

Final Evaluation Report

Your Details	
Full Name	Franck Masudi Muenye Mali
Project Title	Amphibian diversity and environmental education for local people and capacity building for decision makers for the survival of Masako Forest Reserve in the DRC
Application ID	27590-1
Grant Amount	£5000
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Date of this Report	25 April 2020

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
Inventory the Amphibians in the Masako Forest Reserve				We sampled amphibians at Masako. The specific richness is high. For 3 months (April, May and June 2019), we collected 26 species there, practising the less invasive method. We had carefully returned the excess specimens to the forest instead of capture. The primary factor that typically affects local biodiversity in the reserve remains the increased deforestation as a result of growing anthropogenic activities.
Compare the evolution of plant cover deforestation in the Masako Forest Reserve from 1984 to 2018				We carried out the spatial analysis on the forest cover of the Masako reserve. The direct results showed that in 40 years, we consider the fundamental change remarkable. The primitive forest has disappeared. Mixed crops, bare soil and trails have replaced it as shown in the other maps. An extra class has been added, that of habitation, which represents a permanent danger in the reserve.
Organize the awareness-raising and capacity-building workshop for decision-makers and all stakeholders to restore and promote biodiversity in the Masako Forest Reserve				We organised an awareness workshop which brought together decision makers and all stakeholders. All recognised the degradation of the Masako reserve. For 2 days, they willingly had constructive discussions. We gave 15 presentations. The key stakeholders have acted to protect the Masako reserve, each in their own way. The workshop had the active participation of 40 people, whereas we initially planned for 30 participants including policymakers, NGOs, scientists, students, local people and independent researchers. The direct involvement of humans in the destruction of the Masako reserve is apparent. The weakness of the law on conservation, poverty, the lack of effective communication on the adequate protection of biodiversity and the non-involvement of the local

			community in the reserve's management are the pitfalls representing factors which adversely affect the recovery of the Masako reserve.
Socio-economic surveys in the Masako Forest Reserve			We considered it essential and very informative to identify the standard of living of the local population in the reserve. The principle aim was twofold: to see the accurate perception of the inhabitants on biodiversity; and to know if the local population are informed on the monetary and non-monetary ecosystem goods and services that the reserve generates. After this investigation, we realised that the local population were poorly informed. However, they were skilful to list the adverse effects and other changes observed (the agricultural calendar, the drying up of watercourses, the appearance of locusts, the disappearance of non-timber forest products (NTFPs).
Restore the Masako Forest Reserve and conserve its biodiversity			We found that the Masako reserve is in an advanced state of degradation. Local people, environmental decision makers and scientists must join forces to restore it. The local population recognises the adverse effects of human activities in the reserve whose consequences are multiple (no medicinal plants, no food, non-existent cash receipts and water sources are dried up). Other factors naturally affecting the reserve are that the local population ignores goods and services that the forest provides, notably the carbon well (sequestration of greenhouse gases, temperature regulation, protection of water, etc.). Besides, almost 85% of the current occupants of the reserve are non-natives and mainly exploit local lumber. The level of study of the local population is low. They do not know about participatory management of a forest reserve. Economic poverty is glaring in the Masako reserve (85%). A key addition to these critical factors that disadvantage conservation on the reserve is that there is the communication deficit because most of the official documents on biodiversity

			<p>management are written in fluent English or French, the languages that the local population doesn't understand. This favours a misinterpretation of the conservation objectives pursued for the Masako reserve.</p>
<p>Raise awareness and organize the population of the Masako Forest Reserve</p>			<p>The development plan for the Masako reserve makes up a local emergency. For the Masako reserve to be restored, we must structure the local population into executive committees to develop revenue generating activities (IGAs). They can carry these specific activities out in various sectors, including the raising of lesser livestock (goats, rabbits, pork), community fields, sustainable forestry, and fish farming. Our aim with this approach is to empower the local population to limit drawing natural resources from the reserve. In this proper way, valuable ecosystems and local biodiversity will be preserved.</p>

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

We did not encounter any unforeseen difficulties during the execution of this local project. However, we must specify the long-time residents of Masako were reluctant when we are announced the project in April 2019. The reaction of the local population was predictable. They were skeptical because previous projects in social sectors other than the environment had not convinced them for clear lack of their direct participation and effective co-management. To satisfactorily solve this fundamental issue, we had met with the village chief and the key opinion leaders in the local community for a direct contact.

On this occasion, we presented the prime essentials of the project. We had educationally showed its fundamental importance. After this meeting, we had gathered the active population by age group in the focus group to discuss the essentials of the project. All of them unanimously agreed with the philosophy of the ambitious project and supported it.

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

1. A species list of amphibians of the Masako Reserve Forest was made and we know the dangers observed by the biodiversity in reserve. Explicitly, we noted the absence of four species (*Nectophryne batesi*, *Phrynobatrachus perpalmatus*, *Hyperolius kuligae* and *Sclerophrys funerea*). Mainly aquatic and forest species of the family Pipidae, Bufonidae and Arthroleptidae are rare. However, *Hoplobatrachus occipitalis*, *Ptychadena aequiplicata*, *Ptychadena christyi*, *Xenopus laevis* and *Aubria masako* are eaten and

marketed on a small scale in the reserve. This is a danger to the survival of Amphibians in key addition to fungal diseases (chytridiomycosis), the deliberate destruction of rainforest habitats and the adverse effects of global climate change.

2. We had produced a series of comparative aerial photographs characterising the local level of forest cover loss in the Masako forest reserve over 40 years. These Landsat images processed in ArcMap & ArcGIS highlight the gradual disappearance of various classes, specifically, the used forest and the considerable reduction of local rivers. New categories are emerging, namely mixed cultures, barely soils and trails.
3. We sensitised 40 active participants (key decision makers, local media, the local population living in Masako, scientists, independent researchers, members of NGOs and local students) on the restoration and protection of the Masako Forest Reserve (from October 29th-30th 2019) in Kisangani, Faculty of Science, Université de Kisangani, Centre de Surveillance de la Biodiversité, DRC. All stakeholders are aware of the situation prevailing in Masako and have promptly changed their ethical behaviour at diverse levels to restore the reserve.

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

The involvement of the local population highlights general questions on the reserves in the DRC. Before accepting this project in Masako, local chiefs, and community leaders were involved and informed because they played a significant role in communication. This was the key reason we had gathered these local notables. Participants are aware of the importance of amphibians and their conservation in the reserve for their well-being. Convinced of significance of the project in their site, they passed on the information to their population. The local community took part for the first time in a discussion about amphibian importance and forest conservation.

They understood that by consuming amphibians they break the ecological chain which can unbalance the functioning of ecosystems. They were also exposed to the possible zoonoses in bats such as Ebola virus and COVID-19. With the students, we taught them the ecosystem services of forests and their importance in a reserve. A secondary teacher of natural science understood the amphibian significance and therefore supported the promotion of biodiversity. I informed them that a globally recognised species of amphibian (*Aubria masako*). They came out and wanted to know, moreover. We delivered the necessary further information to them.

We organised a workshop on the restoration of the Masako reserve. Four Masako representatives enthusiastically took part in this work. They intervened in the language of their choice (Swahili). At the end of the workshop, the stakeholders had formed into various reflection committees. They made three presentations from each group. The small editorial management team produced a finished report forwarded to each corporation.

Ultimately, during the execution of the fieldwork for 3 months, we hired and rewarded the inexperienced people who help us as night and day field guides. A mother and daughter from Masako was our cook, and we paid her after each mission.

5. Are there any plans to continue this work?

Absolutely. We must reevaluate the biodiversity of the amphibian species list for the whole of Masako and the neighbouring forests within a radius of ± 10 km to compare the results with those of 2019. This pragmatic approach is part of the specific context of ecological degradation, of potential habitats and climate change. This comparative study will sufficiently allow us to justify the apparent absence of certain species of amphibians observed in the 2019 survey. For amphibian species that are difficult to identify, I will send a sample with negotiated Rufford Foundation agreement to the USA to the University of Texas At El Paso for confirmation of identifications using DNA.

We want to emphasise stakeholder awareness. We strategically plan adequately to communicate through multimedia in vernacular languages (Lingala and Swahili) the imminent danger and the fundamental importance of biodiversity conservation in Masako. We directly target students, primary and secondary school teachers, women and policymakers. To achieve this, we will produce a 25-minute film. The main message of the film will focus on the tangible adverse environmental impacts experienced by the inhabitants of Masako namely loss of habitat, drying up of drinkable water, the vanishing of NWFPs, appearance of locusts in the forest area, and disappearance of fungi and caterpillars. We will principally use local people, and 75% of actors will represent primarily the local inhabitants of Masako. This film will directly and individually inspire the local people. The aim of this film is to report on the direct and indirect negative consequences of human activities at the local level. We are precisely targeting in the long term the effective mechanisms to be taken on to improve the standard of living of the local inhabitants and restore the forest habitats in Masako.

We will achieve this by combining specific strategies, namely: (a) Denouncing the erroneous decisions of environmental sector decision-makers through popular articles and the media (radio broadcasts); and (b) requesting more funding that will willingly allow us to restore the Masako Forest Reserve. We are campaigning for conservation laws to be enforced, particularly the DRC forest code. As for the point (b), the fund will make it possible to organise the local community into structured associations (fish farmers, breeders, market gardeners). Leading specialists will naturally accompany these local associations in the field for a limited period. As soon as the population can maintain its activities properly, the experts will be withdrawn. After retiring, they will continue developing a simple community management plan and then the development plan. In this way, the poverty indicators will disappear in local scale.

Other project phases will restore the forest by planting local tree species in Masako, which will typically involve children and women. We will sow wild food plants at the

same time. Ultimately, we plan to create a Masako non-profit friends club (CAM) that will specialise in the ongoing awareness of biodiversity protection. Schools will be involved in various activities. Workshops and various activities with schools and stakeholders will be organised so that children comprehend the importance of biodiversity from the youngest age.

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

I plan to publish the results in a peer-reviewed journal. I will also present them through seminars in my university and local media and through question and answer sessions. I will disseminate the reports produced with stakeholders, mainly at the municipal level. We are working with the ICCN (Institut Congolais pour la Conservation de la Nature) and will provide them with the insightful reports and the published article. The Masako amphibian species list will be provided to ICCN and the local community leader as an informative poster which presents the Masako's amphibians with their scientific names, local names and names in French to strengthen knowledge of local biodiversity.

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

The confirmed grant was implemented correctly from April 2019 to April 2020. This is in line with the actual duration of the funded 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.

We have grouped the direct expenses into three specific categories, namely:
 1 = Biodiversity Fieldwork session activities: £2,305 (\$2,927) is representing 46.1% of the total budget; representing 46.1% of the total budget;
 2 = Dissemination, sensitisation on biodiversity's policy and research results: £1,180 (\$1,498.6) represent 23.6% of the total budget and;
 3 = local Holding workshop on local stakeholders and key decision-makers: £1,515 (\$1,924.05) represent 30.3% of the total budget.

Item	Budgeted Amount	Actual Amount	Difference	Comments
1 Motorcycle CG 100: Transport for descent into the field	£942	£787	-£155	The CG100 motorcycle was purchased at a reduced price than planned in the project budget
Per diem participants workshop,	£472	£472		

2 days				
Local transport/30 participants people, 2 days	£236	£236		
Participants/lunch/dinner 30 people participants workshop, 2 days	£709	£864	+£155	In total, 40 people participated in the workshop instead of 30 people initially planned
Food, one researcher on the fieldwork session	£118	£118		
Field guide, 4 people and food on the fieldwork session	£630	£630		
Local staff one-person Cooker	£39	£39		
Article writing and submission, lecturer, statistical analysis, etc. for one article Research results	£393	£393		
5-piece boots Researcher and guides	£79	£79		
Notebooks, pencils, pens, field note-taking package	£19	£19		
Communication Package TV spot, Radio, press article, communicating during the workshop session with the team, Participants' badges, buttons, notebook, pens, etc.	£787	£787		
Spare part Package spark plug, inner tube, bulbs	£79	£79		
Engine oil 5 litres Lubricant	£20	£20		
Fuel 40 litres Lubricant	£36	£36		
Insurance, Technical inspection and documents insurance package	£79	£79		
Motorcycle maintenance costs Package	£39	£39		
Pharmaceutical kit 1 health insurance kit	£39	£39		
Tent and berth 1 room Camping on the fieldwork sessions (for rent at the institution)	£8	£8		
1-Camera Digitize specimens and habitats (for rent at the institution)	£3	£3		
Label, 200 pieces, Label specimens (for rent at the institution)	£4	£4		
1-piece Thermometer: Take the temperature (for rent at the	£2	£2		

institution)				
1 Dissection Kit: Laboratory works (for rent at the institution)	£2	£2		
2 pieces of mounting tray (for rent at the institution)	£2	£2		
200 pieces of pins: Label specimens (for rent at the institution)	£4	£4		
1 Tag: Label specimens (for rent at the institution)	£3	£3		
1 GPS: To take the geographical coordinates (for rent at the institution)	£1	£1		
200 pieces Eppendorf tubes: Keep biopsies (for rent at the institution)	£2	£2		
10 litres of alcohol (75%).	£79	£79		
300 ml Absolute alcohol (96%): Keeps the biopsies in Eppendorf tubes	£87	£87		
1 kg Formaldehyde: To fix the tissues	£87	£87		
Total	£5000	£5000		Exchange rate £ 1 = \$ 1.27

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

For the foreseeable future, the following steps are essential:

1. The first aim is to reevaluate the local diversity of amphibians in the Masako Forest Reserve and those around in a ± 10 km radius in neighbouring forest patches. I will publish amphibian distributions on the official GBIF platform through the Kisangani University Biodiversity Monitoring Centre, which is one datum publication institutions accredited by the GBIF-RDC node.
2. We wish to produce a documentary movie highlighting the direct local adverse effects of extensive deforestation observed in Masako. The aim of this film is to demonstrate the dangers that humans present through their non-biological activities which generates unfortunate consequences for biodiversity and their own survival. The originality of this documentary film would be that the leading actors (75%) would represent the inhabitants of Masako and we will produce it in Lingala and Swahili to convey the message well but subtitled in French. Environmental specialists will supervise the local actors (25%).
3. We will work with school around the Masako reserve through meetings and awareness campaigns and distribution of announcements (policy briefs) and large format posters. These posters will be produced in simple and understandable vocabularies in three languages (Lingala, Swahili and

French). We will distribute them to school officials at the start of the 2021 school year.

4. I will submit the reports produced during the carrying out of the project to ICCN of Tshopo Province and the updated list of amphibians from the Masako Forest Reserve. Our global aim is to produce a basic management plan which will be discussed and finalised within a specific deadline of fewer than 2 years.

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 use the official Rufford Foundation logo on all the documents produced in this successful project. The official invitations, the promotional posters of the workshop, the invoices, workshop presentations for October 2019. We wrote on all documents 'this project is funded by Rufford Foundation', and we sincerely thank the organisation in the published article being reread.

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

Franck Masudi Muenye Mali (team leader)

I directed the successful execution of the project, took part in field research, awareness campaigns, the organisation of the workshop, the creative writing of the article and the various reports.

Prof Dr Eli Greenbaum

He has played an essential role in article proofreading and writing guidelines, organising and correcting the scientific names of Amphibians.

Prof Dr Gembu Tungaluna

He has played a precious was in specific charge of collaboratively developing and accurately analysing the structured questionnaires that submitted to the local population in Masako.

Prof Dr Sysvestre Gambalemoke

His role was notable in various discussions about fieldwork, the organisation of the workshop and took part in the article's writing.

Prof Dr Ewango E. (DRC)

His role was essential in the key development of the survey questions, the modern design of the extensive research.

Prof Dr Dudu Akaibe (DRC)

As Director of the Centre de Surveillance de la Biodiversité, he carefully coordinated the various specific activities of the project.

Dr Erik Verheyen

He carries out a crucial role in writing and revising the article.

CT Mikwa Jean-Fiston (DRC)

He produced maps and performed spatial analysis.

Ass Komba Michel (DRC)

He meaningfully took part in the active inventory of Amphibians in Masako.

Attr Gabriel Badjedjea (DRC)

He took part in the extensive sampling and proper identification of Amphibians in Masako and at the Laboratory of Centre de Surveillance de la Biodiversité of the University of Kisangani.

Ass Félix Kihambu (DRC)

He took part in the collection of Amphibians in Masako.

Local assistants (field guides)

We had typically used four field guides during our three outings carried out in April, May, and June 2019, respectively.

Marcel (Marcellius)

He represents the oldest inhabitant (78 years old), born and aged in the Masako Reserve. But also, he is one of the local workers of the Masako reserve. He provided us with practical information on the history of the reserve, its objectives, its activities, its management, and its destruction. This valuable information graciously allowed us to circumscribe the almost real contours on the ecological Masako reserve. We had deemed it necessary to associate him with the Amphibian capture team so he could enjoy certain advantages of the project and the payment.

12. Any other comments?

My team and I would enjoy thanking Rufford Foundation sincerely for helping us to carry out these activities in connection with the conservation of renewable natural resources and the promotion of biodiversity. There was not much fundamental difference in spending on the fluctuation in item prices. After the organised workshop, I asked to provide certain information on the state of Masako degradation by a local radio. Data provided in Masako will serve as a scientific basis to manage a plan for the reserve. Tremendous efforts will involve raising awareness and collect other data and work together with key stakeholders to improve conservation activities in the Masako forest reserve.

Restoring Masako remain a challenging question. The key role of funding by the Rufford Foundation would be desirable, as it has naturally made it possible to assess the diversity of amphibians in Masako.



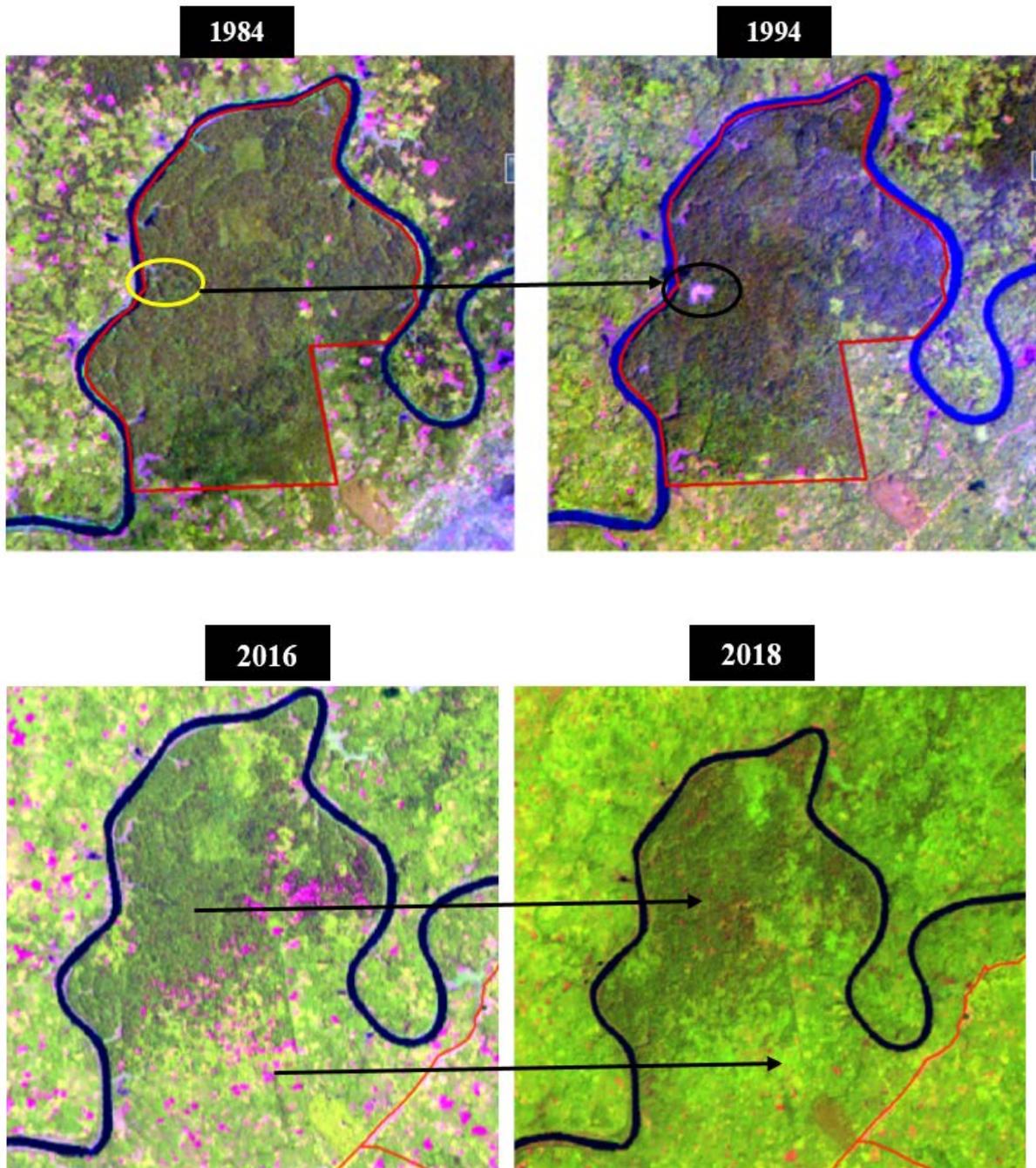
From left to right: A species of *Ptychadena christyi* and the return of the species to its native habitat where it was captured.



From left to right: successful capture of Amphibians by a mowing net and a familiar source of drinkable water that no longer flows in the Reserve.



From left to right: Key questions and satisfactory answers and logical explanation of the completed work engaged by the Rufford Foundation carried out in the Masako Reserve.



Four historical figures sufficiently illustrating severe deforestation in the Masako Forest Reserve from 1984 to 2018.



From left to right: Effective deployment of the research team in the field (in the protected reserve) and a cassava crop in the full reserve.