# The Rufford Foundation
# Final Report

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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**

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| **Grant Recipient Details** | |
|---|---|
| **Your name** | Magdalene Namondo Ngeve |
| **Project title** | Incorporating local ecological knowledge and scientific research towards the management and sustainable use of mangroves of the Cameroon |
| **RSG reference** | 20820-2 |
| **Reporting period** | December 2016 – December 2017 |
| **Amount of grant** | £5000 |
| **Your email address** | ngevem@yahoo.com |
| **Date of this report** | 15th January 2018 |

**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 |
|---|---|---|---|---|
| Assessment of local ecological knowledge (LEK) and valuation of mangroves in communities of the Cameroon Estuary complex | | | | Please refer to comment 1 |
| Assess (undocumented) threats and create awareness in local communities on the conservation of mangroves, through sensitization in education campaigns and focused group discussions | | | | Please refer to comment 2 |
| Integrating LEK and scientific research in designing conservation guidelines for these forests | | | | Please refer to comment 3 |

**Comment 1:** This objective was fully achieved following the administration of semi-structured questionnaires. A total of 660 respondents from all the three local communities participated in the survey and revealed changes in the mangrove ecosystem that surrounds them; their perception of mangrove valuation, their perception of mangrove degradation and decline, and their perception of government regulatory efforts (and bans) on mangrove exploitation. A manuscript is currently being prepared on this major aim of the project. Significant variation in the perceptions existed across age groups, gender, occupation, and more importantly among the three different studied communities. Data analyses is currently being carried out.

Most of the respondents indicated that the mangroves are changing negatively. For example, over 70% of respondents indicated that there were some places where they used to go to cut down wood but they longer go to those places because the mangroves are no longer there; while 80% agree that the mangroves are over-exploited. And as expected, the decline in mangrove trees results in the decline in the fauna. Local people said that there have been changes over time in the different fauna which they used to hunt from the mangrove forests because some animals (alligators, snakes and monkeys) are no longer very abundant, or now occur only seasonally, while some others mentioned that the animals have moved deeper into the sea (into the seaward mangrove stands) and

are, therefore, not as accessible to them as they were before. Others attested that because trees have been fallen and people now leave even closer to the mangroves than before, "noise has scared some of the animals away". Nevertheless, only about half of the respondents saw practices such as sand extraction, fish drying, as harmful to the mangroves, although the majority think that over exploitation and illegal logging remain the major threats to these mangroves.

Local communities are generally aware (80%) of the government bans on mangrove logging, however, not so many agree that such regulations are good/fair. They suggest that other governmental efforts, such as increase in employment opportunities, and provision of better fish drying technology, will automatically result in the reduction of mangrove logging. Others however think that employing forest guards to protect the forests is the way forward to curb illegal logging.

Although almost all local people value these ecosystems because of their provisioning, regulatory, and ecosystem services, and as such would like to contribute to their protection (participatory forest management); too many (> 75%) are completely dependent on the mangroves as a source of income. As such, some respondent said they could sell the mangroves if they were not marshlands. However, others believe the mangroves are worth much more than anyone could ever pay for; and with such value, they are willing to participate in their protection.

**Comment 2: a).** *Profiling of threats to the CEC mangroves*: As was initiated in the last project, we carried out focused group discussions and field assessments to profile in detail the major (undocumented) threats to mangroves in the Cameroon estuary complex. From focus group discussions, these mangroves are plagued by a plethora of threats that is resulting in their degradation and decline. Excessive illegal logging which is borne from poor implementation of government legislation on mangrove protection and the absence of forest guards ranks as the major threat. However, threats like depredation from molluscs (periwinkles) and primates severely reduce the viable seed load of the forests and thereby restricting natural rejuvenation in most areas. This as well has strong impact on the reforested areas which are very close to natural stands with a high predator burden. This is addition to the invasive plant species (*Nypa fruticans* and *Eichhornia crassipes*) and pollution pressure, which is higher in the southerly populations of this estuary, and the sand/mangrove sediment extraction pointed out in our first project. Sand/sediment extraction, being a major source of income, was not considered a threat to the mangroves by local leaders and other members to the communities, although this activity severely affects sediment stability and likely reduces mangrove recruitment chances. This could either be an act of negligence or ignorance. Although most people acknowledge illegal logging to be the major threat, most others reported that natural phenomena (depredation and floods) severely affect the mangroves, but not sand/sediment extraction. We strongly advocate for more education campaigns to create awareness of deleterious practices of local people on these mangrove ecosystems. This objective was fully achieved and a short article has been published to highlight the sand/sediment extraction problem that these mangroves face.

Based on the focus group discussions we had, local people seem to rank the different threats on these ecosystems differently from established scientific facts, probably because most do not want to acknowledge that some of their practices directly harm the mangroves or because they are completely ignorant. Below is the profiling by local people vs. scientific facts of the threats on these mangroves, ranking done based on importance, from most important threat (1) to least important threat.

| Local people | vs. | Field/scientific observations |
|---|---|---|
| 1. Over exploitation.<br>2. Depredation (by periwinkles and monkeys).<br>3. "Unemployment"<br>4. Sea level rise<br>5. Global warming<br>6. Pesticide leaching from inland plantations<br>7. Illegal logging | | 1. Deforestation for agriculture and urban development.<br>2. Uncontrolled/illegal logging for firewood.<br>3. Encroachment (expansion of human settlements).<br>4. Sea level rise.<br>5. Sand extraction.<br><br>See: Nfotabong-Atheull et al., 2009, 2011, 2013; Ngeve, 2016. |

Additionally, education campaigns were carried out in two of the three studied communities, where a technical report summarising our findings from the survey were presented to the chiefs and then other members of the communities were sensitised to value the mangroves more not just because of their provisioning services, but also because of their regulatory services (without which some of them will be forced out of their homes by floods), and because of their ecosystem services (which further promotes their provisioning capacity as whole system). Also, during the field work, a sense of "the mangroves belong to the government so we don't need to protect it" was detected from some people in the communities. During our education campaigns, we encouraged the people to see the system as theirs, as much as the governments and with that mindset, strive to protect them for the coming generations to have their fair share of the benefits these ecosystems provide.

**b).** *Awareness enhancement and sensitization*: Education campaigns were carried out in the studied communities and participants were stakeholders of the mangroves, i.e., community heads, local chiefs, community title persons, quarter heads, and other leaders of the mangrove community. The aim was to foster positive behavioural shifts in the members of these communities that would positively impact the mangroves around them. During this campaign, feedback was given to the people based on the information we had acquired during field survey on assessing LEK. The main emphasis to the local people was that since mangroves are largely threatened by their actions (anthropogenic activities), if given a chance right away, the mangrove would recover from the disturbed state. The community members were also applauded for recognising that the mangrove around them was depleting, thus high time to act. The people were encouraged to consider the mangroves as everyone's, rather than 'government' property; then they would see them more than a mere source of income, but a heritage to uphold and protect to allow the younger /coming generations to partake of all their benefits. The main question of the local people was: "How do we consider the mangrove ours, when the government has banned the logging of

mangrove wood which is one of our main source of income?" we explained to them that the government's ban is just an attempt to enable sustainable use of mangrove resources, which is beneficial to the community. The take home message for this concern was: "Seeing the mangrove as government property would only justify over exploitation by your community as a means to rob a government that does not provide for its citizens (you and your community). If the mangroves are all destroyed, your community will be the first to suffer. They are yours and they protect and provide for you, so protect them also."

In the end, the people welcomed the initiative to actively take part in protecting the mangrove, via sustainable exploitation and participatory forest management efforts (such as reforestation of degraded areas). This shifts their behaviour from exaggeration on logging to sustainable use of the forest and its resources; to change from seeing the mangrove as government property that they can "steal" from, to seeing them as their property to protect. The local people were more open to the idea of sustainable exploitation, knowing that the findings and recommendations were based on their responses.

One community's chief expressed appreciation to the Rufford Foundation, and to our research team for coming back to educate the community after the completion of initial survey, which assessed LEK. He was glad that his community was aware of how important the mangroves are to them and their willingness to protect it. His final word was to his quarter-heads and other mangrove community leaders, asking them to ensure the sustainable use of mangrove resources.

**Comment 3:** Extensive literature review on the Cameroonian mangroves and particularly on those of the Cameroon Estuary, the state of the art, current management efforts and measures, as well as lessons on successful mangrove management efforts in different parts of the world, has been performed and assembled. However, because data analyses of our findings on LEK are still underway, we cannot really integrate both to design improved conservation guidelines for these forests at this moment. However, upon the completion of the LEK analyses, this would be done and presented to the necessary authorities and local NGO's, and used in future projects to further educate the local communities.

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

This project, which was supposed to start in December of 2016, started in January of 2017 due to the onset of the socio-political unrest in Anglophone regions of Cameroon, which occurred in the end of 2016 and early 2017. This was unanticipated so it slowed down the commencement of the field work as our team members were not free to commute and sample the studied communities. It also caused some respondents in the communities to be sceptical/afraid to participate in the survey. Additionally, some respondents were unwilling to respond to the questionnaires (especially in Mabeta) because they feared that they would be asked to stop cutting down the mangrove trees. In some areas, focus group discussions were affected by a variation in the literacy level of members of a

focus group. In such cases, the team had to adapt to the challenge. All these led to a lengthier field period.

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

a) In-depth understanding of the perception of the mangrove ecosystem by the local communities; and how these perceptions and LEK vary among communities in this complex estuary.
b) Capacity building in these communities on mangrove conservation should be achieved. Also, raising awareness in local communities on mangrove conservation and valuation. Mangrove community leaders and local chiefs developed interest in mangrove reforestation and decided to start up a nursery of mangrove trees. From the education campaigns, the local people unanimously decided to practice sustainable use of mangrove resources and participate in the conservation of the forests, followed up by the mangrove leaders.
c) Profiling of threats on the mangrove ecosystem based on LEK vis-à-vis scientific observations.
d) Drafted conservation scheme for the mangroves of the Cameroon estuary complex indicates that it is not a one-size-fits-all for all the communities because of the inter community variations in perceptions of the mangroves. Local communities vary not only perceptions of the mangroves, but also in their structure and accessibility to the mangroves, and their overall willingness to participate in mangrove conservation. As such designing a single detail, general, conservation scheme may be tricky to design. However, a stratified scheme may be more productive – one that will group communities/mangrove areas based on the similarity in their structure, perception and level of awareness together to follow a given conservation plan. Reasons why more communities need to be educated and studied.

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

Local people participated in every aspect in the field for the realisation of this project. They constituted the respondents of the questionnaires, and the participants of the focused group discussions and the education campaigns. They were also the primary beneficiaries of awareness raising via the education campaigns we conducted; they got sensitized about the value of the mangroves surrounding them and how they can actively participate in and make behavioural changes toward their protection.

**5. Are there any plans to continue this work?**

Yes, more sensitisation, more education campaigns, more workshops, target different age groups and educate the local communities.

All communities need to be of one educational level so that a general conservation scheme can be used. Together with local NGOs, we plan to carry out a more far reaching sensitisation campaign. One that will ensure capacity building and mangrove conservation drive in more dwellers and schools in the communities

bordering mangroves of the Cameroon estuary complex and beyond. The goal is to change the status quo of the CEC being the most anthropised mangrove area in Cameroon, against the backdrop of the increasing population and economic development in the surrounding cities and areas of the CEC. Therefore, we have plans to apply for a Rufford Foundation booster grant to carry out our project to further and expand the education of local communities and students on mangrove ecosystem conservation, one that will have a wider impact towards positive behavioural adjustments for the conservation of the mangroves of the CEC.

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

When data analyses are complete, manuscript(s) would be written and published in international peer-review journals. Additionally, the Resource Center for Environment and Sustainable Development (RCESD Cameroon), which is an NGO which was actively involved in this project, will make the findings publicly available. The findings therefore are available for the perusal of different stakeholders and other NGO's involved in the protection of mangroves. RCESD Cameroon also trains interns from time to time, as such the findings will be available to emerging nature protection scientists.

**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 Foundation was the primary sponsor of this project. As such, the grant was used for the entire 12 months of the project. Funds were received in December 1st 2016 and the project commenced January 14th 2017.

**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 |
|---|---|---|---|---|
| Travel and transportation related costs | 2000 | 1600 | -400 | Cheaper air tickets at the time of booking |
| Fuel and hiring of speedboats and canoes | 550 | 650 | 100 | |
| Permits, site feasibility assessment, printing of questionnaires, didactic materials, T-shirts, & banner | 1200 | 900 | -300 | Estimated amount was higher than actual amount because of a good deal we achieved with a printing company. |

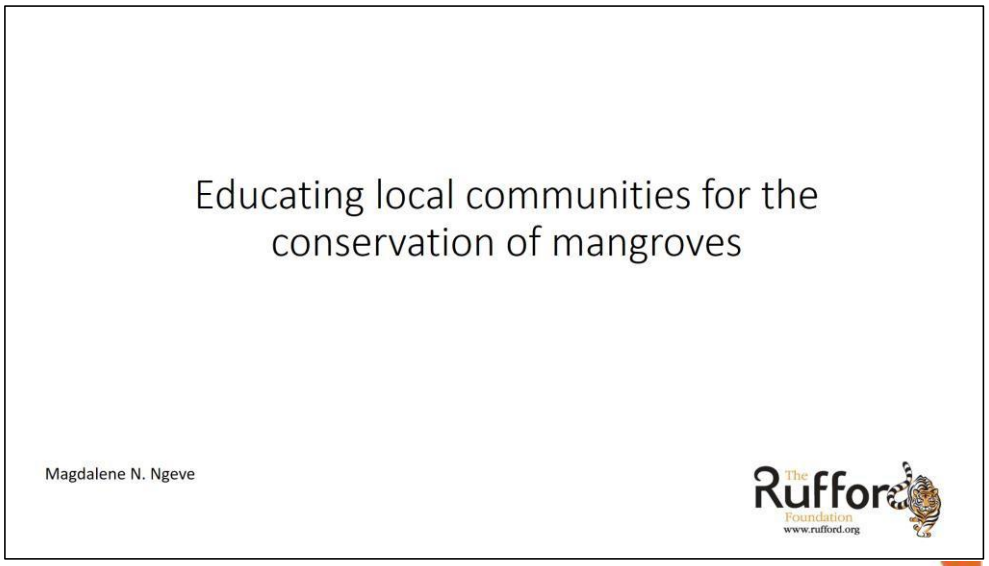
| | | | | |
|---|---|---|---|---|
| Projector, projector stand & microphones | 200 | 0 | -200 | We did not find strong relevance for this since most of the target group were not literate, so the funds were reallocated for other expenses. |
| Communication cost | 0 | 50 | 50 | |
| Sensitization meetings with community heads and introduction of research | 0 | 350 | 350 | |
| First aid for research-incurred injury | 0 | 30 | 30 | |
| Food and Accommodation | 300 | 350 | 50 | |
| Field guides & Training of extra staff for interviews | 300 | 450 | 150 | |
| Video camera | 300 | 0 | -300 | Funds were reallocated for other crucial items on the budget list. |
| International money transfer & wiring cost | 0 | 567 | 567 | Unexpected cost incurred from bank wiring charges. |
| Miscellaneous | 150 | 275 | 125 | |
| **Total** | **5000** | **5222** | **222** | |

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

The outcome of the education campaigns and the field surveys was impressive. Many of the local respondents indicated that sensation campaigns are a way forward to educate the people of the detriments of their actions and how they can be part of conserving the mangroves. Therefore, more sensitisation is needed. Ones that will target larger groups, different age groups, students and pupils of many schools around the mangrove communities and beyond. Such wider education campaigns to educate local people and different stakeholders on the protection of mangrove ecosystems will go a long way to ignite the passion to conserve the mangroves by the local people. By so doing, the communities will not be working against the government's legislations but will rather help them to be enforced by defaulters. Therefore, we plan to apply for another Rufford Foundation grant to carry out more sensitisation campaigns. We also hope to partner with different local NGO's, to air some of our findings on local TV and even broadcast future education campaigns; that way our efforts will have further impact than just on the local communities

**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?**

Yes. We used the Rufford Foundation logo on posters, presentations, including the presentation slides used in education campaigns. Additionally, the logo was imprinted on the T-shirts used for the education campaigns (see photo gallery at the end of the report).




Acknowledgements

VRIJE UNIVERSITEIT BRUSSEL International Relations and Mobility Office

United Kingdom

## 11. Any other comments?

On behalf of my team, I would like to sincerely thank The Rufford Foundation UK, for enabling the realization of this project and the findings, through the grant I received.

Below is a photo gallery of some field moments.

Our team arrives at the mangrove wood market in Tiko

Our team arrives at the mangrove wood market in Tiko


Our team administering questionnaires


Cross-section of participants at an education campaign and one of our presenter

Participation by some mangrove community leaders at an education campaign

Some of our team members take a pose with some leaders of a local community

**Useful references**

Nfotabong-Atheull, A., N. Din, and F. Dahdouh-Guebas, 2013. Qualitative and quantitative characterization of mangrove vegetation structure and dynamics in a peri-urban settings of Douala (Cameroon): An approach using airborne imagery. Estuaries and Coasts 36: 1181 – 1192.

Nfotabong-Atheull, A., N. Din, L. G. E. Koum, B. Satyanarayana, N. Koedam, and F. Dahdouh-Guebas, 2011. Assessing forest products usage and local residents' perception of environmental changes in peri-urban and rural mangroves of Cameroon, Central Africa. Journal of Ethnobiology and Ethnomedicine 7: 41.

Nfotabong-Atheull, A., N. Din, S. N. Longonje, N. Koedam, and F. Dahdouh-Guebas, 2009. Commercial activities and subsistence utilization of mangrove forests around the Wouri estuary and the Douala-Edea reserve (Cameroon). Journal of Ethnobiology and Ethnomedicine 5: 35.

Ngeve, M., N., 2016. Man & nature conflict: Are the Wouri people in Cameroon despising the mangroves? rcesdcam.org, September 2016.