Turtle Trade in India

A Study of
Tortoises and Freshwater Turtles

World Wide Fund for Nature, India

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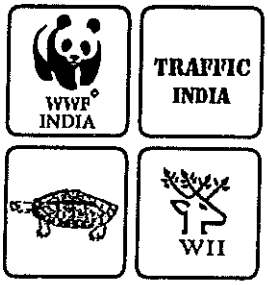
INTRODUCTION

Turtles, both freshwater and marine, and land tortoises have been exploited throughout their range in India for food and medicine for hundreds of years. They are a source of protein for the fishermen and hill tribes and an important renewable resource. Turtles play the important role of scavenger in the aquatic ecosystem as softshell turtles are useful carrion eaters. Being slow, turtles mostly feed on dead, injured or diseased animals instead of healthy ones. By removing unhealthy ones from the ecosystem, turtles help in maintaining a healthy community of organisms. While the carnivorous ones feed on snails and insects that spread diseases in human beings and livestock, herbivorous turtles feed on weeds. Tortoises on their part, live on scrub-land poor quality forage unsuitable for livestock. They thus convert useless fodder into protein rich biomass, available to the next carnivorous trophic level including human beings.

A poikilotherm with a high fecundity and ability to convert a high percentage of food consumed into body biomass, the aquatic and semi-aquatic turtles can be utilised on a sustainable basis like fish resource instead of being mined.

Until the mid 1970's, exploitation of turtles and tortoises in India was at a sustainable subsistence level. However, alongwith the growth of organised fisheries and related markets, turtles as associate species of the aquatic system entered the new commercial avenue. During the early 80's, the turtle trade in India was at its peak, even though some of the turtle species in trade were already in the Schedules of Wildlife (Protection) Act, 1972. The growth of an organised illegal turtle trade in India could be attributed to the following factors:



(i) Growth of fisheries operations in all kinds of waterbodies, wherein turtles were considered detrimental to fish resources.

(ii) With a market and pricetag, turtles provided an extra source of income for fishermen. Further, unlike fish,

turtles could be kept alive and fresh for a long duration thus assuring a market price.

(iii) Increase in the price of fish and other meat, making it unaffordable for people of lower income groups, who then find turtle meat a better and cheaper substitute.

(iv) Traditional medicinal beliefs attached to turtle meat and products.

(v) Migration of refugees from Bangladesh who constitute the bulk of buyers in Calcutta, the major turtle market.

(vi) Increasing interest of academics both in India and abroad on turtle research.

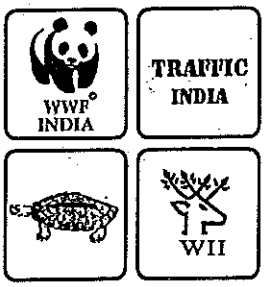
(vii) Turtles being slow moving and linked to an accessible habitat, are vulnerable and easy to capture.

The level of commercial exploitation is a cause of worry for the survival of several turtle species, particularly those whose ranges are small, as also those species which are endemic and have a low reproductive capability (late sexual maturity, small brood size and low survival rate).

Increasing destruction and shrinkage of their habitat combined with direct exploitation is a major threat to the Indian fresh water turtles and land tortoises. Protected areas in all bio-geographic regions of the country may provide the last remaining habitats for some of these species. If, however, the exploitation of turtles and tortoises continues, particularly in the riverine and scrubland habitats, much of which are not under Protected Area status, the future of turtles in India appears bleak. It is therefore important to determine exploitation and trade levels of turtles, as it would contribute in devising a proper conservation management strategy.

The present investigation is an attempt to document the turtle species exploited for in trade in India, localities from where they are exploited, methods and purpose of exploitation, groups and

people involved in the trade, trade routes and transportation methods, the socio-economics involved in the turtle trade and the impact of the trade on turtles in India. This investigation has a special significance in defining the trend of illegal turtle trade, particularly when compared to the investigation of turtle trade carried out in India by Moll in 1983 (See Table 10). Wildlife officials of States and Central Government, Custom and Import Export officials, Regional Deputy Director of Wildlife Preservation and the CITES organisation will find this investigation invaluable in the discharge of their duties.

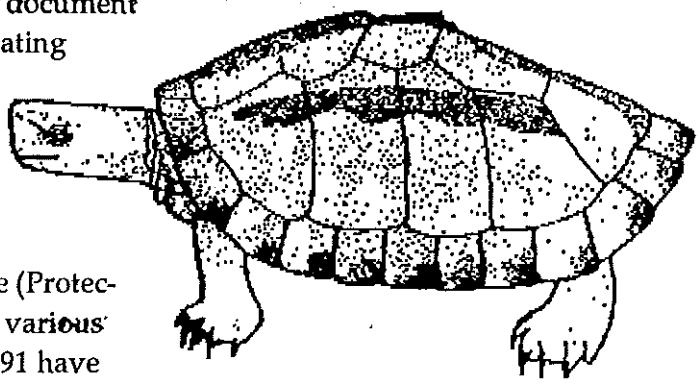


Present Status Of Freshwater Turtles And Land Tortoises In India

The freshwater turtle and land tortoise fauna of India comprises 16 species of freshwater and semi aquatic batagurines (*Emydidae*), 6 species of softshell turtles (*Trionychidae*) and 4 species of land tortoises (*Testudinidae*). Broadly, the turtle fauna of India can be demarcated into five regions; i) Gangetic plains comprising the plains of Northern India, the Brahmaputra valley and Mahanadi; ii) dry land and plains of Indus; iii) the hill country and moist forests of North-eastern India; iv) The rain forests of Western Ghats; and v) hill ranges and riverine plains of east coast.

The flood plains of the Brahmaputra, Ganges and the Mahanadi, with vast stretches of riverine and lake systems, support a great diversity of aquatic turtles alongwith the largely semi-aquatic and hill dwelling species in the north-eastern, and eastern plains. The Western Ghats represents some endemic forest dwelling species and the Eastern Ghats and the plains of the coast with numerous river and delta, support a somewhat impoverished but truly Indian species.

For generations, both turtles and tortoises have been venerated and exploited for subsistence in this country. However, commercial exploitation, habitat alteration and loss of habitat threatens many species of turtles in India. Fifteen of the 26 tortoise and freshwater turtle species of India have been included in the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group Conservation Action Plan document (Stubbs 1991) indicating the status and the actions required to safeguard them.



The Wildlife (Protection) Act, 1972 and various amendments till 1991 have

included 15 species of tortoises and freshwater turtles in the schedules providing legal protection (Table 1). Ten species of Indian turtles and tortoises have also been included in the Appendices of CITES prohibiting and (or) controlling international trade. The 1981 IUCN Red List of threatened animals also includes 10 Indian species (See Table 1 and Stubbs 1991).

A review of the present status of tortoises and freshwater turtles in India reveals that the riverine and lacustrine species have been adversely affected in the Ganges and Mahanadi river systems because of commercial exploitation and habitat destruction, particularly *Aspideretes gangeticus, A.hurum, Chitra indica, Hardella thurjii* and the large-bodied *Kachuga* species. Amongst the semi-aquatic hill species, all species in north-eastern India are suffering from non-sustainable subsistence exploitation (Bhupathy *et al.* 1992) as well as gross habitat destruction, the Asian brown tortoise *Manouria emys* being the worst sufferer. The two brackishwater species, Asian giant softshell turtle *Pelochelys bibroni* and River terrapin,*Batagur baska* have been practically wiped out from their distribution range in India because of over exploitation.

The increasing occurrence of the Indian star tortoise in the pet trade is also a cause of worry. With the exception of the widely distributed Indian flapshell turtle *Lissemys punctata*, no freshwater turtle or land tortoise in India can be termed as 'abundant'.

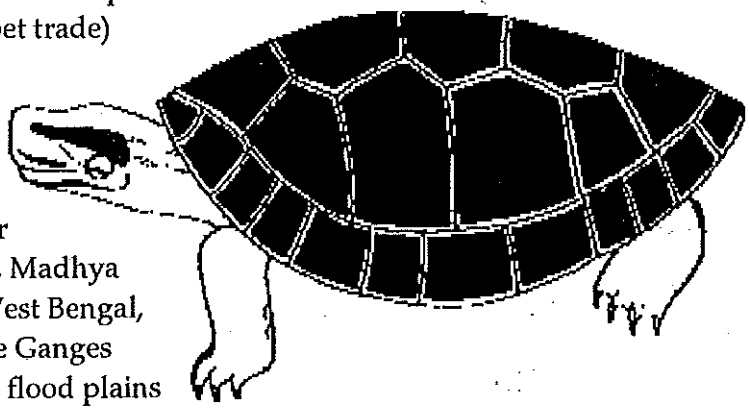
Utilisation Of Tortoises And Freshwater Turtles

The turtle is an incarnation of God "Vishnu" to the Hindus. Religious shrines of the Hindus, Muslims and Buddhists maintain turtles with reverence. Village ponds and wells are stocked with turtles to scavenge on dead and decaying material. Caste Hindus and tribes derive their clan name from the turtle ancestor. Mythology and folklore all over India are replete with stories surrounding turtles. While the presence of a turtle in the house is considered a good omen in the east and north-eastern region of India, it is considered evil and a bad omen in the south.

Turtles, therefore, are utilised in India in religious rites, as food, medicine and many other purposes in recent years. The range of utilisation purposes given in Table 2, has gradually been shifting from a sustainable to a non-sustainable level.

Twenty-two out of the 26 species that occur in India's political territory are exploited to a varying degree, either on a subsistence level or on a non-subsistence commercial level (Table 3). Subsistence level of exploitation of turtles for food and medicine have been recorded for 22 species of turtle throughout their distribution range, the levels of such utilisation being very high in the states of north-eastern India, West Bengal, Bihar, Uttar Pradesh and Orissa (Table 4).

Four species of softshell turtle and three species of hardshell turtles (food) and one species of land tortoise (pet trade) have gone into the commercial exploitation sector (Table 5). Uttar Pradesh, Bihar, Madhya Pradesh and West Bengal, the states in the Ganges river basin and flood plains



contribute most of the species to the trade. The Mahanadi river basin in Madhya Pradesh and Orissa, and the Godavari and Krishna river basin in Andhra Pradesh also contribute riverine species to the commercial market.

The present investigation examined the level of exploitation and trade in turtles and tortoises in the subsistence and the commercial sector including the pet trade.

North-eastern India (Brahmaputra valley and Cachar hills), Western Ghats, the east coast, lower Gangetic flood plains and the semi-arid western India regions were covered during the one and half years of field investigation. Calcutta, the well known centre of all turtle trade was the focus of investigation but other trade centres like Bangalore, Bombay, Madras and Trivandrum, were also included.

The investigation also covered two other tortoise resource users; the zoological parks and the universities. Other uses of turtles, such as in religious rites and beliefs, folklore and culture were also documented.

Commercial Exploitation Of Turtles For Food Markets

A countrywide food and pet market survey was conducted between September 1991 and April 1993 to determine exploitation pressure on turtles. Calcutta markets were surveyed twice, once in autumn (September 1991) and again in winter (January 1992). Market surveys were also conducted in 55 towns and cities in 13 States of India (Map1, Table 6).

Methodology

The surveys were conducted between 07.00 and 11.00 hrs for morning markets and, 15.00 and 18.00 hrs. for evening markets. Acting as buyers, the investigators surveyed the Calcutta market in a very rapid and clandestine manner to collect maximum information on turtle exploitation. Surveys of markets in other cities and towns were coupled with field surveys. At each market, the number of species seen and the approximate number being traded (and weight in kg.) were noted. Queries on the price per kilogram of meat, source and methods of obtaining of stock and mode of transportation were made. Whenever possible, wildlife officials in charge of controlling trade were also contacted, as also turtle meat eaters.

In all, 61 markets (30 markets surveyed in Calcutta are counted as one) were surveyed in India of which 12 markets recorded the selling of turtles. Of the 61 markets surveyed, 7 were pet markets and the others were fish, meat and other animal product markets. Only in two pet markets, namely, the Shivaji market in Bangalore and the Narmada pet shop in Trivandrum were turtles recorded as being sold. The value of one turtle varied from Rs 40 for a Indian black turtle, *Melanochelys trijuga*, to Rs 75-125 for Indian star tortoise, *Geochelone elegans*. In food markets, the prices varied from Rs.15 to Rs 200 per kilogram of turtle meat. Turtle meat was sold at a very low price in South India (Rs. 15), whereas it was Rs.150-200 per kilogram in north-east India (Table 7). Markets, other than Calcutta, received turtles from local sources and never from far away places.

Turtle Trade in Calcutta

A total of 25 and 23 Calcutta markets were surveyed during monsoon and winter respectively. Turtles were observed being sold only in 6 (24%) and 5 (21.7%) markets respectively. Three freshwater turtle species, namely, Indian softshell turtle (*Aspideretes gangeticus*) Indian flapshell turtle (*Lissemys punctata*) and Crowned river turtle (*Hardella thurjii*) were recorded in the markets. No exploitation of other larger softshells, namely, *Aspideretes hurum, A. leithii* and *Chitra indica* was recorded during the present survey. During the monsoon season, the exploitation of larger softshells was higher when compared with winter (Table 8). The quantity of turtles in each market varied from 10 to 70 kg and the price of one kilogram of turtle meat varied between Rs to 30 and Rs 50. There was not much difference in the turtle exploitation between two survey seasons. In the monsoon the most exploited species was *Aspideretes gangeticus*, whereas during winter it was *Lissemys punctata*. A shift in the markets selling turtles was observed between monsoon and winter (Table 8) ie. during the monsoon (September 1991) turtles were sold within the metro limits, whereas it had shifted to the outskirts during winter (January 1992). This is attributed to the frequent raids conducted by the Forest Department and Wildlife Preservation officials (Table 9). According to the turtle sellers, turtles for the Calcutta markets are collected in Orissa, Bihar, Andhra Pradesh and north and central Uttar Pradesh and shipped alongwith fish by train.

Collection centres and trade routes

All major cities and towns along the Ganges and its tributaries in Uttar Pradesh and Bihar were reported to be collection centres for turtles to be sent to Calcutta. Kanpur, Lucknow, Moradabad, Agra, Etawah, Patna, Chhapra, Monghyr are the major locations. Turtle consignments are reported to have been sent to Calcutta from Punjab (Harike lake), Jammu & Kashmir (Jammu), Orissa (Cuttack, Chardwar, Naraj) and Andhra Pradesh (Rajahmundry, Vijayawada).

Capture and transport methods

Fishermen operating in rivers, large reservoirs and lakes who have pledged most of their catch to contractors use set nets (eg. in Chambal, Gomti, and Yamuna rivers, Hirakud, and Naraj barrage in Orissa, Nagarajunasagar in Andhra Pradesh, Narmada river near Khandwa etc.). Snares and traps are used in Rajahmundry in Andhra Pradesh. Bamboos with iron pokers are also used to pull out buried turtles from mud bottoms of drying reservoirs in Andhra Pradesh, and from lakes in Gujarat and Rajasthan.

Large softshell turtles like the Indian softshell turtle (*Aspideretes gangeticus*), Leith's softshell turtle (*A.leithi*) and Indian Peacock softshell turtle (*A.hurum*) are the preferred riverine species of the trappers. Weighing as much as 15-20 kg, a single turtle of any of these species could fetch upto Rs.200-300 for a turtle trapper. In the Calcutta market they fetch as much as Rs.600-800 per piece at Rs.40-60 per kg of meat. The widely distributed Indian flapshell turtle *Lissemys punctata* is captured from rivers, lakes, ponds and even from paddyfields during the monsoon. This species is much more terrestrial in habits and constitutes the largest bulk of the trade. Almost 50-60% of turtles confiscated in Calcutta markets belong to this species.

Large hardshelled river turtles of the genus *Kachuga* and the softshelled *Chitra indica* also are currently not an important part of the trade. Either because of their rarity or difficulty to capture, these species are now hardly sold. The Crowned river turtle (*Hardella thurjii*), though a popular species in the Calcutta food market, is relatively uncommon these days.

Captured turtles are sold live to contractors who pack them alongwith fish to be despatched. Occasional catches are sold in local markets (eg. Hyderabad, Surat, Coimbatore, Pune). Turtles are occasionally also sold in Chittarajan Park (New Delhi) fish market (Ashok Kumar, *pers. comm.*) Turtle sellers in Calcutta confirm that turtles remain live in ice-packs even after two to three days of journey.

Railway parcels particularly alongwith fish supplies appears to be the most favoured method of transporting turtles followed by despatches alongwith truckloads of fish. The former method is popular in northern and south-eastern railways and the latter (truckloads) on the highway of Uttar Pradesh and Bihar to West Bengal.

Till recently (early 1991), the destination of such consignments used to be Bandel and Sealdah for northern railway consignments and Howrah for south-eastern railway consignments. Due to increased enforcement, the West Bengal wildlife officials suspect the destination to have changed, of late, to Diamond harbour and even almost to the Bangladesh border at Basheerhat.

Trends of Commercial trade

The commercial trade in turtles still persists in India. Compared to the 1983 survey of Moll, where he recorded as many as ten species in trade, the present extensive investigation recorded only seven species. While five species *Hardella thurjii, Lissemys punctata, Aspideretes gangeticus, A.hurum* and *A.leithii* continues in the trade, two other species *Melanochelys trijuga* and *Geochelone elegans,* have entered into the trade more recently. A comparison of turtle species in trade during 1983 and 1993 is given in Table 10.

Medicinal use of tortoises and turtles

Use of tortoises and turtles is not restricted to traditional medicine but also occurs in the Unani, the Greco-Arabic system of medicine. Das (1985,1991) gives the details of diseases for which shell, meat and other organs of turtles are used in India.

During the present investigation, an attempt was made to document the levels of tortoise and turtle exploitation for medicinal uses. The study indicates a very low level of exploitation of turtles for exclusive medicinal use. This is so because turtle shells are the most commonly used part in medicine, and is available as a secondary product after utilisation of the meat.

Medicinal use of the turtle shell by indigenous people was recorded in almost all parts of the country. Riverside people and fishermen along the Narmada, Tapi, Mahi, Godavari, Krishna, Mahanadi and Brahmputra rivers also exploit turtle eggs for medicinal use. The semi-aquatic turtle species in the hilly tracts of north-eastern India and the Western ghats are the most commonly used turtle species. Table 11 gives the details of species used in tribal medicine. Even though the Table includes only eight species, all turtle species eaten for their food value are also used for medicinal purposes, irrespective of locality, religion, caste and creed. In Assam (Dibrugarh, Jorhat, Tezpur, Dhubri and Guwahati) and West Bengal (Calcutta) turtle meat is eaten for its medicinal properties even by affluent urban people.

Pet Trade In Tortoises And Turtles

Though several species of tortoises and fresh water turtles are kept in captivity in India (See Table 13), only the Indian star tortoise *Geochelone elegans*, Indian black turtle *Melanochelys trijuga* and Indian roofed turtle *Kachuga tecta* have entered into the pet trade. There are also unconfirmed reports of some trade involving the Assam roofed turtle *Kachuga sylhetensis*.

Being an adaptable, terrestrial, herbivorous species tolerant to extremes of temperature, the colourful Indian star tortoise is a popular chelonian species in the pet trade. Its wide distribution (See Fig. 2) and its comparative abundance is also another reason for its being in the pet trade. During the course of the present countrywide survey, information was gathered on the species being kept as pet in many towns and cities. Specimens that have been in households for 20-25 years have been examined at Madras, Hyderabad, Pune, Bombay, Bangalore and Vadodara. The star tortoise is also the commonest land tortoise in Indian zoos. Animal dealers in Hyderabad, Madras, Bangalore, Lucknow and Delhi mention of hundreds of star tortoises being sold in pet shops in India. One animal dealer in Bangalore even boasted of a monthly capture of over 500 individuals of star tortoise for the pet trade. After the inclusion of star tortoise in Schedule IV of The Indian Wildlife (Protection) Act in 1980, the trade has gone underground and an illegal trade both inside the country and one that caters to the export market, thrives. Confiscations both inside and outside the country are evidence enough for this.

During the course of the present survey (1991-92) over 1500 star tortoises were confiscated in Calcutta, Bombay, Gujarat and Amsterdam (See Box, *Star Seizure*).

In recent years (1991), the Indian black turtle (*Melanochelys trijuga*) has also entered in the pet trade and specimen have been recorded in Cochin and Trivandrum pet shops with a price of Rs 40 for individuals. Specimens purchased and kept as pet have also been examined at Hyderabad.

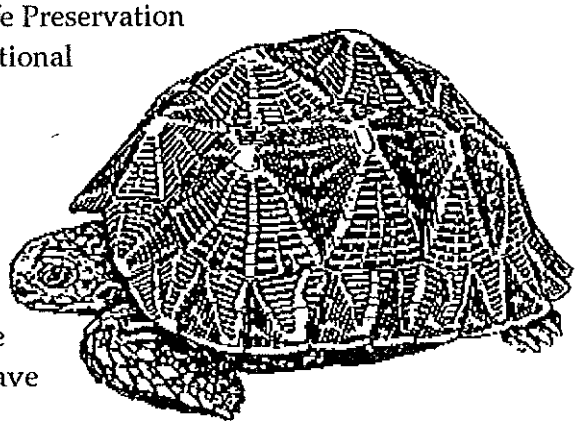
Kachuga tecta have also been reported in the pet markets of Lucknow, Kanpur, Dehra Dun, Vadodara and other north Indian cities particularly after the monsoon floods. *Melanochelys trijuga* and *Kachuga tecta* have created a local pet trade interest but are not being exploited in significant commercial levels.

Exploitation localities of star tortoise

The southern thorn scrub forest areas on the borders of Karnataka, Andhra Pradesh and Tamil Nadu, Mansaur district of Madhya Pradesh, coastal, dry, thorny, scrub forests in Andhra Pradesh and Orissa coast and the Saurashtra and Kutch regions are the localities from where star tortoises are exploited (Map 2). Since most of these areas are not given as much attention as forested land, exploitation becomes easier. Earlier surveys by Frazier (1987), the present survey and personal communications with P. Kannan in Madras and S.R. Sane in Bombay confirm this. There may be a much wider range of exploitation of star tortoises from Tamil Nadu, Andhra Pradesh and Rajasthan.

Major centres of trade

Bangalore, Madras, Bombay, Calcutta and Pune appear to be the major cities in India for the star tortoise trade. Based on large-scale confiscations from Calcutta and Bombay and the port city of Kandla in the Gulf of Kutch, it appears that there is an illegal export market too. The 1992 confiscation of a consignment in Amsterdam is speculated to have been originated from the Saurashtra and Kutch coast of Gujarat. Confiscation of star tortoises by the customs and the Western Region Wildlife Preservation officals from a Pakistan national supports such speculation.



Routes of the pet trade

Tortoises and turtles collected in Madras, Bangalore, and the east coast are believed to have

STAR SEIZURE

The star tortoise (Geochelone elegans Schoepff) is a much sought after species in the international pet trade and is highly prized. The species is fairly common in sandy tracts such as in coastal scrublands of Tamil Nadu and in Andhra Pradesh and Karnataka (Daniel, J.C. 1983). The western distributional limit of the tortoise is in West Pakistan (B.C. Chowdhury in litt.).

The tortoise is attractively coloured with a yellow central areola radiating yellow streaks onto each black shield of the shell. In India, large-scale collection of the star tortoise takes place in Southern India with 10-15000 individuals entering the trade annually. The tortoise is protected in India under the Wildlife Protection Act, 1972 (Schedule II) and is also on Appendix IV of the CITES.

On 24 August 1992, 200 star tortoises were seized in Amsterdam while they were in transit to the California Zoological Garden in the United States of America. The shipment, crammed into two wooden crates, originated from Dubai, U.A.E. A unit price of $65 was invoiced for the tortoises making the entire shipment worth $ 13000. It is interesting to note that the species is known to fetch (300-400$) per individual in the U.S.A. (Ginette Hemley in litt) which would make the shipment worth about $ 60000-80000. This could be a clear case of underinvoicing.

The transporter had declared the animals captive bred in Dubai although field enquiries by TRAFFIC-INDIA in Dubai failed to come up with any likely captive breeding facility. Experts were of the opinion that the tortoises were in fact of Indian or Sri Lankan origin which were smuggled into Dubai from the Western coast of India on board Arab 'dhows' or sail-boats. This is the normal smuggling route of many wildlife and non-wildlife commodities between the sub-continent and the Middle East.

Alert custom authorities in the Netherlands, reasoned out that the species could not have been bred in Dubai. The shipment was intercepted and confiscated by the Dutch General Inspection Service (which is the wildlife wing of the Dutch Customs) with the active co-operation of TRAFFIC- Europe's Investigations Officer. Attempts were made to try and 'repatriate' the animals back to India, but TRAFFIC-India after consultations with several experts felt that the possibilities of genetic dissimilarities were too great to take the risk of setting them loose in the field. The tortoises were later sent to the USA, where they were placed in zoological parks with breeding programmes under the watchful eyes of the Tortoise and Freshwater Turtle Specialist Group of the IUCN.

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a trade route as follows: (i) Bangalore-Calcutta-Singapore-Hongkong (ii) Bombay to the Middle East (iii) Saurashtra-Kutch-Kandla the Middle East. The Central India (Madhya Pradesh) and the Rajasthan collections may also be reaching Bombay for destinations outside India. (See Map 2).

Price range and exploitation level

At market prices ranging from Rs. 75-125 for an individual, the trade within India may be in the range of Rs. 500,000 annually with an estimated sale of upto 5000 individuals of Indian star tortoise.

At the quoted price of US $ 65 (Amsterdam confiscation) and reported price of upto US $ 300 in United States (John Behler *Pers Comm*) for individuals in the international trade, star tortoises may bring in the range of US $ 500,000 annually at present. From the confiscation and from discussions with animal dealers and professional trappers the quantity of star tortoises that enters into export and internal trade is estimated to be above 10,000 in number annually. The exploitation of star tortoises from their rapidly depleting habitats is a cause of worry. Several protected areas in the country could perhaps assure the survival of the species but only in an isolated fragmented fashion.

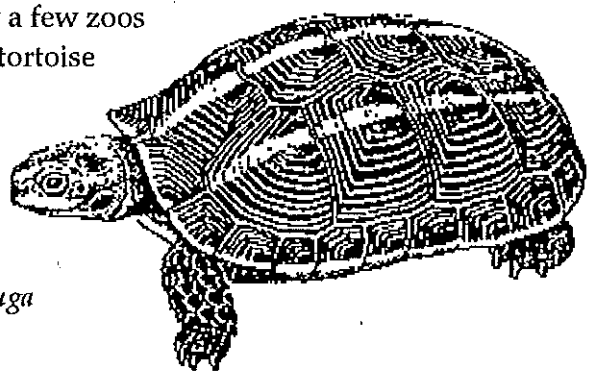
Other Uses Of Turtles In India

Though the levels of commercial and subsistence exploitation are being monitored to understand their impact on the tortoise and turtle fauna of India, the contribution of many other kinds of utilisation was also examined during this investigation. Exploitations of these have very little or no impact on the Indian turtles and tortoises at the present time. Three such uses examined were: in the Indian zoos, in Indian universities and other research institutions, and in religious rites and beliefs.

Turtles in Indian zoos

An inventory of the captive stock of turtles in Indian zoos was prepared based on a questionnaire survey and visit to many zoos. Proformas were sent to 120 Indian zoos/parks/captive breeding centres requesting information on turtle species in their collection especially, number and breeding status. Also, a request for information was published in **Zoos Print**, the newsletter of Zoo Outreach Organisation.

Information on the captive stock of turtles was obtained for 36 Indian zoos/captive breeding centres. Out of these, 27 zoos were personally visited by the authors. The authors particularly visited zoos where there was a doubt of proper identification of species. A total of 30 zoos possess one or more turtle species. The Indian flapshell turtle (*Lissemys punctata*) is exhibited in as many as 22 and starred tortoise (*Geochelone elegans*) in 20 zoos (Choudhury and Bhupathy 1992). In all,only 10 Indian zoos have successful breeding records (attempted and accidental) of one or more turtle species. A maximum of six zoos have breeding records for *Geochelone elegans*. Only a few zoos have rare and endangered tortoise and turtle species in their collection. They are, Madras Crocodile Bank (Travancore tortoise, *Indotestudo forstenii* and Painted roofed turtle, *Kachuga*



kachuga); Nandankanan Zoological Park (Elongated tortoise, *Indotestudo elongata*); Deori Gharial Breeding Centre, Morena (*Kachuga kachuga*); Kukrail Turtle Breeding Centre (*Kachuga kachuga* and the Peacock softshell turtle *A. hurum*); Vanvihar, Bhopal (*Kachuga kachuga*) and Miao zoo (Asian leaf turtle, *Cyclemys dentata*, Keeled box turtle, *Pyxidea mouhotii* and *A.hurum*). The River terrapin (*Batagur baska*) is exhibited at Sajanakhali River Turtle Breeding Centre (Sunderbans, West Bengal), Alipore Zoo, Calcutta and Madras Crocodile Bank. Summary of information gathered in the inventory is given below in abstract form:

Number of zoos contacted for turtle information	:	120
● Information received (feedbacks and personal visit)	:	36
● Number of zoos having one or more turtle species	:	30
● Number of turtle species in Indian zoo collections	:	10
● Species that is represented in maximum no.of zoos (*L.punctata*)	:	23
● Number of zoos breeding one or more turtle species	:	10
● Species breeding in maximum number of zoos (*G. elegans*)	:	6

Zoological parks in India are not the major exploiters of turtles and tortoises. The small number of zoo's that exhibit and a still smaller number of zoo's that breed any turtle and tortoise is a testimony to this (Table 13 and 14). However, confiscations of turtles both in India and abroad, that have been falsely declared as "captive bred" is something that needs attention. The species of Indian turtles that have bred in captivity so far in India are :

- Indian star tortoise *Geochelone elegans*
- Travancore tortoise *Indotestudo forstenii*
- Indian black turtle *Melanochelys trijuga*
- Indian roofed turtle *Kachuga tecta*
- Indian tent turtle *Kachuga tentoria*
- Indian flapshell turtle *Lissemys punctata*
- Indian softshell turtle *Aspideretes gangeticus*

The code of conduct and guidelines for zoological parks that is being enforced by the Central Zoo Authority of Government of India

will ensure that the zoos do not drain off endangered and rare tortoises and turtles from the wild.

Turtle exploitation for research

Reproductive biology and physiology, genetics, morphology, ageing, and blood chemistry are some of the subjects of research for which riverine turtles have been exploited in India by the universities. In recent years, turtles as indicators of aquatic pollution is also a major interest area of research. Ecological studies not involving exploitation is the new thrust of research on turtles now. A non-detrimental exploitation level, mostly after obtaining permission from wildlife authorities does, however, exist. A list of species used by 14 universities is given in Table 12. Since the present study did not specifically collect information from all colleges, universities and other institutions, the level of turtle utilisation in biological research may be somewhat higher.

Turtles in religious rites, folklore and culture

Religious use of turtles was recorded in coastal Andhra Pradesh, Orissa, Gujarat and the temple towns of Tamil Nadu and Uttar Pradesh (along Ganges river). In most cases turtles (any species available locally) were kept in sacred ponds and devotees are allowed to feed them. *A.gangeticus, A.leithii, Lissemys punctata, Kachuga tecta* and *Geochelone elegans*, were the preferred species.

The religious among the Muslim community in Gujarat (Bharuch) rescue drought-hit turtle populations and keep and feed them in large ponds.

Tribals in Bihar, Tamil Nadu and Kerala keep land tortoises (*Indotestudo elongata* and *Indotestudo forstenii*) in homes with vermillion marks to symbolise a venerated God.

RECOMMENDATIONS

Compared to the turtle trade situation in India documented by Moll in 1983, the present level of trade appears to be in low key. The West Bengal Forest Department has done a commendable job in curbing the illegal turtle trade in the Calcutta fish markets. However, the present investigation finds that the trade (a) is in the process of going underground, (b) is opening up new turtle trade routes — West Bengal to Bangladesh and Gujarat coast to the Middle East. The domestic commercial trade in turtles for food is mainly of the common and abundant species ie. the Indian flapshell turtle or *Lissemys punctata*. While the Indian Wildlife (Protection) Act, 1972 has several species in Schedule I that are very common and have wide distribution range, endemic species with small distribution ranges and small population find no mention in any of the schedules. Subsistence level of trade and utilisation of all turtles and tortoises is common in the north-east, eastern India and south India but the inclusion of turtles in schedules of Wildlife Protection Act is not known to such users, even to official agencies such as the Indian railways which is used for transporting turtles. The recommendations that emerge out of the present study may necessitate some policy changes, direct actions and a fair degree of coordination between several agencies to curb illegal trade and promote rational utilisation of turtles and tortoises in India.

I. Revision of Wildlife (Protection) Act and CITES Listing

Based on the current status, habitat conditions and utilisation patterns of various Indian Chelonians, a more realistic assignment of legal protection status to tortoises and turtles in both the Indian Wildlife (Protection) Act, 1972 and CITES is needed. Enforcement of the Indian Wildlife (Protection) Act, 1972 and CITES regulation cannot be overstressed. The suggested listing of Indian freshwater turtle and land tortoises in Indian Wildlife (Protection) Act, 1972 and CITES is appended (Table 15) with explanatory notes justifying the recommendation. It is recommended that the Ministry of Environment and Forests prepare CITES listing proposals in time for the 1994

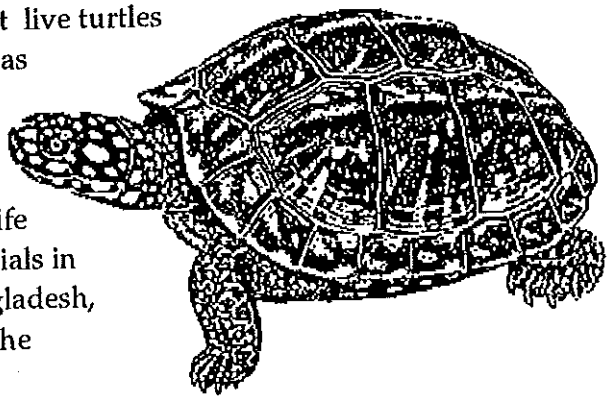
Conference of Parties. This report makes an attempt to help wildlife enforcement officers by providing a colour poster of Indian freshwater turtles and tortoises.

II. Alerting Indian railways and roadways

The freshwater turtle trade is dependent on the Indian railways and the road transport. The freshwater turtles are concealed along with frozen fish and/or live fish and booked through the Indian railways or by truckloads through road transport. The entire large scale confiscation of turtles in Calcutta had entered the market through either Howrah or Bandel railway stations or through other wholesellers and retailers receiving stock from road transporters. Railway stations along the Ganges river in Uttar Pradesh and Bihar and stations in Orissa and Andhra Pradesh book large quantities of fish for the Calcutta market. The environment ministry should alert the Indian railway authorities particularly the Northern, Eastern and South-Eastern railway authorities of this clandestine activity. The Railway Protection Force should also be alerted. The association of road transporters should be informed of the consequences of such illegal transport of turtles. The railways and roadways are to be made aware of the illegal nature of such cargo.

III. Alerting border check points and neighbouring countries

Agencies such as the Border Security Force (along India-Bangladesh and India - Pakistan borders) and the customs officials in the port cities of Jamnagar, Kandla, Bombay, Cochin, Madras and Calcutta should be alerted to examine live specimen cargoes and to check illegal consignments of turtles. It is suspected that live turtles and tortoises are declared as other 'permitted to be exported livestock' and exported out. Export-import authorities, wildlife officials and customs officials in ports and airports of Bangladesh, Pakistan, Sri Lanka, and the



WWF INDIA | TRAFFIC INDIA | WII

countries of the Middle-East need to be alerted about this clandestine trade.

IV. Seeking assistance from the judiciary

Illegal consignments or confiscations of turtles are viewed by the judiciary very casually. The judiciary needs to be made aware of the problems of turtles and the impact of the turtle trade on turtle populations. Legal procedures and delay in relocating confiscated livestock have caused mortalities in the past. The judiciary should be requested to deal with such cases speedily and release livestock for proper housing with the wildlife or zoo authorities.

V. Public awareness campaign

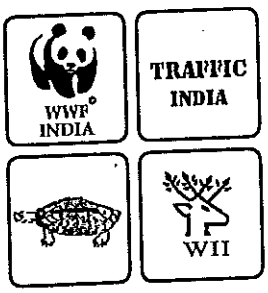
The trans-Gangetic and trans-Brahmaputra plain are the two important areas where large scale exploitation of river turtles takes place. Riverside people and fishermen are not aware of the banned species and the Wildlife Act. Simple and clear posters in local languages should be prepared and distributed among the fishermen, riverside people and in river ferrys to make them aware of turtle conservation. Particular attention should be given to this sector in the states of Uttar Pradesh, Madhya Pradesh, Bihar, West Bengal and Assam. The Ganga Project Directorate of the Ministry of Environment & Forests may be requested to coordinate this.

VI. Turtle trade database

State Wildlife Act enforcement officials, regional wildlife protection officials of Government of India, customs officials, Border Security Force and port and airport officials confiscate wildlife species and products that are in the illegal trade. Much of this information is stored in isolated locations. TRAFFIC-INDIA has initiated and is coordinating a database for all such information. All wildlife officials should cooperate in feeding information to this database which they will be able to use subsequently.

VII. Future directions of Trade research

Uttar Pradesh, Bihar, Madhya Pradesh and West Bengal in the Indo-Gangetic plans needs stringent control and monitoring of the commercial turtle trade. The impact of subsistence utilisation of turtles and tortoises in the north-eastern states and Western Ghats needs to be studied. The increasing pet trade of species from central and south India should also be monitored.



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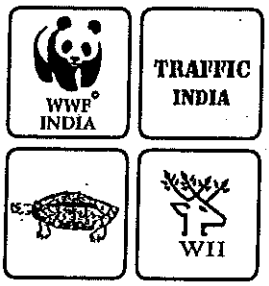

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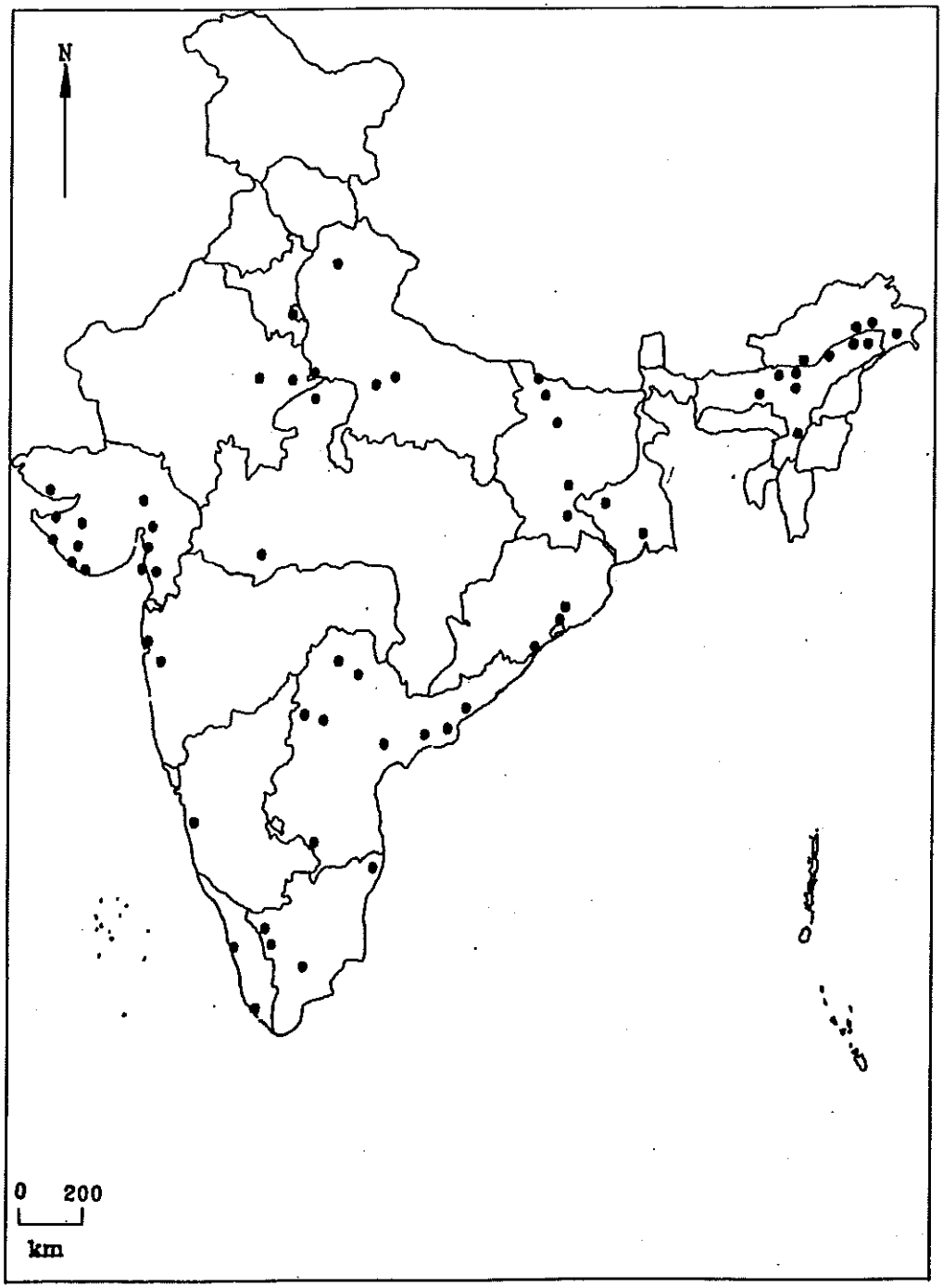
Map 1 MARKETS SURVEYED FOR TURTLE TRADE



Map 2 PET TRADE: SPECIES, DISTRIBUTION, EXPLOITATION LOCATIONS AND MARKET ROUTES

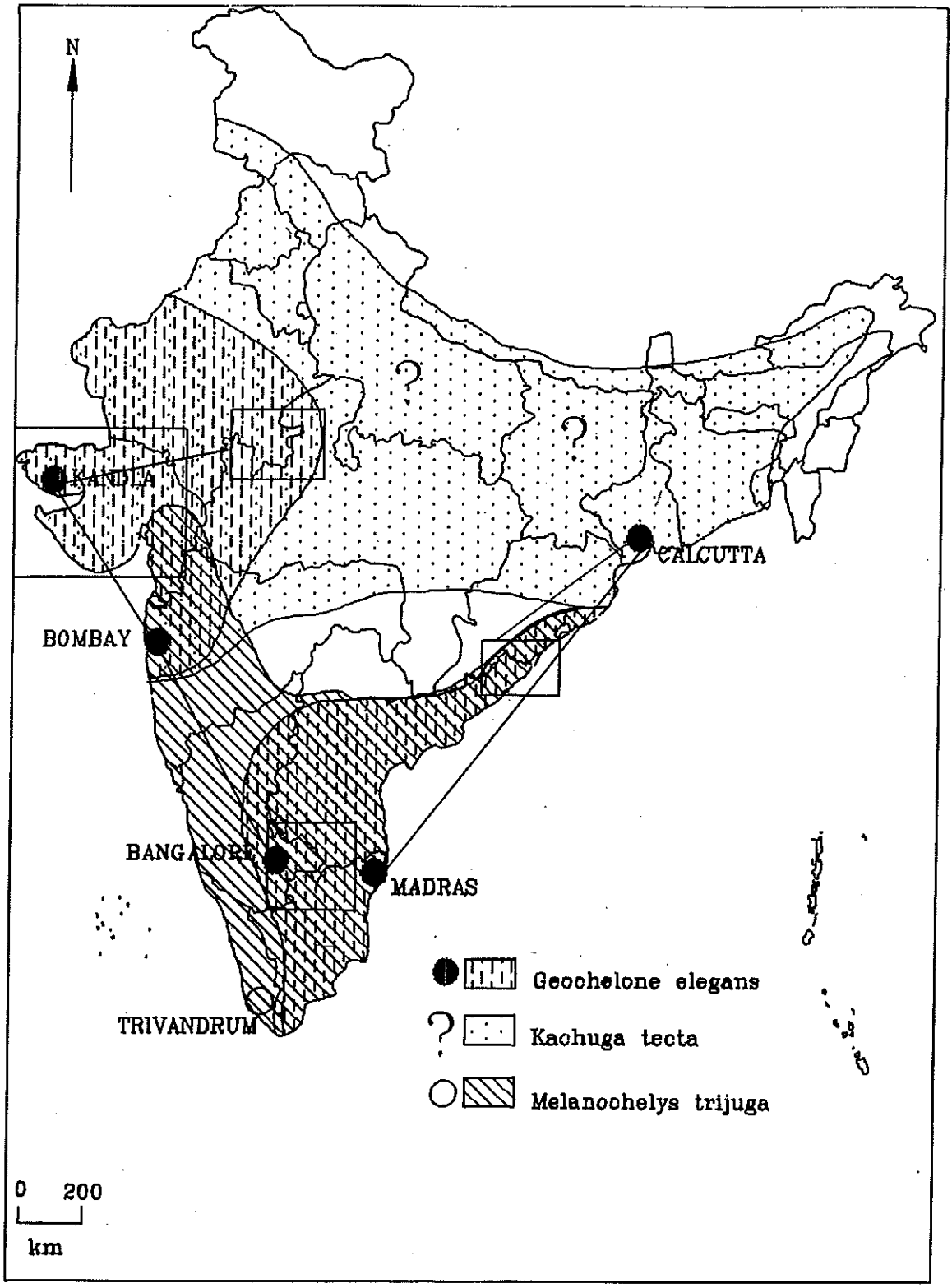


Table 1:INDIAN TURTLES : PRESENT (1993) CONSERVATION AND LEGAL STATUS

SPECIES	WPA	RDB	CITES
River Terrapin *Batagur baska*	I	E	I
Malayan Box Turtle *Cuora amboinensis*	-	-	-
Asian Leaf Turtle *Cyclemys dentata*	-	-	-
Spotted Pond Turtle *Geoclemys hamiltonii*	I	I	I
Cochin Forest Cane Turtle *Geoemyda silvatica*	I	V	-
Crowned River Turtle *Hardella thurjii*	-	-	-
Three-striped Roof Turtle *Kachuga dhongoka*	-	-	-
Red-crowned Roof Turtle *Kachuga kachuga*	I	-	-
Brown Roofed Turtle *Kachuga smithii*	-	-	-
Assam Roofed Turtle *Kachuga sylhetensis*	-	K	-
Indian Roofed Turtle *Kachuga tecta*	I	I	-
Indian Tent Turtle *Kachuga tentoria*	-	-	-
Tricarinate Hill Turtle *Melanochelys tricarinata*	I	I	I
Indian Pond Turtle *Melanochelys trijuga*	-	-	-
Indian Eyed Turtle *Morenia petersi*	-	-	-
Keeled Box Turtle *Pyxidea mouhotii*	-	-	-
Indian Starred Tortoise *Geochelone elegans*	IV	-	II
Elongated Tortoise *Indotestudo elongata*	IV	K	II

Travancore Tortoise *Indotestudo forstenii*	IV	R	II
Asian Brown Tortoise *Manouria emys*	IV	K	II
Indian Flapshell Turtle *Lissemys punctata*	I	-	I
Indian Softshell Turtle *Aspideretes gangeticus*	I	-	I
Indian Peacock Softshell Turtle, *A. hurum*	I	-	I
Leith's Softshell Turtle *A. leithii*	IV	-	-
Narrowheaded Softshell Turtle *Chitra indica*	IV	-	-
Asian Giant Softshell Turtle *Pelochelys bibronil*			

WPA - Indian Wildlife (Protection) Act, 1972

RDB - Red Data Book of IUCN Amphibia & Reptilia (updated 1988). Red Data Book. IUCN RDB Categories of Threat are as follows : E: Endangered; V: Vulnerable; R: Rare; I: Indeterminate; K: Insufficiently Known.

CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora.

TABLE 2 : UTILISATION PURPOSES OF INDIAN TURTLES & TORTOISES

	PURPOSE	UTILISATION LEVELS
1.	Food	Subsistence, Commercial
2.	Pet Trade	Commercial
3.	Indigenous medicine	Subsistence
4.	Biological Research	Sustainable
5.	Religious	Sustainable
6.	Conservation, (Zoos etc.)	Sustainable
7.	Other traditional uses	Sustainable

TABLE 3: INDIAN TURTLES & TORTOISE SPECIES IN EXPLOITATION SECTOR

SPECIES	COMMERCIAL	SUBSISTANCE
River Terrapin *Batagur baska*	-	?
Malayan Box Turtle *Cuora amboinensis*	-	F
Asian Leaf Turtle *Cyclemys dentata*	-	F
Spotted Pond Turtle *Geoclemys hamiltonii*	-	F
Cochin Forest Cane Turtle *Geoemyda silvatica*	-	FM
Crowned River Turtle *Hardella thurjii*	F	F
Three-striped Roof Turtle *Kachuga dhongoka*	F	F
Red-crowned Roof Turtle *Kachuga kachuga*	-	?
Brown Roofed Turtle *Kachuga smithii*	-	F
Assam Roofed Turtle *Kachuga sylhetensis*	-	F
Indian Roofed Turtle *Kachuga tecta*	-	F
Indian Tent Turtle *Kachuga tentoria*	-	F
Tricarinate Hill Turtle *Melanochelys tricarinata*	-	F
Indian Pond Turtle *Melanochelys trijuga*	PT,F	F
Indian Eyed Turtle *Morenia petersi*	-	?
Keeled Box Turtle *Pyxidea mouhotii*	-	F
Indian Starred Tortoise *Geochelone elegans*	PT	F
Elongated Tortoise *Indotestudo elongata*	-	FM
Travancore Tortoise *Indotestudo forstenii*	-	FM

Asian Brown Tortoise *Manouria emys*	-	F
Indian Flapshell Turtle *Lissemys punctata*	F	F
Indian Softshell Turtle *Aspideretes gangeticus*	F	F
Indian Peacock Softshell Turtle *A. hurum*	F	F
Leith's Softshell Turtle *A. leithii*	?	F
Narrowheaded Softshell Turtle *Chitra indica*	?	F
Asian Giant Softshell Turtle *Pelochelys bibroni*		

Note: F - Food, PT - Pet, M - Medicine ? - Not recorded

TABLE 4: INDIAN TORTOISES & FRESHWATER TURTLES IN SUBSISTENCE UTILISATION IN DIFFERENT STATES

SPECIES	SUBSISTENCE EXPLOITATION
River Terrapin *Batagur baska*	West Bengal ?
Malayan Box Turtle *Cuora amboinensis*	Arunachal Pradesh, Assam
Asian Leaf Turtle *Cyclemys dentata*	Arunachal Pradesh
Spotted Pond Turtle *Geoclemys hamiltonii*	Assam, Bihar, Uttar Pradesh
Cochin Forest Cane Turtle *Geoemyda silvatica*	Kerala
Crowned River Turtle *Hardella thurjii*	Uttar Pradesh, Bihar, Assam
Three-striped Roof Turtle *Kachuga dhongoka*	Uttar Pradesh, Bihar
Red-crowned Roof Turtle *Kachuga kachuga*	
Brown Roofed Turtle *Kachuga smithii*	Uttar Pradesh, Bihar, Assam
Assam Roofed Turtle *Kachuga sylhetensis*	Arunachal Pradesh, Assam
Indian Roofed Turtle *Kachuga tecta*	Bihar, Uttar Pradesh, Assam
Indian Tent Turtle *Kachuga tentoria*	Arunachal Pradesh, Assam, Bihar, Uttar Pradesh
Tricarinate Hill Turtle *Melanochelys tricarinata*	Assam, Bihar
Indian Pond Turtle *Melanochelys trijuga*	Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Gujarat, Uttar Pradesh
Indian Eyed Turtle *Morenia petersi*	
Keeled Box Turtle *Pyxidea mouhotii*	Arunachal Pradesh, Assam
Indian Starred Tortoise *Geochelone elegans*	Andhra Pradesh
Elongated Tortoise *Indotestudo elongata*	Bihar

Travancore Tortoise *Indotestudo forstenii*	Kerala, Tamil Nadu
Asian Brown Tortoise *Manouria emys*	Assam
Indian Flapshell Turtle *Lissemys punctata*	All India
Indian Softshell Turtle *Aspideretes gangeticus*	Uttar Pradesh, Bihar, Orissa, Assam
Indian Peacock Softshell Turtle *A. hurum*	Uttar Pradesh, Bihar, Assam, Arunachal Pradesh
Leith's Softshell Turtle *A. leithii*	Karnataka, Andhra Pradesh, Maharastra
Narrowheaded Softshell Turtle *Chitra indica*	Andhra Pradesh, Orissa, Bihar, Uttar Pradesh, Assam
Asian Giant Softshell Turtle *Pelochelys bibroni*	-

TABLE 5 :INDIAN TORTOISES & FRESHWATER TURTLES
IN COMMERCIAL UTILISATION IN DIFFERENT STATES

SPECIES	COMMERCIAL EXPLOITATION IN STATES
Crowned River Turtle *Hardella thurjii*	West Bengal
Three-striped Roof Turtle *Kachuga dhongoka*	Bihar
Indian Pond Turtle *Melanochelys trijuga*	Kerala
Indian Starred Tortoise *Geochelone elegans*	Andhra Pradesh, Karnataka Maharastra, Gujarat
Indian Flapshell Turtle *Lissemys punctata*	Kerala, Andhra Pradesh, Maharastra, Bihar, Uttar Pradesh Orissa, West Bengal
Indian Softshell Turtle *Aspideretes gangeticus*	West Bengal, Bihar, Assam, Uttar Pradesh, Orissa
Indian Peacock Softshell Turtle *A. hurum*	Assam
Leith's softshell turtle, *A. Leithii*	Andhra Pradesh

TABLE 6 :TOWN AND CITIES IN DIFFERENT STATES WHERE MARKET SURVEY WAS CARRIED OUT FOR TURTLE TRADE

	STATES	TOWNS & CITIES
1.	ANDHRA PRADESH	Secunderabad, Hyderabad*, Warangal, Karim Nagar*, Kakinada*, Vishakapatnam, Medak, Madanapally, Vijayawada.
2.	ARUNACHAL PRADESH	Pasighat, Roing, Miao, Itanagar
3.	ASSAM	Guwahati, Tinsukia, Dibrugarh*, Bokaghat*, Haflong, Bodolony, Sootea
4.	BIHAR	Begusarai*, Bettiah, Bokaro, Tatanagar, Valmiknagar.
5.	GUJARAT	Ahmedabad, Vadodara, Surat, Mandvi, Bhuj, Jamnagar, Verval.
6.	KARNATAKA	Kargal*, Bangalore*
7.	KERALA	Trivandrum*, Trissur*
8.	MADHYA PRADESH	Khandwa, Gwalior
9.	MAHARASHTRA	Bombay, Pune*
10.	ORISSA	Bhubaneswar, Cuttack, Berhampur
11.	RAJASTHAN	Jaipur, Bharatpur
12.	TAMIL NADU	Madras, Coimbatore, Madurai, Pollachi.
13.	UTTAR PRADESH	Agra, Dehra Dun, Lucknow, Kanpur.
14.	WEST BENGAL	Calcutta*, Durgapur

* Turtle trade recorded

TABLE 7 : RANGE OF MARKET - PRICE OF TURTLES IN INDIA

MARKET LOCATION	TURTLE SPECIES	PRICE/KG	REMARKS
Calcutta	LP, Ag, Ht	40- 50	Food market
Bokaghat, Assam	Ag	150-175	Food market
Dibrugargh	Ag, Ah	175-200	Food market
Begusarai	Lp	60	Food market
Hyderabad	Lp	20	Food market
Poona	Lp	15	Food market
Bangalore	Ge	75-125	Pet market
Kargal, Karnataka	Mt	15	Food market
Trissur, Kerala	Lp	30	Food market
Trivandrum	Mt	40	Pet market
Karimnagar	Lp	15	Food Market
Kakinada	Lp	15	Food Market

Note: Price in pet market is Rupees/turtle

Ag - *Aspideretes gangeticus*
Lp - *Lissemys punctata*
Mt - *Melanochelys trijuga*
Ah- *A. hurum*
Ht- *Hardella thurjii*
Ge- *Geochelone elegans*

TABLE 8 :COMPARISON OF SPECIES AND QUANTITY OF TURTLE RECORDED IN CALCUTTA MARKET IN 1993

MARKET	MONSOON SURVEY		WINTER SURVEY	
	Species	Quantity	Species	Quantity
*Bidhannagar	Ag, Ht	60, 10	-	-
*Ultadanga	Ag	25	-	-
*Dum Dum	Ag	25	Lp	10
New Barackpur	Ag	16	Lp	35
*Tolley gunj	Ag, Lp	4, 5	-	-
Utterpara	Lp	1	-	-
Madyamgram	-	-	Lp	10
Barasat	-	-	Lp	15
Sodepur	-	-	Lp	40

Note: Quantity in kilograms
* Markets inside the city limit

Lp - Lissemys punctata
Ht - Hardella thurjii
Ag - Aspideretes gangeticus

TABLE 9 : TURTLES CONFISCATED IN CALCUTTA BY WILDLIFE OFFICIALS IN 1991-93

TURTLE SPECIES	TURTLE CONFISCATION		
	1991	1992	1993 (upto March)
Lissemys punctata	4053	2735	1134
Aspideretes gangeticus	105	189	64
Hardella thurjii	1	–	–
Geochelone elegans	289	2	–
Total	4448	2926	1198

TABLE 10 : COMPARISON OF OCCURENCE OF TURTLE SPECIES IN TRADE IN INDIA DURING LAST 10 YEARS

SPECIES	MOLL (1983)	PRESENT STUDY (1993)
Crowned River Turtle *Hardella thurjii*	9	1
Three-striped Roof Turtle *Kachuga dhongoka*	7	-
Red-crowned Roof Turtle *Kachuga kachuga*	3	-
Indian Roofed Turtle *Kachuga tecta*	3	-
Indian Tent Turtle *Kachuga tentoria*	7	-
Indian Pond Turtle *Melanochelys trijuga*	-	2
Indian Starred Tortoise *Geochelone elegans*	*	1
Indian Flapshell Turtle *Lissemys punctata*	22	7
Indian Softshell Turtle *Aspideretes gangeticus*	17	3
Indian Peacock Softshell turtle, *A. hurum*	9	1
Leith's Softshell Turtle *A. leithii*	2	1
Narrowheaded softshell turtle *Chitra indica*	11	-
No. of Markets surveyed	**35**	61

* Species not included in the survey by Moll (1983)

TABLE 11: TURTLE SPECIES USED AS MEDICINE BY TRIBALS IN INDIA.

TURTLE SPECIES	TRIBAL COMMUNITY	PART	MEDICINE
Lissemys punctata	Ho tribe, Saranda, Bihar	Shell (burnt)	Skin diseases
	Konda reddy, Papikonda Hills, Andhra Pradesh	Blood	Stomach ailment
	Fishermen along Tapi and Mahi river Gujarat Shell (burnt)	Ground Shell with oil	Stomach disorder & diarrhoea
Aspideretes gangeticus	Butia tribe, Valmik TR, Bihar	Gall Bladder	Stomach ailment
Aspideretes hurum	Mishmi Tribe, Arunachal Pradesh	Shell	Skin diseases
A. leithii	Konda reddy, Papikonda Hills	Gall bladder	Stomach ailment
Melanochelys trijuga	Kanis, Kerala, Tamil Nadu	Shell	Cuts, burns and Skin diseases
Geoemyda silvatica	Kanis, Kerala	Shell	stomach ailment, skin diseases
Indotestudo forstenii	Kanis, Kadars, Kerala, Tamil Nadu	Shell blood	Skin diseases Stomach ailment, Piles
Indotestudo elongata	Ho tribe, Saranda, Bihar	Shell, Blood	Skin disease piles, stomach ailment

TABLE 12 : TURTLE SPECIES USED IN BIOLOGICAL RESEARCH BY INDIAN UNIVERSITIES.

NAME OF THE UNIVERSITY	TURTLE SPECIES USED
Jammu University, Jammu	*Lissemys punctata* *Aspideretes gangeticus* *Kachuga tecta*
Punjab University, Patiala	*Kachuga tecta,* *Kachuga smithii,* *Geoclemys hamiltonii*
Patna University, Patna	*Kachuga tecta*
Agra University, Agra	*Geochelone elegans*
Dayalbaug University, Agra	*Lissemys punctata*
Banaras Hindu University, Banaras	*Lissemys punctata*
Avadh University, Faizabad	*Lissemys punctata* *Kachuga smithii*
Utkal University, Bhubaneswar	*Kachuga tentoria*
Berampur University, Berampur	*Lissemys punctata,* *Aspideretes sp.*
Pune University, Pune	*Lissemys punctata,* *Kachuga tentoria*
Mangalore University, Mangalore	*Indotestudo forstenii,* *Melonochelys trijuga,* *Geoemyda silvatica*
M.S.Baroda University, Baroda	*Trionyx gangeticus,* *Lissemys punctata*
Madras University, Madras	*Melanochelys trijuga,* *Lissemys punctata*
Gwalior University, Gwalior	*Kachuga tentoria,* *Kachuga dhongoka,* *Chitra indica,* *Aspideretes gangeticus*

TABLE 13 :TURTLES AND TORTOISES EXHIBITED IN INDIAN ZOOS

NAME OF THE ZOO	NO.OF SPECIES		SP.BREEDING
	Present	Breeding	
Balbhavan, Rajkot	2	2	Ge, Lp
Jaipur Zoo	1	-	-
S.Gandhi National Park, Borivli	-	-	-
Sakkarbaug Zoo, Junagadh	2	1	Ge
Vanvihar National Park, Bhopal	7	-	-
Snake Park& Aviary, Pune	1	-	-
*Madras Crocodile Bank	11	3	Mt,If,Lp
Children Park, Bangalore	-	-	-
P.Naidu Zoological Park, Darjeeling	-	-	-
Mini Zoo, Port Blair	1	-	-
Sayaji Baug Zoo, Vadodara	6	4	Kt1,Ge,Lp,Ag
National Zoological Park, New Delhi	1	-	-
Nandankanan Park	7	-	-
Nagar haveli, Silvassa	-	-	-
* Chambal Sanctuary, Deori	6	6	Kd,Kk,Kt2, Lp,Ci,Ag
Zoological Garden, Alipur	3	-	-
I.Gandhi Zoological Park, Vizak	3	1	Ge
A.Anna Zoological Park, Madras	2	-	-
Madras Snake Park	4	1	Mt
Trivandrum Zoo	2	-	-
Banegatta National Park	2	-	-
Guwahati Zoo	1	-	-

Miao Zoo, Miao	3	-	-
*Kukrail Turtle Centre	10	-	-
Nagpur Zoo	2	-	-
Nehru Zoological Park, Hyderabad	5	2	Ge, Mt
Prince of Wales Zoo, Lucknow	3	-	-
Surat Zoo, Surat	4	-	-
Kanpur Zoo	1	-	-
GNFC Wildlife Park, Bharuch	2	-	-
Salt lake City	4	-	-
*Sajakhali Captive Breeding Centre	1	-	-
Itanagar Zoo	-	-	-
Roing Zoo	-	-	-
Sasan Crocodile Complex	1	1	Ge
Warangal,Mini Zoo	1	-	Lp
Saranath, Varanasi Turtle Breeding Centre	10	-	-

* Captive breeding centres

Ge - Geochelone elegans
Mt - Melanochelys trijuga
Ci - Chitra indica
Kt2 -Kachuga tentoria
Kk - Kachuga kachuga
Lp - Lissemys punctata
Ag - Aspideretes gangeticus
Kt1 -Kachuga tecta
Kd - Kachuga dhongoka
If - Indotestudo forsternii

Table :14 BREEDING RECORDS OF TURTLES AND TORTOISES IN INDIAN ZOOS AND CAPTIVE BREEDING CENTRES (CBC)

NAME OF THE TURTLE	NO. OF CBCs HAVING TURTLE	NO. OF CBC BREEDING
Indian flapshell turtle	22	4
Indian softshell turtle	12	1
Peacock softshell turtle	3	-
Leith's softshell turtle	2	-
Narrowheaded softshell turtle	1	1
River terrapin	3	-
Indian roof turtle	4	1
Indian tent turtle	7	2
Three striped roof turtle	4	-
Brown roof turtle	2	-
Redcrowned roof turtle	4	1
Crowned river turtle	2	-
Indian black turtle	7	3
Spotted black turtle	2	-
Asian leaf turtle	1	-
Keeled box turtle	1	-
Indian starred tortoise	20	6
Travancore tortoise	1	1
Elongated tortoise	1	-

TABLE 15 :INDIAN TURTLES : PROPOSED LEGAL STATUS WITH EXPLANATION

SPECIES	IWPA	IWPA PROPOSED	CITES	CITES PROPOSED
River Terrapin *Batagur baska*	I	I	I	I
Malayan Box turtle *Cuora amboinensis*	-	-	-	-
Asian Leaf turtle *Cyclemys dentata*	-	-	-	-
Spotted Pond turtle *Geoclemys hamiltonii*	I	IV (3,4)	I	-(8)
Cochin Forest Cane turtle *Geoemyda silvatica*	I	I (1,2)	-	-
Crowned River turtle *Hardella thurjii*	-	-	-	-
Three-striped Roof turtle *Kachuga dhongoka*	-	-	-	-
Red-crowned Roof turtle *Kachuga kachuga*	-	I (1,2)	-	-
Brown Roofed turtle *Kachuga smithii*	-	-	-	-
Assam Roofed turtle *Kachuga sylhetensis*	-	I(1,2,6)	-	-
Indian Roofed turtle *Kachuga tecta*	I	IV (3,7)	-	-
Indian Tent turtle *Kachuga tentoria*	-	-	-	-
Tricarinate Hill turtle *Melanochelys tricarinata*	I	-	I	-(8)
Indian Pond turtle *Melanochelys trijuga*	-	-	-	-

Indian Eyed turtle *Morenia petersi*	-	-	-	-
Keeled Box turtle *Pyxidea mouhotii*	-	-	-	-
Indian Starred tortoise *Geochelone elegans*	IV	IV (3)	II	II (7)
Elongated tortoise *Indotestudo elongata*	IV	I (1,2)	II	II (7)
Travancore tortoise *Indotestudo forstenii*	IV	I (1,2)	II	II (7)
Asian Brown tortoise *Manouria emys*	IV	I(1,2 6)	II	II (7)
Indian Flapshell turtle *Lissemys punctata*	I	IV (5)	I	-(8)
Indian Softshell turtle *Aspideretes gangeticus*	I	IV (7)	I	-(8)
Indian Peacock Softshell turtle, *A. hurum*	I	IV (7)	I	-(8)
Leith's Softshell turtle *A. leithii*	IV	IV (7)	-	-
Narrowheaded Softshell turtle, *Chitra indica*	IV	I(1,7,6)	-	-
Asian Giant Softshell turtle *Pelochelys bibroni*	I	I (1,2*)	-	-

1. Serious decline in population numbers or small population numbers indicated
2. Limited range with threats to habitats
3. Survey indicates moderate to large populations
4. More extensive range than previously known
5. Heavy trade in this species needs monitoring
6. Insufficient data available on species
7. Low to medium trade exists
8. International trade not reported in recent years