

Final Evaluation Report

Your Details	
Full Name	Chefor Fotang
Project Title	Fruit availability and dietary ecology of Nigeria-Cameroon chimpanzee (<i>Pan troglodytes ellioti</i>) in Kom-Wum Forest Reserve, Cameroon
Application ID	32006-B
Date of this Report	07.09.2023

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 productivity of chimpanzee feeding tree species				Fruit productivity was higher during the rainy season than in the dry season. Consequently, more fruits were available in trees in the rainy season than in the dry season.
Investigate dietary composition, seasonal changes in diet, and dietary preference				The chimpanzees of Kom-Wum Forest Reserve feed mainly on fruits (98%), but they also consume leaves and pith (2%). Up to 15 fruit species were found in chimpanzee diet. Seasonality significantly affected the proportion of fibre in chimpanzee diet but did not affect the proportion of fruits consumed. <i>Landolphia sp.</i> , <i>Marantochloa filipes</i> , <i>Cyclomorpha solmsii</i> , <i>Ficus sp.</i> and <i>Pseudospondias macrocarpa</i> are the most preferred food of chimpanzees in the reserve.
Conduct a socio-economic survey to investigate the drivers of bushmeat hunting and consumption and to identify important plant species used by locals.				Bushmeat hunting and consumption were reportedly linked to a lack of income and alternative protein sources. <i>Eremospatha macrocarpa</i> , <i>Garcinia kola</i> , <i>Peper nigrum</i> , <i>Ricinodendron heudelotii</i> , <i>Cola acuminata</i> , and <i>Pygeum africanum</i> were important plant species used by locals.
Organise capacity-building workshops for community members on camera trapping and Global positioning system (GPS) devices in animal inventory and domestication of two locally used plant species.				Eighty-four people, consisting of 11 eco-guards and 73 farmers, were trained. After the training, eight eco-guards could effectively monitor animal populations using wildlife cameras and Global Positioning System (GPS) devices. Three nurseries of <i>Garcinia kola</i> and <i>Ricinodendron heudelotii</i> were created in three villages, and 34 farmers introduced seedlings one of the two species in their home gardens.

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

a). 3.1 Seasonal productivity of chimpanzee feeding trees species

Fruit productivity was high during the rainy season (April to October) and low during the dry season (November to March). More fruits were available in trees in the rainy season than in the dry season, and ripe fruit availability peaked in the mid-rainy season (June, July, August) and the late dry season (February and March). Many matured ripe and unripe fruits of *Pseudospondias* (*Pseudospondias macrocarpa*), bush pineapple (*Myrianthus arboreus*), Groundnut spice (*Monodora myristica*) and *Landolphia* sp.2 were available in trees during the rainy season (April and September). *Landolphia* sp.3., *Pseudospondias macrocarpa*, and *Monodora myristica* fruits were available in trees in both seasons, while *Ficus* sp. and *Marantochloa filipes* fruits were only available in the dry season (November to March).

b). 3.2 Diet composition

Chimpanzee diet contained 23 food components, among which 15 were the seeds of different fruit species, and the rest was fibre (leaves and pith). Fruits represented 98% of the total volume of faecal samples, while fibre represented 2%. The fruit species identified in faecal samples included *Landolphia* sp., *Myrianthus arboreus*, *Pseudospondias macrocarpa*, *Monodora myristica*, *Ficus* sp., *Marantochloa filipes*, *Pycnanthus angolensis*, *Canarium scheinfurthii*, *Vitex grandifolia*, *Antrocaryon klaineianum* and *Diospyros* sp. Fibre included pith of the branches of young palms (*Elaeis guineensis*) and full leaves of unidentified plant species.

c). 3.3. Effect of seasonality on diet composition

Seasonality significantly affected the proportion of fibre in chimpanzee diet but did not affect the proportion and diversity of fruits consumed. Fiber volume (pith and leaves) in faecal samples was significantly higher in the dry season when fruits were scarce in trees than in the rainy season when fruits were available. *Landolphia* sp., *Myrianthus arboreus*, *Pseudospondias macrocarpa* and *Monodora myristica* appeared in faecal samples during the rainy and dry season, *Ficus* sp. and *Marantochloa filipes* were only present in dry season samples, while *Pycnanthus angolensis*, *Canarium scheinfurthii*, *Vitex grandifolia*, *Antrocaryon klaineianum* and *Diospyros* sp. only appeared in rainy season samples.

d). 3.4. Food preference

Landolphia sp., *Marantochloa filipes*, *Cyclomorpha solmsii*, *Ficus* sp. and *Pseudospondias macrocarpa*, and *Marantochloa filipes* met the criteria of preferred chimpanzee food. *Landolphia* sp. and *Cyclomorpha solmsii* were preferentially consumed during the rainy season when fruit availability was high, suggesting that the chimpanzees of Kom-Wum Forest Reserve probably select a small subset of fruits (a less diverse diet) in periods of high fruit availability. Figs (*Ficus* sp.) and *Marantochloa filipes* were preferentially consumed during the dry season when fruits were scarce, suggesting that they are consumed as fall-back food.

e). 3.5 Socio-economic survey

A socio-economic survey was conducted with community members (N=147) to 1) investigate the drivers of bushmeat hunting and consumption and the livelihood

activities to reduce hunting and 2) identify important plant species used by the locals. All respondents (N=147) reported that bushmeat hunting and consumption were linked to a lack of alternative protein sources and income generation. Most respondents (129, 87.7%) said they would stop hunting bushmeat if supported in piggery, apiculture, poultry and fish farming. The most important plant species used by locals in descending were Rattan cane (*Eremospatha macrocarpa*), Bitter cola (*Garcinia kola*), Bush pepper (*Peper nigrum* L), Djangsang (*Ricinodendron heudelotii*), Cola (*Cola acuminata*), and Prunus (*Pygeum africanum*).

f). 3.6 Capacity-building workshops

Eighty-four people participated in the capacity-building workshops (11 community eco-guards and 73 farmers). The community eco-guards received training on camera trapping and GPS devices, while the farmers received training on the domestication of *Garcinia kola* (locally known as bitter cola) and *Ricinodendron heudelotii* (locally known as Djangsang). Most community eco-guards (72.72%, n=8) could use wildlife cameras and GPS effectively after the training and during field surveys. One month after the training, a *Garcinia kola* and *Ricinodendron heudelotii* nursery was established by farmers in three village communities (Baiso, Mbengkas and Bu), and the germination trail for the two species was successful in two villages (Mbengkas and Bu). However, only 34 (46.57 %) farmers introduced *Garcinia kola* or *Ricinodendron heudelotii* seedlings from the nurseries into their home gardens.

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

One of my main field guides refused to work with us during the rainy season survey (April to September 2022) because the wage we proposed to pay him could not solve a current family problem. He explained that he had another job in Douala (a city in Cameroon) with a higher wage than we offered. We replaced him with a young adult who happily joined our team.

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

4.1 The local chiefs

The local chiefs (village heads) of all six villages assisted us in selecting key informants that helped our research team collect socio-economic data. The key informants (two women and two men) who were above 40 years and had stayed in the communities for more than 20 years were paid. The local chiefs also provided free accommodation for the research team during the three-day reconnaissance socio-economic survey in each village community. The local chiefs also accepted that extra field materials like tents, boots, and other belongings of our team members should be stored in this accommodation.

4.2 Employment of community members (ecoguards, youths)

Local community members were employed in this project as eco-guards, porters, and guides during ecological surveys. The employed assistants were paid. We employed a new field assistant in our team (Mbeng Marvelous Che). He used the wage he received to pay his school fees.

4.3 Capacity building workshops and socio-economic surveys

The local community members were involved in this project through capacity-building workshops and socio-economic surveys. During the workshops, we used an interactive and participatory approach to ensure that the eco-guards and local guides were fully involved and benefited from training on camera trapping and navigation with the GPS and assessing the phenology of important chimpanzee food trees. One-to-one coaching and mentoring of eco-guards was done after training workshops to help them improve on the techniques learned. Mentoring strengthened the relationship between our team and community members. During field surveys, the principal investigator first demonstrated how to install cameras and the eco-guards observed. The eco-guards then installed the other cameras, and the principal supervised if the eco-guards correctly installed the cameras. The principal investigator also ensured that all eco-guards participated in the process. During the socio-economic surveys, community members were involved in brainstorming meetings, focus group discussions and semi-structured interviews to select the most important livelihood activities that could reduce bushmeat hunting and consumption. The three *Garcinia kola* and *Ricinodendron heudelotii* nurseries in the three villages were established using a participatory approach involving the community members.

4.4 Relationship with communities around Kom-Wum Forest Reserve

Our research team has established a very good relationship with the community members in four of the six villages surrounding the reserve. The community members are happy to participate in future projects.

5. Are there any plans to continue this work?

Yes, there are plans to continue this work.

Two important chimpanzee fruits (*Pseudospondias macrocarpa* and *Monodora myristica*) were exploited by locals living around Kom-Wum Forest Reserve. Both fruits are consumed and commercialised by locals in the areas. We also found an important number of hunting traps in the reserve during our survey. The target animals for these hunting traps were small to medium-sized mammals like Cane rats (*Thryonomys* sp), African porcupines (*Hystrix* sp) and Duikers (*Cephalophus* sp). Still, they are threats to chimpanzees in the reserve. These results indicate a high competition in selecting wild fruits and space between chimpanzees and humans in Kom-Wum Forest Reserve. Therefore, human-chimpanzee conflict, bushmeat hunting, and unsustainable exploitation of non-timber forest products remain major threats to chimpanzees in the reserve and should be addressed in future projects.

During focused group discussions, community members reported that the lack of income and alternative protein sources were the significant drivers of bushmeat consumption and the exploitation of timber and non-timber forest products from the reserve, like rattan cane, African honeybees (*Apis mellifera*), and *Pygeum* (*Prunus africana*). They acknowledged that they would stop hunting if they were trained in bee farming, pig farming, goat farming, fish farming and market gardening because

going to the forest is challenging, and animals are becoming scarce. It would, therefore, be important to train farmers and youths on alternative income activities like bee farming and hunters on fish farming to divert their attention from hunting in future projects.

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

I am preparing an abstract to present at the 46th Annual Meeting of the American Society of Primatologists, at Reno, Nevada, in the United States of America, on June 20–23, 2023. I also plan to share the result of this work at the first-ever meeting of the Cameroon Association of Primatologists in 2023.

I am preparing a manuscript titled: Fruit availability and dietary ecology of the Nigeria-Cameroon chimpanzee in Kom-Wum Forest Reserve. I intend to publish this research in the African Journal of Ecology by December 2023.

The results of this project have been summarised in a chapter of my PhD thesis that I have submitted, and I expect to defend by March 2023. The thesis will also be published, and a hard copy will be kept in the Brandenburg University of Technology Cottbus–Senftenberg library for public consumption.

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

Future work should focus on reducing illegal hunting in the reserve and human wildlife conflict, raising conservation awareness, and building local capacities on alternative livelihood activities in the six communities surrounding the reserve.

Illegal hunting can be reduced by:

- Conducting field surveyance and monthly anti-poaching patrols by community ecoguards and local field guides in the reserve to improve the conservation of the Nigeria-Cameroon chimpanzee in Kom-Wum Forest Reserve.

Conservation education and awareness raising should include:

- Posting educational posters of chimpanzees and other threatened species at like the market square, schools, and churches per village.
- Installing educational signboards at reserve boundaries, village squares, churches, community halls, and palaces per village.
- Creating ecoclubs in primary and secondary schools per village.

Building local capacities on alternative livelihood activities should include:

- Training farmers and youths on bee farming activities
- Training hunters on fish farming activities
- Training Non-Timber Forest collectors on domestication techniques of important timber forest products.

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?

I used the Rufford Foundation logo during the presentation of my research work in Kom-Wum Forest Reserve at the University of Dschang in Cameroon. I intend to use the logo in my presentation titled "Identifying suitable chimpanzee habitats in Kom-Wum Forest Reserve" at International Conference on Ecological Sciences in Metz, France, on 21-25 November 2022.

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

Members	Role
Soh Clotilde	Community eco-guard
Chai Cosmas	Community eco-guard
Seme Ephraim	Community eco-guard
Muh Evans	Community eco-guard
Asumah Raymond	Community eco-guard
Song Ambrose	Community eco-guard
Jam Thomas	Community eco-guard
Wossi Denis	Community eco-guard
Chia Daniel	Community eco-guard
Asanga Elvis	Community eco-guard
Chong Rene	Community eco-guard
Akou Emmanuel Mbeng	Field assistant
Achai Genesis Kam	Field assistant
Mbeng Marvelous Che	Field assistant
Mbeng Godwill Akou	Porter and cook
Evidence Chinedu Enoguanbhor	GIS specialists
Kamgang Serge Alexis	Head of the research institution in Cameroon
Christain Ross	External supervisor
Peter Schierack	External supervisor
Paul Dutton	External supervisor
Ekwoke Enang Abwe	External supervisor
Tsi Evaristus Angwafo.	Field supervisor
Klaus Birkhofer	Academic supervisor
Udo Bröring	Academic supervisor

10. Any other comments?

I have now received three grants from the Rufford Foundation. I sincerely thank the Rufford Foundation for providing this funding which has significantly contributed to my dissertation's success and the conservation of chimpanzees and biodiversity in Kom-Wum Forest Reserve in Cameroon. The results generated from my project have been summarised into five chapters that make up the core of my PhD thesis that I have submitted and expect to defend in March 2023.



Figure 1: Phenology of important chimpanzee fruiting trees with a) Many mature unripe and few ripe fruits of *Pseudospondias microcarpa*, b) young fruits of *Monodora myristica*, c) young fruits of *Myranthus arboreus*, and d) mature fruits of *Pycnanthus angolensis* (March 2022).

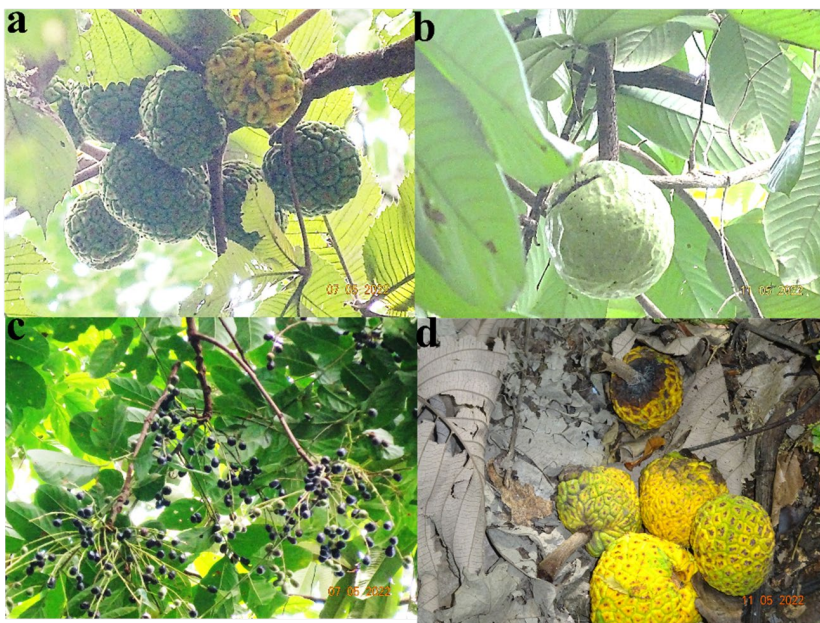


Figure 2 Phenology of important chimpanzee feeding trees with a) mature ripe and unripe fruits of *Myranthus arboreus*, b) mature fruits of *Monodora myristica*, c) mature ripe fruits of *Pseudospondias macrocarpa*, and d) mature ripe fruits of *Myranthus arboreus* on the forest floor (May 2022).

