


**CONSERVATION IN ACTION**

# Amelioration of the Freshwater Turtle Breeding and Rehabilitation Station in Varanasi, India

Animesh Talukdar, Debaprasad Sengupta, Gowri Mallapur, Syed Ainul Hussain, Pradeep Kumar Malik, and Parag Nigam

Wildlife Institute of India, Dehradun-248001, Uttarakhand, India (nigamp@wii.gov.in)

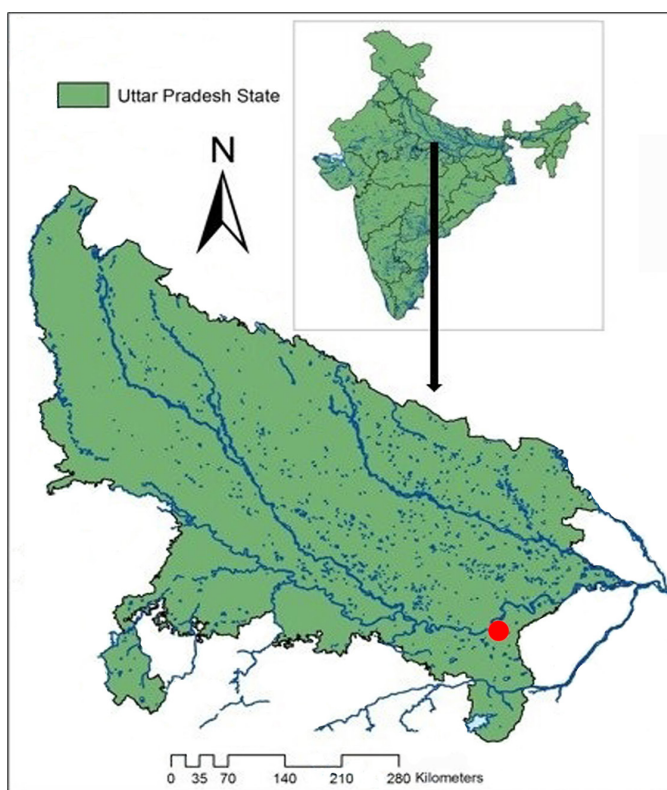
Photographs courtesy of the WII-NMCG Component- IV Team.

The River Ganga, which flows through the entire northern plains of India, is considered one of the most sacred Indian rivers, but it is not bereft of its share of threats and conservation concerns. A Turtle Sanctuary was declared at Varanasi, Uttar Pradesh in 1989 as part of the Ganga Action Plan, followed closely by the establishment of the Turtle Breeding Facility at Sarnath, Varanasi. The hope was to curb the rate at which the population of the Ganges Soft-shelled Turtle (*Nilssonina gangetica*) was declining and to provide head-starting facilities for turtles intended for release into the river. One prime objective of the Ganga Action Plan was for these large carnivorous turtles to serve as a biological control for pollution along the riverbanks caused by partially cremated bodies deposited in the river at Varanasi.

The Turtle Breeding and Rehabilitation Centre, Sarnath, is situated on the outskirts of Varanasi (Fig. 1). Given currently prevailing threats to fresh water turtle numbers and the sizable number of displaced animals and confiscations, chelonian recovery stations like the Kachua Punarvaas Kendra (Turtle Breeding and Rehabilitation Centre) play a vital role in conservation management programs.

The Turtle Breeding and Rehabilitation Centre covers 3.75 ha and houses various species of turtles. Before the onset of the project, the Sarnath facility had two functional enclosures (E-1 and E-2; Fig. 2) and a non-functional enclosure (E-3). In 2017, with the collaboration of the Wildlife Institute of India, the center was brought under the aegis of the Biodiversity Conservation and Ganga Rejuvenation (BCGR) Project to be managed by Component IV-Rescue and Rehabilitation.

Initially, the facility housed multiple turtle species of different age classes in the same enclosures, which resulted in injuries because of infighting. All animals were fed an exclusively vegetable diet without regard to age class or whether they were naturally carnivorous, omnivorous, or herbivorous. The limited number of basking spots led to compromises in thermoregulation and unrestricted public entry created stress for reclusive species unable to find hiding spots. The center



**Fig. 1.** Map showing the location of the Turtle Breeding and Rehabilitation Centre, Sarnath, Varanasi, Uttar Pradesh, India.

also lacked facilities to monitor hatchlings. The water was changed almost daily, with waste water (approx. 5 million liters every day) dumped in an open area. The ponds within the enclosures were devoid of natural elements and arrangements for seasonal temperature fluctuation were limited, compromising the thermoregulatory behavior of the turtles. Sanitation and hygiene for the enclosures as well as ponds were not considered before the onset of the project.

Subsequently, the team of Component-IV (Rescue and Rehabilitation) of the BCGR Project has been working on structural and functional upgrades. The existing enclosures





**Fig. 2.** Functional enclosures E-1 (left) and E-2 (right) at the onset of the project.



**Fig. 3.** Enclosures covered with green shade to minimize interaction with humans.



**Fig. 4.** A new juvenile enclosure to allow close monitoring for one month after hatching.

accommodate age-class requirements. These include a juvenile enclosure (Fig. 4) that holds hatchlings for a month to allow careful monitoring. A part of the previously non-functional E-3 was renovated and extended to accommodate large turtles weighing 20–50 kg (Fig. 5). Landscaping inside the enclosures includes logs for basking, aquatic macrophytes for cover and food, water circulation units, hides, shades, and haul-out mats to improve aesthetics, provide the animals with better opportunities to exhibit natural behaviors, and reduce the stress of captivity (Figs. 6 & 7). Live fishes have also been incorporated for the carnivorous and omnivorous species for



**Fig. 5.** Part of the previously non-functional enclosure E-3 after renovation. This enclosure houses large turtles weighing 20–50 kg.



**Fig. 6.** Landscaping in the renovated enclosure E-1.

have been enriched with species-specific upgrades. In accordance with the ecology of the species, new furnishings and upgraded bio-filtration and aeration systems have been incorporated. Diets have been adjusted to match the feeding habits of each species. The enclosures are covered on all four sides with green shade drapes (Fig. 3) to minimize interaction with humans, whereas the top remains exposed to natural sunlight for basking. Additional enclosures have been added to





**Fig. 7.** Critically Endangered Three-striped Roof Turtles (*Batagur dhongoka*) using the haul-out mats (left) and logs for basking (right).



**Fig. 8.** During the winter, water heaters (left) are installed for temperature management and plastic sheeting (right) provides insulation.



**Fig. 9.** Thatched shades and small trees in the enclosures provide shelter during the heat of summer.

the same purpose. For sanitation and hygiene of the enclosure, 20% of the total water volume is changed every three days, ponds are scrubbed clean once a month, and the premises are cleaned regularly.

Maintaining optimal water temperatures in captivity is challenging. Temperatures drop to as low as 4–10 °C during winters and rise to as high as 40–48 °C during summers. During winters (November to mid-February), enclosures are insulated with thick plastic sheets and water is heated to maintain ambient temperatures around 29–30 °C (Fig. 8). During summers, thatched shades and shrubs (Fig. 9) limit direct sunlight but still provide sufficient basking sites and roofs of enclosures are covered partially with thatch to prevent over-heating of water.

With prior permission from the Uttar Pradesh Forest Department, turtles in the center are released when declared





**Fig. 10.** Improvements to enclosures (here renovated enclosure E-2) provide simulated habitats that increase chances of survival when turtles are released into natural environments.

fit to survive in their natural habitat (Fig. 10), which helps to sustain viable populations in the wild. Because freshwater turtles are important components of aquatic habitats, the Rescue and Rehabilitation Centre at Sarnath plays a vital role in ecological sustainability (Fig. 11).

#### Acknowledgements

We thank the National Mission for Clean Ganga for providing funding to execute this work and to the Uttar Pradesh



**Fig. 11.** Critically Endangered Three-striped Roof Turtles (*Batagur dhongoka*) slated for release at the Turtle Breeding and Rehabilitation Centre, Sarnath, Varanasi, Uttar Pradesh, India.

Forest Department for their support and for granting permission to carry out the project. We also extend our gratitude to Dr. V.B. Mathur, Director; Dr. G.S. Rawat, Dean, FWS; Dr. Bitapi Sinha, Research Coordinator; and Dr. Ruchi Badola, Scientist-G of the Wildlife Institute of India, for their extensive support. We also thank our field assistants, Brijesh Maurya, Ishu Verma, Pyarelal, Pintu Yadav, and Jyoti Singh, for their hard work and support for the refurbishment of the centers.