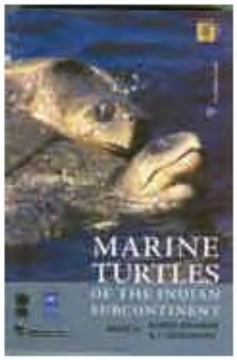

Marine Turtles of the Indian Subcontinent. Kartik Shanker and B. C. Choudhury (eds). Universities Press (India) Pvt Ltd, 3-5-819, Hyderguda, Hyderabad 500 029. 2006. 415 pp. Price: Rs 425.

This book is the result of the Government of India (GOI) UNDP-funded sea turtle project to the Wildlife Institute of India (WII). It has 30 chapters under eight parts. It is more of a compendium covering diverse aspects from the status in different States/Countries, to international legal instruments for conservation of marine turtles. One of the major contributions of the book is that for the first time, a detailed survey has been made showing that except for the Olive Ridleys of Orissa, there are hardly any data, barring some past trade records, on marine turtles for the rest of the subcontinent. In addition, turtles and eggs continue to be exploited with complete disregard to their protected status. There is considerable overlap in various aspects like status, problems related to conservation, fishery-related issues, and suggestions for future. Therefore, the most pertinent matters related to the present and future are taken up here.

The introduction appropriately has an article by Romulus Whitaker on the pioneer Satish Bhaskar who left IIT, Madras (now Chennai) to walk India's 4000 km coastline in pursuit of marine turtles. The rest of the articles relate to the current status of the five species of marine turtles (green, hawksbill, leatherback, loggerhead and Olive Ridley) from the subcontinent.

The Andaman and Nicobar Islands have important feeding and nesting areas for four species (green, hawksbill, leatherback and Olive Ridley). Considering the small size of the areas, the mortality is high. Mercifully the best viable nesting sites are either in the tribal reserves or on remote islands. Tamil Nadu is the only State in India which still has all the five species of marine turtles reported from Indian waters. Again, it has both breeding and foraging grounds. It is also a part of the migratory corridor for the Olive Ridleys of Orissa. The Gulf of Mannar is a major feeding ground and developmental habitat for Olive Ridleys and green turtles. Mortality of all species is high. Turtles and eggs are regularly exploited along the southern coast, specially in the Gulf of Mannar, in spite of the fact that it is a Biosphere Reserve. It is unfortunate that no attempt has been made to tag and monitor the turtles in this critical area. The authors are silent about the impact of the Setu–Samudram project on biodiversity, where massive dredging has been undertaken though it is a Biosphere Reserve.

Although five species have been reported from Andhra Pradesh, only Olive Ridleys nest at present. The Andhra coast is also an important developmental habitat for Olive Ridleys and green turtles. Genetic studies indicate that all Olive Ridleys along the east coast form part of a single population. Since they use multiple nesting sites in Orissa separated by as much as 300 km, Tripathy *et al.* (p. 81) speculate that the Olive Ridleys of Orissa may be nesting in Andhra Pradesh. Olive Ridleys nest all along the Orissa coast with three major (Gahirmatha, Rushikulya and Devi) and several minor mass nesting sites. Since the population is the same and considers the whole of Orissa coast as suitable, these turtles have developed plasticity to nest in minor sites to cope with the ever-changing geomorphology, when major nesting areas become geo-environmentally unsuitable. It includes information on high mortality and other threats but no attempt has been made to relate mortality to population size. Four species (green, hawksbill, loggerhead and Olive Ridley) are reported from West Bengal, out of which the Olive Ridleys have some minor nesting sites on and off the islands. Pug marks around the remains of Olive Ridleys lead to the possibility of the tiger as a predator in the Sunderbans. Traditionally, Olive Ridley adults and eggs from Orissa and West Bengal were exploited for the Kolkata market. Now the legal trade has stopped, but clandestine trade continues at Digha and Shankarpur landing centres.

With regard to marine turtles of the Arabian Sea in the west coast, Lakshadweep has a healthy population of four species (Olive Ridley, hawksbill, green and leatherback). Besides nesting in the islands, lagoons are important developmental habitats for hawkbill and green turtles. The muslim islanders do not eat turtle meat, but continue to exploit then for products or as curios. Even with limited populations of hawksbill, leatherback, green and Olive Ridley turtles, eggs are sold freely in Kerala. Turtle fishing continues with hook-line and nets. Sporadic nesting of Olive Ridleys continues throughout the coast. Gujarat has four (green, hawksbill, leatherback and Olive Ridley) species off the coast and has both nesting and developmental habitats. It was an important area for trade in green turtles. At present, limited number of turtles nest in the region (68% green turtles and the rest Olive Ridleys). It is unfortunate that such an important area has not received the attention it deserves from turtle biologists.

Coming to the neighbouring countries, Sri Lanka is an example of a sad commentary of a rich turtle region gone wary due to overexploitation and lack of proper management. Once home to all the four species, it no longer has a significant population of any species. Politics has taken its toll – no information from the northern coast due to ethnic war in that region. Tagging records show that Olive Ridleys of Orissa forage off the coast of Sri Lanka. Historical account by Ansem de Silva deals with trade in turtle shells with India and Rome going back to pre-Christian times. Despite attempts by the government to stop illegal trade, tortoise shell business continues to thrive. Several marine turtle hatcheries have been established purely for commercial purpose as tourist attraction. Only a limited number of Olive Ridley and green turtles nest at present in Bangladesh. Trade (meat, egg and stuffed curios) continues openly. What is alarming is that two turtles (species not mentioned) were recovered with fibropappiloma tumours on the front flipper. This is the first report of fibropappiloma in the northern Indian Ocean population and needs attention and confirmation. Pakistan had a flourishing trade of flippers (about 5000 kg each year for leather to Japan) from the Baluchistan area, in the late 70s. Mercifully, Sindh Wildlife Department has a hatchery and tagging programme in place since 1979. Tagged green turtles have been recovered from Gujarat in India and as far as Eritrea. Considered to have aph-

rodisiac property, eggs are heavily exploited. Interestingly, the green turtles nest all around the year, but Olive Ridleys nest mainly during monsoon season (apparently, the turtles can dig in the wet sand). There seems to be geographical divide in threats, accelerating urban development in Karachi and heavy exploitation in Baluchistan.

The section of the book with marine turtles and fishery-related issues has 3 out of 4 chapters devoted to TED (turtle excluder device). Having played a role in technology transfer of TEDs from USA to India, and having represented India twice in WTO during the shrimp–turtle dispute, I can safely say that implementation of TEDs in India is not a simple matter. To enforce use of TED there has to be a massive deployment for enforcement in the east coast and part of the west coast, which is non-existent now. Besides, as we argued at WTO, TED is of limited use in high-concentration areas, as the turtles in large numbers will choke the escape which is meant for single turtles. A case in point is the stable population in Orissa although TED laws are yet to be implemented. Just the closure of Gahirmatha Marine Sanctuary and Rushikulya and Devi in season, has resulted in the stable population. Rajagopalan *et al.* (p. 233) inform that the east coast accounts for 90–93% fishery-related incidental mortality. Although mortality in the Orissa coast is common knowledge now, their findings indicate high mortality in Tamil Nadu and Andhra Pradesh. Also, more turtles die due to gill nets than trawl nets. This calls for a different strategy now, as TED can address only trawler-net deaths. A special TED has been developed by the Central Institute of Fisheries Technology, but woefully it is merely of academic interest now.

The section on Laws and Marine Turtle Conservation in India is a compendium of laws – national and international – for protection of the marine habitat. It is opined that legal regime on the marine area is comprehensive in nature and scope, but in reality is inadequate in managing marine ecosystems. The full section on International Instruments and Marine Turtle Conservation by Bache and Frazier (pp. 324–353) can be used as reference material. Interestingly, it is pointed out that CITES (Convention on International Trade in Endangered Species), is a global treaty with tremendous political importance and power, but *has limited application to conservation as it deals with trade and commerce*!

The section on marine turtles and research is mainly devoted to the Olive Ridleys of Orissa. The massive aggregation of Olive Ridleys in the Orissa coast has been highlighted in national and international press, ever since Bustard brought the largest rookery in the world into focus in 1976. This international attention has been responsible for the unprecedented protection to Gahirmatha turtles which was later extended to Rushikulya and Devi river estuaries. The media goes into overdrive reporting on the mortality of these turtles in season and some international groups also take this opportunity to stage novel *dharnas* in season. *Therefore, one of the important messages from the book is that the strategies undertaken by the government and timely declaration of marine sanctuary at Gahirmatha, have resulted in a stable population.* Taking into account the Gahirmatha nesting population (averaging about 180,000) from 1976 to 2002, Shankar *et al.* (p. 362) have concluded that the population may not have declined yet; it would be prudent to monitor the population. In addition, there are two more nesting sites (Rushikulya and Devi) and some minor nesting sites. Pandav and Choudhury (p. 368) show that there is considerable inter-rookery movement within and between breeding seasons, and the same turtles nest at all the rookeries. Conventional metal-tagging and telemetry indicate that turtles roam offshore in the east coast and also migrate to the Gulf of Mannar and Sri Lanka. When it comes to mortality, Kartik Shankar *et al.* (p. 362) opine that there should be attempts to reduce mortality, but do not address the main problem about the sustainable levels of mortality for such a large population. *The fact remains that in spite of all the mortality, the population remains stable.* According to data from Orissa Forest Department, record numbers nested during 2005–06 (2.53 and 1.22 lakhs at Gahirmatha and Rushikulya respectively). In addition, there was nesting at Devi and other minor sites.

Lack of '*arribadas*' (mass nesting) in Gahirmatha in 1997 and 1998 has been considered as the highest incidence of failure in the documented history of the rookeries (Kartik Shanker *et al.*, p. 362). *An explanation for the failure comes from an unexpected source-records from the Defence Department.* Prusty and Dash tell us that *there is a scientific basis other than simplistic cause and effect logic, which should be applied to the mysteries of nature!* Apparently, turtles respond to spatio-temporal changes before it is obvious to us. They abandon these areas to nest in other places. With drastic changes in geomorphology, the main nesting area has shifted close to Wheeler Island so much so that the turtles do not follow the law of the land and nest on the Wheeler Island when they deem it fit. Defence Department scientists tell us that there are ten favourable geo-environmental parameters conducive to mass nesting. *There was a hue and cry when the Defence Department established its missile range in Wheeler Island close to Gahirmatha. This also attracted the attention of our President A. P. J. Abdul Kalam (who happened to be the Scientific Adviser at that time), who started taking personal interest in the conservation of turtles and involved the scientists of his department, who have come out with important information which is beyond the scope of regular research. The saturation of nesting sites* (Mohanty Hejmadi, P., *Curr. Sci.*, 2003, **84**, 972), *leading to intraspecific predation (waves of nesting turtles dig out the nests laid before!) is a major problem for turtles nesting in Orissa. It was due to Kalam's intervention, that management practices through sound hatchery programmes have been adopted by the Forest Department in recent years with funding from the Ministry of Defence.*

A short section is devoted to conservation programmes and marine turtles. NGOs could serve the interface between stakeholders, like fishermen who oppose and sometimes defy the closure of fishing in Gahirmatha in season. As fish catch has been reducing from year to year due to unsound practices (overfishing, no restriction for minimum and maximum size, etc.), it is believed that there will be a collapse in marine fisheries in 50 years (Black, R., *BBC News Website*, 2 November 2006). Therefore, fishermen have to be convinced to seek alternate livelihoods for their own survival.

To sum up, the editors Kartik Shanker and B. C. Choudhury have done a commendable job in consolidating the present situation relating to marine turtles in the subcontinent. The timely survey of turtles indicates that there are hardly any

records for most States and their current status is not encouraging. Rapid industrialization, developmental activities (sand/coral mining, illumination, establishment of ports, tourism) and mechanized fishing have left little room for marine turtles in all States, except Orissa. There are recommendations for proper enforcement of laws for protection of turtles, egg harvest to improve the economy of poor people and promotion for ecotourism. On the whole this book will be a good reference for turtle biologists and public alike. A glossary would have helped the latter understand the subject better. Inclusion of messages from officials is a distraction in an University publication.

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Governing Water: Contentious Transnational Politics and Global Institution Building. Ken Conca. The MIT Press, 55, Hayard Street, Cambridge, Massachusetts 02142-1315, USA. 2005. 466 pp. Price: US$ 28.00.

We live on the water-dominated earth's surface as the dominant life form. Water is the most critical natural resource as it is the basis of life on earth, with no known substitute. Water is also the basis of local communities and their livelihood and cultures. Our numbers, living style and greed are all growing together. This growth has brought in a tremendous stress on the available water resources and probably the recycling capacity of our earth. Therefore, the gap between supply and demand of water is increasing. Supply-side initiatives to address the gap include large-scale manipulation of water resources and marketization of water with the involvement of private sector. Because water is also a basis of local communities livelihood and culture and also a medium of social control, controversies over the current practice of water management are also on the increase. Globalization of markets and growth of satellite-based communication have only aggravated the controversies over these issues, although water is a local resource, excepting some rivers which are transnational politically.

Building institutions and framework for governance of water on a global scale, like other environmental problems of the earth's atmosphere, is extremely difficult because in the case of water the problems, sources of these problems and their solutions are largely local. The book by Ken Conca presents a good account of the governance and world politics relating to water and to formulating regimes using conventional norms of authority of the State, territoriality of resource itself and our own knowledge of all issues connected with water and its use. Conca argues that newer alterative, although more informal, types of institutions/regimes are needed to govern water wherein norms of authority, territoriality and knowledge are to be taken as variables rather than constants along with participation of all stakeholders. The book has been written at the most appropriate time and for concerned water-experts, planners and policy makers, and for anyone interested in the history of evolution of water-related struggles in the world. As claimed by the author, the book is not intended to increase our scientific understanding of water and its resources. Details of long-term struggles of building large dams and those of institutional building for water governance in Brazil and South Africa are informative and therefore are useful to those involved in politics and governance of global environmental problems. The book has ten chapters, with adequate reference to data sources as well as general references cited.

Chapter 1 discusses the difficulties involved in conventional institution building around a local resource such as water. Unlike the globally common issues of climate and ozone depletion wherein global regime had worked, in the case of water the problems are local; however, because of increasing social interconnectedness in the world, the causes and effects of local problems are taken to the global scale. Therefore, the author underscores the necessity of building alternative institutions for water governance. In Chapter 2, the author describes the three global environmental regimes such as the 1987 Montreal Protocol (to protect atmospheric ozone), 1989 Basel Convention (on the transnational movement of hazardous wastes and their disposal) and the 1997 Kyoto Protocol on climate changes. Using these regime-building processes, the author defines that a regime basically 'relates to the rules of the game agreed upon by actors in the international arena and define their admissible behaviour'. Implicit in such regime-building norms is that the State is the authority, nature is territorialized and our knowledge of any environmental problems is stabilized. However, Conca argues that nature of the environmental resources, the patterns and control of consumption, and our knowledge of the problems are all continuing variables in space and time. Therefore, any regime formulation with conventional norms of governance is purely temporary. Increasing globalization of economy only compounds the problem of building institutions, especially for a multidimensional resource such as water.

Chapter 3 is interesting and useful for scientists interested in issues related to water, rivers and watersheds. It provides an overview of the importance of rivers and watersheds, sources of ecological stresses without large-scale manipulation of rivers and consequences of manipulation on hydrologic cycle, freshwater biodiversity and human settlements. Because of increasing global demand for water in three major sectors such as agriculture, industry and urban areas, the challenges to meet the growing demands are enormous. Due to sectoral perceptions and demands, there is no consensus on the norms of governance of water, rivers and watersheds. Details of development of dam-building as a major activity for the economic growth of a nation and the interests of multinational companies therein are interestingly presented. This is a chapter which I enjoyed reading the most.

Chapter 4 deals with international regime formation around shared rivers, as many large rivers or at least their basins are transnational. Any water shortage is likely to trigger wars between States, unless they learn to cooperate in water management. This cooperation calls for