The Rufford Small Grants Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other format. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. Please note that the information may be edited for clarity. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Paul Kariuki Ndang'ang'a
Project title	Investigating and promoting natural pest and weed suppression by birds in Kinangop agricultural landscape, Kenya
RSG reference	9082-1
Reporting period	1 December 2010 to 31 January 2012
Amount of grant	£5780
Your email address	ndanganga@yahoo.com
Date of this report	31 January 2012

1. Please 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
To examine the influence of extent and diversity of non-crop and crop habitat in the agricultural landscape on the abundance and species richness of wild birds from different ecologically functional groups, with a special focus on insectivores and small gramnivores.			X	Birds were counted and habitat measurements taken at 172-point count locations spread along 35 transects at three study sites (Murungaru, Ndunyu Njeru and Njabini) located in Kinangop. These RSG grants were used to do these surveys for two seasons (1) Dec 2010 to Jan 2011 (falling within Dry season) and (2) May-June 2011 (falling within rainy season). Previously, another season of surveys (May-June 2010) had been undertaken using funds from elsewhere and final round of surveys has just started (Dec 2011 – Jan 2012). Preliminary analysis of data from the first three seasons of data has already been used to assess patterns of occurrence of various diet groupings of birds. Insectivores numbers were found to be significantly lower in entirely cultivated areas, with numbers being higher in areas with a mix if grasslands and cultivated areas. Gramnivore numbers were much higher in cultivated areas and significantly low entirely cultivated areas. Analysis was also done to relate habitat and landscape features to abundance of particular common bird species. A comprehensive analysis and presentation of results is being prepared in form of a scientific paper, which is currently in progress. However, a simple presentation of results has already been done using a brochure (attached) and a PowerPoint presentation (attached) both of which were presented at a local stakeholders seminar (see below).
To investigate the effect of bird foraging behaviour within agricultural fields on arthropod pest occurrence and post-dispersal weed seed abundance.			X	Bird foraging observations were undertaken for 60 hours - 30 in February 2011 and another 30 in July 2011. These were undertaken at count locations which had been found to be dominated by cultivation (>50%) and an observer would spend 30 minutes at a point location observing foraging birds, noting: species, substrate and height from which they were taking food and type of food (if known). Exclusion experiments were also undertaken to measure the impacts of bird foraging behaviour on post-dispersal weed seed

				germination and pest occurrence on kale plants. Preliminary analysis of the results from these observations and experiments make up most of the contents of simply presented outcomes in the brochure and power point presentation disseminated to local stakeholders (see attached).
To determine the landscape composition features that are suitable for enhancing occurrence of functionally important birds (e.g. pest- and weed seed-eating)			X	The abundance of specific common species which were found to most frequently take invertebrates (Common Fiscal and Common Stonechat), take weed parts (Streaky Seedeater and Yellow-crowned Canary) or take crop parts (Speke's Weaver and Baglafecht Weaver) was related with habitat and landscape measurements in order to determine what attracted them. The results were presented in the brochure and power point presentation. However, more detailed analysis and presentation of results will be done in a planned scientific paper and conference presentation.
To create awareness among farmers on ways of enhancing landscape-driven natural pest and weed suppression			X	A series of three seminars with local stakeholders is planned. The first of these was held on 29th January 2012 at Murungaru in Kinangop. The others two are scheduled for February 2012 – one in Njabini and another in Nyahururu. The first seminar was attended by 50 people comprised of farmers, students, teachers and an agricultural extension officer. A simple presentation was made, and a brochure disseminated. Discussions were done using the local language (Kikuyu) and the participants were very engaging. They appreciated the value birds play in the agricultural landscape but were seriously concerned about the damage brought about by the Speckled Mousebird and the Quelea to their crops. Based on our field observations we advised on some measures that could be taken to reduce attraction of these bird species into the cultivated areas, e.g. during the dry season (when speckled mousebirds are likely to attack crops), horticultural crops shouldn't be planted near exotic hedges and fruit trees (mousebirds like to hide in these). They recommended that thorough investigations be made into environmental-friendly ways of significantly reducing crop damage by mousebirds and queleas. We hope that this will form part of our follow-up project.

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

1. Difficulties were faced in implementing experiments to test the contribution of birds in removal of pests from crops. The first challenge was as a result of failing to get appropriate plots within private farms in which to plant the study crop on the experimental plots. Some farmers gave us permission to plant in their properties, but would latter change their mind or interfere with the experiments. We had to finally decide to pay one of the farmers to allow us to use part of his farm, eventually abandoning some plants we had planted elsewhere. This caused significant delays. The second challenge was related to establishment of the study crop used (Kale). When planted in Kinangop, it initially failed to establish due to extremely heavy rains that were being experienced in July-September 2011 which caused some flooding in the plots. When it eventually established, there was frost that completely destroyed the crop in December 2011. We had again to abandon the plants and sought permission from another farmer to use some his established bigger plants at a fee. It is now only three weeks since we started experiments with this new plot. However, we are lucky in the sense that, using funding from another grant source (IFS), we had similar experiments going on elsewhere in another study site outside Kinangop (Ol Joro Orok) within property owned by an agricultural research institution. Although outside Kinangop the results from there will be important in informing what could be happening in Kinangop.
2. Transport costs significantly increased beyond what we had budgeted for mainly due to two reasons: a) hikes in petrol prices, and b) we realised that field workers could not be able to use shared public transport every day due to need to access some distant count localities very early in the morning. We had to result into paying motorcycle taxis in some instances, which increased the cost of transport.

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

a) From bird foraging observations, I determined the foraging behaviour of specific common bird species within cultivated areas and can now confidently advice on the substrates where birds most frequently take food items, and which bird species most frequently take weed plant and crop plant parts, as well as invertebrates (potentially pests). Further to this, I did experiments which demonstrated that birds can contribute to up to 22% post-dispersal weed seed removal from cultivated areas in Kinangop.
b) From counting birds and relating their abundance to environmental variables, I can now be able to explain what environmental elements make it habitat suitable for some particular species that are of interest in terms of provision of services and crop damage in the agricultural landscape.
c) I disseminated preliminary research findings to local stakeholders through a seminar (and two more are planned) and a colourful brochure. The discussions during the seminar were very engaging and well received.

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

All the field workers who provided assistance during this project were from the local community in Kinangop. The following members of the Friends of Kinangop Plateau (FoKP) were involved throughout the project and earned a living from the project: Jack Kiiru, John Ndaire, James Maina

and Dominic Kimani. The following other individuals from Kinangop participated in data entry, thus improving their computer skills: Justus Thiong'o, Mary Wanjiku and Sabina Wangare. At least 10 young volunteers from the community participated in data collection at one stage or another, thus learning skills in use of field equipment, bird identification and getting firsthand information on the role of birds in agricultural areas. The awareness seminar which engaged community members was also useful for the community; especially farmers in learning a few ideas on how to manage their farms avoid crop damage while getting important services from birds.

5. Are there any plans to continue this work?

In the short-term, there are plans to continue this work in order to complete the experiments investigating the role of birds in pest removal (by end of March 2012) and complete the fourth and final season of bird counts by end of February 2012.

In the long-term, I would like to continue further work focussing on Speckled Mousebird, a bird species that farmers expressed serious concerns about due to its damage of horticultural crops especially during the dry season. I'll investigate what environmental features really attract the mousebird and ways of managing cultivated areas in order to reduce crop damages from the species. One farmer indicated that he has successfully used a fruiting climber species as a means of 'pulling away' mousebirds from crops. I would like to trial this and other methods and if successful, spread their use to wider areas. I would like to make a follow-up application to RSGF to implement this.

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

Firstly, I will hold more awareness seminars at the local level. Second, I intend to publish the results in at least one scientific paper in a popular journal. Third, I'll present the results in the 13th Pan-African Ornithological Congress (14-20 October 2012). Fourth, once the scientific paper is out, I'll popularise it through a simple media article.

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

The RSG was used from 15th December 2010 to 31 January 2012. This in comparison to the anticipated length of time is 45 days more. This was brought about by the delays explained above relating to establishment of experimental plants.

8. Budget: Please 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.

Item	Budgeted Amount	Actual Amount (KShs)	Actual Amount (£)	Difference (£)	Comments
Field travel – Car mileage & fuel	1800	311025	2430	630	Fuel price significantly hiked within the project period

Field travel - local bus fares	500	85600	669	169	Project team was forced in some instances to use motorbike taxis
Field manpower - 1 local field assistant	1200	144000	1125	-75	
Field subsistence and accommodation - Investigator	1200	63000	492	-708	To cut costs, at times I camped and other times spent nights at friends and relatives' homes
Communication costs - telephone, email etc.	100	12600	98	-2	
Costs for constructing experimental enclosures	180	18000	141	-39	More cages were required than budgeted since some were stolen
Book costs - 2 Bird Field Guide books	50	5450	43	-7	
3 Awareness seminars (venue, refreshment etc)	360	44055	344	-16	
Printing of awareness materials (brochures)	360	55709	435	75	Cost was higher than previously estimated
Equipment -telescope, binoculars, PS unit, laptop	0	0	0	0	
Expendables - DC batteries etc.	30	4120	32	2	
Total	5780	**743559**	5809	29	

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

(1) Disseminate project results/outcomes through two more awareness seminars and local media.
(2) Publish research results in a scientific journal.
(3) Develop a follow-up proposal to investigate and implement effective methods of reducing crop damage by Speckled Mousebird.

10. Did you use the RSGF logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?

I used the RSGF logo in the following materials:

a) A poster (attached) that I presented during the Student Conference on Conservation Science (SCCS) held in Cambridge in March 2011.
b) A brochure (attached) outlining the outcomes of the project. 500 copies have been produced for dissemination in Kinangop.
c) PowerPoint presentations made at the awareness seminar in Kinangop and university seminars at the Jomo Kenyatta University of Agriculture and Technology.

11. Any other comments?

I am very grateful to the RSGF for the support. I would like to continue updating the project's page on the RSG website beyond the project period. Some photos from the project will be provided with this report.