

Final Evaluation Report

Your Details	
Full Name	Anuj Shinde
Project Title	Shieldtail Mapping Project: Assessing the Conservation Status of Lesser-Known Shieldtail Snakes through Citizen Science & Community Engagement
Application ID	41170-1
Date of this Report	17.05.2025

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

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Conducting a threat assessment of Indian shieldtail snakes				We managed to quantitatively assess threats for 12 shieldtail species. The lack of sufficient data prevented us from assessing more species.
Gathering distribution and natural history data through community engagement.				Our outreach and education approach allowed us to gather data for shieldtails that are commonly found. We have yet to gather sufficient data for the rare and renege-restricted species, for which, directed sampling efforts may be needed.
Understanding plantation workers' perception towards shieldtail snakes.				We conducted a Knowledge-Attitude-Practice study in the state of Kerala, interviewing 311 plantation workers. Although we are yet to analyse those data, we expect to gain valuable insights into people's perception towards shieldtails, from the state that hosts the highest shieldtail diversity.
Training local naturalists in documenting shieldtail occurrences and				We conducted a three-day workshop, "Shieldtail Mapping Bootcamp", training 15 naturalists with field methods in

natural history information.				documenting and surveying for shieldtails.
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2. Describe the three most important outcomes of your project.

a) A comprehensive evidence-based threat assessment of twelve shieldtail species with accompanying IUCN Red List category recommendations. This assessment framework can be applied to evaluate additional shieldtail species once sufficient data becomes available. We have submitted a manuscript detailing this work and its findings to a conservation journal.

b) A state-wide knowledge-attitude-practice (KAP) survey examining plantation workers' awareness of shieldtail snakes across Kerala. The survey was conducted in three strategic locations representing the northern, central, and southern regions of Kerala, with responses from over 311 participants. We are currently analysing the collected data and plan to publish our findings in a peer-reviewed journal.

c) We conducted the inaugural 'Shieldtail Mapping Bootcamp', a three-day workshop held in the Western Ghats of Karnataka. This intensive training program equipped 15 naturalists with skills to identify shieldtail species (see **Table 1**), document observations systematically, and conduct effective shieldtail awareness initiatives in their communities.

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

- 1) In the previous years, our social media outreach campaigns had shown a massive increase in shieldtail uploads from the baseline, but we didn't see a further uptick during the project year. During the project year, we conducted targeted outreach sessions across multiple locations, focusing on generating enthusiasm for shieldtail snakes and promoting citizen science participation. The impact of these efforts on our citizen science platforms during the 2024 monsoon season (May to September) remains unclear, as shieldtails are typically encountered opportunistically.
- 2) When we visited plantations for our pilot work, we quickly realised that getting plantation workers together to talk about shieldtail snakes - whether on weekdays or weekends - just wasn't going to work well. Most plantations didn't have what we needed: a decent venue, reliable electricity, or proper equipment for presentations (projectors, mics, speakers, etc.). Getting permission also turned out to be trickier than we expected. So we shifted gears - we ran our mass outreach programs at colleges where facilities were available (see a complete list in **Table 2**), and for plantation workers, we opted for structured KAP surveys and one-on-one awareness during their breaks instead.
- 3) While developing our evidence-based framework for regional species threat assessment, we encountered significant methodological challenges. Initially, we struggled to present empirical evidence demonstrating the relationship between specific geographic threat variables and their effects on shieldtail populations or individuals. Limited data points prevented us from employing species distribution models to estimate shieldtail geographic range boundaries, and we were unable to determine how multiple threat variables

interact to affect these species collectively. We have addressed these methodological limitations in our manuscript. Due to these constraints, we could not confidently utilise all available shieldtail data or include all recognised species in our threat assessments. Consequently, our analysis was limited to 12 shieldtail species for which we had sufficient high-quality data to produce reliable threat assessments.

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

Our perception surveys in Kerala relied heavily on community engagement and collaborative partnerships. As I lacked proficiency in local languages (primarily Malayalam and Tamil), direct communication with plantation workers presented a significant challenge. To overcome this barrier, we collaborated with MARC (Malabar Awareness and Rescue Centre for Wildlife), a Kannur-based NGO with extensive regional expertise. MARC's founder, Mr. Roshnath Ramesh, and team member, Mr. Thahir M facilitated access to various tea, coffee, and cardamom plantations through their established networks and provided invaluable guidance in conceptualising and designing our KAP survey methodology. We were also helped by Mr. Arjun CP with the study design.

Throughout our field visits, we involved a local member from the plantation community in our research team. They were trained to communicate effectively with respondents, conduct questionnaire interviews, and guide us through the plantation. Our interactions extended beyond data collection to include educational components on regionally relevant venomous snake species, snakebite prevention protocols, and emergency response procedures for snakebite incidents.

These community engagements yielded unexpected scientific insights into shieldtail ecology and behaviour. One particularly knowledgeable plantation worker, whose regular duties involved extensive digging activities, shared detailed observations of shieldtail behaviour with remarkable enthusiasm. His firsthand accounts revealed that shieldtails actively hunt termites in addition to their well-documented earthworm diet. While scientific literature has previously noted insects in shieldtail diets, this worker's specific observations of shieldtails actively pursuing termites contribute valuable evidence to our understanding of their feeding ecology.

5. Are there any plans to continue this work?

Our perception study data currently awaits cleaning and comprehensive analysis. We anticipate valuable insights regarding plantation workers' perceptions of shieldtails and their ability to accurately distinguish these snakes from other similar species in their work environments. Until this analysis is complete, we have not developed plans to expand this research component. We continue to prioritise the citizen science aspect of our project through consistent social media engagement, encouraging observers to document and upload their shieldtail sightings. This ongoing data collection will enhance our ability to map shieldtail distributions more accurately and conduct robust threat assessments for additional species in the future. We are committed to organising more workshops modeled after our successful 'Shieldtail Mapping Bootcamp' across various shieldtail habitats. This intensive workshop format provided unique opportunities for meaningful interaction with our shieldtail ambassadors,

fostering genuine concern for shieldtail conservation. Such depth of engagement and impact would not be achievable through conventional awareness approaches like brief presentations or online articles.

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

We have presented our findings and threat assessment framework at 14 distinct locations throughout the Western Ghats, reaching diverse audiences including college students, interdisciplinary conference participants, conservation practitioners, and forest department personnel. Additionally, we have disseminated project information and results through various visual media, including posters, banners, and strategic social media content designed to stimulate public engagement with our research.

We have now submitted a manuscript detailing our threat assessments of 12 shieldtail species, which also introduces our novel quantitative threat assessment framework.

Furthermore, we have established formal agreements with our trained shieldtail ambassadors to incorporate educational components on shieldtail diversity and conservation into their existing conservation awareness programs, extending the reach and impact of our work through these established networks.

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

We have identified multiple pathways to advance this project. Our primary focus is developing a deeper understanding of India's citizen scientist community. This will enable us to refine our shieldtail outreach strategies and potentially increase shieldtail observation submissions to our platforms. This initiative will require enhanced engagement with citizen scientists and the implementation of additional workshops modeled after our successful Shieldtail Mapping Bootcamp.

A parallel priority is addressing the significant gaps in our shieldtail databases. We currently lack sufficient observational data from key geographic regions and have inadequate information on several rare and endemic shieldtail species. Systematically filling these knowledge gaps and publishing evidence-based threat assessments for the remaining species represents both a crucial next step and a long-term objective of this conservation initiative.

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?

We have prominently featured the Rufford Foundation's logo across our comprehensive suite of educational materials, including conference posters, multilingual plantation posters (in English, Kannada, and Malayalam), social media content, Shieldtail Mapping Bootcamp banners, and field identification scale cards.

Additionally, we have incorporated the Rufford Foundation's logo in all presentations delivered across 14 different venues throughout the past year. We will continue to acknowledge the Rufford Foundation's support in our forthcoming paper publication and all future activities associated with this project.

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

Currently, our team consists of two members, including me.

Vivek Cyriac: He is an evolutionary ecologist and a Marie Skłodowska-Curie postdoctoral researcher at the Natural History Museum in London. He is an expert in shieldtail biology with a decade-long research experience. His extensive Western Ghats fieldwork has established networks with naturalists, communities, and plantation managers. He is a core team member, involved in all aspects of the project.

10. Any other comments?

I would like to thank the Rufford Foundation for their support and for a short project extension. I would also like to thank Prof. Kartik Shanker for discussions, which greatly improved the project and the Indian Institute of Science (IISc), Bengaluru, for their institutional support.

Table 1: List of people trained to be Shieldtail Ambassadors. A majority of these people attended out Shieldtail Mapping Bootcamp in October 2024.

	Name of the Participant	Affiliation
1	Aditi Rao	Nature Classrooms Programme
2	Anuvrinda Sharma	Pondicherry University, Pondicherry
3	Aritra Bhattacharya	Pondicherry University, Pondicherry
4	K P Dhananjay Kumar	College of Forestry, Sirsi, Karnataka
5	Mahesh Bilaskar	Savitribai Phule Pune University, Pune, Maharashtra
6	Melito Pinto	Independent Naturalist
7	Mrunali Raut	Ashoka University, Sonipat, Haryana
8	Naman Hegde	Independent Naturalist
9	Nandita Madhu	Nature Conservation Foundation, Mysuru, Karnataka
10	Rajashree Sain	Pondicherry University, Pondicherry
11	Sachin Kamble	Independent Naturalist
12	Sagar Naik	Goa University, Panaji, Goa
13	Sahas Mehta	SP College, Pune, Maharashtra
14	Samar Ahmad	Dakshin Foundation, Bengaluru, Karnataka
15	Sanskriti Salutgi	Rajasthan University of Veterinary & Animal Sciences, Jaipur
16	Shubham Rane	Goa University, Panaji, Goa
17	Thahir M	Independent Naturalist

Table 2: List of locations where we conducted mass outreach, largely in the form of 1-hour presentations, poster displays, or information booths.

	Venue	month year	Outreach type
1	Aghanashini Nature Foundation (online)	Jan 2024	Talk
2	Open Day IISc in Bengaluru	Feb 2024	Booth
3	Chowgule College, Margao in Goa	March 2024	Talk
4	Department of Zoology, Goa University, in Panjim, Goa.	March 2024	Talk
5	Nasrapur Forest Range Office, in collaboration with MCBT, Chennai in Pune, Maharashtra.	March 2024	Talk
6	Sirsi College of Forestry in Sirsi, Karnataka.	May 2024	Talk
7	Department of Zoology at Kannur University's Mananthavady campus in Wayanad, Kerala.	June 2024	Talk
8	The Tropical BioSummit Conference, organised by the Centre for Tropical Biodiversity Conservation (CTBC) in Calicut, Kerala.	June 2024	Talk
9	Indian Wildlife Ecology Conference (IWEC24) at the National Centre for Biological Sciences (NCBS) campus in Bengaluru, Karnataka.	June 2024	Talk
10	Department of Ecology and Environmental Sciences, Pondicherry University in Pondicherry.	October 2024	Talk
11	Department of Zoology, Ferguson College in Pune, Maharashtra.	October 2024	Talk
12	Student Conference for Conservation Science, Bangalore (SCCS BnG) in Bengaluru, Karnataka.	October 2024	Poster
13	College of Forestry, Vellanikkara in Thrissur, Kerala.	December 2024	Talk
14	Aghanashini Nature Foundation (online) second talk	January 2025	Talk