The Rufford Foundation
Final Report

Congratulations on the completion of your project that was supported by The Rufford Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other format. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. Please note that the information may be edited for clarity. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Said Ali Ousseni DHURHAM
Project title	Habitat Suitability and Ecological Niche Modeling of the mongoose lemur (*Eulemur mongoz*) in the Comoros islands to assess a relevant conservation plan
RSG reference	21803-1
Reporting period	June 2017-July 2018
Amount of grant	£4,990
Your email address	s.dhurham@gmail.com
Date of this report	August 2018

1. Please 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
Assessing population Density of the Mongoz lemur (*Eulemur mongoz*)				Lemur density data have been collected and are being analysed and a paper is in preparation for submission in American Journal of Physical Anthropology.
Assessing the geographic distribution limits of the *E. mongoz* in the Comoros Islands (Anjouan and Mohéli)				Lemur presence and distribution were assessed and a paper is in preparation for submission.
Evaluate the effects natural resource use and anthropogenic factors on the Comoros biodiversity				A paper for this part entitled; "Poverty is the main driver of unsustainable use of natural resources in the Comoros Islands" is completely finished and currently in submission on Environmental Management international journal.
Provide a basic guiding and scientific field work to local guides and Comorian students for the long-term monitoring of the Comoros biodiversity				We are continuously providing knowledge, basic guiding and field works of Comoros local people including local guide and Masters students.
Assess in collaboration with local people a relevant management plan for lemurs, flying foxes and the Comoros biodiversity				

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

Field work in remote regions of Anjouan during the night time in highly inaccessible and dense forests is always complicated. Some locations were more difficult to reach than we expected and some field constraints significantly differ from our expectations. Due to these remote forests, we were often forced to bypass valleys and mountains that indicating that our transects were generally not as linear as

expected. Several of the forests identified on published maps and from satellites images were in some cases deeply deforested. In these cases we had to camp more deeply in the forests. Despite these surprises, we did not meet major and unforeseen difficulties.

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

The first outcomes of this project relate to the educational and training aspect: basic guiding, scientific field work, and basic conservation training have been provided to our local guides from all localities as well as a complete training for our Comorian Masters students (Anziza Ali Hassane, Mouniati Ombade). The training courses included population density estimate models, lemur presence and absence data collection, basic computing knowledge such as excel etc., computation of density estimates, species distribution modeling, basic statistics using the freely available R statistical language and Geographical Information System (GIS) tools. These courses were conducted by Ibouroi Mohamed Thani (software programmes, statistical methods, GIS tools, socio-economic data collection and analysis using the Qsort approach) and allowed the Masters students to carry out and improve their data analyses.

The second outcomes of this project are the evaluation of lemur population density and distribution but also the effect of ecological and anthropogenic factors on the habitat selection by the species. These results are useful for assessing management plans for the long-term conservation of this species and local biodiversity.

We also carried out a study about the relationships between the local community and natural resource uses and their impacts on natural habitats. More specifically we assessed: (1) how rural informants perceive benefits from natural resources and how they impact biodiversity, and (2) the various knowledge, perceptions and attitudes towards biodiversity in general, bat and lemur species in particular as well as conservation actions in general. As social factors such as age, activity, level of formal education, and geographic localisation can affect knowledge and determine attitude and perceptions, we assessed what factors might be related to positive or negative perception towards forests, biodiversity and lemur and flying fox conservation.

These information helped understanding the representation of the local community for this biodiversity, in order to interpret the ongoing natural habitat evolution and to predict its future allowing us to subsequently propose some relevant long-term conservation actions and habitat management.

According to our results, despite the crucial efforts carried out by researchers and NGOs including the NGO Dahari to ensure the long-term biodiversity conservation but also to educate local people about the environment and to raise their awareness about the importance of biodiversity conservation, the unsustainable use of natural resources continues.

According to our results, all interviewed people received direct benefits from forests and their livelihood sources come from subsistence of natural resources. Although local people are using natural resources in an unsustainable way, they have positive perception toward biodiversity and reported that wild animals are useful for their subsistence. The lack of governmental assistance is claimed as the main cause leading to forest overharvesting. According to our results, formal education and employment appeared to influence the ranking of statements. Respondents with a higher formal education level and employment were more in favour of long-term forest and biodiversity conservation. In contrast, respondents with low level of formal education and often unemployed were in favour of more immediate benefits. These results suggest that the lack of livelihoods for rural people is the main factor leading them to over-harvest natural resources.

A wider problem is that Comorians seem constrained by poverty to heavily exploit forests. Thus reducing poverty and improving the subsistence conditions of the rural population are of prime importance in order to successfully implement long-term conservation strategies for biodiversity and habitats (Ibouroi 2017, Ibouroi et al. unpublished results). In the Comoros, the most effective conservation management plan would be to adopt programmes that tackle poverty in communities near forests (Ibouroi *et al.,* unpublished results). This strategy could begin by addressing the needs of local people, allowing them to be less dependent on forest resources. For instance, it will be necessary to propose a locally acceptable and sustainable mechanism that will protect and restore intact and degraded natural forests as well as offset the opportunity costs to local impoverished farmers.

The work I carried out was part of a larger project in which Ibouroi Mohamed Thani is involved. This project help support my field work by providing financial support beyond the support of the Rufford Small Grant. Thanks to the joint support the project gathered data from various regions of the Comoros Islands including the Grande Comoro Island.

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

During our field works, local guides were hired to help carry out the fieldwork. These guides benefitted from courses in which we provided basic and theoretical training on lemur and flying fox population monitoring, population density estimate models, basic computing knowledge, ecological niche modeling. At the same time we tried to favour exchange with local people to better understand how they view their environment.

During field works, we used semi-structured interviews and Q-methodology approach to assess how local communities use natural resources. We investigated the local human subjectivity and perceptions toward biodiversity in general as well as toward conservation actions.

Our project does not provide direct benefit to local people but we continuously working with local community through education environmental to raise their

awareness about the importance of biodiversity conservation and to limit unsustainable use of natural resources and to ensure the long-term biodiversity conservation.

5. Are there any plans to continue this work?

The work that I carried out is part of a larger research project involving Mohamed Thani (PhD in the CEFE-CNRS-Montpellier, France). We are very interested in investigating population dynamic, habitat use by the species using GPS telemetry. I will thus continue for a long term population monitoring and to assess the demographic evolutionary and colonisation history in the three islands of Comoros using genetic data. I obtained a 3-year PhD to pursue this study. The fieldwork will continue to explore the Comoros islands for the Mongoz lemur and Comorian biodiversity.

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

A large part of this project was published through national conference in collaboration with the United Nations Development Program (Comoros), European Union (Comoros) and the national system of protected areas (RNAP-Comoros). These conferences have been published in the Comorian media.

One scientific paper is in submission on international journal and another scientific paper is in writing.

Moreover, information of project activities are communicated to some acquainted people through informal discussions. Personal communication will thus be a mode of sharing of the final results. Pictures of the study (mostly taken in the field) are also shared on the Facebook page of the team on Madagascar lemurs: https://www.facebook.com/population.conservation.genetics.madagascar/?ref=bookmarks

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

The RSG was used from July 2017 to July 2018.

8. Budget: Please 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.

Item	Budget Amount (£)	Actual Amount(£)	Difference (£)	Comments
Food for 8 months for the team members	2,400	2550	-150	Higher costs than expected
Master student payments	120	200	-80	Higher costs than expected
Cooker payments (90£ per month x 8months)	560	560	0	
Local guides payment (8 months x 115£ per month x 1 guide per locality)	1200	1200	0	
Battery Charger for head lamp	20	20	0	
Cook materials	40	40	0	
Camping material (Tant= 50£ x 2)	100	92	+8	Camping material
Field shoes	50	50	0	
Field Laptop netbook	500	450	+50	The Laptop netbook was less expensive
TOTAL	**4990**	**5162**	**-172**	Additional financial have been proved by the lab of Mohamed Thani Ibouroi

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

In the next steps of the project, I would like to use the combination of different methods and experiences I acquired from this project (line and point transect distance sampling, GIS tools, socio-economic approaches and species distribution modeling) with other methods such as multivariate analysis, population dynamic modelling to develop robust and efficient monitoring of the species during my PhD.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did The Rufford Foundation receive any publicity during the course of your work?

The Rufford Foundation support is acknowledged in one scientific paper (in submission) and one other scientific paper in writing. The RF logo has been used during the national conference in the Comoros and other communications in the Comoros media. I plan to participate in international conference during which The RF logo will be acknowledged.

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

Project Leader: **Said Ali Ousseni Dhurham**

Dhurham Said Ousseni is a student of the Primatology Master from Mahajanga University. He has been working with lemur species from north-western and northern regions of Madagascar since 2011, and he is now finishing his Master thesis on "The density, distribution and diversity of Northern sportive lemurs", a scientific work entirely performed during the RSG project (Field work, courses, data analysis, Thesis writing, etc.). Since 2014, he continuously worked in the Comoros Islands with the Ibouroi Mohamed Thani team as research assistant aiming at assessing relevant conservation action for Comoros biodiversity.

Mohamed Thani Ibouroi

Dr. Mohamed Thani Ibouroi is a research assistant and post PhD in the French prestigious research agency (CNRS) and the Center of functional and evolutionary ecology, Montpellier, France. For the five last years, he continuously worked in the conservation of endangered species including flying fox and lemur species in the Comoros islands. His group in Comoros has worked and published research on several flying fox species, Pteropus livingstonii, P. seychellensis comorensis, (Ibouroi 2017, Ibouroi et al. 2017, 2018, Ibouroi et al in press).

Rabarivola Joseph Clement

Pr. Rabarivola Joseph Clement is professor in the Mahajanga university, ''Department de Biologie Animale et Ecologie'' ''Option: Ecologie des Primates''. He is one of the best specialists on primatology in Madagascar working on population genetic and primate ecology in the context of conservation biology.

Ali Hassane Anziza

Anziza is a Master student from the University of Antananarivo (Madagascar). Until now she has been working extensively on the Comorian biodiversity including bat and lemur species with our team. She plans to submit a RSG on the endemic bat species.

Mouniati Ombade

Mouniati Ombade is our most recent Master student. His project will focus on the Comoros terrestrial fauna including birds and will assess the inventory and distribution of the endemic avifauna of Comoros and their implication for conservation.