

The Rufford Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford 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	Vani Dahiya
Project title	Elephant-human conflict: a multivariate ecological approach to understanding crop raiding in Kodagu, southern India
RSG reference	11219-1
Reporting period	May 2012 – October 2013
Amount of grant	£6000
Your email address	v.dahiya04@gmail.com , vani@ces.iisc.ernet.in
Date of this report	November 2013

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
Determining the spatio-temporal patterns of crop raiding in Kodagu.			✓	<p>Secondary data (crop-raid compensation claim records) for all three taluks (Somwarpet, Madikeri and Virajpet) in Kodagu were collected from the Karnataka Forest Department and translated from Kannada to English. Analyses of these data will help identify and map conflict hotspots spatially and also highlight seasonal variations in hotspot locations and crop-raid intensities.</p> <p>Primary data collection involved getting data from the site of crop-raid. This included measuring variables such as the area of the crop field, distance of crop fields from closest forest boundary, location of the field, time and date of raid etc. The primary data are expected to further our understanding of the spatio-temporal patterns of crop-raiding in Kodagu.</p>
Estimating forest fragmentation in Kodagu.			✓	<p>We procured maps from the forest department and also took GPS points for different forests as well as the villages in the study area. The next step is to integrate these in a GIS framework to understand correlations between forest fragmentation as well as habitat patchiness and crop-raids.</p>
Determining seasonal elephant densities			✓	<p>Transects were laid in different seasons across various gradients (north-south fragmentation gradient and east-west rainfall gradient) in most forests of Kodagu (from Reserve Forests to Tiger Reserve to Wildlife Sanctuary) to determine local elephant densities. Seasonal densities additionally shed light on movement patterns of elephant.</p>
Determining the sex of the raiding elephant.		✓		<p>Sex of the crop-raiding elephants was proposed to be determined using molecular sexing technique. For this purpose, elephant dung samples from raided fields were collected over the last year. These samples are now in the process</p>

				of being analysed at CES, IISc, Bangalore by Dr Ishani Sinha.
Understanding natural elephant diets and estimating seasonal nutritional difference(s) between natural forage and raided crops.	✓			Due to extensive focus on other aspects of the fieldwork in this study, we could not work on this objective simultaneously. We plan to proceed with work on this objective from January 2014.
Interaction with local communities and knowledge sharing			✓	We participated in meetings with local farmers and coffee-planters on several occasions to explicate the scope and details of this project, to understand perspectives of the local communities and to identify volunteers for providing information on crop raid events.

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

1. Kodagu experiences very heavy rainfall during the monsoons and has a challenging terrain. As a result, conducting field work was difficult for 3-4 months (June-September) during the south-west monsoon season. During this time period we focussed on collecting secondary data from the Forest Department.
2. Crop raiding data are collected opportunistically, and we rely on volunteers and contact persons in the villages to provide this information. However, often, either information about crop raids would not be conveyed at all or delayed. To overcome this difficulty, we would periodically visit all sample villages to enquire about elephant crop raids and also keep in touch with the local forest department officials to get updates on any crop raid complaints that might be filed.
3. Due to extensive field work (primary and secondary crop raid data collection, estimation of seasonal elephant densities and village surveys) it was not feasible to collect data on assessing the nutritional differences between natural forage of elephants in the forests and the raided crops. It was therefore decided to carry out this work from January 2014.

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

1. Our study is one of the first to collect data at a large spatial scale in Kodagu and adopt a multivariate approach to understanding elephant-human conflict in the region. Specifically, the study is expected to reveal the significance of several spatial variables in determining crop raiding frequencies in Kodagu. Such results are likely to have a bearing on future land planning and management. For instance, from preliminary analyses, fragmented landscapes are found to be conflict hotspots as opposed to areas near contiguous forests. Therefore, decision makers may consider restoring/preserving wildlife corridors in fragmented areas to reduce conflict.

2. Elephant densities in different forests of Kodagu are calculated by the Karnataka Forest Department once in several years. This does not capture the seasonal variation in elephant densities and the elephant movement pattern. This lacuna has been overcome by our study as we have collected data to produce reasonable estimates of elephant densities spanning different geographical areas in Kodagu over different time frames.
3. Understanding local (farmers, coffee planters, the economically strong and weak sections of the society) perceptions from village surveys. We now also have a baseline understanding of the success of various mitigation measures employed and can utilise these results to intensively focus on areas where mitigation strategies have repeatedly failed.

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

Elephant-human conflict has an integral “human” component to it. Local communities, specifically farmers and coffee planters, are directly impacted by elephant incursions into their crop fields and coffee estates. Therefore, the involvement of the local communities has been essential for the project.

At the very start of the project we conducted surveys in all the villages considered for this study. We interacted with the locals and discussed our project and its scope with them. We also got inputs and suggestions from them with respect to reaching out and spreading awareness about our project. We also got insights into the local perceptions of elephant-human conflict. Needless to say, these discussions revealed a whole spectrum of wide-ranging attitudes from hostility towards elephants to more tolerant approaches. These surveys were carried out periodically to keep the locals updated about the project. Furthermore, we also interacted with two local NGOs – the Coorg Wildlife Society and Kodagu Model Forest Trust and got a lot of useful inputs and suggestions as well as logistical support from them.

Few members and volunteers of the local communities were also involved in the project as informants. In the events of crop raids, we would be contacted by these people, which would be followed by a field visit to collect data.

The field assistants and driver employed for this project came from the local communities. Their involvement in the project was crucial as they helped build rapport and trust with the locals and also translated information from the local language to English and vice versa.

We believe that the findings from our study will directly and indirectly benefit the local communities. The understanding of the ecological basis of crop raiding behaviour is likely to contribute to formulation of scientifically sound policies and development of effective mitigation measures. The project has also contributed to bridging the communication/interaction gap between the local communities and the forest department.

5. Are there any plans to continue this work?

Yes, the proposed project is still work in progress and we plan to continue data collection for some more time in the future. This is to ensure that seasonal and spatial variations are well captured in the study and statistically appropriate sample sizes are obtained. There are also plans to extend and

expand the project with the involvement of other researchers to get an even more exhaustive picture of elephant-human conflict in Kodagu and adjoining areas.

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

The findings from this study will be shared at the following three levels-

- The project outcomes will be shared with the local communities – farmers, coffee planters, civil societies as well as the NGOs, local conservationists and academicians. We plan to disseminate the results in a non-technical format through easy-to-understand presentations and awareness sessions.
- The project report with the results and recommendations will be shared with the Karnataka Forest Department with the hope that the understandings from the research will aid (EHC relevant) policy formulation and implementation.
- We seek to publish results from this study in peer-reviewed science journals to not only get inputs on the technical aspects of the work but to also reach out to a wider scientific audience. The findings will also be presented in conferences as oral and/or poster presentations as and when the opportunities arise.
- A suggestion from the local communities has been to make a brief documentary showcasing the elephant-human conflict in the region. If time and funds permit, we may produce a documentary highlighting various aspects of elephant-human conflict in Kodagu.

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

The anticipated duration of the study is approximately 3 years (January 2012- December 2014) of which the Rufford funding was used for a period of 1.5 years from May 2012 to October 2013. Data collection is under progress and we plan to seek financial support from Rufford and/or other funding agencies to continue the project for another 18 months.

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	Difference	Comments
Field station rent	668	925	+257	Calculated for 18 months (see note 1.)
Remuneration - Driver	668	1,500	+832	Calculated for 18 months (see note 1.)
Remuneration - Field Assistant I	572	1,500	+928	Calculated for 18 months (see note 1.)
Remuneration - Field Assistant II	0	1,400	+1400	Calculated for 18 months (see note 1.) Salary for the second field assistant was not budgeted in the proposal, however due to the extensive field work; another field assistant had to be hired.

Remuneration Cook	190	0	-190	Food arrangements were made locally and there was no requirement for a cook.
Remuneration Local Informants	594	100	-494	Most informants were kind enough to provide information for free. A minor sum was spent on their food and telephone bills.
Food charges	612	475	-137	Food was sourced locally and therefore turned out to be cheaper than expected.
Fuel Charges	1388	0	-1388	All fuel costs were borne by the Centre for Ecological Sciences, Indian Institute of Science, Bangalore.
Vehicle Maintenance	594	100	-494	Most vehicle maintenance costs were borne by the Centre for Ecological Sciences, Indian Institute of Science, Bangalore.
Freezer	144	0	-144	Provided by IISc, Bangalore.
Freeze Dryer	200	0	-200	Please see note 2.
Vernier Calipers	70	0	-70	Provided by IISc, Bangalore.
Power backup	150	0	-150	Not required.
Grinder	150	0	-150	Please see note 2.
Total	6000	6000	0	Exchange rate: 1£ = 80 INR

Notes:

1. The anticipated duration of the project is 3 years (January 2012- December 2014). Data collection is still on-going. Actual amounts for items 1-4 were calculated for 18 months as opposed to 12 months proposed in the budget. We hope to secure a booster grant from the RSGF to see the project to completion. CES, IISc, Bangalore will be supporting the project in the meanwhile.
2. The freeze dryer and grinder will be used for plant sample analyses, the work for which will commence post January 2014. The amounts budgeted for these items were re-directed to other expenditures (salaries for additional 6 months of field work; salary for additional field assistant).

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

- Post collection, compilation and analyses of all data, we look forward to disseminating the results of our study amongst the local communities, NGOs and the forest department. It is crucial that all stakeholders understand and, hopefully, benefit from the study.
- All theoretical understanding emerging from this research (and other studies focussing on conflict between humans and wildlife) should eventually translate into practical mitigation measures to reduce elephant-human conflict in the region.
- Expanding the research to better understand the role of elephant behaviour in elephant-human conflict. Study of some of these aspects (for example, understanding the role of stress in crop raiding elephants) has already been initiated by other researchers in our lab at the Centre for Ecological Sciences, Indian Institute of Science, Bangalore. Other long term research should

incorporate elements related to understanding the perception of conflict, especially across the socio-economic gradient, impact of on-going and predicted climate change on conflict levels and IDing and radio-collaring habitual crop-raiders to develop an early warning system.

- Developing a more “user-friendly” system for claiming damage compensation. Many farmers and coffee-planters shy away from even registering damage complaints owing to the tedious paperwork involved.
- Initiating awareness programmes across the region and ensuring involvement of the local stakeholders in EHC related work-plans and policy formulations.

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

The project is still in the data collection phase; therefore, no materials have been produced from the project yet. However, the Rufford Foundation Logo will occupy prominent space in all future scientific publications, reports, presentations (Powerpoint/poster) and maps resulting from this study.

RSGF’s role in the study was acknowledged and highlighted in numerous interactions with the local communities, NGOs, universities in Kodagu as well as during meetings with the officials of the Karnataka Forest Department. Additionally, during discussions with peers and colleagues, RSGF’s contribution to this project and conservation initiatives all over the world was emphasized upon, which, I’m happy to report, encouraged many researchers to apply to RSGF.

11. Any other comments?

I express gratitude to the Rufford Small Grants Foundation (RSGF) for providing financial support to the project.



Left: Elephant dung sample collection to determine elephant diet. Right: Line transect work in Nagarhole Tiger Reserve to estimate elephant densities.



Left: Line transect work in Brahmagiri Wildlife Sanctuary for estimating elephant densities. Right: A paddy field damaged by an elephant.



Left: Elephant dung and footprints at the crop-raid site. Right: Elephant dung sample collection from raided crop field for molecular sexing.