Final Project Evaluation

Your Details	
Full Name	Zekeng Jules Christian
Project Title	Ecology, spatial modelling of high-priority species for conservation and Community-based involvement in their conservation in the Doume Communal Forest Cameroon
Application ID	29322-2
Grant Amount	£6000
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Date of this Report	January 18th, 2021

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
Carry out high-priority species description and the assessment of their socio-economic and ecological values			■	A socio-economic survey of 670 people in 16 of the 22 villages in the Doumé district provided information on the socio-economic importance (e.g., food, traditional medicine, and sources of income for local people) and ecological values (e.g., shade in agroforestry systems, protection against climate change, etc.) of the high conservation priority species studied.
Determine the spatial modelling distribution of these high-priority species using data analysis of forest inventory, remote sensing, and GIS		■		We partially achieve this objective because statistical and cartographic analyses in progress have already allowed highlighting the spatial distribution of about 10 of the 29 high-priority species identified during the botanical inventory.
Carry out a description of habitat and assessment of habitat loss of these high-priority species in the Doume communal forest			■	We have described the habitat and habitat loss of 29 out of the 50 high-priorities species for conservation in consideration because only these were identified during the botanical inventory.
Evaluate population trends, and threats on these high-priority species in the Doume communal forest			■	Using the inventory data, literature review data and perceptions point of view of riparian populations collected during interview and questionnaires administration, we provided populations trends and threats to the high priority species for consideration.
Information/awareness session on conservation and alternatively activities other than those which can reduce habitat loss and therefore promote			■	Contrary to what was planned and given the COVID-19 pandemic constraints, to sensitize and be aware of the maximum number of people, the sensitization sessions were carried out during the socio-

conservation of biodiversity				economic surveys
Session to collect the strategic needs and interests of riparian peoples in high-priority species for conservation				The socio-economic survey helped us to collect information on what ecosystems services, what needs, and where local riparian peoples collect them in the Doume Communal Forest.
Carry out a workshop to empower local managers in order to practice forest resources management and biodiversity conservation				Four members of the Doumé communal forestry cell as well as 12 local leaders of six villages of the Doumé Council have seen their capacity in good practices of biodiversity conservation a sustainable management enhanced during 2 working days.
Make a proposal for improvement of high-priority species management and conservation in the DCF				Socio-economic data, field observations and focus group and workshop discussions led to proposals for in situ and ex situ conservation of the high priority species studied.
Communication and dissemination of the project results.				This activity has begun (e.g., master's thesis defence; draft strategies proposal) and will be continued even after the project when possible.

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

The COVID-19 pandemic was the major difficulty we faced during the implementation of this project. All activities of socio-economic surveys, sensitisations had to be rescheduled several times. Indeed, the COVID-19 pandemic forced us to revise the deployment strategies to obtain the expected results concerning mainly the training and sensitisation activities. Thus, the socio-economic survey phases were matched with an awareness phase.

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

1. As this project is the continuation of our 1st Rufford Small Grant project, we also continued in the same way by reinforcing the capacities of four members of the communal forestry cell of Doumé and local guides. To this end, this capacity building focused on the approach to be followed during the installation of a transect to carry out a botanical inventory, the use of a GPS to take the geographical coordinates of the trees within the framework of an inventory, and the methods of socio-economic surveys. In addition, four students and at least of four volunteers of the CSNRM-NET organisation were involved in the project and also benefited from this capacity building. In

addition, this project has started for two students and will contribute to the personal and professional development of the other remaining two students involved in the project by helping them achieve and defend their master's theses.

2. The socio-economic phase confirmed the high pressure on forest resources already observed in this communal forest. It also highlights the practice of agriculture in the communal forest of Doumé to the detriment of the forest. In addition, it highlights the problems of poor management of forest resources. Concerning direct anthropogenic pressure on the high-priority species studied, we found their non suitable exploitation due to economic value of some of them and the habitat loss. The populations surveyed were made aware of the concepts of conservation and sustainable management of forest resources.

3. The botanical inventory was carried out in a total area of 50 ha using 10 transects of 2500 x 20 m. Only 29 high conservation priority species (a total of 833 individuals) out of the 50 target species were identified and inventoried. Moreover, along each transect, five habitat types (i.e., field, fallow, mature secondary forest, young secondary forest, and periodically flooded swamp forest) were identified and characterised. Their GPS points were also collected. The density of inventoried target species ranged from 0.2 individuals/ha to 4 individuals/ha.

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

As mentioned above, four members of the communal forestry unit were involved in all project activities and thus had their capacity strengthened in various areas, namely: (i) the installation of an inventory device, in this case, the transect; (ii) the use of GPS for delimiting habitats and taking geographical coordinates of trees during the botanical inventory; and (iii) socio-economic survey techniques. In addition, their presence during the workshop where we have shared our experiment have improved their knowledge of conservation strategies and/or best practices to implement for a sustainable high priority for conservation species.

In addition to the members of the Doumé communal forestry unit, in each village, the chief and sometimes some of their notables were involved in the organisation and planning of the focus groups. In this case, they were also sensitised and then they had improved knowledge on best practices to enhance sustainable management of their resource

Finally, the council worked hard to ensure the effectiveness of this project during the COVID-19 period. To this end, we are working and will continue to work with them to develop and implement strategies for the conservation and sustainable management of high-priority species for conservation.

5. Are there any plans to continue this work?

Yes. Very close links have already been established not only with the local populations close to the Doumé communal forest but also with those responsible for the communal forest. At this stage, we note a particular enthusiasm of the officials of the council to work with us for future projects of biodiversity conservation and sustainable management as they have begun to understand such project need for their communal forest. Therefore, the results of the present study allow us to foresee an urgent need to carry out reforestation projects for species with high conservation priorities whose small population sizes have been observed and also to propose projects for the restoration of degraded habitats of these species. For that, I plan to propose a reforestation project for the 1st Booster Grant that would support reforestation projects of some high priority species for conservation in the Doume Communal Forest.

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

Just like our 1st Rufford Small Grant, the first beneficiaries with whom we shared the results of this study are the Doumé council members and particularly those members of the Doumé communal cell who were not involved in the project. A final research report will be submitted to them as soon as possible. A copy of all our publications will be sent to them as they come out.

We shared the results of our project with the local management of the Doume Communal Forest. We also wrote a research report that we sent to them.

The interesting results of this study will be the subject of scientific presentations at international conferences in the coming months. Three scientific publications are currently being finalised. The results of this study are already being presented in seminars by the four master's students involved in the project. These results had been subjected to public defence by two students and will be done in the coming days by the two remaining students involved in the project.

Lastly, we will share our work via my social networks (e.g., ResearchGate, Facebook) and via the webpage (www.csnrm-net.org) of the local organisation Conservation and Sustainable Natural Resources Management Network (CSNRM-NET) that we have created with other researchers, and that we are the CEO to promote biodiversity conservation and others research aspects.

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

The period of the work for this RSG was August 2020 to November 2021, with funds spent from November 2020 to January 2021, and from September to October 2021 for the socio-economic survey, from April to June 2021 for forest inventory, and November 2021 for the workshop. This is a bit longer than anticipated length (we expected to finish in August 2021) due to unforeseen difficulties we encountered with the COVID-19 pandemic

Note: there is remaining work concerning data analyses and write-up the data, and I will continue working hard on this for the next months.

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
Processing and data analysis, communication, publication	£1000	£400	-600	The amount of item processing, data analysis, communication has been revised downward to compensate for the surplus of students and volunteers integrated into the project. Thus, the amount saved (£600) has allowed balancing the surplus of transportation (-£300) and nutrition (-£300).
Daily Subsistence (DSA) field team	2100	2400	+300	
Transportation (to finance three trips (Yaoundé-Doume, Doume-Yaounde) for 9 people. The remaining field team member will be found at the Doume as they are an employee of the Doume Council. Doume has situated approximately 300 km from Yaoundé.	1500	1800	+300	
Workshops and training sessions	£1000	£1400	+400	The surplus of £400 was assumed by the CSNRM-NET organization.
Local guide & porter	400	400		Completed as planned
Total*	**£6000**	**£6400**	**-£400**	**The surplus of £400 was assumed by the CSNRM-NET organization.**

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

The most important next step is:

Socio-economic surveys, awareness-raising activities, and the workshop helped determine the activities to be implemented to reduce the causes of degradation and deforestation in the Doumé communal forest.

(i) As an activity, we could strengthen the capacities of the populations to practice income-generating activities (beekeeping and fish farming).

(ii) Continue to sensitise the population to go towards conservation and encourage and support the commune of Doumé in its actions of conservation and sustainable management of its resources. To this end, we will encourage the volunteers of the CSNRM-NET organisation in particular and those involved in this project to develop conservation projects in this commune.

The results of the botanical inventories inform us of two types of actions to be taken in the next phases.

(i) This study has allowed us to determine the degraded habitats of species with high conservation priority and therefore restoration activities of these environments could be welcome.

(ii) This study also provides information on the low density of certain high priority species for conservation. Indeed, we note a density ≤ 0.22 stems/ha for some species (e.g., *Baillonnela toxisperma* and *Autranella congolensis*). To remedy this, in situ conservation or reforestation projects using these species are urgently needed.

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, the logo of The Rufford Foundation has been and will continue to be used during the presentation of the results of the project. We have used the logo of RF during workshops and training sessions at the hall of the Doume Council Town. We were also supposed to make presentations at two international conferences but due to the COVID-19 pandemic, the conferences were cancelled.

In the project, four master's students were involved and two have already defended their master's thesis and the logo of Rufford was future in their presentation during their defence. The outcomes of the study are the scientific publications, which in the three manuscripts in finalisation, the RF is well acknowledged. Copies will be made available to the RF when published. The RF logo will be posted on the website of the CSNRM-NET as the funder of the project.

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

Collaborators or resources persons:

Dr. MBOLO Marie Marguerite (Professor): Former thesis supervisor at the University of Yaounde I, Cameroon. She gave and continue to give us advice in terms of forest ecology and conservation.

Dr. Maginot Ngangyo Heya (Senior Lecturer at the Facultad de Agronomía, Universidad Autónoma de Nuevo León (UANL**):** He is a great collaborator and I have benefited of his expertise in Natural resources management since my Ph. D studies. He also contributed to the scientific valorization of this project.

Dr. FOBANE Jean Louis (Senior lecturer): Specialist of He was helpful for the planning of the fieldwork and will continue to contribute to the writing of papers as he is a specialist in botany and forest ecology.

Field team:

Dr. ZEKENG Jules Christian: Project Manager, field team member.

Dr. CHIMI DJOMO Cédric: Program Manager at Conservation and Sustainable Natural Resources Management Network (CSNRM-NET) and Researcher at the Ministry of Scientific Innovation. A field team member, botanist and ecologist; He has contributed immensely to the mentoring of young students and volunteers within the CSNRM-NET organization.

This project contributed to building the capacity of all students and volunteers at the Conservation and Sustainable Natural Resources Management Network (CSNRM-NET) in several areas, namely (i) techniques of selective botanical inventories; (ii) techniques of socio-economic surveys; and (iii) management of human resources during the realization of the various activities of a project.

Mr. TCHONANG DJOUMBI Bienvenu, Ph.D. student in plant ecology and conservation, Project Manager assistant, and volunteer at the CSNRM-NET.

Mrs. CHOUPOU MATAMO Nicole Fleury, Msc student and volunteer at the CSNRM-NET. Field team member and ecologist. She was co-responsible for the management of logistics and human resources during the socio-economic survey phase of the project.

Miss SAKOU WANDJI Rozane, Msc student and volunteer at the CSNRM-NET. Field team member and ecologist. She was co-responsible for the management of logistics and human resources during the socio-economic survey phase of the project.

Miss MAKOUTSING TALLA Ameline Clarence, **Msc student and volunteer at** the CSNRM-NET. Field team member and ecologist. She was responsible for the management of logistics and human resources during the botanical inventory phase of the project.

Miss Ngo Ngue Chimène, field team member, MSc student (She analysed botanical inventory data of a few competing species to produce her thesis Master of Science).

Miss Mbiada Tchamba Ismaëlle, field team member, MSc student (She analysed botanical inventory data and socio-economic data to produce her thesis Master of Science).

Miss Nitcheu Tcheugoue Sylviane Sorelle, field team member, MSc student (She analysed botanical inventory data of a few high-priorities species for conservation to produce her thesis of Master of Science).

Miss Ngueuting Isabelle, **field team member, MSc student** (She analysed socio-economic data to produce her thesis Master of Science).

Mr. Tsile Patrick is a botanist, and hence he assists with plant identification in the field during botanical field inventory.

Mr. Deugoue Guy: Doume field team, transect materialization.

Mr. Essomba Pierre: Doume field team, transect materialization

Mr. BINDZEME ROSTAND: Doume field team. He has significant knowledge about plants and their uses in the locality, and hence he was very helpful in determining the actual threats to the species.

Mr. GUEDION ARNOLD: Doume field team. He has significant knowledge about plants and their uses in the locality, and hence he was very helpful in determining the actual threats to the species.

12. Any other comments?

We are grateful to The Rufford Foundation. Their support in this project was essential to continue with the conservation of species with high priorities in the Doume Communal Forest in eastern Cameroon. We know that these are difficult times due to the pandemic COVID-19 that we are experiencing. Nevertheless, we are comforted with the fact that our project was carried out with great enthusiasm and the objectives set could be met. We still have some objectives to meet, which we are sure we will share the results with you in the future. Thank you to Jane and her entire work team for the attention and facilities she gave us. We remain open to future collaborations and new goals to meet.

Scientifics production from the project in process
Currently, we are in progress for finalizing three scientific papers which will be submitted by probably next month.

Master's students trained

Miss NGO NGUE Chimène, 2022. "Ecologie et distribution de quelques espèces concurrentielles dans la forêt communale de Doumé, Est-Cameroun ». Master of Science, Plant Biology Department, Faculty of Science, University of Yaoundé I. Defence upcoming.

Miss MBIADA TCHAMBA Ismaëlle, 2021. « Dépendance des populations locales vis-à-vis des services écosystémiques de la forêt communale de Doumé, Est-Cameroun ». Master of Science, Plant Biology Department, Faculty of Science, University of Yaoundé I. 71 p. Defence on 16th December 2021.

Miss NITCHEU TCHEUGOUE Sylviane Sorelle, 2021. « Ecologie et distribution de quelques espèces prioritaires pour la conservation dans la forêt communale de Doumé à l'est Cameroun ». Master of Science, Plant Biology Department, Faculty of Science, University of Yaoundé I. 65 p. Defence on 19th November 2021.