Final Evaluation Report

Your Details	
Full Name	Elmugheira Mockarram Ibrahim Mohammed
Project Title	Exploring the responses of *Balanites aegyptiaca* seedlings and saplings to grazing for proper conservation of the species in Sudan
Application ID	30315-1
Grant Amount	£6000
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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
To assess the current status of *Balanites aegyptiaca* in Dinder Biosphere Reserve – Sudan.			■	We assessed the species population in the transition, buffer, and core zones of Dinder Biosphere Reserve. Generally, the core zone showed a good population of *B. aegyptiaca* with healthy seedlings, saplings and adult trees, as well as high species density compared to transition zone. Besides that, the transition zone exhibited low regeneration status with a high number of browsed/grazed seedlings, saplings, and tree stumps.
To determine which stage of species development (seedling or sapling) are more sensitive to animal grazing/ browsing (livestock).			■	The study findings illustrated that saplings of *B. aegyptiaca* are more sensitive to livestock browsing than their seedlings. Seedlings recover better than saplings after being browsed by livestock, and, unexpectedly, goat browsing severely affected the natural regeneration of *B. aegyptiaca* in DBR compared to other livestock species.
To determine the areas where the species is dominant and stable as well, where it is declining and need quick action.			■	We observed a vigorous regeneration and growing stock of *B. aegyptiaca* in the core zone compared to poor and fair regeneration in the transition and buffer zones, respectively. We recommended that more awareness-raising programmes are needed, as well as, patrolling guards and afforestation programmes in the transition zone.
To raise the awareness of local community about the importance of the species and train them on seedlings raising and conservation for further contribution in protection activities.		■		Although we conducted awareness-raising programmes in nine villages across the biosphere, the observed intensive livestock grazing, and illegal harvesting need more effort to be controlled. The western and southern parts of the reserve need special packages due to their low seedling,

			sapling and tree densities, with a high population of livestock and crown-debranching activities.
To develop a comprehensive landscape conservation plan that will cover all habitats components in the reserve.			A conservation plan has been developed based on recently gathered data on *B. aegyptiaca* and other rare, dominant, and codominant tree species inventoried in the reserve.
To contribute in capacity building approach for the forest & rangelands officers within and around the Dinder Biosphere Reserve.			The key informant interviews and administrated questionnaires formed a baseline foundation for all capacity building and training programmes, through which we trained the local officers, patrolling guards and villages leaders.

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

Awareness-raising and training programmes in 2020 had severely been affected by the COVID-19 pandemic and its complete lockdown for more than 6 months in Sudan. Moreover, in some villages, the locals were not cooperative due to existing conflicts with the reserve management resulting from their frequent illegal practices in the reserve. Additionally, rough terrain and muddy roads forced the team to walk for long distances to reach some target groups and field sites.

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

The project identified the sensitive stage of development at which *B. aegyptiaca* is mostly affected by livestock grazing and browsing.

The project determined the hotspot sites where the *B. aegyptiaca* population is declining, and a proper conservation plan has been proposed to the reserve management.

The project also raised the awareness of locals about the importance of *B. aegyptiaca* and the severity of intensive livestock browsing and overgrazing on the species sustainability and conservation. Moreover, a huge knowledge gap was discovered during the socio-economic study of the project, as many villagers were not aware of the consequences of woody plants decline on their livelihood and welfare.

4. What do you consider to be the most significant achievement of this work?

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

The local communities within and around Dinder Biosphere Reserve were the targeted beneficiaries of the project training and the offered conservation education. Locals have learned and gained knowledge on the severity of overgrazing on the recruitment of tree seedlings and saplings, and how they can distinguish between light, moderate, and severe grazing. Furthermore, for the first time, the project introduced to the locals the concept of community forests which was warmly welcomed by the villagers, and they proposed some areas to be reserved as a community forest.

6. Are there any plans to continue this work?

Yes, this project noted a real need for conservation education and awareness-raising programmes as most of the communities in the area are forest-based communities, and they depend on the forests and their products by more than 85% in their daily consumption. Therefore, besides the introduction of community forests, there is a need for other sources of income generation such as beekeeping and authorised non-timber forest products trade, which are not harmful to the environment and will contribute positively to the proposed tree species conservation plan.

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

The findings have been shared through village meetings, training programmes, seminars, and scientific papers. Out of this project, we managed to publish two research articles in the journals of Sustainable Forestry and Global Ecology and Conservation, respectively, and one poster presentation at the Agroecology conference. In addition to that, currently we submitted a third manuscript to the journal of Trees, Forests & People.

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

The project activities were severely affected by COVID – 19 pandemic and that is why most activities that required people gathering, such as training and conservation education, were postponed from 2020 to 2021 due to the complete lockdown in Sudan in 2020. Because of this challenge, the project period covered 2 years instead of 1.

9. 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
Conservation education and awareness-raising	2500	2000	-500	The 500 was used for reconnaissance survey
Transport expenditure	1600	1400	- 200	The 200 was used for reconnaissance survey
Accommodation	1200	1200		
Reconnaissance survey		700	+ 700	This amount has been covered from the conservation and transport budget as CREATES failed to support it.
Handheld GPS	330	330		
Suunto Tandem	270	270		
Stationary	100	100		
Total	**6000**	**6000**		

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

There is an urgent need for additional conservation efforts and awareness-raising programs to protect *B. aegyptiaca* and other multiuse and vulnerable tree species like *Grewia bicolor*, *Grewia mollis*, *Grewia flavescens*, and *Tamarindus indica*. Moreover, afforestation programs for the severely degraded areas can accelerate the species restoration and enhance their population dynamic.

11. 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, we used it during all training activities, awareness-raising, presentations and seminars.

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

Prof. Anna C. Treydte: Associate professor in Biodiversity Conservation and Ecosystem Management, School of Life Science and Bioengineering, The Nelson Mandela

African Institution of Science and Technology, Arusha, Tanzania. She is the main supervisor and technical advisor for this project.

Prof. Patrick Ndakidemi: Professor in Sustainable Agriculture and Biodiversity Conservation, School of Life Science and Bioengineering, The Nelson Mandela African Institution of Science and Technology, Arusha, Tanzania. He is a co-supervisor and participated effectively in managing and overseeing the successful implementation of the project activities.

Prof. Abbas M. E. Hamed: Associated professor in remote sensing and GIS applications and land use change detection, Department of Basic Sciences, College of Natural Resources and Environmental Studies, University of Bahri, Khartoum, Sudan. He is a co-supervisor and contributed efficiently to supervising the reconnaissance survey and stratification process.

Prof. Tamera Minnick: Professor in restoration ecology, Environmental Science and Technology, Department of Physical and Environmental Sciences, Colorado Mesa University, Colorado, USA. She supported the project through the analysis of biophysical data and manuscript review.

Dr. Tarig T. Hassan: Assistant professor in forest economics with a minor specialty in Non-timber Forest Products and Forest Services, Department of Forestry, College of Natural Resources and Environmental Studies, University of Bahri, Khartoum, Sudan. He guided the socio-economic study, questionnaires designing, and analysis.

Mr. Elmugheira Mockarram Ibrahim Mohammed: A PhD student in Biodiversity Conservation and Ecosystem Management, School of Life Science and Bioengineering, The Nelson Mandela African Institution of Science and Technology, Arusha, Tanzania. He is a project leader and responsible for fieldwork activities, data collection, analysis, manuscripts drafting, and final report preparation.

Mr. Abdel Jaleel M. Ahmed: A holder of Forestry BSc from College of Natural Resources and Environmental Studies, University of Juba, Khartoum, Sudan. He participated in all fieldwork activities and reconnaissance survey.

Nine Villages Leaders: They supported the project as community facilitators during questionnaire administration and individual interviews in the selected villages.

Three Forest Extension Officers: They facilitated the focus group discussions and conservation education.

Five Patrolling Guards: They offered protection services during the fieldwork activities, which took place in the transition, buffer, and core zones of the reserve.

13. Any other comments?

The project team and local community in Dinder Biosphere Reserve are thankful for the kind financial support received from The Rufford Foundation, which facilitated the currently implemented project. However, as a healthy ecosystem and a

balanced environment are common targets for most ecologists and nature conservationists, I am insisting on more awareness-raising programmes and conservation education.