VALUE OF SEA TURTLES TO INDIA

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INTRODUCTION

Five species of sea turtles are known to inhabit Indian Coastal waters and Bay Islands. In the order of abundance they are the olive ridley *Lepidochelys olivacea*, the green turtle *Chelonia mydas*, the hawksbill *Eretmochelys imbricata*, the loggerhead *Caretta caretta* and the leatherback *Dermochelys coriacea*. The green turtle is considered the most valuable of all living marine reptiles since its flesh is a delicacy and the main source of the famous turtle soup on account of which the turtle itself is called by Germans as 'Supenchild Krote' (Soup turtle). In addition to its flesh, the eggs of green turtle are also consumed. Green turtles are sought for their oil which is used in the manufacture of cosmetics and the skin to be made into leather. Until recently baby turtles were killed, cured, stuffed and sold as ornaments. The blood of this turtle is in demand in Tuticorin, Tamil Nadu where it is believed by the locals to be an elixir. The hawksbill turtle, is famous for its dermal plates which are used for tortorise shell. The carapace of the adult is strikingly amber with streaks and markings of reddish brown, blackish brown and yellow. The shell of the hawksbill consists of scutes that overlaps at first but become juxtaposed in large animals. The shell is most valuable before juxtaposition

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occurs. Shields are removed from the shell by immersing the freshly killed turtle in boiling water. Heat and pressure are applied to flatten the plates before working into jewellery and other objects. It is known one hawksbill can yield a maximum of 3.6 kg of shell but normally it is about 0.68 to 0.91 kg of shell. Eggs of loggerhead are much relished than the flesh. The shell of the adults are used in the preparation of ornaments. Olive ridley eggs are considered a delicacy and flesh is also consumed. Flesh of the leatherback is not relished but the eggs are considered a delicacy when fresh. The oil extracted from the leatherback is used in maintenance of boats and canoes.

Value of Turtle in the Past

Turtle fishery in Tamil Nadu

Turtle fishing was practised for ages in the Gulf of Mannar and Palk Bay mainly by non-Hindu fishermen. In the sixties it was estimated that on an average about 3000 to 4000 turtles were landed every year between Pamban and Cape Comorin. In the Palk Bay, the fishery was of a much lower level and about 1000 turtles were landed annually between Rameswaram and Mimisal. The main fishing centres in the Gulf of Mannar were Pamban, Kilakarai, Tuticorin, Ovari, Kuttankuli, Periathalai and Cape Comorin while along the Palk Bay the centres were Rameswaram, Tondi, Tirupallakudi, Devipatnam and Pamban. The green turtle constituted about three fourth of the total catch. Olive ridley and loggerhead formed about 20% of the catch. The catch was mainly sent to Tuticorin from different places of capture. The assembling centres for turtles in the Gulf of Mannar were Rameswaram, Kilakarai and Tuticorin and on the Palk Bay Coast Tondi and Pamban. At these places special pens were constructed in the sea close to shore for keeping the turtles alive.

Turtles were caught by special type of wall nets and nets were made of fibres of *Acacia planifrons* or of cotton yarn. Two types of nets known as 'Pachuvalai' and 'Kattuvalai' were used requiring between 5 to 8 men each for operation. The 'Pachuvalai' was usually cast at night at the entrance of two parallel coral reefs and hauled after a lapse of 12 to 18 hours.

' Kattuvalai ' used to be longer and devoid of any anchor and buoy. Fishing with this net was also conducted between two coral reefs but in much shallower water and six fishermen usually operate the net. They beat the surface of the water or the sides of the canoe to drive turtles into the net. The net was usually laid on full moon nights and fishing was generally conducted for two hours.

In Orissa

Eventhough no organised fishery for turtles existed along Orissa and West Bengal Coast, trade in turtle eggs and turtle flesh occurred every year during the ' arribada ' in Bhitarkaniaka area. From the time when Kanika was a Zamindari holding, people were paying ' Andakara ' (revenue for the eggs) and were collecting boat loads of eggs from this area. The Forest Department of Orissa has also issued licenses for collection of eggs at the rate of Rs. 15 per boat load of eggs (roughly between 35,000 to 1,00,000 eggs). Eggs were sold in all the river side villages where they were consumed mainly by the economically poorer communities of Orissa. Large scale transport of eggs during the season to the Calcutta markets also took place. Locally people used to preserve the turtle eggs in large quantities by drying them in the sun for future use. The estimated legal take in the 1973 season was 15 lakh eggs but the actual illegal take was probably much more.

Status of export of turtles and turtle products

Prior to the sixties, there was a regular trade in turtles between India and Sri Lanka. Live turtles were transported in sailing boats from Pamban, Tamil Nadu to Jaffna, Sri Lanka. Due to restrictions imposed by the Sri Lanka Government, the trade was stopped in 1965.

Chelonian products have been exported under the category as turtle meat, turtle shell, turtles, tortoise shell, living tortoise, tortoise belly and as tortoise skin. Between 1963 and 1974, 102022 kg of sea turtle products valued $ 1,00,800 were exported from India. The price of 1 kg of tortoise shell increased from Re. 1 in 1967 to Rs. 20 in 1969 and to Rs. 185 in 1975.

Between 1971 to 1976, 120 kg of turtle shell worth of Rs. 2,916 were exported to France and United Kingdom. The tortoise

shell weighing 8215 kg valued at Rs. 2,97,892 were exported to Australia, France, Hong Kong, Italy, Japan, Netherlands, Singapore, Spain and Federal Republic of Germany between 1971 and 1977. The turtle hoofs of 757 kg worth of Rs. 20,402 was exported to Japan, Singapore and U.K. between 1975 and 1980 Living tortoise was exported between 1971 and 1975 to the tune of about Rs. 25,350 to France, Italy, Japan, Netherlands, Switzerland, U.S.A., U.K. and West Germany. Between 1974 and 1976, 106 kg of turtles were exported to Nepal and West Germany worth Rs. 4,577. Turtle flesh as calipash, the light greenish fat-like meat found as irregular patches inside the carapace immediately below the scutes and calipee the light yellowish meat found in patches attached to the plastron are exported. 125 kg of tortoise belly was exported to Singapore during 1971—1972 worth Rs. 4,160.

Present Status

At present all the five species of sea turtles occurring in Indian seas are protected as they are placed in Schedule I of the Indian Wildlife (Protection) Act 1972 as per Amendments made to the Schedules in September 1977. India abides by the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES) which prohibits trade in turtle products.

The explosive trade which sprung up for the olive ridley, in the late seventies and early eighties despite the Indian Wildlife (Protection) Act, created considerable concern at the national level. During the 1981-82 season it was estimated that 15 fishing units, each unit comprising of a motor launch with six country boats were deployed from Digha, West Bengal. Each unit captured about 6000 turtles during the season from November to January off Orissa Coast. During the 1982-83 season the scale of poaching was reduced to a great exent. It was estimated that from mid December to end of February 1983 about 10000 live olive ridley turtles were clandestinely landed at Bhanshalghat, West Bengal and thence transported to Calcutta and Tata Nagar markets. In the 1982-83 season there was a reduction in the catch by almost 90% over the previous season. The directed fishery for olive ridley was not carried out during the 1983-84 season. The

incidental catch from gill nets were hidden and transported in wooden boxes and bamboo baskets and sold in Calcutta markets. In December 1983 about 360 olive ridley turtles were sold in Calcutta markets.

The 1982-83 season saw a significantly large number of dead olive ridley washed ashore along the Gahirmatha coast. This was the result of incidental catch from fishing gears operated from mechanised and non-mechanised fishing boats. It was estimated that about 7000 to 7500 dead turtles were washed ashore along a stretch of 15 km at Gahirmatha. The incidental catch was drastically reduced in 1983-84 season to about 400 turtles stranded over a stretch of 15 km along Gahirmatha Coast chiefly due to voluntary refrainment of fishing. A seasonal restriction in the fishing activity using certain types of fishing gears such as wide meshed gill nets would be imperative. Clearly demarcated inshore area should afford protection to turtles from fishing activity during the mating season. A turtle excluder net for shrimp trawling has been developed in the U.S.A. and trials with similar designed trawl nets should be undertaken to see its efficacy in allowing turtles to escape while fishing selectively for shrimps from mechanised boats in our coastal waters.

In Bay Islands

In the Andaman Islands all species except the leatherback was hunted for meat. In the Nicobar group cooked turtle meat is still consumed regularly, but sometimes taken raw when it is minced and mixed with coconut. The green turtle and hawksbill are the species usually eaten. The green turtle meat was brought to Port Blair market and sold at Rs. 3 to Rs. 5 per kg as late as seventies.

In the Lakshadweep the turtle meat is rarely eaten by the islanders, but a handful have acquired the habit from turtle eating mainlanders. In some areas turtle meat was ueed as shark bait. Turtle fat was used to waterproof the boats in Amindivi and other islands. There was no systematic effort made to dig out eggs for consumption.

Recovery Programme

The recovery programme for the olive ridley has been taken up by the Central Marine Fisheries Research Institute, the Forest

Department, Govt. of Tamil Nadu and other agencies in Tamil Nadu. In this programme turtle eggs are collected soon after nesting and incubated in the properly maintained hatcheries and young ones are released back at the same beach on hatching. The recovery programme was initiated in Tamil Nadu as the human and non-human egg predation was very high and nesting is sparce. The Tamil Nadu Forest Department has taken up the programme in all the districts bordering the east coast of the State.

Future prospects

Serious consideration has to be given for stepping up the recovery programme to sea-ranching programmes. There will be a possibility of culling of turtles as well as doomed eggs from Gahirmatha, Orissa. We have to monitor and evaluate the marine turtle resources to take any decision on this. There is also need to look into the non-consumptive utilisation of sea turtles in activities such as education, recreation and tourism.

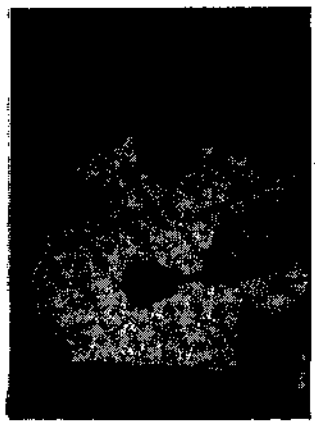
Cultural and aesthetic values

The turtle is venerated as according to Hindu belief, it is the second incarnation of Lord Vishnu. During the churning of the ocean of milk for getting nectar by Gods and Demons using Mount Manthara as churner and Serpent Vasuki as cord, the Mount Manthara started to sink, but was supported by Lord Vishnu in the form of a turtle. Due to this belief Hindu fishermen in Tamil Nadu consider the sea turtle as God and as such when a turtle is caught in their fishing net it is released into the sea. Fishermen generally do not eat, collect or sell turtle eggs. Whenever the nesting females crawl close to or inside fishermen's huts, they perform religious rituals. There is another legend about a turtle called 'sea goddess' which lays two large eggs which a human can never see.

In the Lakshadweep, the hawksbill shells were used for ornamental purposes. An entire shell is cleaned and coated with French polish and displayed in living room walls. The laminae on a hawksbill shell are made pliable by heat and moulded around the shafts of walking sticks. Knife handles are also adorned by hawksbill laminae.

In the Nicobars, shells of turtles are found on trees near Nicobares homes. This is apparently done after a turtle has been speared by a novice for the first time and ensures good lunch in future hunts. Turtle shells are used as feeding troughs for chicken and as containers for transporting coconut. Turtle carapace are frequently seen hanging on the walls of huts of Onge tribals. The horny laminae on the shells of hawksbill are moulded by the Nicobares into a variety of trinkets, finger and ear rings, bangles, combs and belts. Pieces of silver are imbedded into tortoise shell finger rings.

DISCUSSION



P. J. SANJEEVARAJ : Has any work been done to study migration of sea turtles by using remote sensing technique? Would telemetry be useful in such studies?

E. G. SILAS : Central Marine Fisheries Research Institute is carrying out remote sensing and satellite imagery studies along the west coast, but I don't think this will help in pinpointing turtles, unless they are in large aggregation. Aerial surveys could certainly help. In the United States, a number of experiments using telemetry have been carried out to study inshore and offshore migration of turtles. Documented information on this is available. Large scale tagging over a number of years may also help in understanding the migratory habits and breeding behaviour such as renesting of sea turtles. Using monel metal tags supplied by FAO, Mr. Chandrasekar Kar has already tagged about 15,000 olive ridley at Gahirmatha and recoveries have started coming in. One thousand similar monel metal tags from Central Marine Fisheries Research Institute have been handed over to Shri Kar for continuing the programme. Internal tags have been developed recently in the United States and these require X-ray equipment for detection and may not be practicable in India.

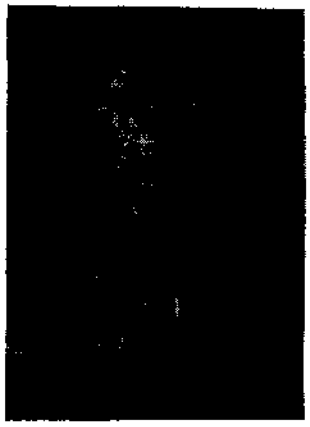
J. C. DANIEL : Can anyone do the tagging? How can monitoring be strengthened ?

E. G. SILAS : The external tags as used now can be done with little practice. If not properly done, the tag losses may be great and the results could become negative. The Central Marine Fisheries Research Institute has over 45 field and research centres along the coast and the monitoring of the tag recoveries of tagged turtles in the drowning incidental catch or from the nesting beaches can be monitored to some extent. This will certainly supplement observations by individuals and other organisations. There will be need for developing a co-ordinated approach on this.

J. C. DANIEL : Tagging should be done by one Central Agency like the Central Marine Fisheries Research Institute.

E. G. SILAS : I welcome the suggestion. With our infrastructure at the Institute, we will be able to positively help in this programme as well as in monitoring tag recoveries or ' tag reading ' of remigrants.

T. S. N. MURTHY : I would like to mention that there is a Vishnu temple in Srikkakulam District, Andhra Pradesh, where Vishnu is seated on a turtle. There are religious sentiments regarding the turtles in some coastal areas and fishermen do not fish turtles or eat turtle meat or egg.



P. J. SANJEEVARAJ : It is surprising why such sentiments are not attached to fish which is also an avatar of Vishnu.

K. SHANMUGANATHAN : An administrator would ask in what way would turtle conservation help other than protecting an endangered species. It is difficult to try and convince the authorities the actual value of turtle conservation. There is need for bringing out pamphlets and information in regional languages to help create greater awareness.

E. G. SILAS : At Gahirmatha during mass nesting of the olive ridley there is heavy destruction of nests of previously laid eggs by subsequent influxes of nesting females. This is more so as nesting is restricted to a short stretch of the beach as had taken place in January-February 1984. This is also

followed by heavy predation by non-human predators. The time has come when we may have to consider whether a part of the eggs could be utilised for human consumption or some of the animals could be culled. How do we go ahead with this?

K. SHANMUGANATHAN: How long should we protect turtles? Why not start mariculture of turtles?

J. FRAZIER: The exploitation of turtles during 'Arribada' must be carefully studied taking into consideration two previous instances. Nesting population in 4 mass nesting places have been destroyed in Mexico where exploitation of turtles from nesting beaches for reptile skin was started in 1960. In about 10-15 years 3 or 4 major populations have been destroyed and it no longer is a resource in the country. Similarly in Costa Rica there are 3 mass nesting areas and recently some of the students are appealing for the rational exploitation of the turtle eggs for preserving the species. The problem is aggravated by the poor hatching success of the eggs.

T. SUBRAMONIAM: What is the hatching mechanism in turtles and are turtle eggs cleidoic or non-cleidoic?

R. WHITAKER: The hatching is by breaking the shell by the beak and claws.

M. VIJAYAKUMARAN: Based on water absorption, protein and fat metabolism and nitrogen excretion, we have now classified sea turtle eggs as non-cleidoic. I would refer you to a paper in CMFRI Bulletin No. 35 on this subject.

J. AZARIAH: How do turtle hatchlings orient themselves to the sea?

J. FRAZIER: The seaward orientation of hatchlings has been studied in detail. It is due to phototaxis.