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	Mwita Marwa Mangora
Project title	Biodiversity, ecological integrity and ecosystem services of mangroves under contrasting management regimes in Tanzania
RSG reference	13215-1
Reporting period	May 2013 – April 2014
Amount of grant	£6,000.00
Your email address	mmangora@yahoo.com
Date of this report	13 May 2014

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
Establish Permanent Sampling Plots (PSPs) in Wami and Ruvu estuarine mangrove forests, Tanzania			✓	In each estuary, six permanent sampling plots (PSPs) were established, marked and GPS coordinates recorded
Assess mangrove diversity in the two Estuaries of Wami River and Ruvu River, Tanzania			✓	Mangrove tree inventory was conducted in each of the six PSPs, identifying, measuring, and counting all live trees and seedlings; standing and downed dead wood falling within the plots basing on the protocols adopted (and where necessary modified) from Kauffman & Donato 2012[1] In each PSP one sediment core was retrieved from the plot centre up to an average depth of 2.1 m in all sites.
Assess mangrove forests structure, biomass, and carbon pools in Wami River and Ruvu River estuaries, Tanzania			✓	
Appraise the flow of ecosystem services (wood and non-wood and shrimping/fishing) that support livelihoods dependent on the estuarine mangrove resources from Wami and Ruvu rivers, Tanzania		✓		Only two key informant interviews, one for each site and one focus group discussion for Wami were conducted to explore for dynamics of provisioning services. A regulating service on the status of forest carbon pools was evaluated through analysis of retrieved sediments cores and vegetation data.

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

Budget for purchase of field equipment became higher than the proposed amounts. This made it necessary to cut field days for conducting socio-economic surveys for mangrove associated ecosystem services and thus hindered fully administration of community surveys. Nonetheless, in addition to the key informant interviews, a survey of recent literature on socio-economics of communities especially around Saadani National Park provided some insights on the community perceptions regarding the flow and/or improvement of ecosystem services associated with mangrove related fisheries. Future opportunity will be directed to fulfil this important segment.

[1] Kauffman J.B., Donato D.C. 2012 Protocols for the measurement, monitoring and reporting of structure, biomass and carbon stocks in mangrove forests. Working Paper 86. CIFOR, Bogor, Indonesia.

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

i) Initial set of PSPs have been established that have produced a set of baseline preliminary data on the current state of mangrove vegetation and carbon pools in the two contrasting estuarine mangrove forests. These data sets are an important starting point for future and long-term monitoring of changes in mangrove health, especially in determining and detecting change in forest carbon stocks that would demonstrate the relevance of management regimes and the potential of mangrove forests for carbon credit schemes. PSPs are important references particularly for restoration initiatives (natural or artificial) that require reference sites to ascertain levels of success in restored sites. This is particularly important for Wami Estuary mangrove which is under Saadani National Park that practices "no take" management regime. To advance collaborative work and ensure sustainability, another different study on the hydrological dynamics of the Wami River estuary has proposed to make reference and/or use of these PSPs for data collection. This will contribute to the envisioned establishment of a long term ecological data bank that is important in guiding management decisions.

ii) Data sets have been acquired for a comprehensive scientific project report and a related peer review journal article to document and demonstrate the impact of human pressure of mangrove forest health and integrity while proposing best practices for conservation and adaptive management. The report and the article will be shared with the Saadani National Park and the Tanzania Forest Services Agency to inform planning and management decisions of the critical mangrove ecosystems in Tanzania.

iii) A science and policy brief is in preparation to reach the local research community, policy and decision makers, and dependent local communities to raise awareness on the threatened mangrove ecosystems in the country. The policy will also describe in a common language the role of and link between science and management i.e. how scientific knowledge can best inform rational policy, planning and decision making on management and conservation of the highly dynamic mangroves systems.

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

During this phase, involvement of local communities was limited as large part of the project activities at this stage involved forest surveys and sediment coring. Only a few community members randomly identified were involved in key informant interviews. In the next phase(s), comprehensive socio-economic survey will involve a full range of participatory tools that will comprehend community perceptions on access, use and conservation of the pressurized and threatened mangrove resources. Outreach and feedback programme on the project findings is also earmarked for future requests for support.

5. Are there any plans to continue this work?

Project activities reported here are considered preliminary in gauging baseline data for a long-term monitoring and evaluation of the mangrove status in the two studied estuaries. It is therefore planned to scale up and validate the present results through additional PSPs in the two sites, and into other important mangrove areas in the country. Use of GIS and Remote Sensing is also planned

to capture real time change detection that can demonstrate to policy and decision makers on the efficiency on a chosen management strategy for mangrove forests.

In addition, studies for growth and productivity are also earmarked as important components in modelling the mangrove ecosystems as significant carbon sinks especially at such local scales where conservation and management strategies have direct relevance to the immediate communities. Field observation indicated there is urgent need of advocating and experimenting restoration initiatives as a strategy to save the endangered mangroves.

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

A comprehensive technical project report and a policy brief is being prepared that will be submitted to Rufford for publication into it website. A scientific journal paper is also in preparation for submission to an audience rich Forest Ecology and Management journal. Copies of these materials will also be submitted to Tanzania Forest Services Agency and Tanzania National Parks to inform their management planning and decisions and dissemination to their line of communication. I will also seek to present results in the relevant regional and international conferences to reach a wider scientific audience.

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 report here was used over a span of 12 months. This duration compared well with the proposed project activities. Nevertheless, possible future surveys that would include assessment of productivity dynamics as they inform on the dynamics of carbon will require extended time to cover the influencing temporal (seasonal) variations.

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
1. Transport				
Transportation for PI to field sites	£270	=£650	£545	Because of uncertain availability of SANAPA engine boats, I decided to use my Institute's field boat to directly cross through the Zanzibar Channel to Wami and Bagamoyo (for Ruvu) and access field sites. Although this meant to fully pay for two boatmen from my Institute (indicated in field assistants cost item below), it significantly saved the cost of transport which was then relocated to cover additional costs for field equipment.
Car hire and related costs for intra-site movements at SANAPA	£130			
Boat hire and related costs for plot inventories and sediments coring	£795			
2. Personnel & Subsistence				

Field subsistence for Principal Investigator	£1310	=£952	£358	Number of field days had to be reduced to 8 instead of planned 11 because socio-economic surveys were cut down
Field assistants	£1190	=£1587	-£397	After revising the transport arrangement due to uncertain access of TANAPA transport facilities), 2 boatmen from my Institute also served as field assistants, reducing the local assistants to 3 instead of earlier planned 5 at each site
3. Field equipment				
Shock & waterproof Camera	£320	£236	£84	Field equipment was purchased from Forestry Supplies, Inc. USA and Amazon.com. Until all ordered equipment were received, the rest of the budget was revised to make sure that the core field and laboratory work is appropriately conducted with the remaining budget.
Hypsometer Forestry Pro	£190	£354	-£164	
Garmin GPS MAP62S	£95	£304	-£209	
Diameter tape	£35	£19	£16	
GRS Densitometer	£95	£65	£30	
Corer sampler, accessories and spares	£415	£617	-£202	
Tree tags, nails & spray	£270	£75	£195	
4. Supplies & Services				
Field waterproof stationery	£100	£20	£80	
Shipment & taxes		£342	-£342	These were not certain during proposal writing
Import taxes		£223	-£223	
Laboratory work	£785	£560	£225	To help reduce the cost I personally conducted some sample processing procedures
Total	**£6000**	**£6004**	**-£4**	This deficit was cleared by a deduction from subsistence funds

Notes to the budget

1. Exchange rates used for the local currency is same as that used earlier in the proposal stage which was £1 = TZS 2520
2. For USD the current rate applied is £1 = USD 1.687

3. The proposed budget was beyond Rufford funding and therefore the budget figures of the cost items indicated here are only that were requested and paid for against Rufford funds.

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

Depending on funding availability the following are relevant:

- Addition of more sampling plots is necessary to have more representative sets of data and help in making rational conclusions in trends and projections of the dynamics of mangrove ecosystems under protected and open management strategies.
- Develop site specific allometric and growth models and volume tables for long term ecological monitoring of change
- Mapping for spatial and temporal change detection in the studied estuarine mangroves.
- Commission a comprehensive socio-economic survey for mangrove adjacent and/or dependent communities especially the remote dwellers around the two estuarine sites.

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

The full technical report and science and policy brief which are in preparation will bear the Rufford logo. As such Rufford will dully be acknowledged in a scientific manuscript being prepared for submission to the Journal of Forest Ecology and Management. All these materials will be submitted to Rufford once completed. I understand that some of my colleagues have drawn interest to apply for Rufford support to their future conservation careers, following encouragement with my grant.

11. Any other comments?

I strongly commend the Rufford Small Grants initiative for extending research and community outreach support especially to developing countries where access to large funding is limited. Nevertheless, these small grants are the foundation stones for capacity development and professional competence in scientific research and management of the natural resources for enhanced societal benefits.