Final Evaluation Report

Your Details	
Full Name	Zinsou Cosme Koudenoukpo
Project Title	Biomonitoring and Environmental education programs for conservation and sustainable management of three wild rivers of Pendjari National Park in Benin
Application ID	39401-2
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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
Data collection (environmental parameters and macroinvertebrates sampling)			■	750 measurements (five missions * 10 parameters *15 sites) of physico-chemical parameters were carried out over the entire study period. These measurements were used to determine the organic pollution index for each site on each river.
Physico-chemical quality of the park's rivers			■	The organic pollution index identified four highly polluted sites on the Yarama and Mago rivers and one moderately polluted site on the pendrai river.
Processing, identification of samples and data analysis			■	A total of 116 taxonomic families have been identified in the three rivers. However, we need to continue identification down to genus/species level in order to account for all diversity, establish the gradient of distribution and identify threatened species.
Awareness materials			■	400 key rings and four posters
Local communication			■	Two radio broadcasts in local languages
Awareness and environmental education campaigns with village committees and students from local high schools			■	-27 women oyster fishermen were made aware of the rest periods to be observed between oyster catches. - 65 farmers were made aware of the permanent risk of river contamination through the use of agricultural chemical inputs. Organic inputs were recommended and proposed. - 102 pupils took part in a day devoted to discovering the biodiversity of the park's rivers.
Writing articles, policy brief and final report.		■		We are currently working on a manuscript on ecological quality based on macroinvertebrate assemblages in Pendjari Park rivers, using data obtained during surveys.

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

a). The first very important result is a taxonomic list of indicator sentinel species for water quality at the sites explored. A total of 116 macroinvertebrate taxa were identified on all three rivers. The fauna inventoried is mainly composed of insects, molluscs, annelids and crustaceans. The dominance of sensitive taxa (Ephemeroptera, Trichoptera, Plecotera) throughout the Pendjari river indicates that its waters and sites are little or not anthropised. In contrast, the Magou and Yatama temporary rivers are heavily dominated by tolerant polluted taxa (Oligochaeta, Chironomidae), indicating that the waters and sites are highly anthropised.

b). Secondly, we have collaborated with the authorities in charge of managing the Pendjari Park, making available an initial database of macroinvertebrate communities in the park's rivers. This collaboration has also enabled ecoguards to be trained in macroinvertebrate sampling techniques and the measuring of physicochemical water parameters.

c). Thirdly, strong involvement of women oyster fishermen and raising their awareness of the need to observe rest periods between catches. Similarly, farmer-breeders were made aware of the importance of reducing the use of pesticides and chemical fertilisers, which can cause toxicity in the water of the park's rivers, fatal not only for the organisms themselves, but also for their animals, which drink from these rivers.

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

The principal difficulty concerns security. At one moment there was a terrorist threat, which caused the park to remain closed for a period. We had to wait over 2 months before resuming field activities. We were accompanied by forest rangers for the final sampling.

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

- Initially planned for 70 pupils, 102 pupils participated in the river biodiversity discovery day. They learned for the first time about macroinvertebrates, and observed the insects and molluscs sampled. We explained the benefits of ecosystem services and the importance of not polluting rivers with domestic effluent.

- Municipal representatives from four different towns took part in the determination of the degree of organic pollution based on the organic pollution index. They had the opportunity to see how this index is applied. They also participated in two PowerPoint presentations and the preliminary results of my research.

- 400 key rings to be distributed during the awareness sessions.

- Two radio broadcasts in local languages

5. Are there any plans to continue this work?

At this step, we limited identification to the family taxonomic level, to provide an account of the taxonomic composition of aquatic macorinvertebrate communities in the park's rivers. In future, we plan to extend identifications to the species level, using molecular biology tools. We therefore plan to carry out eDNA analyses to compare the observed diversity with the real diversity, which will enable us to refine the biomonitoring program. Ecoguards will be introduced to and trained in this tool for better monitoring of the rivers in the park.

Furthermore, awareness raising activities will continue with stakeholder groups such as women oyster fishermen, farmers and breeders. Similarly, the impact of this project on schools has been very significant, so it needs to be continued.

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

- Publishing the results and associated data in international scientific, open access journals.
- Presentation at congresses, symposia, regional and international conferences.
- All primary data will be made available in online data repositories, such as DRYAD (https://datadryad.org/stash).
- All collected specimens will be deposited in the collections of RBINS.

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

The next stage will focus on several other activities:

- Including environmental DNA.
- Work with park managers to develop simpler monitoring forms to assess the quality of the park's river waters on an annual basis. This monitoring will also indirectly help conserve several species of wildlife which hydrate and sometimes mate in the riverbeds.
- Continue to organise awareness raising meetings, especially with women fishermen, on the harvesting of edible shellfish from the park's rivers.
- Consider the possibility of raising oysters in an artificial environment to reduce fishing pressure on the existing stock.
- Awareness raising activities will also be extended to schoolchildren, with the possibility of including in school programs days devoted to discovering the park and the importance of conserving ecosystem resources and services.

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 following poster, bearing the Rufford Foundation logo, was used to present the results of the project at a number of events (awareness-raising workshops, workshops at the University of Abomey-Calavi and the University of Parakou).

Poster.

Some pictures of the sampling stations.

Some photos after the awareness raising activities.

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

Professor Thierry Backeljau, Director of OD Taxonomy and Phylogeny of Royal Belgian Institute for Natural Sciences, helped to confirm some species that were not easily identifiable.

Dr Simeon Tchakonte, Lecturer, university of Buea, Cameroon, contributed to the index and multivariate analyses based on the macroinvertebrate's groups identified.

Dr Jean Didier Akpona, Special Projects Manager for African Park in Benin, facilitated easy access to the park to collect data during the entire sampling period.

Dr Prudenciene Agboho, contributed to identification the micro molluscs samples.

MSc. Christian Kohonou facilitated some links with municipal authorities and public officials.

10. Any other comments?

I am very grateful to The Rufford Foundation for providing 2nd RSG to carry out this project. This research has generated, for the first time, a database on the diversity of macroinvertebrates in the park's rivers and has initiated awareness raising activities.

There is no doubt that the results we have obtained are very important. They will have a major impact on the implementation of conservation strategies for the habitats ("low disturbance" or "undisturbed") and ecosystem services of the park's rivers.

Our special thanks go to the rangers for ensuring our safety during the terrorist threat to the park. Likewise, the local authorities who advised and helped us at various levels to ensure the activities ran smoothly.

We hope that the support of The Rufford Foundation will reward us again and enable us to continue this important project.


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