

## 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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

---

Grant Recipient Details	
Your name	Manase Elisa Pallangyo
Project title	The impact of water abstraction and changes in surface water availability on ecological integrity the Arusha-Kilimanjaro ecosystem, Tanzania
RSG reference	26374-1
Reporting period	September 2018 to October 2019
Amount of grant	£5000
Your email address	Elisam27@yahoo.com
Date of this report	28/08/2019

**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
Assessment of changes in surface water abundance and seasonality				One year data was collected as planned. However this will also be supplemented with the on-going second year data
Assessment of ecological impacts of water abstraction and changes in surface water availability				One year data was collected as planned. However this will also be supplemented with the on-going second year data

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

One of the challenges was difficult in surveying for herbivores in the upstream of most of the extraction sites in Kilimanjaro national park due to presence of high river banks, inaccessible dense forest and difficult in spotting the rarely available herbivores. For these inaccessible sites, herbivore survey was only conducted in the downstream areas giving much attention on the existing water points during the dry season. It was also expected to be able to collect most of the wet season data in March and April which is the usual period for wet season in the study area, however this was not possible because the dry season extended over this period, and thus the wet season started in late April, lasting only over a short period in May. While some data were collected over all this period, the researcher expects to collect further data over the next coming wet season in order to have adequate representation of the wet season. In addition this will be supplemented with available past data.

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

Having completed 1 year of implementation, the project has actually provided the evidence for the impact of water abstraction on ecological integrity in the Arusha-Kilimanjaro.

(a)The 1-year project work has a mapped the spatial and temporal distribution of surface water and shown that water quality and quantity vary across space and

time for all sites assessed within the parks and outside adjacent areas in the Arusha-Kilimanjaro ecosystem.

(b) The project has provided an assessment of the quality and quantity of the surface water in the ecosystem based on both primary and secondary data. For instance, the assessment of the quantity of surface water has shown that there is a high demand in surface water for domestic, irrigation, livestock and wild animals use in the entire ecosystem. Unlike the case where water quality in the parks was generally not affected by extraction the park, excessive extraction is markedly affecting surface water within the parks and in the outside dry areas. In both national parks, existing abstractions consumed between 60% and 100% of the available water. Some of the abstraction especially in ANAPA extracted all water leaving nothing for the environment. Both Ngarenanyuki and Simba rivers were excessively abstracted mainly for irrigation farming which largely concentrated in the upstream areas, where more than 80% of available water was consumed in upstream villages within 15 to 20 km downstream of the rivers from the park. Existing unsustainable water extraction dries up the Simba and Ngarenanyuki rivers in the downstream areas during the dry season thereby depriving access to water for people and herbivores in these areas, and as result human-wildlife conflicts emerge as wild animals invade upstream areas in searching for water.

(c) The project has shown the ecological impacts of abstraction and changes in surface water in the ecosystem. Particularly in the dry areas distribution of herbivores is apparently linked to the availability of surface water regardless of its quality. Wildebeest and zebras for instance are strongly attracted to water sources, and their relative abundance was higher within 1 km distance from water source.

The obtained findings form an important base for the decision making required for the sustainable management of water resources and biodiversity in the Arusha and Kilimanjaro National Parks, and surrounding protected and unprotected wildlife-rich areas. The project has further contributed significantly in the progress for my PhD study.

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

While it is expected that the local communities will be further involved to ensure sustainable management of water and biodiversity resources, so far implementation of the project involved the local communities particularly during the field work. This included communicating the purpose of the project and obtained the consent of the local community's leadership, and the use of local personnel for the field work logistics and guiding service.

**5. Are there any plans to continue this work?**

Large part of the data collection and 1-year progress report has been accomplished covering all the main components (objectives) of the study. Data collected include herbivores counts, water and quantity assessment in focal rivers, streams, water holes and lakes. In addition, part of the complementary secondary data on both remote sensing and office based data have been collected. Collected data were processed to produce a progress report. The future work includes obtaining the rest of secondary data, and continuation of primary data collection for a second year (subject to availability of funds), and producing the final comprehensive report and publication by December 2020.

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

The findings of this study will be shared in various ways including scientific publications and official reports and clearly communicated to relevant stakeholders including local communities, and local and state governments through workshop presentations. This will contribute to the body of knowledge in the relevant field, but also raise awareness and understanding which is required for improved water resources and biodiversity management in this and similar ecosystems. So far the progress report has been shared with the wildlife research institute of Tanzania.

**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 Rufford grant covered a period from September 2018 to October 2019. This is essentially half of the expected length of the project following an extension into a 2nd year.

**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	Budgeted Amount	Actual Amount	Difference	Comments
Vehicle (4wd-landscruiser) hire and fuel	3,500	3,730	+230	This fund covered the hiring of a land cruiser 4wd and fuel during the field work period. Funds for purchasing flow

				meter was re-allocated for transport due to high cost of hiring a reliable land cruiser and compensate for a low exchange rate of £1 for TZS2800 which is below what was planned in the budget
Escort ranger/ botanist/field assistant	1,270	1,270		The fund was used cover for the payment for one ranger, a botanist and field assistant
Advanced stream flow meter (GEOPACK)	230		-230	This was purchased by my supervisor
<b>TOTAL</b>	<b>5000</b>	<b>5000</b>		

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

I think it would be great to extend data collection for a period of about 1 year in order to capture all important patterns and trends. Thereafter produce a comprehensive report of the key findings and communicate the findings to all relevant stakeholders to enhance management of water resources and biodiversity in the Arusha-Kilimanjaro ecosystem

**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?**

I have not used Rufford Foundation logo in any materials, however I have acknowledged the Rufford support in the progress report submitted to the University of Manchester and Tanzania Wildlife Research Institute.

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

**Manase Elisa Pallangyo** was the Principal Investigator responsible for the overall project

**Prof. Susanne Shultz** advised on the assessment of biodiversity components which include wild animal survey and riparian vegetation assessment.

**Prof. Keith White** and **Eric Wolanski** advised on the water quality and quantity assessment

**Manja Tobico** assisted ensured protection against the wild animals as well as guiding the research crew through various study sites in Arusha-Kilimanjaro ecosystem

**Joseph Siarra** served as the field assistant participating and supporting in organising for the field logistics and field data collection

**Daniel Sitone** a botanist who assisted in riparian plants identification during the field work

## **12. Any other comments?**

Generally the research work has been a great success, thanks to The Rufford Foundation for the financial support.