Final Evaluation Report

Your Details	
Full Name	Jedidah Akawu Jacob
Project Title	Conservation of Azanza garckeana, a poorly studied, and locally threatened plant species in Nigeria
Application ID	37030-1
Date of this Report	April, 2023

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
Assess the population status of A. garckeana in Nigeria				The distribution and abundance of *A. garckeana* was assessed. The species occurs in four different locations (sub populations) in Gombe State, namely, Tula Yiri, Tula Bwaule/Wange, Dutsen Mamaki and Lawishi. The IUCN Red List Criterion B was used to estimate the extinction risk of *A. garckeana* in Nigeria based on the species' Extent of Occurrence (EOO) and Area of Occupancy metrics. *A. garckeana* EOO is 351.777 km^2 (<5,000 km^2) and the AOO is 60.000 km^2 (<500 km^2). This qualifies *A. garckeana* for the 'Endangered' category. The ontogenic stages (saplings and adults) of individuals of the four identified sub populations of *A. garckeana* were assessed. 677 (65.2%) individuals were saplings while 361(34.8%) individuals were adults. 27 (7.5%) individuals of the adult population are infected with disease. This could further threaten the species abundance and cause more decline in their range size.
Determine the best propagation technique that will facilitate the groA. garckeana growth.				We used five treatments: cold water where seeds were soaked for 24 hrs; hot water where seeds were soaked in boiled water @1000 C for 10 mins; sulphuric acid where seeds were soaked in H_2SO_4 (98% concentration) for 10 minutes; scarification; and the control treatment to break seed dormancy in *A garckeana*. We compared the effects of the treatments on the germination of *A garckeana* and proposed the best method of breaking seed dormancy for farmers. The effects of cold water and H_2SO_4 showed significant difference at $p<0.05$

				while scarification, hot water and control treatment had lower germination records.
Raise awareness for the restoration and conservation of A garckeana population.				We conducted community-based awareness campaign to sensitise local communities and other relevant stakeholders on threats facing A. *garckeana*, sustainable harvesting technique, seed dormancy breaking treatments and farmer enhanced natural regeneration. We had meetings with community chiefs, farmers, school students and plant nursery staff of three different organisation – Gombe State University, Jewel Environmental Initiative and Kanawa Forest Reserve.
Conduct tree planting campaign				In collaboration with the local community the project team planted 2005 seedlings of *A. garckeana* across Tula Yir, Tula Wange and Tula Baule. The seedlings were planted in home gardens farmlands and along streets.

2. Describe the three most important outcomes of your project.

a). The estimation of the extinction risk of *A. garckeana* in Nigeria based on the species' Extent of Occurrence (EOO) and Area of Occupancy metrics. A. garckeana EOO is 351.777 km^2 (<5,000 km^2) and the AOO is 60.000 km^2 (<500 km^2). And based on the information provided *A. garckeana* qualifies for the 'Endangered' category. Also, the population ratio of adults 361(34.8%) to samplings 677 (65.2%) and the state of health (27 individuals i.e., 7.5%, of adult plants infected with diseases) of the population indicates the urgent need for strategic conservation and management of *A. garckeana* to prevent range reduction and possible extinction.

b). This study identified cold water and H_2SO_4 as the two most effective treatment for breaking seed dormancy and enhancing germination and growth. This is presently used for the propagation of *A. garckeana* by three plant nurseries in Gombe State.

c). Our conservation awareness directly reached out to over 10000 individuals through seminar, distribution of educational materials and radio broadcast. We recorded 1825 (about 91%) individual seedling growth and establishment out of the 2005 seedlings planted.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

Pest: The *A. garckeana* seedlings were infestation by pests that damaged over 400 seedlings. We tackled the pest by using neem ash (bio pesticide). The damaged seedlings did not affect our planned number (2000) of seedlings because we raised 2467 seedlings.

The time we conducted the community awareness campaign, was mid planting season for most families. Getting people together during the day was a bit difficult, but the team went through farms to enlightened people and plant the seedlings on their respective farms. That was a bit hectic, but it was achieved.

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

The most significant outcome of these work is the estimation of the extinction risk of *A. garckeana* in Nigeria; the identification of best seed dormancy breaking techniques for *A. garckeana*; and the in-situ conservation of 1825 established seedlings of *A. garckeana*.

5. Are there any plans to continue this work?

The local people were involved throughout the project. At the start of the project the Chief of Tula (the study area) gave us a palace representative who coordinated all our meetings with the community. We hired local guides who we place on allowance during the field survey for the assessment of the *A. garckeana* population. We also engaged farmers, school students and women during our community-based conservation awareness and tree planting exercise.

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

We are currently working on two manuscripts that would be submitted to Wiley and PLoS ONE journal for publication. We hope that these articles would inform a wider audience about the population status, and extinction risk associated with *A. garckeana* population in Nigeria.

We will also make a comprehensive protocol for sustainable harvest technique and seed dormancy breaking techniques that will be shared with plant nurseries and community chiefs to guide exploitation and both in-situ and ex-situ replanting.

Our findings will also be presented at the annual conference of Botanical Society of Nigeria and one more international conference.

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

Based on our findings, pest and disease are a major threat to *A. garckeana* (fruits, leaves and stems) population that needs to be tackled urgently. Therefore, I would study the diseases associated with *A. garckeana*.

8. 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?

The Rufford Foundation logo was printed on all promotional materials used for the project. Furthermore, The Rufford Foundation will be acknowledged in all future publications.

9. Provide a full list of all the members of your team and their role in the project.

Dr Daniel Andrawus Zhigila: participated in field data collection and awareness campaign.

Ibrahim Muhammed: is the plant nursery staff that led all nursery activities for raising the *A. garckeana* seedlings that were used for the project.

Naboth Nuhu: Field assistant.

Josiah Mabe: Field assistant.

Maigari Ishaku: participated in awareness and tree planting.

Prof Danladi Umar: Supervised the entire project execution.

10. Any other comments?

Funding from The Rufford Foundation has played a major role in understanding the conservation status of a very important yet understudied plant that has ecological and socio-economic value. Findings from these studies has set a pace for even more studies on *A. garckena*.

I appreciate The Rufford Foundation for this great initiative of funding biodiversity conservation research globally. This generous support has helped many early career researchers like me who have limited access to funding. I appreciate the opportunity given to me to conduct this study. And I look forward to enjoying more funding from the foundation.