Final Evaluation Report

Your Details	
Full Name	Jelaine Gan
Project Title	Seed Dispersal and Movement of a Philippine Frugivorous Bird in a Fragmented Forest Landscape
Application ID	35849-1
Date of this Report	29 April 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
Tag a total of 10 Spotted Imperial-pigeons		X		Got two out of the 10 targets; we had to move sites due to security issues and difficulty in catching canopy birds
Create individual-based models (IBM) to understand how bird-mediated seed dispersal will be affected by habitat fragmentation		X		Insufficient data for the IBM; instead, we present an overview of our understanding of bird-mediated seed dispersal, particularly on movement patterns and bird-fruit linkages.
Reforestation workshop with community and stakeholders			X	

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

We had to stop our fieldwork in Baggao, Cagayan and change sites due to security issues. There was an armed conflict between the military and an insurgency group near our fieldwork site, and we had to postpone our activities indefinitely until the area has been 'cleared'. After a month of waiting for news, we decided to move to San Mariano, Isabela rather than be delayed further. This took time as we needed to obtain permits and local contacts once again. We moved to San Mariano where we found a site with large flocks of spotted imperial pigeons, and this became our primary site for trapping and tracking them. We have identified multiple fruiting trees they forage on and got a good idea of their movement.

However, we had limited success with trapping despite huge amount of effort and ended up catching only two individuals. They flew above the canopy and usually land on a fruiting tree from above, evading the canopy mist nets that we have placed. We plan to use pigeon decoys and tape lures in future tagging efforts.

We were supposed to try again this dry season (when they are present in high numbers), but for reasons undisclosed to us, we were not granted a research permit by the local government unit. We had good relations with the local community, complied with protocols and laws, and constantly updated them on the project's activities, so we are perplexed as to why we were denied.

Moving forward, we are trying to find another site to conduct our research activities. The target birds will be expanded to forest pigeons in general, due to difficulties and constraints

explained above. Other species, such as cream-bellied fruit dove and green imperial pigeon, have similar ecological role, in terms of size and diet, as the target species.

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

Home-range estimates for the Vulnerable Spotted Imperial Pigeon

We conducted the first ever tracking study on the spotted imperial pigeon. A male was tracked successfully for 26 days, with 746 location points recorded. The female was tracked only for 10 days, and there were 258 location points obtained. From this, we obtained important information about their movement and ecology, which are important for species assessment and conservation. We computed the home-range estimates using the Minimum Convex Polygon (MCP) and the utilisation distribution using Kernel Density method for each individual bird.

Minimum Convex Polygon: 468.84 ha (Male "aldao") and 98.61 ha (Female "bulan")
Utilization distribution: 226.06 ha (Male "aldao") and 187.94 ha (Female "bulan")

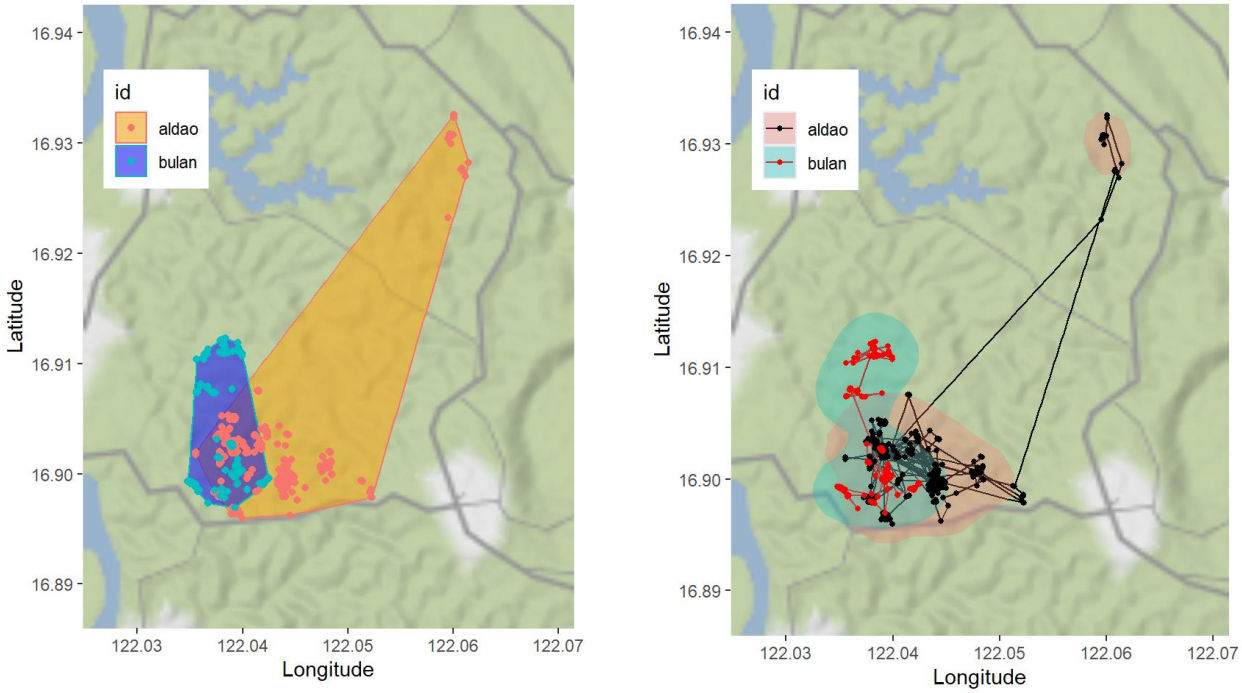


Figure 1. The home-range using minimum convex polygon (left) and the utilization distribution using kernel density method (right) for the two Spotted Imperial Pigeon tagged in San Mariano, Isabela.

From these maps, we see that the pigeons are likely to be contributing seeds at these areas. Their activities appeared be concentrated in certain patches, although the male bird did travel more than 3km to a different patch in the north for a short period. This suggests that they can be quite dispersive, most likely tracking food resources (i.e., fruits). Due to limited sample size, we defer from making generalisations about the differences in movement between sexes. We also had a shorter tracking time with the female, which can be attributed to the variable battery performance of the tags.

Database on bird-fruit links for the Philippines

We compiled bird frugivory records from our field surveys and from online sources into a database on bird-fruit links. This is a list of what fruits / plant trees different bird species eat. Our field observations were supplemented with information extracted from photographs posted in social media. We have over 400 records, representing 76 plant species and 82 bird species. These plants are good candidates to plant in active tree planting initiatives, as they will be attracting bird dispersers into the degraded area and in turn accelerate natural forest regeneration. This was presented at the reforestation workshop (see below), and we hope to develop it further to share it publicly in the future.

Reforestation workshop

We conducted a workshop on reforestation with the local communities and stakeholders. The workshop was attended by 27 participants representing different stakeholders. We had representatives from Department of Environment and Natural Resources (DENR), the Mabuwaya Foundation (NGO), local community representatives, and Isabela State University. We presented the study's results, and we discussed challenges with current reforestation initiatives. This workshop will hopefully not be the last, as we want to continue engaging the local stakeholders towards the conservation of the forest.

4. What do you consider to be the most significant achievement of this work?

We made significant contribution in understanding of the mutualistic links between frugivorous birds and plants in the Philippines. The tracking data collected on the forest pigeons are the only movement data available on any pigeons in the Philippines to date. Understanding their movement patterns is very critical for seed dispersal of forest tree species, especially since these forest pigeons represent one of the few medium-sized dispersers in the Philippine forests. In addition, we recorded frugivory events whilst doing the fieldwork, which expanded the database of bird-fruit links in the country.

These data are important puzzle pieces to understand how birds are contributing to the seed dispersal process in our study landscapes. The picture is not yet complete for us to create an individual-based model, but even so we have enough data to prove that birds are crucial for forest ecosystem functioning.

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

The local communities in six different sites were involved in the project as local guides. They were taught how to do point count transects and identify the names of the birds. We also spoke in community meetings to discuss our project and share about the importance of birds as seed dispersers. Based on personal accounts by our local guides, the community became more aware and less inclined to hunt birds because of the project.

The project also made some significant indirect contributions to the local communities. We managed to raise funds from friends and colleagues in the UK to give children storybooks to three elementary schools where we did fieldwork in. These included bilingual books (English and Filipino) that touches on science and conservation, which most rural schools would not have access to. In addition, we helped Mabuwaya Foundation in their tracking study of the Isabela orioles, a Critically Endangered bird found in the study area. We assisted them in procuring the tags and equipment. One of our team members also trained their staff on using canopy nets for catching birds.

6. Are there any plans to continue this work?
Yes, through this project, we have developed a good relationship with the Mabuwaya Foundation. We hope to conduct more research and engagement activities in the future. One of the ideas we are exploring is a pilot test of placing artificial perches in degraded areas to increase bird-mediated seed dispersal.

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

We have designed education materials as part of the project. The spotted imperial pigeon, locally known as Balog, was the project's flagship species, chosen because of their importance as medium-sized seed dispersers and popularity with the local people. We printed these materials as posters and handed them out to the local government units and communities.

In addition, we have shared the results of the project to the local stakeholders during the reforestation workshop held this January 2024. We also got important feedback and insights from them. One of the concerns raised was the availability / sourcing of the native seedlings for reforestation projects.

We are also currently collaborating with a student-artist from the Massachusetts College of Art and Design on a comic about the project's outcome. It aims to raise awareness about the importance of birds in an agricultural-forest mosaic landscape, encouraging farmers to protect or include trees in their farms.

Lastly, we are planning to publish the findings in scientific journals in the future. We will ensure that the foundation will be properly acknowledged when we do so.

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

We started procurement of equipment in October 2022, and fieldwork was held during the dry season around February 2023. We were doing fieldwork for 4 months on and off, and this was more than the anticipated length of fieldwork.

Despite the project ending, we are planning to continue the work and conduct further trapping and tracking activities this year to prevent the tags from going to waste.

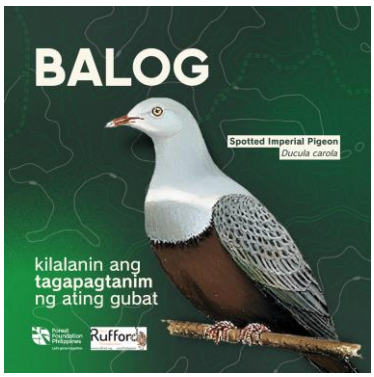
9. Looking ahead, what do you feel are the important next steps?

First, we will try and capture more pigeons to get more movement data. We will use decoys and tape-lures to increase our chances. This will improve our understanding of this species' ecology and allow us to build the IBMs.

Second, we need to integrate social sciences into the conservation research. One of the main threats to biodiversity in the area is the expansion of arable farming and shifting agriculture. To balance biodiversity conservation and livelihood of local communities, a shift to more sustainable farming practices is needed, but it is a big challenge for smallholder and family farmers due to resource constraints, lack of knowledge, preserving traditions, and others. Understanding these challenges, through a social science lens, can inform management and conservation plans, i.e., how to help farmers incorporate sustainable practices into their farms.

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?

Yes, we used the Rufford Foundation logo in our education materials. Aside from posting them online, these were also printed as large format posters and given to local communities. We have also acknowledged the foundation in scientific posters, which were presented at local and international conferences in the UK.



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

Erwin Torio – research assistant, helped in the conduct of the surveys, trapping and tracking activities
Craig Sorono – research assistant, helped in the conduct of the surveys, and trapping activities
Ronald Agnote – field technician, had the most experience in mist-netting birds at the canopy; helped in the trapping and tracking activities
Dr. Marion Pfeifer – supervisor at Newcastle University, provided overall guidance and helped facilitate the reforestation workshop
Dr. Mark Shirley – supervisor at Newcastle University, provided overall guidance

12. Any other comments?

We are very grateful for the support given by The Rufford Foundation. The project faced some difficulties, which we tried to handle and work around as best as we could. We thank you for the patience and understanding.