

## Final Evaluation Report

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| Your Details               |   |
|----------------------------|---|
| <b>Full Name</b>           | Subhashree Sahoo  |
| <b>Project Title</b>       | Developing molecular forensic database of Indian star tortoise to combat illegal trade and aid in conservation management |
| <b>Application ID</b>      | 33621-1   |
| <b>Date of this Report</b> | 30 <sup>th</sup> January, 2023  |

**1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.**

| Objective  | Not<br>achieved | Partially<br>achieved | Fully<br>achieved | Comments  |
|--|-----------------|-----------------------|-------------------|---|
| To gain insight into the population genetic structure of wild populations of Indian Star Tortoises (ISTs) with novel data from previously unsampled geographic locations with extensive range coverage |                 |                       |                   | We have comprehensively sampled all major known population sites of the IST, across seven Indian states (11 protected areas and eight zoos).              |
| To identify the most likely area of provenance of zoo and confiscated ISTs   |                 |                       |                   | We used the samples collected from various zoos to match with our generated database and are able to differentiate among local and non-local individuals. |
| To conduct outreach and awareness programme for law enforcement agencies and local community, to sensitize against illegal pet trade   |                 |                       |                   | We conducted awareness and training programmes for forest staff, zoo staff and enforcement officials across the field sites.                              |

**2. Describe the three most important outcomes of your project.**

- a) We generated the most comprehensive molecular database of wild IST identifying two distinct major populations in northern and southern India. The southern India population is further genetically divided into distinct sub populations. The elucidated genetic subdivisions have important management implications for release and rehabilitation of seized individuals.
- b) The generated database is successfully able to identify population specific genetic signatures and distinguish between local and non-local individuals in zoos, tracking source of seized individuals. This shall aid enforcement and forest departments to track origin of confiscated individuals to combat poaching of the most traded tortoise in the world.
- c) With our networking across stakeholders (local community, forest staff, zookeepers and scientific officers), we have created both alacrity against wildlife trade and a fertile ground for efficient use of our genetic intelligence across institutions.

**3. Explain any unforeseen difficulties that arose during the project and how these were tackled.**

Due to the COVID-19 pandemic, field stay, accommodation and travel expenses exceeded the previous estimates. Thankfully, the institute stepped in to provide the chemicals whose earmarked amount was then diverted towards compensating for the additional expense.

Due to the literature review being outdated and unverified, many field sites yielded no sightings due to absence (Nauradehi in Madhya Pradesh) or rarity of species (Gandhisagar in Madhya Pradesh), or unclear seasonal information (Bandipur in Madhya Pradesh). This also led to doubling of work as other sites (based on local information such as Chittorgarh Wildlife Sanctuary in Rajasthan) were later surveyed to capture the landscape's genetic information.

This not only increased our expenses but also led us to exceed our time limits. Thankfully, the Rufford Foundation was flexible enough to accommodate the changes as well as extend our duration of both field and final report.

**4. Describe the involvement of local communities and how they have benefitted from the project.**

In all the field sites, we took help from local community as field assistants and forest staff (from local community) as trackers and informers to identify potential sites and survey. We tapped into the traditional knowledge of various tribal groups (Meenas in Rajasthan, Maldharis in Gujarat, Senchus in Andhra Pradesh and Soligas in Karnataka). We also learnt about the species' biology from many experienced zookeepers.

In all the sites, we informed our aides and targets audience through awareness programmes about the scale of poaching, trade and its potential catastrophic impact on the species. We discussed the ecological as well as cultural significance of the species in their lives.

We trained the local communities and staff in identifying the sex and age of the tortoises and learnt about their different diets. Apart from the officially organised awareness programmes, every walk and survey in the field or zoo was a two-way learning and unlearning session.

Involving the local community as field assistants, we not only apprised them of the global predicament of a local species but also learnt their view on illegal poaching and conservation, understanding motives and attitude towards illegal poaching. Our daily wages (INR 500 /5 GBP), though nominal considering their years of skill and experience, was a significant help for our field staff and assistants during the pandemic induced economic fragility. Being a part of a larger national effort, they made felt acknowledged in their skills and experience, and appreciated. Through this project, we have kindled on ground interest in the species which will lead to better alertness, monitoring of movements and attention to a species otherwise found in their backyard and rarely paid serious attention.

## **5. Are there any plans to continue this work?**

The aim of this study was to create the basic foundational resource, which can be continuously used and updated by respective state forest departments and enforcement agencies. The Wildlife Institute of India plans to continue adding to the database reference samples to be submitted by states as well as matching seizure individuals intercepted by forest departments and enforcement agencies.

## **6. How do you plan to share the results of your work with others?**

- I. We will submit final reports to respective state forest departments and zoos from where samples have been collected. This shall inform them of the contemporary status of ISTs in their areas, guiding management interventions.
- II. As part of the lead researcher's PhD, research papers will be published in reputed peer reviewed journals to reach a larger scientific and academic audience.
- III. Also, as per PhD requirements, the findings will be shared with scientists, nature enthusiasts etc at an international conference (Students Conference on Conservation Science, Cambridge, United Kingdom, 2023).
- IV. Based on our results, we will submit a recommendation for revision of status and updation of habitat sites to the IUCN.
- V. We will relay our findings in media such as national newspapers and science magazines to reach a wider audience.

## **7. Looking ahead, what do you feel are the important next steps?**

Recently, the IST has been upgraded to Appendix I of the CITES and Schedule I of the Indian Wildlife Protection Act. This brings into sharp focus the species and time is right to institutionalise a tracking mechanism to curb the menace of its poaching and trade.

The state and national agencies should create a seamless coordinated network starting from population monitoring and management (in wild habitats and zoos), to locating poaching hotspots, intercepting seizures, to responsible rehabilitation based on our database. This shall not only effectively use the genetic resource but also augment its robustness and help in reviving vulnerable wild populations.

## **8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?**

Yes. The Rufford Foundation logo was used in all the posters and pamphlets distributed during the field study and awareness programmes, to forest department staff, department offices, zoo staff (also distributed to visiting school children) and

officers from enforcement agencies. Moreover, all the presentations, standee and banners used had the Rufford Foundation logo.

**9. Provide a full list of all the members of your team and their role in the project.**

**Subhashree Sahoo:** Subhashree was the lead researcher, and the study is part of her PhD research. She planned, coordinated and led field surveys and awareness programmes in field sites and zoos. She also conducted the data analysis and inferred results post laboratory work as well as finalised reports and scientific papers.

**Kumudani Bala Gautam:** Kumudani helped cover large field sites such as Kutch in Gujarat, NSTR in Andhra Pradesh etc to cover maximum area effectively. Kumudani also conducted several awareness programmes with enforcement agencies such as Customs departments and helped in processing of genetic samples.

**Bhim Singh:** Bhim took care of the experimental laboratory work standardizing sample lysis steps to extract quality DNA from hard keratin scute samples. His foundational standardisation paved smooth way for Subhashree and Kumudani to easily process all the samples effectively.

**10. Any other comments?**

The project spanned several states with varied climatic and distinct local regimes, spread across two distant and disjunct regions of India. With limited foundational information on field sites and species biology, Rufford Small Grant was the perfect support in terms of their flexibility and understanding of field limitations. We have been very lucky and are thankful that such a project of scale could be implemented for the Indian Star Tortoise to aid its conservation. As PhD students and amidst the pandemic, we could not have aspired for a better ally.