

Final Project Evaluation Report

Your Details	
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Project Title	Shade-coffee plantations as reservoirs of large mammal biodiversity in the tropical rainforest of Ethiopia
Application ID	20390-1
Grant Amount	£4955
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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
1) Determine the mammals' density in semi-forest coffee, semi-plantation coffee and plantation coffee in comparison with natural forest using 30 camera traps and line transects.				The use of line transect and camera trap methodologies allowed for the identification of 24 species of medium and large sized wild mammals in natural forest and shade coffee management systems belonging to eight order. Represented as eight species of Carnivora, six species of Primates, Perissodactyla and Artiodactyla three species each, Rodentia, Lagomorpha, Hyracoidea and Aardvark represented by one species each. Comparison of these mammals diversity were made in natural forest and shade coffee management systems (semi-forest coffee, semi-plantation coffee and plantation coffee) of the area. This has a number of interesting findings and will be published in scientific journals soon.
2) Vegetation structure, canopy cover, and species composition from a random 20m by 20m quadrants in shade coffee habitats and natural forest.				We identified variation in canopy cover and tree density in coffee management systems of the area. This helped us for the classification of shade coffee management types in the area.
3) Examine whether certified shade coffee plantation is home for larger mammals when compared to non-certified shade coffee farms using transect lines and camera traps				We identified illegal hunting of buffalo and timber production activities in uncertified shade coffee farming and the nearby forest areas. These threats were not observed in certified shade coffee habitats.

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

During coffee harvesting period, people engaged in coffee bean collection mainly occupied the coffee agricultural areas and make camera trap data collection difficult. Due to this we are forced to change our schedule for camera trap installation until the disturbance is reduced in shade coffee habitats.

The other challenge was to conceal the camera traps not to be stolen by people. From the 30 camera traps until now two of them were stolen from field. We latter start to use a strong cable that fix the cameras to the trees and create awareness on the importance of the device which finally reduce the risks of losing the cameras.

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

1. We found that the abundance and diversity of most large mammals in natural forest are relatively similar to traditional shade coffee management systems (semi-forest and semi-plantation coffee types). Whereas, the mammalian diversity is relatively low in plantation coffee management types of the area. Semi-forest and semi-plantation shade coffee management systems can harbour and/or be a corridor for diverse types of medium to large sized mammalian species in the area. Intensification of shade coffee habitat have negative impact on the diversity of terrestrial and arboreal mammals.
2. The traditional shade coffee management systems (semi-forest and semi-plantation coffee system) consists of diverse old shade tree species and densities that may attract large mammalian species. Intensification of shade coffee farming have negative impact on the indigenous plant species diversity and density.
3. We did not find any significant difference on mammalian diversity and abundance between the certified shade coffee plantations and uncertified shade coffee plantations.

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

Local communities were involved in this project in a variety of ways including working as local guide, field assistant, camp attendant and hiring horses and mule and got economic benefit. In addition to this, field assistants from the local areas have gained knowledge regarding methods of ecological data collection, trained basic computer skills, trained installation of camera traps in the field, and familiarised how to collect and enter data in computer excel program.

The district political leaders have been supporting this project and have great interest to see the finding of this study because the livelihood of most of the local inhabitants in the district are directly or indirectly linked with coffee production and

processing. The authorities discussed different issues with the principal investigator including coffee and its conservation value and showed interest to work more on conservation and management.

5. Are there any plans to continue this work?

Yes. The area is the main coffee source of the country and in the study, we confirmed that some forest loving large mammals' diversity and abundance is higher in traditional shade coffee management systems (semi-forest and semi-plantation shade coffee) than the primary forest. For the future, I would like to answer the following: Why some forest loving species like buffalo and blue monkey observed in large number in some shade coffee habitats sites? Why colobus monkeys mainly observed in shade coffee habits than the primary forest? Which primate species is more sensitive to shade coffee intensification and why? Why the less studied De Brazza's monkeys are very less in number in shade coffee habitats?

Nowadays, coffee agriculture intensification is increasing in the area. Identifying the factors that influence the distribution of mammals in coffee agricultures are important. Therefore, investigating the conservation value of riparian buffers found in coffee farm as well as the roles of wetlands and grasslands of different size present in the coffee agricultural areas for medium and large sized mammals are crucial for better conservation and management of the coffee farm diversification in the future.

Furthermore, the threats of large mammals' particularly excessive hunting of buffalo needs to be addressed with continuous awareness raising with responsible bodies. In one of the study site where coffee is uncertified, our camera captured bleeding buffalo that escaped from gun shoot and people carrying meats of buffalo. By further information, we confirmed that local inhabitants that live in uncertified shade coffee areas hunt buffaloes at a certain month. In total six buffaloes were killed per month. This action is very devastating for the dwindling buffalo population in the area. We tried to communicate with some local inhabitants and it was difficult to solve the problem. We talk this issue with local authorities. We agreed that in the near future there should be an awareness-raising program for the local inhabitants and all the stakeholders in the district to reduce the habit meaningfully.

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

The research result will be published in reputable scientific journals. The final report will be given to the decision makers such as the Ethiopian Wildlife Conservation Authority (EWCA), the Oromia Region Wildlife Enterprise, Jimma Zone and Gera District Office.

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

The Rufford Foundation grant was used for a period of 18 months. We proposed a total of 17 months for this project but we extended the fieldwork by one month. This is to compensate the time lost in the wet season because of the heavy rain.

8. Budget: 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. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Per diem for two field assistances (2 person * £4 *330 days of field work)	2640	2640	0	
Per diem for principal investigator (1 person * £4 *200 days of field work)	1200	1200	0	
Per diem for camp and camera traps attendant(2 person * £1 *300 days)	365	600	-235	This was partially covered by shifting budget from driver per diem.
Local transport (horse or mule)	100	100	0	
Cost for vehicle transport	250	250	0	
Per diem for driver (1 person * £4 *50 days)	200	0	+200	We hired vehicles and used the money to cover additional cost for camp and camera trap attendants.
Solar power converter for electricity and computer charging	200	250	-50	
Total	4955	5040	+85	The principal investigator and other funds completed the difference.

(Exchange rate £1=31.1 Ethiopian birr)

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

The next important steps are to publish the finding of the research and submitting the reports to the decision makers. Surprisingly in our result, we found that traditional shade coffee management systems harbours diverse types of medium and large sized mammals. At the same time the threat on some species are also clearly

observed in areas because of coffee intensification. We need to work further on the detail of the factors that affect the species and the potential of habitat types to put the management plan. Then my next research plan is to select potential buffer areas in coffee agricultural systems and identify the minimum required buffer areas for the survival of forest mammals' species. This will help to design scientific ways of conservation of wild animals together with need of local people. Furthermore, we will start media advocacy for protection of the potential areas together with local authorities, local community, conservation practitioners and decision makers.

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, I used the RF logo for presentation on annual student conference at the Centre for Ecological and Evolutionary Synthesis (CEES), University of Oslo, held on November 22 – 23, 2016 in Norway. I will also use the RF logo for any material and report produced in relation to this project and for the final document.

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

Behailu Etana- Jimma University, Student at University of Oslo. Principal investigator, Planned and conducted all fieldworks, Managed databases, conducted analysis.

Acalu Asefa – collaborate as data collector and field assistant in all fieldwork seasons and in all sites.

Teka Kefiyalew - collaborate as data collector, field assistant in Dacho, Afalo, Cala and Anderacha sites. Involved in camera trap data recording.

Abasharo Aba Gero and **Mr Kefyalew** - collaborate as a field guide in Afalo sites.

Abdela Aba Oli and **Yasin Aba Gidi** - collaborate as a field guide in Dacho area.

Abdi Jemal, Neima and **Bekele Dubale** participated as camp attendant.

Dr Anagaw Atickem - researcher at University of Oslo, German Primate Centre, and Addis Ababa University, involved in facilitating logistics and assisting with project design including systematic sampling of transects and pellet counts. Involved in identification of some mammalian species from camera trap data. Participated on analysis of habitat selection models from presence data obtained during transect counts, pellet counts and involved in DNA extraction.

Prof. Afework Bekele, Professor at Addis Ababa University, provided practical support and critical feedback during fieldwork. Facilitated logistics for the fieldwork including the infrared camera traps.

Prof. Peter Fashing, Associate Professor of Anthropology & Environmental Studies at California State University. Involved as co-supervisor and provided critical feedback mainly in transect count design.

Dr Dietmar Zinner, Senior Research Scientists at the German Primate Centre. Involved in this project as co-supervisor and helped identification of some primates from camera trap data.

Prof. Nils Chr. Stenseth, Professor at the University of Oslo, supervised all aspects of this project.

12. Any other comments?

This project would have not been carried out without the Rufford Foundation funding. Thus, I would like to thank the Rufford Foundation for the financial support of my work and contribution for the conservation of these potential areas.



Left: Principal investigator with field guides in natural forest. Right: Principal investigator at the time of line transect walk.



Overview of area.



Left: Leopard (*Panthera pardus*). Right: African buffalo and Giant forest hog.



Left: Baboons. Right: African buffalo wounded by bullet.