

## Final Evaluation Report

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Your Details	
<b>Full Name</b>	Sospeter Kibiwot
<b>Project Title</b>	Ecology and conservation threats of forest bats at South and North Nandi forests, Kenya
<b>Application ID</b>	28114-1
<b>Grant Amount</b>	£ 4, 994
<b>Email Address</b>	<a href="mailto:sospeterkib@gmail.com">sospeterkib@gmail.com</a>
<b>Date of this Report</b>	31/7/2020

**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
Compare bat abundance and species richness along a gradient of disturbance from the matrix through the edge and into the forest interior at both forests.				A total of 5322 m mist net effort and 2016 harp hours resulted in the capture of 6003 bats representing 24 species from eight families. Species abundance increased progressively from interior (17 species) to edge (15 species) and matrix (10 species) habitats, with capture rates at the edge and matrix habitats being higher than in interiors. My prediction was that edge or open space foraging insectivorous species and generalist frugivorous bats to be more edge- and matrix-tolerant than forest-dependent or forest-interior insectivorous bats.
Assess the influence of human activities, and disturbance, on different bat species and species assemblages at both forests				I predicted that forest-interior insectivores are more affected by human activities that degrade forests than edge or open space foraging insectivorous species and generalist frugivorous bats.
Establish a comprehensive local echolocation call library of bats at both forests and adjacent areas to facilitate future acoustic studies and monitoring.				I collected over 400 hours of echolocation calls using SM4 acoustic bat detectors in 73 days. There was considerably high overlap between call parameters of some species based on peak frequencies. This has made it complex in distinguishing between closely related species, but analysis is ongoing.
Sensitize local communities on what bats are, their ecosystem roles, need to conserve them, why forests are important and need to conserve them for bats and other fauna.				Carried out very little community and school talk on bats and their role in the ecosystem successfully. The community and learners from schools I visited acknowledged this group of mammals and promised not to persecute nor fear bats but protect and conserve the environment for bats.

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

**Weather pattern.** The rains lasted longer for the year 2019 as compared to normal weather patterns. This change in seasons altered and greatly affected data collection and the time frame planned for the research pushing some activities to the year 2020.

**Poor road network/accessibility.** Generally, most of the forest road networks were impassable and at some point, porters had to be hired to access study sites. South Nandi Forest had a better road network as compared to North Nandi Forest which most sites were almost inaccessible.

**Covid-19 pandemic.**

The untimely and unpredictable calamity greatly affected community programmes at South Nandi Forest. Also, the restrictions and negative publicity of bats as the source of the virus, negatively tilted the view of the changed attitude on bats by the community.

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

**Difference in abundance and species richness along gradient of disturbance.**

We recorded more bat captures at North Nandi Forest and fewer at South Nandi Forest. Over 50% of the captures constitute frugivores mainly recorded on the matrix and edges of the forest with a few records from the interior. Apart from the frugivores, vespertilionids were also recorded more frequently across the three gradients of disturbance (matrix, edge, and interior). The few captures of forest interior species were mainly caught on harp traps and most records on the acoustic call records.

Generally, there was no big difference in species composition of the two forests, North Nandi 22 species and South 20 species. The two forests interior had high species diversity, while the edges and the matrix had slight differences with the matrix mainly dominated by molossids.

**Influence of human activities and disturbance on bat assemblages.**

Species distribution across the two forests (South and North Nandi), were directly related to the level of disturbance. Most of the insectivores, majorly forest-interior species were only recorded in less disturbed areas. Another group of bats adapted to disturbed areas composing of frugivores and some insectivores were recorded on the edges of the forest and the matrix species comprised bats adapted to heavily disturbed habitats and open space foraging species. However, presence of some interior species on the edge is a clear indicator of human disturbance in the forest interior.

**Establishing echolocation call library**

We collected over 400 hours of echolocation calls using SM4 bat detectors in 72 nights. Acoustic monitoring made it possible to identify presence of some additional

species and families. The calls also, enabled us to confirm species recorded through mist net and harp trap captures.

There was considerably high overlap between call parameters of some species based on peak and low frequencies. This overlap made it complex to selecting a species reference call, though some families like Rhinolophidae and Hipposideridae had clear variation between species.

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

The local communities' participation was so immense and of high spirit. We were so glad when the community attitude towards bats positively changed, and they started to view bats as an important organism in the ecosystem. For the younger generation we interacted during school meetings, majority opened for their fear for bats, how their family members killed bats when they spot them inside their homes, and the appreciation and love for bats after training melted my heart.

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

Yes. I only visited a few fragments of the Nandi forests and would like to explore other fragments to check if there is any specific species utilising the fragments. The community programme was greatly affected by Covid-19, and I would like to teach the community more on the importance of this group of mammals.

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

Results of this project will be published in an ecological journal whereby it will be accessible for scientist with passion in order Chiroptera and those who have interest in conservation. Furthermore, the findings will be shared through presentation/seminars at the university and local county government regarding the findings.

**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 for 13 months starting August 2019 to August 2020. Data collection lasted 11 months adding four extra months from the actual plan of the 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.**

Item	Budgeted Amount	Actual Amount	Difference	Comments
Camping fee for 88 days @ £1.5 per day	132	162	+30	20 extra days
Two-man camping tent	200	200		
Research Permits from KWS and KFS	120	120		
1 Research technician @ £5 per day for 7 days	35	35		
1 Local full time Field Assistant @ £3 per day for 88 days	264	324	+60	
Fuel @ £0.38per km for 800 km for three trips	912	1064	+152	
Mileage to and from field and local running @ £0.6 per km for 800 km for four trips	1440	1680	+240	
Public education facilitation	250	240	-10	
Calico (Cotton) collection bags (assorted)	23	23		
Dry cells for head lamps and detectors	80	177	+97	
Stationery	40	40		
4 (64GB) Card readers @ £15 each	60	60		
4 (64GB) Card readers @ £15 each				
Weighing balances, assorted weights (±0.5g)	80	80		
1 GPS unit	250	225	-25	
2 head lamps @ £54	108	108		
10 mist nets @ £100 each)	1000	1000		
<b>Sub-total</b>	<b>4994</b>	<b>5538</b>	<b>+544</b>	
12% PDO administration fee		606	606	
<b>Total</b>	<b>4994</b>	<b>6144</b>	<b>+1150</b>	

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

- a. More of community programmes needed especially to do follow up after bats were negatively publicised being source of Covid-19 virus.

- b. A community headed forest restoration program to improve the forest cover around the two forests. This initiative will reduce illegal logging since the community will work to protect their environment.
- c. We need to build bat boxes at community residential areas to host high flyers roosting at homesteads. Most schools and churches have bats roosting on the roofs and their administration always device ways to flash the bats out using chemicals.

**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 in all the presentation and seminars. Also, I printed lots of brochures with The Rufford Foundation logo. The foundation received great publicity during the whole project period.

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

**Erick Kipngetch** \_field assistant and guide. He made pre-visits to every study site to assess accessibility and the security three days before we conducted data collection. He also, organized for porters whenever needed.

**Beatrice Jepchumba** \_ community liaison officer. Coordinated and organized all community and schools meeting.

**Nelly Ogada** \_ National Museums of Kenya Technician at mammalogy section. She prepared and tagged all the voucher specimens deposited at the section.

**Pictures below:**





Fig 1. Sospeter releasing a *Neoromicia somalica*. © Evans



Fig 2. Student with supervisor Dr. Paul Webala. © Evan





Fig 3. *Scotophilus andrewebori*. © Sospeter



Fig 4. Sospeter setting SM4 song meter in readiness to release bats after exploring a cave.





Fig 5. Research assistant holding an improvised hand net



Fig 6. An outdoor session with school pupils





Fig 7. Illegal logging at South Nandi Forest.



Fig 8. Forest clearing for agriculture at South Nandi Forest.





Fig 9. North Nandi Forest canopy. © Sospeter