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CONSERVATION STRATAGIES OF INDIAN FRESHWATER TURTLES

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ABSTRACT

In recent years there has been growing awareness of the need for positive conservation action for chelonians. Unfortunately, there are still major gaps in our knowledge of the ecology, distribution and status of many of the rarer and endangered species. This makes conservation planning more difficult. In India there is a great variety of Chelonian fauna - 22 species of freshwater turtles, 4 species of tortoises and 5 species of marine turtles. Among the freshwater turtles, the emydid turtles are dominating with 16 species than Trionychid turtles, which represent 6 species. Some Indian turtle species are endangered for clearly defined reasons, while others are feared to be in trouble because of their restricted ranges or habitat specialization. Efforts have to be made to formulate suitable action plan for conservation of turtles in India. All the recommendations made out of the recently concluded Indo-US project should be implemented immediately. The goal to get the right kind of support for turtle conservation is being achieved by creating awareness of the importance of turtle fishery among the public. If the people realize that turtle resources are managed primarily for a common benefit then only would they co-operate in conservation and rationally utilize the turtle resources.

Key words : conservation of fresh water turtles, utilization of resources

INTRODUCTION

Freshwater turtles in India inhabit different water bodies ranging from shallow ponds to deep lakes and rivers and are divided broadly into two categories: 1. Hard-shell turtles (Emydid turtles) and 2. Soft-shell turtles (Trionychid turtles). Few studies conducted on Indian freshwater turtles have mainly dealt with taxonomy and their broad distribution ranges (Smith, 1933; Pritchard, 1979; Daniel, 1983; Das, 1985; Tikader and Sharma, 1985, Moll, 1997; Das et.al., 2010). Data on demographic and life histories of Indian turtles are not available (Rao, 1982; Moll, 1984). Recently, Rao (1990) contributed much knowledge on the ecological relationships among few turtles in the Chambal River, a major tributary in the Ganga river-system. However, this information is limited to a small fraction of turtle species occur in India in a single geographical range. Still large numbers of turtle species are not studied in details and their habitats have not been explored. The lack of scientific information on life history, bio-ecology and populations of turtles has been considered as one of the pressing problems to devise management strategies for turtles in the field. In addition, large numbers of turtles were slaughtered in different parts of the country for consumptive utilization. Due to lack of restrictions on the capture of turtles and little or no enforcement of existing legislation, populations of turtles in different water bodies are decreasing (Moll, 1984; 1997). The National as well as International scientific and conservation community has therefore declared a number of turtles as endangered in the Schedules of Indian Wildlife (Protection) Act, 1972 and in the Red Data Book (IUCN. 1982; Rao, 1989, Pandit, 1997).

Looking into the success of the crocodile conservation project in India, where populations of all three species of crocodiles are highly protected, turtles living in similar aquatic habitats can also be conserved effectively. This paper deals with species diversity and major conservation issues for turtles in India.

Species diversity:

India is bestowed with a great variety of Chelonian fauna. The country has been divided into different Biogeographic zones (Rodgers and Panwar, 1988). There are 22 species of freshwater turtles, 4 species of tortoises and 5 species of marine turtles. Among the freshwater turtles, the emydid turtles are dominating with 16 species than Trionychid turtles, which represent 6 species. According to Frazier (1992), distribution information on Indian turtles is extremely sketchy. He pointed that no thorough and meaningful plan can be developed until reliable information on the distribution of the relevant species is available. The distribution of freshwater turtles in India is not known clearly until a country wide survey was conducted during early 1990's (Choudhury and Bhupathy, 1993). With the increase in the interest on Chelonian studies, now large number of locality records of different species is available (Rao, 1989; Nair and Krishna 2013). The occurrence of different species of freshwater turtles in various biogeographic zones and in different states is shown in table (1-3, see Figs. 1-7). Each State in the country holds at least one species of turtle with maximum number of 17 turtle species in the State of West Bengal (77.3%) (Table 1).

Biological information:

Although India is a home for many species of freshwater turtles surprisingly, ecology and biology of very few species are studied in detail (Rao, 1990, 2016; Das et. al., 2010). Detailed information on reproduction, feeding, habitat utilization, population ecology of different species of *Kachuga*, *Nilssonia gangeticus, Lissemys punctata* and *Chitra indica* are available from the Chambal River (Nair and Krishna, 2013; Rao, 2016). Most of the biological studies were conducted on *Lissemys punctata* in seven States followed by *N. gangeticus* in five States, *Batagur* and *Pangshura* sp., *Chitra indica*, *Melanochelys trijuga* and *Geomyda silvatica* in atleast two States each (Rao, 1992). The status of turtles and their habitat were extensively studied in a collaborative project by the Wildlife Institute of India and United States Fish and Wildlife Service (Choudhury and Bhupathy, 1993). Recently, ecological studies on freshwater turtles have been carried out in the Ganga River (Rao, 1993).

Economic importance:

In India freshwater turtles are used as a source of cheaper food for the local tribal as well as the poorer section of the urban and rural people. Although turtle meat is delicious, some communities do not eat it because of religious sentiments. The eggs of turtles are also heavily consumed by tribal (Das, 1985; Rao, 1987; Choudhury and Bhupathy, 1993). Turtles are also useful for medicinal uses. People prepare medicines from turtles for curing many diseases (Choudhury and Bhupathy, 1993). In India people buy turtles, mainly *Lissemys* sp. to keep them in their wells in the belief that the turtles keep the wells clean. The soft-shell turtles are useful as scavengers to dead and putrefying human and other animals which are disposed off purposefully, sometimes as a token of religious rites. Turtles like *Batagur baska*, *P. tecta, P. tentoria* etc., are also kept as pets in different parts of the country (Das, 1985; Choudhury and Bhupathy, 1993).

Threats:

In India turtle populations have declined drastically during the last few decades as a result of direct and indirect human interventions. Illegal and over exploitation have caused an alarming state for turtles (Rhodin, et al., 2011). To meet the demand, freshwater turtles from different rivers of the northern States of India are illegally caught and exported to various markets in the north-eastern States (Das, 1985; Rao. 1987;

Choudhury and Bhupathy, 1993). Soft-shell turtles particularly, *A. gangeticus, N. hurum, N. leithii, Chitra indica, Lissemys punctata* are most commonly sold due to their tender flesh and more meat yield per animal. *Batagur kachuga, G. hamiltoni*, and other large hard-shell turtles are also sold in the markets.

Loss of turtle eggs due to predation by man, domestic and wild animals, and other abiotic factors are the main factors for population decline of turtles (Rhodin et. al., 2011). The water development projects in India are serious threats to the freshwater turtle population. The dams and barrages on the rivers mainly affect the natural riverine habitats of the turtles. Natural discharge of rivers is altered by the construction of dams. Additional important factors are conversion of river banks into agricultural fields and collection of sand from nesting sites (Rao, 1990, 1993; Taigor and Rao, 2010).

Conservation:

The Indian Chelonians are protected by various ways like religious, legislation, incidental protection etc.

Religious protection:

The turtle occupies a honored place in many mythologies. The turtles and tortoises are considered as religious symbols. According to Hindu mythology, the Universe is supported by four elephants standing on a turtle's back. People show special reverence to the turtle as they consider the turtle as one of the ten main incarnations of 'Vishnu', the supreme God. River Yamuna, mythologically called as 'Mother Yamuna' used the turtle as her 'vahan' (vehicle) (Rao, 1987). All these superstitions gave good protection to the turtles. In addition, the river stretches at major pilgrimage centers are protected by local people where they perform rituals. These river stretches are good habitats for large number of turtles. Such river stretches can be referred as ' Religious Sanctuaries ' for the protection of turtles.

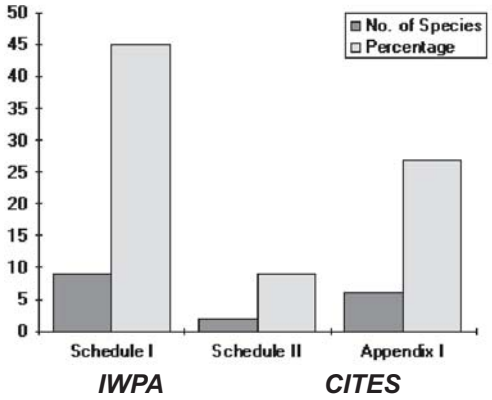

Fig. 1. Showing number of turtle species included in Indian Wildlife Protection Act, 1972 and in CITES. (Percentages are also shown).

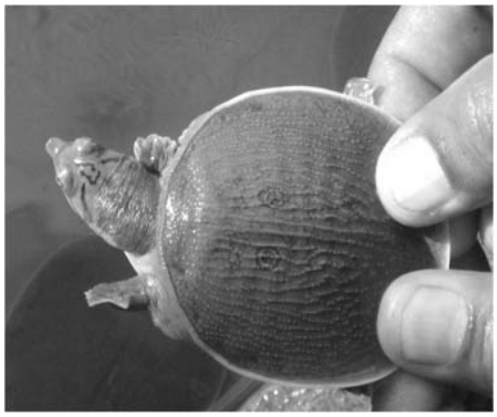

Fig. 2 Hatchling of Nelsonia gangeticus

Fig. 3. Juvenile Batagur kachuga

Legislation:

In India, laws are legislated under Wildlife (Protection) Act, 1972 to save the endangered species from illegal poaching and give protection to their habitat. To control any illegal International trade many of the endangered species are included in Appendix I of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Indian chelonians are also given protection through National as well as International legislation (Rao, 1987; Choudhury and Bhupathy, 1993). The total number of species included in Indian Wildlife (Protection) Act (IWPA) and CITES are shown in figure 1. Among the freshwater turtles in India 9 (45%) turtles are included in Schedule I of the IWPA. Horne et. al., (2012) recommended the changes in listing of the turtles in different categories under IUCN Red list status. The current conservation status and the proposed update to IUCN Red list and CITES statuses of Indian turtles are shown in table 4, 5 and 6. The critically endangered species are *Batagur baska*, *B. kachuga, Cuora mouhotii* and *Nilssonia leithii*. The Indian flapshell turtle Lissemys punctata which is an Appendix II species of CITES has been proposed to list in Appendix I due to the threat to the species because of high exploitation for meat purpose. Four other species have also been proposed to include in Appendix II of CITES (Table 6). The softshell turtle *Nilssonia leithii*, which is a vulnerable species under Red listing has been proposed as critically endangered. Three vulnerable and one near threatened species were also proposed to list as Endangered under IUCN Red list category (Table 5).

Incidental protection:

Freshwater turtles in India receive incidental protection in different sanctuaries specially created for crocodile conservation started since 1975. Populations of crocodiles have been protected in 34 protected areas in which 13 areas have been specially created as crocodile sanctuaries. Stopping of fishing activity, maintaining full protection from poaching, extending protection to habitat and rehabilitation of captive reared crocodiles are the management strategies adopted in different crocodile sanctuaries (Rao, 1992). Protection staff posted in the sanctuaries and in other protected areas keeps regular vigil to stop illegal capturing of crocodiles and also other animals like turtles. In this way turtle receive incidental protection in different crocodile areas.

Captive management of freshwater turtles:

The captive management programmes of different animals have focused on maintaining adults for breeding and rearing of young. Through the experience gained by the captive rearing programmes of crocodiles, it is felt that turtles are also relatively easy to maintain in captivity. To study various aspects of behaviour of turtles and also to gain knowledge on captive management a captive rearing programme was designed to head-start a small percentage of juvenile turtles in the National Chambal Sanctuary in addition to the rearing of adult turtles captured from the Chambal River (Rao, 1990). Eggs of various species of turtles particularly *Batagur* and *Pangshura* sp., *N. gangeticus* and *Lissemys punctata* were collected from the Chambal river and incubated in the laboratory for artificial hatching.

All young turtles were reared in plastic tubs and cemented pools, sometime along with gharial crocodiles. Experiments have been carried out on rearing methodology, feeding etc. This is the first record of captive rearing of turtles in India. Captive rearing of freshwater turtles was also carried out at Madras Crocodile Bank (Harry per. inf.).

Looking into the general loss of adults, eggs and the scavenging nature of soft-shell turtles, the Ganga Project Directorate, Govt. of India had sanctioned a turtle rehabilitation project in the Ganga River during 1987-88 as a development programme. During 1990 the same programme was continued as species conservation programme. This project was

terminated during 1994 and currently the success of the project is being evaluated. A total of Rs. 56 lakhs have been spent on the project (Official records). In this project eggs of soft-shell turtles, particularly, *N. gangeticus* were collected from the Chambal River, incubated in artificial hatcheries, reared the young ones for at least two years before releasing into the Ganga river, in a specially created turtle sanctuary at Varanasi, Uttar Pradesh. This is the major turtle rehabilitation project ever taken up in any country. With the funding from Turtle Survival Alliance, USA turtle rehabilitation programme has been started in Deori Gharial Rearing Centre, Morena, Madhya Pradesh and in Itawah District, Uttar Pradesh. Freshwater turtle species *B. kachuga* and *B. dhongoka* are reared in the Gharial rearing centre, Morena and wild-laid eggs are protected in river hatcheries. As per the programme all hatched turtles are released in the Chambal River.

Looking into the large scale exploitation of wild caught turtles and trade of turtle products like meat, shell and cartilage and habitat degradation the endangered turtle species conservation priorities like protection to the turtle habitat, raising the turtles in riverine habitats and captive rearing and turtle farming have been identified.

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Table 1. Data showing number of turtles occurs in different States in India

S.No.	State	No. of Species	Percentage
1.	Andhra Pradesh	5	22.7
2.	Arunachal Pradesh	4	18.2
3.	Assam	14	63.6
4.	Bihar	14	63.6
5.	Goa	4	18.2
6.	Gujarat	5	22.7
7.	Haryana	10	45.5
8.	HimachalPradesh	5	22.7
9.	Jammu & Kashmir	8	36.4
10.	Karnataka	5	22.7
11.	Kerala	4	18.2
12.	Madhya Pradesh	11	50
13.	Maharashtra	7	31.8
14.	Manipur	1	4.6
15.	Meghalaya	6	27.3
16.	Mizoram	1	4.6
17.	Nagaland	3	13.6
18.	Orissa	9	40.9
19.	Punjab	9	40.9
20.	Rajasthan	8	36.4
21.	Sikkim	1	4.6
22.	Tamilnadu	5	22.7
23.	Tripura	1	4.6
24.	Uttar Pradesh	13	59.1
25.	West Bengal	17	77.3

Table 2. Data showing occurrence of different turtle species in various States and Biogeographic Zones in India.

S.No.	Species	No. of States	Percentage	No. of . Biogeographic Zones
1	*Batagur baska*	2	8	1
2	*Batagur dhongoka*	5	20	3
3	*Batagur kachuga*	9	36	3
4	*Chitra indica*	11	44	5
5	*Cuora amboinensis*	3	12	3
6	*Cuora mouhotii*	7	28	1
7	*Cyclemys dentata*	3	12	2
8	*Geoclemys hamiltonii*	9	36	6
9	*Hardella thurjii*	10	40	6
10	*Lissemys punctata*	20	80	9
11	*Melanochelys tricarinata*	6	24	3
12	*Melanochelys trijuga*	11	44	6
13	*Morenia petersi*	4	16	3
14	*Nilssonia gangeticus*	11	44	5
15	*Nilssonia hurum*	10	40	6
16	*Nilssonia leithii*	7	28	3
17	*Pangshura smithii*	8	32	4
18	*Pangshura sylhetensis*	4	16	2
19	*Pangshura tecta*	14	56	6
20	*Pangshura tentoria*	12	48	7
21	*Pelochelys bibroni*	3	12	1
22	*Vijayachelys silvatica*	3	12	1

Table 3 Data showing occurrence of turtle species in different Biogeographic Zones

S.No.	Biogeographic Zone	No. of Species	Percentage
1.	Trans Himalayas	0	0
2.	The Himalayas	17	77.2
3.	The Indian deserts	2	9.1
4.	Semi Arid Zone	10	45.5
5.	Western Ghats	5	22.7
6.	Deccan Peninsula	10	45.5
7.	The Gangetic plains	14	63.6
8.	The North Eastern Zone	15	68.2
9.	Andaman & Nicobar islands	2	9.1
10.	The coastal region	10	45.5

Table 4: Conservation status of Indian Turtles according to IUCN

S. No.	Critical Endangered	Endangered
1	*Batagur baska*	*Batagur dhongoka*
2	*Batagur kachuga*	*Chitra indica*
3	*Cuora mouhotii*	*Geoclemys hamiltonii*
4	*Nilssonia leithii*	*Hardella thurjii*
5		*Nilssonia gangetica*
6		*Nilssonia hurum*
7		*Pangshura sylhetensis*
8		*Vijayachelys silvatica*

Table 5: Red listing status of Indian Turtle species

S.No.	Species	Present Status	Proposed Status
1	*Nilssonia leithii*	Vulnerable	Critically Endangered
2	*Geoclemys hamiltonii*	Near Threatened	Endangered
3	*Hardella thurjii*	Vulnerable	Endangered
4	*Nilssonia gangetica*	Vulnerable	Endangered
5	*Nilssonia hurum*	Vulnerable	Endangered
6	*Pangshura tecta*	Least Concern	Near Threatened

Table 6: Present status of Indian turtle species and proposed listing under CITES

S. No.	Species	Current status	Proposed to	
			Appendix I	Appendix II
1	*Lisemys punctata*	Appendix II	√	
2	*Hardella thurjii*	---		√
3	*Morenia petersi*	---		√
4	*Nilssonia leithii*	---		√
5	*Vijayachelys silvatica*	---		√

Fig. 4. Juvenile Batagur dhongoka

Fig. 5. Juvenile Batagur dhongoka and Lissemys punctata

Fig. 6. Breeding male Batagur kachuga

Fig. 7. Adult Chitra indica

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