Final Evaluation Report

Your Details	
Full Name	Jennifer Appoo
Project Title	Assessing the Influence of Sooty Tern Nutrient Subsidies in the Functioning of Coastal Ecosystems to Inform Commercial Egg Harvesting Practices in Seychelles
Application ID	36780-1
Date of this Report	16-08-2023

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
Assess the quality and quantity of nutrients delivered by breeding seabirds on Farquhar Atoll (Seychelles).			■	This objective was achieved through Activity 1 (fieldwork) and Activity 2 (sample processing in laboratory). During the fieldwork, we successfully collected samples of seabird guano and estimated the number of breeding birds. Activity 1 was conducted in collaboration with our project partner, Island Conservation Society (ICS). We estimated the amount of macro-nutrients, nitrogen (N) and phosphorus (P), in guano of the three seabird species forming large rookeries on Farquhar, comprising of red-footed booby, brown noddy and sooty terns. We also quantified the amount of micro-nutrients in guano comprising of iron, copper, zinc and manganese. Our planned camera trap deployments did not work in the field, so we kept the seabird estimates to breeding population size only. Seabird population size for 2022 was estimated at 232,462 breeding pairs for sooty terns and 17, 800 breeding pairs for brown noddies. Results indicate sooty terns deliver the highest quantities of nutrients to Farquhar atoll.
Assess the ecological impacts of seabird-derived nutrients on coastal ecosystems.			■	This objective was achieved through Activity 1 (fieldwork) and Activity 2 (sample processing in laboratory). During fieldwork we sampled soil, coastal plants and seagrass at three islands of Farquhar during the wet and dry season, giving a total of 112 samples. We successfully analysed all samples and obtained nutrient levels for each island. Results indicate higher levels of nutrients in soil plants and seagrass on the island with breeding sooty terns.
Raise awareness on the role of seabirds in		■		This objective was achieved through Activity 3. We raised awareness on the

tropical island ecosystems.				project in several ways. Five Facebook posts were shared to the wider public by project partner ICS on the fieldwork activities as well as the negative effects of harvesting on sooty tern populations. The preliminary results of the project were presented at the 12th scientific symposium Western Indian Ocean Marine Science Association (WIOMSA), which took place between 10th – 14th October 2022 in South Africa. I presented my results during a special session focussing on seabird-derived nutrients on island ecosystems in the Western Indian Ocean. The research results are currently being written up and will make up one chapter of my PhD thesis.

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

a). Determined the quantity of nutrients delivered by breeding seabirds. Our project shows that without sooty terns, a considerable amount of vital nutrients will be lost to coastal ecosystems and this information is needed to advise on the need to impose limits on sooty tern egg harvesting. Together with the assessment of nutrients for the other seabirds (red-footed boobies and brown noddies), this shows the necessity to reduce other anthropogenic threats impacting their populations such invasive species on island rookeries.

b). Examined the impacts of seabird nutrient inputs on the functioning of coastal ecosystems. This shows the ecological importance of seabirds for their island rookeries. For sooty terns, this provides a baseline of nutrient dynamics on an unharvested rookery which can be used for future comparisons, e.g., to assess the impacts of harvesting in exploited rookeries.

c). Assisted in a regional discussion on monitoring seabird impacts on island ecosystem. The special session during the WIOMSA symposium has given momentum to regional scientists and managers to conduct research on the role of seabirds on threatened ecosystems in other locations in the western Indian Ocean region.

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

Some fieldwork methods failed, e.g., camera trap deployments to census seabird diurnal movements. We therefore could not deduce the number of non-breeding (roosting) seabirds and kept our estimates of nutrient quantity to breeding populations only.

Results of analyses from the laboratory were delayed, therefore, the paper is still being written up. Once completed it will be made available through a manuscript and shared to the authorities and wider public.

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

Three environmental officers from ICS on Farquhar were trained and assisted with the fieldwork. They are now able to share their knowledge and pass on their skills to others.

5. Are there any plans to continue this work?

Yes. I have expanded my research on the role of seabirds to a second location in Seychelles, Aldabra Atoll. It focusses on mangrove-nesting seabirds and aims to investigate seabird nutrients and its impact on mangroves, another highly threatened tropical coastal ecosystems.

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

Once the results are published, a synopsis will be disseminated to the government, island authorities and stakeholders in charge of regulating the sooty tern egg harvesting. A newspaper article will also be drafted to disseminate the research results to a wider public.

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

The next steps are to expand the research to other seabird rookeries in Seychelles.

This includes the harvested sooty tern rookeries to compare with the results from Farquhar. This will enable to assess directly the impacts of harvesting on seabird-derived nutrient cycling.

In addition, Seychelles comprise of islands which have been restored through the removal of invasive mammal predators. On these islands, seabird populations have rebounded. It would be interesting to compare islands which have been restored against islands which have not been restored to examine how seabirds influence the recovery of island ecosystem functions and provide further evidence for seabird conservation actions.

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 logo was used during the presentation during the 12th WIOMSA scientific symposium which took place in October 2022 in South Africa. The Rufford Foundation was also acknowledged during this presentation.

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

Sébastien Jaquemet - thesis supervisor. Assisted with logistics related to fieldwork and laboratory activities. Assisted with the analysis and write-up of results.

Nancy Bunbury - thesis co-supervisor: Assisted with the analysis and write-up of results.

Jake Letori – ICS conservation officer: Assisted with the fieldwork activities.

Aurelie Hector - ICS conservation officer: Assisted with the fieldwork activities.

10. Any other comments?