NATIONAL REPORT

-INDIA-

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INTRODUCTION

A rapid growth of human livestock population along with explosive urbanization and industrialization in the 20th century and consequent pressures of claiming land for development have taken a heavy toll of the country's and in particular coastal wilderness. In 2003, India had 600 wildlife sanctuaries, 89 national parks and 13 biosphere reserves covering about 155,000 km^2 or 4.76% of the geographical area under the Protected Areas network. However, the coasts have got much smaller representation than would be required for their comprehensive protection. Out of 10 biogeographic zones, the coasts with three provinces cover about 2.5% of the total biogeographic zone in India. The three coastal provinces cover 0.6% of the west coast, 9.1% of the east coast and Lakshadweep with less than 0.1%. Out of the thirteen Biosphere Reserves only one is constituted comprehensively for protection of the coastal region and that lies in southeastern India. The Gulf of Mannar Biosphere Reserve established in 1983 is the primary habitat for seahorses in India. The Gulf of Mannar Marine National Park and Palk Bay along the Tamil Nadu coast form the most important habitat for seahorses in India. However, seahorses are also reported from Pondicherry (off the coast of northern Tamil Nadu), the Andaman and Nicobar Islands and the coast of Kerala in the Indian Ocean. They have been reported from the Bay of Bengal in the east, the Indian Ocean in the south and Arabian Sea in southwest.

The Gulf of Mannar comprising of Bay of Bengal and Indian Ocean with a spread over 10,500 kilometers^2 spanning the Rameswaram and Tutikoran coastlines is a highly vulnerable zone. This is also where anthropogenic pressure is the most of all coastal regions in the country. There is concern that more than 80 marine species face threat of extinction in this biosphere reserve. Most of the seahorses of the single genus *Hipppocampus* and the family Syngnathidae have been reported from this region. The Central Marine Fisheries Research Institute (CMFRI) estimates occurrence of 30–40 species of seahorses. In India the legal commercial exploitation of seahorses was carried out from the states of Tamil Nadu and Kerala through July 2001. However, the catch and volume of exports showed a declining trend from 1998. There used to be regular export of seahorses from India, which was facilitated by the Marine Product Export Development Authority (MPEDA) based in Cochin, Kerala. The following table indicates the volume of trade:

TABLE 1. Export of Seahorses from India Source: Marine Product Export Development Authority

Year	Quantity in Kilograms	Country of Export
1996	3790	Singapore, Taiwan
1997	10443	Singapore, UAE, Japan
1998	14936	Singapore
1999	1269	Singapore
2000	1629	Singapore, UAE

I. Information on Wild Populations

a. Species of seahorses in Indian waters

The taxonomy of Indian seahorses is not well researched. However, at least three to four species of seahorses are found in Indo–Pacific waters. Although neither scientific nor common names in use are reliable for most Indo-Pacific seahorses, four broad groupings of exploited species can be classified as follows.

(i) ***Hippocampus kuda*** **or** ***Hippocampus tusai*** Complex species are medium sized, slender, smooth seahorses with fine coronets.

(ii) ***Hippocampus hystrix*** Complex species are medium sized, spring seahorses with fine coronets.

(iii) ***Hippocampus trimaculatus*** Complex species are smaller, deep bodied smooth seahorses with no cornet, characterized by three spots on the dorsal part of the upper trunk.

(iv) ***Hippocampus kelloggi*** Complex species are solid-looking and smooth seahorses with thick coronets.

b. Area of distribution

It is distributed from Tamil Nadu in the east to Kerala in the west and some of species are found in the Andaman and Nicobar Islands and Palk Bay.

c. Abundance

Due to exploitation in trade, the seahorse population is reported to have declined in the wild. However, no accurate estimates are available. The report on abundance is based on the trend of fisheries catch and the volume of exports recorded over the years.

d. Monitoring programs

The Central Marine Fisheries Research Institute (CMFRI) and Fisheries Survey of India maintain an ongoing monitoring program for seahorse catch with a team of fishery biologists and research scientists.

II. Nature Of Seahorse Fisheries

a. Commercial, artisanal, subsistence

Seahorses are occasionally used as medicines in Tamil Nadu with a limited role in curing whooping cough in children as used in Traditional Chinese Medicine. However, major collection is done for international markets. Trade has also been reported for aquariums in southern and western India especially in the metropolitan city of Mumbai.

b. Estimated number of fisheries

All villages along the Palk Bay participate in a targeted fishery for seahorses. The major fishers are from Thondi (90 fishers), Mullimunai (100 fishers), Tirupalaikudi (100 fishers), Diripattinam (60 fishers). Among those, around 10 fishermen are from Mullimunai and 60 fishermen are from Diripattinam. In some areas such as the Gulf of Mannar and Palk Bay, seahorses are collected as incidental fishing or bycatch.

c. Type of gear used

Fishers who are involved in the seahorse trade move as far as three to four kilometers offshore and fish for up to five hours in the middle of the day for six days of the week. They use a mask and wooden fines and free dive it waters up to eight meters deep. Five or more fishers work together to seek out all seahorses in a small area. Seahorses are caught by hand or with seize net and also by trawlers as part of other fishing activities.

d. Volumes landed, if known

During 1993, 300 kilograms of seahorses were collected on average each month in Tamil Nadu and Kerala and the number of seahorses per kilogram was estimated to be about 250–300 specimens. The total annual estimate was at least 3600 kilograms (about 1,050,000 dried seahorses in trade).

During last six years, total collection of seahorses was reported as shown below:

MT = Metric Tons

Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
Quantity	9 MT	11 MT	8 MT	1 MT	3 MT	N/a

Source: TRAFFIC

e. Relationship between CITES offices and fisheries agencies

Central Marine Fisheries Research Institute (CMFRI) in Cochin is a designated Scientific Authority under CITES. Whenever the CITES Management Authorities require any assistance with regard to identification, data or any other assistance, it is provided by CMFRI. With recent changes in the law regarding prohibitory clauses on seahorses, the MPEDA (Marine Product Export Development Authority) has been notified to take necessary steps to stop the collection of seahorses from the wild and to create awareness among fishermen.

III. Extent Of International Trade

a. Number of levels

There appears to be three levels in the trade from fishers to exporter on average. At Level Two it seems to be 2 to 7 buyers from fishers to each village involved in seahorse collection. These Level Two buyers and agents (middlemen) supply to Level Three buyers or the Exporter who finally export it out of India.

b. Exportation on value retail and wholesale prices

Prices have increased substantially since the target seahorse fishery reportedly grew in 1989 or 1990. In 1995, fishermen received Rs.15 to Rs.45 (US $0.33–$1) per seahorse, based on size, with most being worth Rs.6 to Rs.12. Level Two buyers were paid from Rs.2000 to Rs.5000 but most received about Rs.2000 to Rs.3800 (US $62–$118) per kilogram of dried specimens based on size and the perceived quality. During the last six years the value of seahorses exported through India in million US$ are:

c. Customs/ CITES involvement at port

As the figures suggest there was legal trade in India prior to July 2001 and it faced no restrictions. Since July 2001 exports and imports in seahorses have been stopped. Customs officials and CITES authorities are posted at each air exit to enforce the law and monitor the Export–Import points. After the inclusion of seahorses, it has been brought to the notice of all concerned to curtail the trade or exploitation in any form.

d. Licensing/ Permitting requirements

Till recently individuals were allowed to collect and export seahorses under a license from Marine Product Export Development Authority (MPEDA) and Director General of Foreign Trade. But due to inclusion of the entire family of Syngnathidae in Schedule I (Part III) of the Wildlife (Protection) Act of 1972, the trade, fishing, hunting and collection have been completely banned.

e. Preferred markets (Live vs. Dried), if any

All seahorses are exported dried, mostly to Singapore and to some extent to Malaysia and occasionally used as medicines in local market in Tamil Nadu in South India.

f. Volume of exports

Seahorse Export

Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
Quantity in Metric Tons	3.79	10.44	14.94	1.27	1.63	N/a
Value in 000 Rupees	979.37	2225.96	3019.84	1296.00	896.67	N/a
Value in US Dollars	4500	12000	16000	6000	4200	N/a

g. Primary trade pattern for seahorses in India

1. Seahorses in domestic trade
2. Trade in seahorses for aquariums particularly in Mumbai city
3. Trade in seahorses for smuggling to countries in Southeast Asia and East Asia, particularly China

h. Illegal trade

Modes Of Seahorse Smuggling

1. Through International Airports in personal baggage
2. Through postal and courier shipments via international post office and courier services
3. Direct sale to foreign tourists in coastal cities of importance to tourism
4. Export in shipments mixed with other articles and fishes from Ports in Chennai, Mumbai, Ernakulam etc.

Recent Seizures

Month and Year	Species/ Family	Number of Specimens/ Quantity	Nature of Offence/ Destination	Legal Action
May 2003	Unknown/ Syngnathidae	5.6 Kg	Shipment through foreign post office to Singapore	Case booked under the Customs Act, 1962 and the Wildlife (Protection) Act, 1972 (WLP)
June 2003	Unknown/ Syngnathidae	200 Kg	Through Tuticorin sea port to Singapore	Case booked under the Customs Act and the WLP
Sept. 2003	Unknown/ Syngnathidae	67 specimens	Open sale at Diu off the West coast	Person arrested and a case booked under the WLP

Note: A rough estimate suggests that the offence detection rate is not more than 20%

Conservation Programs For Seahorses

Based on export figures and the IUCN database, the Government of India has banned the collection (fishing) of seahorses since July 2001 and brought it under the protected species category. Indian fisheries biologists from the CMFRI keep a close watch on populations and habitat and monitor it through research programs. The research is not very focused and has recently drastically slowed down due to the inclusion of seahorses in the Protected Species category.

Research And Development Of Seahorses In India

All seahorses belong to the single genus *Hippocampus* of the family Syngnathidae. There are about 30–40 species of seahorse under the genus *Hippocampus* which are tropical and sub-tropical in distribution and are found in large numbers in Indian waters. Since time immemorial seahorses have been used in medicines, as ornamental fishes to some extent as food and in modern times in aquariums as well as mythical medicines. They have been found to inhabit coral reefs, seagrass beds and also coastal mangroves. In India, commercial exploitation of seahorses is being carried out only in the states of Tamil Nadu and Kerala. As stated earlier, till the year 2001 the annual export of dried seahorses was about 3600 kilograms. The fisherman earned about Rs.10–25 (US $0.2–0.6) per dried seahorse while the middlemen received about Rs.4000–12000 (US $90–250) per kilogram. For the live seahorse the rates are considerably higher going up to Rs.3000–4500 (US $70-100) per pair of specimens. However, since July 2001, with inclusion of this species under the Wildlife (Protection) Act, 1972 these price structures have become highly skewed and unpredictable. It now depends more or less on the sources and the consumers.

In general no research work of significance has been conducted on the culturing of seahorses. There is a lack of an information database on the taxonomy and biology of seahorses.

Their low fecundity, highly selective habitat in fragile coral and seagrass ecosystems and high vulnerability to fishing due to slow movement warrant increased research and development input. The factors stated above also make the species highly endangered with a potential threat to its survival.

Like several other countries such as China, Thailand, Philippines etc., the attempted culturing of seahorses in India was plagued with high larval and juvenile mortality. Records in India show that the larvae of *Hippocampus kuda* have been successfully reared.

The Central Marine Fisheries Research Institute (CMFRI) is the nodal agency that has carried out research on the *in situ* breeding of seahorses. In artificially simulated conditions the animals reared were fed with reared brine shrimp adults besides amphipods, mysidies prawn & fish larvae collected from the wild. During the study period three spawning were observed. The larvae bred at the ratio of 1:10, showed sluggish movement, were fed live feed, reached a length of 3.2mm and recorded a survival rate of 24%. However, subsequent spawning showed a more promising trend reaching an average length of 31mm in three weeks and a survival rate of 70%.

Experiments Conducted At CMFRI, Mandapam

Hippocampus kuda is one of the species of tropical seahorses that occurs sparsely but is most common among Indian seahorses and is found in the Gulf of Mannar and Palk Bay off the coast of Tamil Nadu. The technique developed may be further improved to establish seahorse hatcheries along the Indian coast.

The experiments conducted were through maintaining the broodstock. The water temperatures ranged from 28–32C and salinity from 33–35 ppt in the broodstock tank. Three different live feeds were cultured and used for rearing the baby seahorses.

After one week of incubation, the baby seahorses resembled the adult in all morphological characteristics. An adult male with a fully developed brood pouch released approximately 250–300 babies in a single release.

The young ones were protected from exposure to bright light and physical injuries. They grew to 12mm at the end of 7th day. On the 10th day, the baby seahorses started accepting the artemia larvae and attained a size of 18mm. On the 30th day, the fishes attained a size of 30mm and started feeding on mysids, artemia and prawn post larvae.

The use of copepods showed better results and higher survival rates for larvae and growth due to a high level of Essential Fatty Acid (EFA). However, the experiments conducted so far are of little commercial significance. The present findings exhibit ample scope for improving rearing methods in the future. The very high price commanded in the international market and a huge gap between supply and demand has further stressed the need for increasing *in situ* rearing efforts for seahorses. These experiments have a significant impact on the conservation and management of these fishes in the Indian context.

Pressures On Seahorse Habitat

The main habitat of seahorses found in the Gulf of Mannar biosphere reserve is under severe stress from unregulated fishing, poaching of corals and seaweeds, targeted fishing of sea cucumbers and to a large extent trawl fishing. The Gulf of Mannar is known to harbor over 3600 species of flora and fauna making it one of the richest coastal regions in Asia. Among the species that figure on the endangered species list are dolphins, seahorses, sea cow (*Dugong dugon*), whales, corals, sea cucumbers (*Holothurians*) etc. Reports say that for every 1000 kilograms of fish collected, 325 kilograms of rare but untargeted organisms get discarded and are left to die on the shores. Sometimes out of ignorance the fishermen resort to destructive practices such as dynamite fishing and targeted fishing.

A recent survey estimates that about 160,000 people in 125 villages abutting the shores depend on coastal resources for a living in a core area of 560 Km^2. It is also estimated that nearly 9000 boats including mechanized ones enter the seas daily. The seahorses struggle for survival under such circumstances is low. The statutory Gulf of Mannar Biosphere Reserve Trust (GMBRT) aimed at integrated coast zone management and comprising of the departments of Environment and Forests, Fisheries, Rural Development etc. in coordination with the Coast Guard and the Indian Navy has been created to provide management

support to these vital resources. It has taken some of the primary steps that include creating awareness among the locals, providing alternative employment to fisherman through a US $40 million project by offering more economically viable and socially acceptable packages to them and finally by increasing the protection mechanisms for habitats.

Legal Issues

Seahorses (all Syngnathids) have been brought under the purview of Wildlife (Protection) Act, 1972 *vide* its amendment in July 2001. The entire Syngnathidae family has been included in Part III of Schedule I of the Wildlife (Protection) Act, 1972 (the Central Act 53 of 1972).

Section 9 prohibits its hunting. Section 39 makes seahorses Government property and Section 40–48 prohibit trade in all seahorse species and require the possessor of this species to declare their stock to lawful authorities. Sections 49 A, B, C and D of Chapter 5A necessitate that trade in this species is completely prohibited. Section 51 entails the offences related to this species as ineligible for bail and cognizant, thereby meaning that a person indulging in an offence related to this species can be arrested without warrant and after prosecution can be convicted for up to a maximum rigorous imprisonment of seven years with a minimum fine of US $500.

The Export-Import Policy 2002–2007 of the Government of India also prohibits the export of Syngnathid species from India under the Export–Import (Development & Regulation) Act, 1991. Import has also been prohibited since July 2001, or restricted to only special purposes with permits and certificates issued by the designated authorities. Under the ITC (HS) classification under theExport–Import Policy, both export and import of this species covered under Schedule I and Part II of Schedule II stands prohibited.

The Government of India is also in the process of drafting a new CITES Act 2003–2004 which will provide the necessary support for CITES implementation in India.