Final Project Evaluation Report

Your Details	
Full Name	Suranjan Karunarathna
Project Title	Here be dragons": Conserving Sri Lanka's unique and endemic agamid lizards outside the protected area network
Application ID	23951-1
Reporting period	May 2018 – October 2020
Grant Amount	£5000
Email Address	Suranjan.karu@gmail.com
Date of this Report	October 2021

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
Identify critical agamid habitats in conservation gaps				It is gratifying to note that in our research we have identified a number of very suitable habitats for lizards. The number of these suitable habitats is approximately 28 (12 in southwestern lowlands and foothills, four in Rakwana Range, nine in Central Highlands and three in Knuckles Range). All these habitats provide habitat for endemic and endangered lizards in Sri Lanka (e.g., *Ceratophora* sp.). But it turned out that there were many more areas in the wet zone to explore. We are trying to continue this research.
Develop ecological information				We have a lot of important environmental and climatic data during this research (e.g., canopy cover and humidity condition). We found many species of trees that lizards use to live and forage outside protected areas (e.g., *Dipterocarpus* sp.). Many lizards appeared to be trying to inhabit the forest border. It is certain that the data can be used to measure the quality of the wet zone and its diversity.
Assess conservation status of agamids				Distributed data is very helpful in measuring and determine their conservation status and population size. We investigated the conservation status of lizards in Sri Lanka in December 2019 and assisted in compiling the Red Data Report. We build some ideas on whether there is a population suitable for a unitary land area. We have been assed conservation status during IUCN RedList assessment in Sri Lanka.
Documenting threats and providing				They already appear to be endangered in the wet zone due to

conservation recommendations				habitat reduction. Our data showed that human settlements in the wet zone were growing rapidly and that forests seemed to be shrinking further. Public awareness can greatly contribute to lizard protection and conservation. Our environmental knowledge (especially lizards) was transmitted in a way that the general public could understand, with the help of a multimedia presentation.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

The RSG funds were delivered in March 2018 and these funds started to be used in May 2018 and ended in October 2020 due to various issues. However, it was too late to issue the permit from time to time and it was renewed year after year. I had to wait for months to apply for the necessary permits to launch the research. It took 3 months to get some permits. The licence was not found on the expected days. Somehow, we were able to get the licence for 3 years. From the outbreak of the COVID pandemic in early 2020 to the present, research has been troubled with travel restrictions.

The main factor in launching the research in the wet zone was the continuous rains throughout the year. In some forests we had to walk quite a long distance to put transects, and some are mountains, and some are very steep areas. But we managed to get the data on a monthly basis. Some lizards spend the day on treetops while others are on the ground, so a very wide range had to be observed.

Education awareness programmes were planned to be conducted in order to disseminate the knowledge on agamids among the schooling community and other local stakeholders. In these educational activities, it was difficult to send messages for conservation when preaching to different age groups together and different languages. Therefore, each age group was addressed separately with different languages. Due to the COVID situation, our lectures and workshops were disrupted to some extent.

3. Briefly describe the three most important outcomes of your project.

a. We found that these agamids have a very good relationship with the forest and its canopy cover with good quality habitat requirement (less disturbed) is very high (especially with *Dipterocarpus* tree sp.). Many endemic animals of Sri Lanka live from the forest boundary into the forest and non-endemic animals live outside the forests. Due to food competition, they are found in different ranges and at different heights from ground level. Several species have not been seen using the same habitat at the same time. It aims to understand the value of natural forests and the importance of conserving forest habits.

b. We conducted lectures at local schools, for universities (University of Wayamba), for general public via zoom and for national park rangers (Peak Wilderness) to educate on the agamid species of the country. Many participants had never heard of agamid diversity, endemism and their role in the ecosystem. Almost all peoples were extremely interested in learning more about them and we have very good connection with them and work closer for agamid conservation. We also uncovered a number of racketeers selling them abroad. It is very valuable for us to be able to acquire their knowledge by interacting with the public. At the same time, it is important to provide them with information about our research and environmental conservation.

c. We were lucky to describe a new agamid lizard of the genus *Ceratophora* after 20 years from range restricted area in Sri Lankas' lowland wet zone. Also, we found new and interesting information of rostral-horn evolution among them. Assessing their conservation status based on our distribution data and population data in compiling the Sri Lanka Red List of IUCN (as co-editor).

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

The involvement of local communities was through discussions and sharing their understanding and knowledge on agamids with the research team at the lectures conducted which actuated the need for further awareness programs. Their attention was brought towards realising the importance of conservation of agamids which enhanced their knowledge on the agamid species and ecological balance. We also uncovered a number of racketeers selling them abroad. They sought out the root causes of problems with lizard conservation. We did not pay for the community, but we gave them more quality environmental knowledge. When foreign tourists come to Sri Lanka, the people living in the forests can try to do reptile tourism and earn some income.

5. Are there any plans to continue this work?

Yes. We do plan on continuing this work in the future. We are now starting to understand the diversity of wet zone agamid species. Agamids are a group of medium-sized reptiles in the wet zone and are an ideal model for monitoring the health of the habitats. Now that we have the basic data for these lizards across the wetland, take action to answer specific questions that can get our attention. There are a number of species with endemic features, and they were only discovered during our work. The next step is to assess the further conservation status of these species by monitoring their population. It's important to gather as much data as we can on these agamids for not only the scientific community, but also for the conservation of these species in Sri Lanka.

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

Our results will be shared through online publications, newspaper and magazine articles, posters, leaflets, and once we have collected more data we will submit a paper to a number of peer-reviewed journals (one article is now complete), and

already presented an abstract in national symposium. We will also continue having lectures for the general public and the conservation community here in Sri Lanka. Most importantly, we hope to engage more actively with the policy makers in providing inputs based on our work that can be translated into more effective policy (e.g., Red List). In addition, a new species has been published in an international journal to reach out to the scientific community. Describing undiscovered diversity is an essential first step to conservation.

7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

The RSG was used from 2018 May to 2020 October for fieldwork. While we had proposed to finish fieldwork in the first 24 months of the project (2018 May to 2020 April), so we needed an extra 5 months to complete the project by 2020 October. But I am sure that, despite these delays, this project is going to produce very positive results, useful to promote the conservation of agamids associated with less disturbed forests in Sri Lanka. This was a very ambitious project which needed the involvement of multiple researchers and widespread sampling. In spite of this, we have sampled across the wet zone in a large number of locations as per our plan in the proposal.

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
GIS data: aerial and satellite maps needed to develop land-use land cover maps to determine landscape-scale predictors and to assess landscape scale threats; £ 100 per image, 7 images needed	700	717	+17	Aerial maps prices were slightly higher than we budgeted for
Anemometer to measure wind speed at each sampling location	80	92	+12	Anemometer price was slightly higher than we budgeted for
Canopy densitometer to measure canopy cover at sampling locations	130	135	+5	Densitometer price was slightly higher than we budgeted for
Batteries 8 AAA packs needed, £ 10 each; 8 AA packs needed, £ 05 each; batteries are for digital equipment/gear	120	128	+8	Batteries prices were slightly higher than we budgeted for

Shipping costs: Shipping costs for ordering equipment and sending the field gear to Sri Lanka via USPS flat rate option: £ 50 per box * 2 boxes	100	118	+18	Shipping costs slightly higher than we budgeted before
Lodging during fieldwork: Lodging in hotels & guest houses closer to the sampling locations during surveys: 200 on-location or near-location lodging for both years: approximately £ 6 per day	1200	1310	+110	Lodging budget slightly higher than we budgeted for
Diesel fuel costs for the rental vehicle during the survey period: fuel mileage 15 km per 1l; 1l costs £ 0.67; total distance to travel for both years 15,000 km	670	695	+25	We occupy additional fuel mileage for fieldwork slightly higher than we budgeted for
A rental vehicle to travel to 60 sampling locations: We need to drive through rugged terrains while carrying field gear, so that we require an all-wheel drive cab rented for 100 days per year (200 days for the entire project), £ 10 per day	2000	2080	+80	Car rental is slightly higher than we budgeted earlier
Total	**5000***	**5275**	**+275**	The additional cost (£ 275) was provided by a member of the research team. *(budget submitted to RSGF)

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

Now that we have baseline data on the agamid species that are found in the wet zone and their distributions, the next most important thing would be to monitor species with small distributions or are point endemics in pet trade. Due to the informal development being carried out by the government at present, even small but valuable forests are being lost. Apart from that, there is an urgent need to educate the relevant department staff and policymakers about the huge diversity that exists in the small forest in wet zone. Most people we have come across have no idea what agamids are and are surprised that such endemic colourful reptiles are found in forest and forest margins. Therefore, we plan on conducting more education and awareness programs for the general public.

10. 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?

The RF logo was used in all the presentations and talks that we made. The RF logo wills also using as a poster for the identification of lizards that will be published by the end of December 2021. The Rufford Foundation received publicity during the course of our work in future.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Dr. Thilina Surasinghe (Collaborator) – he helped numerous ways to analyse field data, and GIS based models with policy making and scientific writing.

Dr. Ruchira Somaweera (Collaborator) – his extensive knowledge and dissemination of ecology leads us to where our research should go. He also assists in policy planning and scientific writing

Mr. Madhava Botejue (Collaborator) – he was very helpful to us in organizing workshops, lectures, developing presentations, and to find important references.

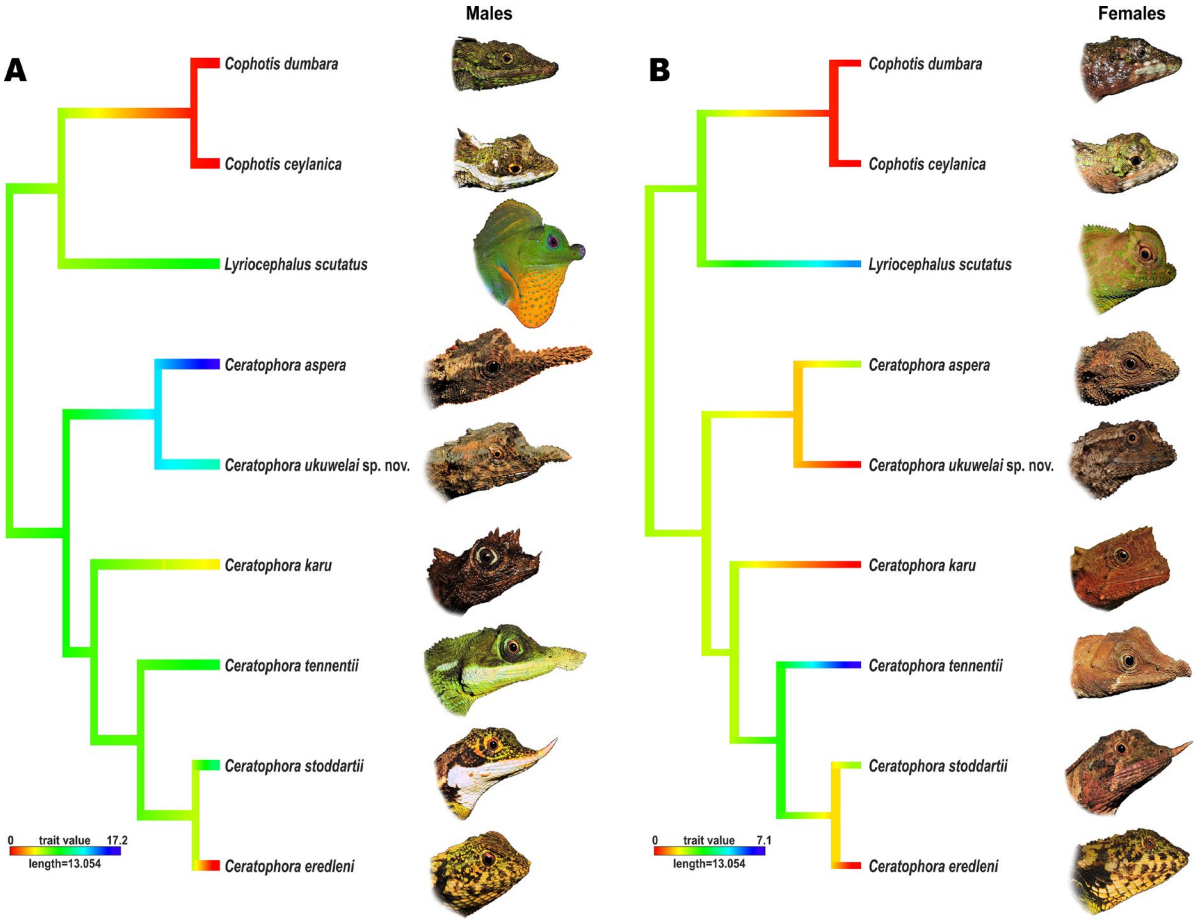
Mr. Dinesh Gabadage (Collaborator) – he contributed to his knowledge of lizards and his active research in the field, also data entering

12. Any other comments?

We are extremely grateful to RF for the support and patience that they have shown towards us during this project. We hope that without your support we will not be able to launch this valuable research project, which will pave the way for the conservation of endangered species as well as endangered habitats in Sri Lanka. We look forward to receiving funding from the RF in the future to continue this research.

An opportunity for us to conduct workshops and lectures on lizard conservation in Ritigala, Sri Lanka

A new species of lizard we discovered (*Ceratophora ukuwelai*) from Salgala, wet zone of Sri Lanka



Relative rostral appendage (RAL/SVL) evolution among members of the Sri Lankan agamids (genera *Ceratophora*, *Lyriocephalus*, and *Cophotis*); Colours of branches correspond to average RAL/SVL values in males (A) and females (B); thumbnails show profiles of the respective lizard species (not to scale).