industry was generating considerable foreign exchange for the country. Various factors like overexploitation, conservation and increasing population subsequently led to a downturn in the industry in India.

Indiscriminate fishing of sea cucumbers in Palk Bay and Gulf of Mannar led to the overexploitation of resources. Higher concentration of skindivers engaged in sea cucumber collection and intensive trawling in Palk Bay and Gulf of Mannar have depleted the stocks to such a level that they need a long time for revival.

Selective harvest

Selective harvest depletes a particular species. For example, *Holothuria scabra,* which yields high-quality *beche de mer,* is

more intensively collected in Palk Bay and Gulf of Mannar than *Holothuria spinifera*, *Holothuria atra* and *Actinopyga echinites*. The population of *Holothuria scabra* is dwindling at an alarming rate. Fishing pressure increases with rising prices for *beche de mer* in the international market. The peak spawning season for *H. scabra* is July and October, which coincides with the peak fishing season, causing irreparable damage to the stock.

Use of drag-nets in the shallow seagrass beds damages the sea grasses and they are washed ashore. Sea grasses play a major role in the lifecycle of sea cucumbers. They serve as a substrate for the settlement of pentactulae larvae and also as a nursery ground for juveniles. Habitat destruction reduces the recruitment rate of sea cucumbers. Particularly in Thondi in the Palk Bay, severe destruction of sea grasses due to drag-net operation can be witnessed.

In 1982, the Government of India banned the export of *beche de mer* below 3 inches. Due to this ban, the *beche de mer* industry in Palk Bay and Gulf of Mannar suffered a severe setback. After a long gap, in 2001, the Ministry of Environment and Forests, Govternment of India brought all sea cucumbers under the Schedule I list of the Wild Life Protection Act, 1972 and strictly banned their collection. This was the ultimate step of conservation taken up by the Government of India to revive the damaged stock. Though it is felt that the ban had crushed the industry, illegal exploitation and processing of sea cucumbers in Palk Bay and Gulf of Mannar have provided a chance for the survival of the *beche de mer* industry. Sea cucumbers have been recommended for inclusion under Appendix II listing of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) to conserve their declining population.

The post-ban management of *beche de mer* resources in Palk Bay, Gulf of Mannar and other parts of India has been a Herculean task for the fisheries managers. The State forest department of Tamil Nadu has been assigned the task of monitoring the illegal fishing activities and many fishermen have been apprehended and prosecuted for illegal fishing of sea cucumbers. Law enforcements have to be strict for effective conservation and management of *beche de mer* resources in India.

Closed season

A huge fishing population's livelihood depends on the *beche de mer* resources of Palk Bay and Gulf of Mannar. The concentration of skindivers in Palk Bay is very high, compared to Gulf of Mannar. Though the recent government ban can revive stocks, from a fishermen's perspective, a closed fishing season would be more helpful than a total ban on the collection of sea cucumbers. In view of

this, a research team from Chennai recently conducted an *in situ* survey to assess the density of *beche de mer* resources in Palk Bay. The observed density was less than one individual per square metre. This suggests that the population of sea cucumbers is under intense illegal fishing pressure. The ban and resource management efforts have not been synergetic to prevent the depletion of stocks. In order to relieve the fishing pressure on sea cucumbers, the fishermen need an alternative source of livelihood for sustenance.

In view of these facts, the ban on sea cucumbers should be extended for a few more years to allow the damaged stocks to recuperate. Periodical surveys (*in situ* observations) have to be initiated for effective management. With the available culture technology for sea cucumber like *Holothuria scabra*, sea ranching of hatchery-grown seeds in the areas of low density, and periodic monitoring are recommended.

A strict ban should be imposed for trawling in shallow areas to prevent further damage to the stocks. There should be a ban on drag-nets in the seagrass zone to prevent habitat loss of larval and juvenile sea cucumbers. Fishing in the months when peak spawning takes place should be banned. If the ban on collecting sea cucumbers is lifted, there should be size regulations and a catch quota system for the sea cucumber fishing and trade. Projects should be initiated by co-ordinating national research laboratories to study the biology, ecology and population dynamics of commercially important sea cucumbers to collect baseline data for effective conservation and management.

Though the above recommendations have been suggested earlier, few steps have been taken to implement them effectively. Strengthening the patrolling manpower, creating awareness among the fishermen about the need for the conservation of sea cucumbers, and initiating research projects related to sea cucumbers are some of the areas where the Government of India should apply a sharper focus for effective conservation and management. Merely banning the collection of sea cucumbers will not revive the damaged stock. Only effective management through strict regulation, periodic monitoring and indepth scientific knowledge can save the sea cucumbers.

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