

Final Project Evaluation Report

Your Details	
Full Name	Dominique Mieguim Ngninpogni
Project Title	Influence of seasonal variation in the abundance, distribution and condition factor of endemic fish populations of Barombi Mbo, Crater Lake (Cameroon).
Application ID	23084-1
Grant Amount	£4,996
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Date of this Report	22 August 2019

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 seasonal variation of physico-chemical features of the lake (pH, salinity, turbidity, temperature, dissolved O2)				
Providing information on seasonal distribution of fish species within the lake.				
Providing information of seasonal species abundance				
Determine if physico-chemical parameters variations observe during seasons are still within tolerable limit for species by calculate their condition factors				
Build 4 different maps representing the distribution of the lake's species at different season for an easy understanding				
Organize a small workshop in order to explain to the fishermen and the local population, the importance of a sustainable fishing and how to manage fisheries with seasonal variations of climate.				The workshop objectives was partially achieved due to the absence of many people in the village because of civil war at the moment.

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

- Fish collection

Multimesh gillnets and trap nets set together were supposed to be deployed from a canoe across several replicate 10 min deployments in a straight line (with the start and end positions marked using a global position system: GPS). We were unable to proceed by this method due to the lake depth (around 110 m) and an inappropriate material. We had to subdivide the lake into 13 different zones, take their GPS coordinates, collect fish within the different zones and take physico-chemical parameter of each zone. Zones were delimited according to six different

families surrounding the lake. Each zone was divided in the shore side and the middle side due to the large surface of the lake (8 km²).

- Mark and recapture method:

Due to the small size of fish in the lake and in order to prevent their death, we used to avoid clipping their fins. But, tagged them using small size tagger.

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

- 1- Middle zones of the lake (7, 8, 9, 10, 11, and 12) were less abundant and diversified during all seasons whereas their seasonal physico-chemical parameters were not statistically different compared to shoreline zones. A possible explanation could be that these zones were deeper than the other whatever the season.
- 2- Fish were more abundant during small rainy season but more diversified in large rainy season, when all the 12 endemic species were found within the lake. During the large rainy season, abundance was positively correlated to pH; turbidity and Temperature but negatively to the salinity, conductivity and dissolved oxygen. Species richness was positively influenced by pH and temperature and negatively by the salinity, conductivity, turbidity and dissolved oxygen
- 3- *Konia Dikume* and *Myaka Myaka* were the two most rare and less abundant species, found only during large rainy season within the middle zones 10 and 11 respectively.

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

We conducted the study with two local fishermen: they were in charge of collecting fish in different zone. We conduct the study also with the greatest help of the CEO of a local NGO OREPRID (Organization for Environment Protection and Rural Infrastructures), he help us to explain in the traditional language to the village leader and the population the importance to conduct our study. After this study, a map explaining the seasonal distribution of fish inside the lake has been discussed during the workshop in the village. Population are now able to know at which seasonal they should not catch a particular species to avoid his extension within the lake.

5. Are there any plans to continue this work?

I plan to pursue my research at University of Berkley fish laboratory and be supervised by one of my referee to this small grant. As this lab is also a molecular lab as well as ecological, I plan to find a possible molecular understanding of the rarity of three species *Sarotheron pindu*; *Konia dikume* and *Myaka myaka* since it is known that:

- The physico-chemical parameters had an influence on them but also on the other fish species but these last one even if influenced, were still available within the lake.
- All the endemics cichlids fish from the lake are sympatric species, so it can be possible to find a molecular explanation of their extreme rarity.

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

I am currently writing articles with my results. I intend to submit abstract for international seminars and I also plan to share some obtained result on my LinkedIn profile, on mosaic Cameroon webpage (an environmental NGO) and on OREPRID the local environment NGO; obviously with my greatest thanks to the Rufford foundation. As it was for my PhD, I intend to organise seminar as a PhD student in my laboratory and at the University.

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 in September 2017 (with the purchase of equipment) and then from October 2017 to July 2018 during field days. It was also used in August to organise the small workshop. The grant has matched the intended length of the project as the study was a seasonal study therefore the need to respect the planned length.

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. The assumed rate of exchange is GBP/XAF close: 1GBP-752.77158 Fcfa.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Money use to buy material	1044	1370	326	Due to lack of those material in Cameroon, I had to be charged for the shipment.
Room rate for fields' days.	816	544	272	I shared my room with one of my team member to balance the extra money used for materials.

Transport round trips between Yaounde and field site	816	648	168	For lake security, The transport between Kumba and the field site (lake) has been forbidden by local authorities, so we had to walk from our room to the lake.
cost to organize a small workshop in order to discuss with local fishermen	124	224	100	The extra money has been used to buy drink to village leader at the end of the study as a traditional purpose advised by the CEO of OREPRID (the local environmental NGO)

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

As it has been confirmed by this study that fish species from Barombi lake have different favourable (abundance, condition factor) season, a better understanding of their biology and ecology (for the species that is unknown) can conduct to put into place well recover measures in order to avoid their extension. These measures are globally to recreate, or simulate as many as possible, changes occurring in wild within the 'favourable' season of a specific species during the 'unfavourable season'.

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 I used the Rufford logo on the fishermen paid slip, on t-shirt that I made for the small workshop and the name Rufford foundation on maps explaining the seasonal distribution of fish within the lake. My LinkedIn profile is mentioning that I am a Rufford Foundation small grant awardee

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

Dr Tombi Jeanette in charge of fish identification. She brought her experience in field as an ichthyologist. She assisted in fish identification on field at the species level.

Akoumba John Francis was in charge of measure their length, weight and mark them before having them release.

Mieguim Dominique was in charge of gather habitat by measuring pH, dissolved oxygen, salinity water and air temperature. Taking GPS coordinate, and assist fishermen in the canoe while fishing

Fishermen they brought their fishing expertise as actually working in the lake and reside in the village.

CEO of OREPRID (Organization for Environment Protection and Rural Infrastructures) He was really helpful by introducing us in the village and giving advises.

12. Any other comments?

Thank you very much for having gave me the opportunity to pursue this study and make my first step in research area. I am very grateful to The Rufford Foundation for their help to young scientists around the world and just hope that my work is up to your expectations.



Sarotherodon lahbergeri

