Final Evaluation Report

Your Details	
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Project Title	Diversity and Assembly of Forest and Savanna Bird Communities Across a Rainfall Gradient in Central Africa
Application ID	36462-1
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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
Obtaining a baseline reference data for bird communities, including data for threatened species,			X	We collected extensive ecological data using point counts and linear transects of more of 144 bird communities across four forest sites in Cameroon (Mbam et Djerem, Dja, Lobeke and Campo Mann). We also collected extensive acoustic data of target bird communities (n=36) in all these protected areas using autonomous recording units.
Getting reliable estimates of population densities and relative abundances of key threatened species			X	We collected data of abundance and population density of grey parrots (*Psittacus Erithacus*), large hornbills (*Bycanistes*, *Ceratogymna*) and tauracos (Musophagidae) in three protected areas (Campo Mann, Dja and Lobeke) using a combination of linear transects and point counts replicated several times inside and outside the protected areas. Additionally, we counted parrot flocks in stationary points in Lobeke National Park.
Third, exploring in detail how the synergy between climate change and land-use change impacts these tropical bird communities	x			We have not achieved this objective, because we have not started formal data analysis for exploring this synergy. We found challenging to collect the data in all the forest sites in a predefined time schedule. Nonetheless, our robust dataset potentially will allow us to explore the synergy in

				detail specially in a modelling context using the community ecology inputs that we collected across the gradient.
Articulating an economic link between forest bird communities and local people		X		We partially achieved this objective by integrating different stakeholders (local field assistants) in the project and the study and monitoring of bird communities in each protected area. Because we involved different members of the local villages in the bird surveys and provide them economic income, we started to consolidate a link. We also sought to reinforce the link with regular income. For instance, via the payment to some locals for checking the autonomous recording units every month. Nonetheless, we consider that there is much more to do to reinforce a strong economic link between bird and people beyond the scope and duration of the current research project. Therefore, we consider partially achieved this objective.

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

a). Robust dataset of bird diversity and abundance of multiple entire tropical rainforest bird communities in a rainfall gradient across all these four protected areas.

b). Population density and detection dataset of large frugivorous birds (grey parrots, hornbills and tauracos).

c). Involvement of several Cameroonian young researchers, students, and local communities in the project.

d) Creation of partnerships and collaborations with multiple actors (government, NGOs, local communities) in each of the sites of the project.

e) Consolidation of a sampling design and a network of plots for potentially studying and monitoring tropical biodiversity in the long-term.

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

During the beginning of the project, we confronted serious difficulties with the acquisition of the research permits due to administrative issues in the government that delay the start of our fieldwork for several months affecting our schedule, planning and fieldwork. This generated a delay of almost 1 year in our planned schedule for finishing the fieldwork. Nonetheless, we kept patient as these challenges could happen in Cameroon and are beyond our control. Making the survey in all the areas was logistically challenging due to the remoteness and hard access of the sites and the difficulties of the terrain. However, we looked for support from the local villager, especially baka people and very experienced collaborators to find the appropriate locations for our study.

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

Our project has benefited local communities in different ways. First, we have involved in all our sites (Mbam et Djerem, Dja, Campo Mann and Lobeke) local collaborators as field assistants to joins us to all our field surveys. We always hired members from the towns and villages close to these protected areas (Somalomo, Mambele, Bmakadou and Campo). In all these areas we aimed to provide job opportunities to those close to the protected areas who have been engaged in conservation activities in the past or ecotourism activities. For example, in Campo Mann national park we involved a local leader who is teacher from the primary school in the village who is very interested in conservation work with birds and animals in general and who has been participating in the past in other conservation activities. In the Dja reserve we involve a local collaborator (an eco guard) who is part of the local community in Somalomo and who has participated in the past of several research and conservation work in the Dja reserve.

Second, we also often involved different people for many activities such as guiding, porting, cooking, logistic coordination and advise. Therefore, our project created a small network (albeit only for short-term) of local employment around our fieldwork in all these four protected areas. While our job opportunities are short-term, they provide an additional but important income to the locals.

Third, our project has offered many opportunities to develop skills and training for conducting scientific research. Particularly with methodologies for collecting data we trained several local collaborators including many members of the local communities. For example, we have involved a network of collaborators for collecting data of birds and arthropods using autonomous recording units and flight

interceptor traps. In each protected area we have trained and showed how to handle and manipulate the sound recording devices for collecting bird data and how to collect, store and labelled arthropods. This has involved people form the government, particularly from the ministry of wildlife and forestry (MINFOF), especially eco guards who have been with us in the surveys. So far at least two members of the community in each site plus at least one eco guard had assisted us in the data collection, and they have learned how to follow a strict protocol for collecting the data.

Finally, because of the large-scale covered in the gradient, the project can provide a template for more future research and conservation work that can potentially involve more local collaborators in the long-term. We have been establishing benchmark plots for studying tropical birds, arthropods and plant communities and potentially other groups (e.g., amphibians, mammals), implying that many more local people and researchers can be involved in future research and conservation activities.

5. Are there any plans to continue this work?

I have very serious plans to continue this large-scale research project in Cameroon for several reasons. We consider that the main asset of our research project is that it has the potential for studying the structure and functioning of tropical rainforest ecosystems from central Africa in the long term (several decades). Our sampling design that explicitly involve a fractal design with a benchmark plot conception, make possible to collect different ecological data from different taxonomic groups in the long term and link the data across spatial and temporal scales. Our network of plots across these national parks can also help to track the status of different species (either threatened or non-threatened), populations, communities, and ecosystems, especially if it is appropriately linked with a rigorous monitoring scheme. This means that I would like to continue this research enterprise for many years to get more data that can be useful for the Cameroonian government and different stakeholders (e.g. local communities, NGOs, etc.), particularly in decision-making, management, and specific conservation interventions.

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

We have in mind different ways to present the results of the project. We will produce posters with illustrations and basic information showing the main insights from our study. We are planning to share these posters to the local villages close to the protected areas as well as with the staff of the national park. We are also considering producing a photographic and auditive catalogue of the birds and other animals of the areas using our acoustic data collected in the plots. This catalogue can be shared to the local communities. Additionally, following the advice of some colleagues we are considering making short video clips of the

fieldwork activities of the project and share with people using YouTube, Instagram, tic toc and other social networks.

Finally, because our project is a research project, we will focus in publish our research outputs in peer reviewed journals in ecology and conservation, we will try to get publish in high profile journals to give visibility to our research. Therefore, we will share out research mostly as original papers with all the data associated with them. We particularly, make free access our data in online depositories such as dryad and others. Finally, we also will share acoustic data (vocalisations) and photographic record to citizen online depositaries such as Xenocanto, Macaulay library, trait data to AVONET (Tobias et al 2022) future versions as well as other citizen online depositories.

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

The important next step is to finish to collect the data in all our sites across the gradient. Particularly, the savanna sites in northern Cameroon. Furthermore, a critical next step is to consolidate, curate and store all the raw data of birds collected in our four forest sites (Campo Mann, the Dja, Lobeke and Mbam et Djerem). Another important step is to deliver research outputs for informing specific conservation actions and interventions. This is especially important for grey parrots, which we believe, are experiencing strong population declines in our study sites because of trapping. Our population densities estimates can work as a baseline for monitoring grey parrot abundance and the influence of patrolling on reducing trapping in our study sites.

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?

So far, we have not used the logo in any material produced by the present project. The only use of the logo was in a power point presentation that we shared among academic colleagues mostly professors, post docs, PhD students, master students as well as a few collaborators in Cameroon (e.g., Congo basin institute). In the presentation we made explicitly clear that we benefited from funds from the foundation.

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

Francis Njie: prime Field ornithologists in charge of all bird surveys.

Joyceline Mzomen: young field ornithologist supporting the surveys of large frugivorous birds (grey parrtos, tauracos and hornbills).

Francis Luma: Field entomologist in charge of arthropod sampling

Korndoi Aodou: Master student from Dchang university, Field assistant supporting bird and arthropod sampling in the Dja forest reserve.

Géraldine Nguemo Djamnou: Field botanist working in establishing plan plots in Campo Mann National park

Olivier Bangsi: Field botanist working in establishing plan plots in Campo Mann National park.

Germaine Ngoko Fah: Master student from Dchang university, field assistant supporting bird sampling in the Dja forest reserve.

Ecoguards: Rangers from the ministry of wildlife and forestry (MINFOF), we worked with many of them in each protected area.

Local field assistants: In all the locations we hired multiple field assistants (>40) from the local communities, especially from the Baka people. They worked in many activities, including transporting the equipment and materials opening the trails guiding, cooking, giving advise in the location of the plots and the camp site, providing essential information and knowledge about the birds and other animals in the forest.

10. Any other comments?

Financially supporting research projects that aimed to uncover the ecology of multiple species plus specific species included in IUCN threat categories, can provide multiple benefits for long-term research in the tropics. While our project collects valuable data of a particular endangered species (e.g. grey parrot), we also collected very valuable ecological data from most of the species (communities) in which can provide clues of the population trends, their ecological interactions and trait data. Together, this knowledge will help us to evaluate how these communities and ecosystems are responding to global environmental change and how they will accommodate to changes in climatic regimes in tropical regions. I greatly appreciate to the Rufford foundation for funding this research initiative that is intended to provide valuable knowledge of tropical rainforest birds communities in central Africa.