Final Evaluation Report

Your Details	
Full Name	Arpitha Jayanth
Project Title	Impacts of logging on plant-frugivore communities and seed dispersal on an oceanic island
Application ID	36315-1
Date of this Report	11th May 2024

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
1. Determining the distribution of bird communities (including several endemic and threatened species) and fruit availability across forest types and disturbance			■	Completed by repeatedly sampling 27 transects, in evergreen and deciduous forest types with varying logging histories, spread across the island. We detected 54 forest bird species (9,921 detections) over 134.5 km of sampling effort and measured various habitat characteristics and signatures of disturbance. A scientific manuscript detailing our findings has been submitted to the Forest Department and to a peer-reviewed international journal, while the preprint and associated data has been made publicly available. Details given below under Section 6. Fruit availability was also assessed (40 km of sampling effort) and will be analysed with the data from Objective 2 (below).
2. Assessing plant-frugivore interactions (leading to seed dispersal) across sites			■	We conducted focal watches (6 hours each) on 94 fruiting trees, systematically documenting interactions between 26 species of fruiting trees and 25 species of frugivorous birds. Additionally, we recorded opportunistic frugivory interactions. We will soon analyse this dataset and submit our findings and data to the Forest Department and scientific journals, like Objective 1. We recognised the importance

				of maintaining both evergreen and deciduous forest types within the island, based on our dataset from 2022. Accordingly, we expanded the scope of our field study in 2023 to examine seed dispersal across co-occurring forest types. We are currently analysing this dataset, with results so far suggesting that seed dispersal limitation plays a role in maintaining distinct forest types in the island.
3. Generating baseline information on densities of endemic and threatened birds and woody plants on the island				From the transect data, we have started to generate species-wise densities of forest birds, including several endemic and threatened species. The final density estimates will soon be shared publicly and with the Forest Department. We also sampled woody plant communities using vegetation plots. Since we prioritised the seed dispersal limitation aspect of the study (mentioned under Objective 2), we could not complete the desirable number of plot replicates owing to time and logistical constraints. However, this continues to be an important objective of the project and is included in our long-term plans.

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

a) Our detailed assessment of forest bird communities clearly highlights the conservation value of hitherto overlooked deciduous forests within South Andaman Island. We find that deciduous forests support greater taxonomic diversity of forest birds compared to evergreen forests and are especially important for the occurrence of at least 39% of birds, including several endemic and threatened species. The inclusion of deciduous forests (most of which

currently subject to logging and extraction) within protected area networks, alongside evergreen forests, may be critical for sustaining endemic bird diversity on large islands like South Andaman. A detailed report of our findings, including this recommendation, has been submitted to the Andaman and Nicobar Forest Department, and to an international scientific journal for peer-review.

b) Our systematic bird monitoring over 2 years has provided useful insights on the densities and species-specific responses of forest birds to different habitat variables – indicative of forest structure, disturbance/extraction (such as logging), and forest type. These findings are particularly useful to evaluate the preferred habitat, status and potential risks to many endemic and threatened bird species on the island and provide a baseline for future monitoring and assessments.

c) Our seed dispersal limitation assays in field have shed light on ecological mechanisms that help maintain co-occurring, yet distinct, mosaics of evergreen and deciduous habitats within South Andaman Island. Maintaining diverse habitat types within large islands like South Andaman are key to sustaining its endemic biodiversity, and our results show that seed dispersal limitation plays an important role in this.

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

The Covid-19 pandemic and its subsequent waves (in 2021 and early 2022) disrupted the initial timelines of the project. It also constrained our travel to the islands and communication with the Forest Department regarding our research permits.

In 2022, we faced significant delays in receiving our research permits and later, the necessary permit extensions as well. Due to this, and the fact that the islands experience intense monsoon showers from May-December, our field time was reduced to 2.5 months. We adapted field protocols to maximise data collection during this period and had to extend our fieldwork late into 2023 to compensate. We used the monsoon period of 2022 to process the initial data collected, generate a report on preliminary bird densities for the Forest Department and plan for the next field season.

By late 2022 and in 2023, we were able to make significant progress and achieve all our objectives (including one new objective) by constantly adapting protocols to make efficient use of the field time available to us.

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

We employed and supported two field assistants from the local community in the Andaman Islands. Over the course of this project, they both have been trained in the identification of birds (by call and by sight) and several important tree species and their seeds, in the use of equipment such as rangefinders, binoculars and basics of GPS, and in systematic data collection using different field protocols. They have been sensitised on the importance and uniqueness of the endemic biodiversity around them. We hope that this training and experience motivates them and enhances their chances of securing more permanent jobs, like with the Forest Department or as nature guides, and continue monitoring and working for island ecosystems. Additionally, this project has facilitated the master's dissertation and training of a student and resident of the Andaman Islands.

5. Are there any plans to continue this work?

Yes. Our study underscores the importance of maintaining diverse habitat types within an island to sustain endemic islandic biodiversity and highlights the value of hitherto less protected deciduous forests. We plan to continue work to understand the ecological drivers and factors that influence/disrupt the co-occurrence of different intra-island habitat types, within such small spatial scales. Importantly, we plan to disseminate our findings with key stakeholders in the islands – particularly the Forest Department and local communities. We wish to continue our vegetation plot surveys, thereby providing a reliable baseline template to monitor endemic species of birds and plants on the island in the future.

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

(a) We have shared two technical reports with the Andaman and Nicobar Forest Department, detailing our findings on the densities of various forest birds, and highlighting the significance of protecting the undervalued deciduous forests within the island. These reports include insights for several endemic and threatened species of birds on the island. The Forest Department is a critical stakeholder in the islands, and we will continue communicating all our research findings with them.

(b) We have submitted a scientific manuscript based on Objective 1 to an international journal for peer-review and subsequent publication. Meanwhile, the manuscript is publicly available as a preprint on bioRxiv.

(c) The data collected as part of this study is publicly available on Zenodo and the bird checklists from our transect walks have been uploaded to eBird. Similarly, other datasets collected will be uploaded to public repositories after data analysis is complete.

(d) We have presented the findings of this study as a scientific poster during the 59th Annual Meeting of the Association for Tropical Biology and Conservation (ATBC) in July 2023, and as presentations in two annual meetings of Nature Conservation

Foundation. This year, an abstract based on this work has been selected for presentation in two conferences – one national and one international.

(e) Once our submitted manuscript is accepted for publication, we plan to widely communicate our findings (and subsequent others) through press releases.

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

The next immediate step is to complete the data analysis and writing up of reports and scientific articles for the density estimates of bird species and the frugivory interactions part of the project. Using the data collected, we will examine the role of various frugivorous birds towards seed dispersal and maintenance of forest tree diversity in the islands and assess the impact of anthropogenic disturbances on this vital ecosystem process. This would be followed by communicating the findings with the Forest Department and local communities.

We also feel it would be important to continue rigorous long-term monitoring of bird and woody plant communities in the Andaman Islands to identify priority areas/species for conservation and better inform policy and management decisions on the island.

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 prominently displayed at the end of all presentations that arose from this project, including a scientific poster presented at an international conference in July 2023. The Rufford Foundation has been duly credited in all manuscripts, reports and uploaded datasets produced by this project.

We will continue to credit The Rufford Foundation in all subsequent outputs generated as part of this study.

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

Arpitha Jayanth – Project lead. Co-developed research ideas, led field data collection, curation and analysis, and co-wrote scientific outputs and publications.

Rohit Naniwadekar – Project co-lead and supervisor. Co-developed research ideas, provided critical inputs at all stages of the project, and co-wrote scientific outputs and publications.

Navendu Page – Project collaborator and key resource person, especially for plant and seed identification. Led the vegetation plot surveys on field. Provided critical inputs for many stages of the project.

Sartaj Ghuman – Project collaborator, artist, and key resource person. Created several artworks that were used to disseminate information about seed dispersal and Narcondam Island endemics to various stakeholders in the Andamans. Played a pivotal role in the vegetation plot surveys.

Aditya Gadkari – Research assistant with the project. Played a key role in fruit availability and vegetation data collection, plant and seed identification, data curation, and project execution on field.

Michael (Vela Kujur) – Employed as a field assistant and played a crucial role in data collection and the execution of all field activities of the project. Resident of South Andaman Island.

Sujith Bengra – Employed as a field assistant and played a vital role in data collection and execution of many project activities in field. Resident of South Andaman Island.

Zankhna Patel – Research assistant with the project. Played a key role in data collection and data curation.

Mohammed Mubeen – Research assistant with the project. Played a key role in data collection, data curation and field set up.

Karthikayan M – Master's student with the project. Played a key role in data collection and field set up. Resident of Andaman Islands.

Vignesh Chandran – Research assistant with the project. Played a key role in data collection and curation.

Smita Prabhakar and Vinay Hegde – Accounts and grant administration

10. Any other comments?

We are grateful to The Rufford Foundation for funding our work and accommodating changes to our project timelines. We are also thankful for additional funding received from Science and Engineering Research Board (Govt. of India), The Rauf Ali Fellowship, Arvind Datar and Rohini Nilekani Philanthropies. We thank the Andaman and Nicobar Forest Department for the necessary research permits and supporting our work in field.