

Final Project Evaluation Report

Your Details	
Full Name	Hedegbetan Georges Codjo
Project Title	Status, threats and community-based restoration of the critically endangered <i>Mansonia altissima</i> in its natural habitat in South-Eastern Benin
Application ID	24033-1
Grant Amount	£5000
Email Address	hgeorgesc21@gmail.com
Date of this Report	12 December 2018

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
-characterize the ecological conditions of the populations of the species				Investigation from the field revealed that the species was mainly found in two types of habitats: semi-deciduous dense forest and degraded dense forest. For dendrometric characteristics assessments of <i>M. altissima</i> population, it comes out that the average density of the species was 20 stems/ha. The average diameter was 20.76 cm with an average total height was 13 m. The species showed a basal surface area of 0.84 (m ² /ha) and the diameter of tree with average basal surface area of 23.91 cm. The regeneration density was 462.12 stems/ha with 314 stems/ha of seedlings versus 148 stems/ha for saplings.
-document the influential enemies of the species				Several influential enemies of the species have been recorded in the forest, collected and appropriately conserved. Those samplings have been sent to the specialist for identification at the International Institute for Tropical Agriculture (ITA). We are now expecting the results from identification.
-test for factors affecting seeds germination and seedlings growth				Several factors have been tested for the germination of the seeds of the species: water-soaking, fertiliser amendment (100% Bokachi, 50% sand and 50% Bokachi and 100% sable). Thus, the germinability of the seeds before and after water soaking treatments, and use or not of amendment; the number and size of the leaves produced in the resulting seedlings were also measured. The best result was obtained for the seeds subject to

			non-soaked seeds in water with a combination of sands and biological fertiliser (here 100%). Seeds soaked in water and subject to use of only bokachi fertiliser produced the lowest germination rate (40%). Meanwhile, some mortalities of seedlings have been recorded also during implementation of the research. Maximum number of leaves obtained for all treatments was four.
-disseminate information gathered to the public through seminar workshops, presentations and publications			Results from ecological characterisation of the species have been shared with locals. Plans are made to share outputs from the influential enemies' identification and results from the germination

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

Data collection for the influential enemy of the species was expected to take place during March-April 2018. This often coincides with the starting of the first wet season in the Guineo-Congolian zone. Unfortunately, some delays were observed for the starting of the season thus leading to delay in the appearance of the enemies too. The rains were also very scarce in the areas and highly influence the development of the species parasites. It was thus very difficult to collect some. This needs further complementary collection.

For the germination test, some unexpected insects (not specific to *Mansonia altissima*) attack the seedlings and contribute to increase of the mortality in tree nursery. In addition, water was provided normally to the seedlings in nursery. But we observed some yellowing of the leaves probably due to non-mastering of the adequate water dose for optimal results. These need further investigation too.

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

a). Investigation from the field revealed that the species was mainly found in two types of habitats namely semi-deciduous dense forest and degraded dense forest. For dendrometric characteristics assessments of *M. altissima* population, it comes out that the average density of the species was 20 stems/ha. The average diameter was 20.76 cm with an average total height was 13 m. The species showed a basal surface area of 0.84 (m²/ha) and the diameter of tree with average basal surface area of 23.91 cm. The regeneration density was 462.12 stems/ha with 314 stems/ha of seedlings versus 148 stems/ha for saplings.

b). Several influential enemies of the species have been recorded in the forest, ranging from the caterpillars to the butterflies and beetle. They have been collected, photographed and appropriately conserved. Those samplings have been sent to the specialist for identification at the International Institute for Tropical Agriculture (IITA). We are now expecting the results from identification to definitely be aware of the influential enemies currently collected and recognised for the species.

c). In the frame of the experiment, several factors have been tested for the germination: water-soaking, fertiliser amendment (100% Bokachi, 50% sand and 50% Bokachi and 100% sable). Thus, the germinability of the seeds before and after water soaking treatments, and use or not of amendment; the number and size of the leaves produced in the resulting seedlings were also measured. The best result was obtained for the seeds subject to non-soaked seeds in water with a combination of sands and biological fertiliser (here 100%). Seeds soaked in water and subject to use of only bokachi fertilizer produced the lowest germination rate (40%). Meanwhile, some mortalities of seedlings have been recorded also during implementation of the research. As regards the number of leaves produced by the each seedlings, the maximum number of leaves obtained for al treatments was 4.

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

Local people/communities have been fully involved in the project. First, they were the ones to help for field works as guides, associate or curious (just to go with you and see what is being doing). Next to that they also helped in identifying localities where we could go and effectively collect the enemies of the species. Furthermore, they helped to get the topsoil from the forest and also prepare the different amendments for the essays. Finally they were at the front of the environmental campaigns which indeed targeting their awareness raising regarding the current status of the species and calls for timely and urgent conservation strategies.

5. Are there any plans to continue this work?

This is just the first part of a full project being developed on the species for further set restoration plans and change its status from threatened to Least Concern.

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

Part of the project findings has already been shared with locals through environmental education. However, remaining part of the results will be shared through participation to workshops, conferences, and trainings section. A paper will also be prepared together with a factsheet once the germination test is ended.

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

The grant was used from 15 January to 12 December 2018. It fits quite well with the anticipated length of the project

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
Exploratory fieldwork	400	400	0	
Sheets preparation for data collection	100	100	0	
Travel to reach all investigation sites	250	300	50	Travels cost were more expensive than expected
Battery for cameras and GPS	240	200	-40	We bought the battery in deals season for the shop. As such it was cheaper
Consumables (Paper, pens, literature, flipchart and external disk)	250	200	-50	Consumables were also bought in deals season to be cheaper
Enemies collection and identification	575	500	-75	Less bottles were acquired due to the particularity of the rainy season
Motorbike hiring	350	390	40	Motorbike hiring has increased in the area due to existence of political meeting in the fieldwork season
Fuel for motorbike	525	600	75	Some increase has been noticed in fuel price internationally.
Subsistence payments for guides	580	580		
Forest soil acquisition and transportation	250	250		
Pots acquisition for propagation test	200	200		
Installation and follow-up of the experiment	525	525		
Rooms hiring rooms + small equipment hiring for	355	355		

workshop				
Communications (telephone and internet)	400	400	0	
TOTAL	5000	5000	0	

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

Next steps of this research are too deep the investigation on the complementary enemies' collection and follow up the germination by controlling for water stress.

In addition to all already done, other objective to pursue are:

- Project potential responses to future climate and anthropogenic disturbances.
- Scale-up public education and awareness creation towards conservation of the species.
- Assess the adaptability of *Mansonia* to its restoration habitats.
- Monitor efficiently the existing and newly established population of the species.
- Set a long-term participatory approach for revegetation of the habitat of the species for after project activities.

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, Rufford logo was used during environmental education sessions. The foundation and its donors will be acknowledged in the factsheets, publications and presentations to come soon.

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

HEDEGBETAN Georges Codjo, MSc. As the main responsible for the project, I have been fully involved in all project activities.

GLELE KAKAI Romain, PhD. He is a full Professor in biostatistics and forest estimations. He provided useful advice in data collection and processing.

ADOMOU Aristide, PhD. He is currently a Full professor of Botany. He helped in characterizing the habitat of the species

GEORGEN Georg, PhD. He has been contacted as the starting of the project and is currently helping in the enemies' identification

HOUENOU Ezeckiel, MSc. He helped in dendrometric data collection and enemies and attacks data collection

GANDAHO Cléo-Claudia, she helped in the seeds' collection and follow-up of the nursery.

Other local people, local community, extension workers, NGO representatives and forest officers were involved in training sections

12. Any other comments?

We thank the foundation and its donor for such an opportunity. We would also be happy if we were accompanied in the continuation of the ecological restoration activities targeting the species and its landscape of occurrence in general.



Left: Leaf collection. Right: *Mansonia altissima* leaves attack.



Left: Pots preparation for germination test. Right: *Mansonia altissima* seedlings.