

Final Evaluation Report

Your Details	
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Project Title	Developing a Comprehensive Conservation Plan to Reduce Human-Elephant Conflict in Wayanad Plateau: A Rapidly Degrading Summer Range of Asian Elephants, India
Application ID	28435-1
Grant Amount	£4950
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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
To understand the seasonal distribution pattern of elephants in the Wayanad region.				Data collection has been done for this objective and preliminary analysis is completed. We published one article in a peer-reviewed journal from this objective and finalising one more manuscript for publication. This objective provided the first baseline information on the pattern of elephant distribution in the Wayanad region.
To understand the Spatio-temporal pattern and drivers of human-elephant conflict in the study area				This objective is done. One general article is accepted for publication and one manuscript is under preparation from this objective. A detailed human-elephant conflict map of the region is prepared. A detailed conflict mitigation plan for Wayanad will be given to the forest department.
Conservation education				Unfortunately, because of the Covid-19 pandemic, we were unable to finish the awareness and education component of the project. This component will be done in a better way in the next phase of the project.
Preparation of a documentary film about human-elephant conflict and elephant conservation in Wayanad Region.				Videos and images for the documentary film are sourced. We hope to release the film by January 2021. The delay is due to strict restrictions by the state government for meeting people in the rural areas due to the Covid-19 pandemic.

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

We encountered some unforeseen situations during the project due to the Covid-19 pandemic. There was a strict restriction in movement and on public gathering. Entry to the forest areas and Covid-19 containment zones were barred by the state government for almost 2 months from March to April 2020. It affected field sampling,

interviews, and awareness programmes. To tackle this issue, the project was extended for 1 month for the successful completion of the proposed objectives. Another entirely unforeseen challenge was a large number of Kyasanur Forest Disease (KFD) or monkey fever cases from Wayanad Wildlife Sanctuary. One of my experienced field assistants was affected by KFD and it took 5 months for him to completely recover from it. This was tackled by arranging another field assistant.

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

(1) In this project, we modelled human activity and ecological features that influence the seasonal presence and absence of Asian elephants in the Wayanad region. Occupancy models showed that the detection probability of elephant dung negatively correlated with human activity. Interestingly, this project found that herds mostly occupy Wayanad forests between January and May, but adult bulls occupy the region during monsoon (June-August) and post-monsoon (October-December). Herds mostly move to Wayanad from other areas of the Nilgiri Biosphere Reserve during summer when the carrying capacity of the dry forests reduces for the species. The presence of large number of adult bulls in Wayanad coincides with the availability of paddy, jackfruit, and mango in the production landscape.

(2) Conflict between humans and elephants has become a serious political and conservation problem in Wayanad. This project provided the first baseline information on the spatio-temporal pattern and drivers of human-elephant conflict (HEC) in Wayanad. A detailed HEC map of the study area was prepared (See Fig 1). This project noticed that bulls are mostly involved in crop depredation which is an important information for conflict mitigation efforts. This will be useful for the forest managers for capturing persistent crop raiders or studying their behaviour for effective conflict mitigation.

(3) We initiated awareness and conservation education to various stakeholders in Wayanad. We partially achieved this component due to Covid 19 pandemic. It is very important to scale-up the awareness programme for the long-term impact of our project. Hence, we are planning to give more importance to the awareness programme in the next phase of the project. We also prepared a documentary film as part of this project about HEC issues in Wayanad.

(4) Field assistants, interns, and forest department officials from Wayanad gained knowledge on various field techniques and handling of field equipment such as GPS, binoculars, and camera.

The outcomes and major findings of the project will be published as general and scientific articles. Besides, a detailed report of the work will be submitted to the Rufford Foundation after the second phase of the project.

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

Youth from tribal communities, traditionally dependent on forest resources were engaged in assisting the field sampling. Also, we hired the vehicles owned by tribal

for the fieldwork. This work provided them monetary benefits and they learned various field techniques and handling of equipment such as GPS, binoculars, and cameras. Two interns joined in the project from Wayanad. They also benefited through learning the field sampling techniques. The farmers were very supportive and willing to share their knowledge with us to tackle the conflict situation in the landscape. Most of the community members are continuously in contact with our team. In the next phase of the project, we are planning to the extent the awareness program to more public.

5. Are there any plans to continue this work?

We have identified the hotspots of human-elephant conflict in the study area. The forest department wants us to continue the study for a detailed understanding of conflict especially in the identification of persistent crop raiders in the area. We were unable to conduct awareness programmes as expected due to Covid 19 pandemic. It is important to continue the awareness programme to different stakeholders to generate awareness about elephants and the threats they face. Phase two of the project plans to focus on the identification of persistent crop raiders in the landscape, and continue education and awareness programmes for students, communities, NGOs, and forest department officials. During the project, we realised that the swamps are an important micro-habitat for elephant herds during summer. But so far, no effort has been made to understand the importance of this habitat for the survival of elephants. Currently, these swamps are degrading due to cattle grazing, forest fire, and the spread of invasive plants. In the next phase of the project, we will demarcate all swamps in Wayanad Wildlife Sanctuary, and study the pattern and drivers of its utilisation by elephants. The second phase of this work is vital for the project to be meaningful.

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

We published one scientific manuscript in the journal Current Science and one article is accepted by the Sanctuary Asia magazine. We have worked closely with the Kerala Forests and Wildlife Department. The information has already been shared with the department to mitigate human-elephant conflict and habitat management. We have sourced videos and images for making a documentary film to raise awareness about the elephant and its habitat conservation in Wayanad. The documentary will be released by January 2021. Two more publications from the project in peer-reviewed international journals are under preparation. The published works will be forwarded to the higher officials of the forest department and NGOs. Outcomes of the project are also covered by the local press.

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 from October of 2019 until November 2020. Fortunately, despite some difficulties due to Covid 19 pandemic, we finished the proposed objectives in 13 months.

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
Field transport	£1478	£1259	-£219	There was travel restriction during the project due to the COVID-19 outbreak. The difference in the amount was allocated to other expenses.
Outstation transport	£248	£91	-£157	We couldn't use the requested amount because the outstation travel was restricted due to the COVID-19 pandemic. Difference in the amount was allocated in other expenses.
Research assistant salary	£1773	£1774	+£1	
Field assistant salary	£788	£769	-£19	
Accommodation	£443	£826	+£383	Accommodation and food costs increased because of the lockdown due to the COVID-19 outbreak.
Field research equipment	£220	£231	-£11	Prize of the equipment increased by the time we received the fund.
TOTAL	£4950	4950		

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

It is important to continue the project in Wayanad to provide advice to the forest department and NGOs to continue developing elephant and its habitat conservation strategies based on the best available scientific knowledge. During the project, we realised that only a few elephants are involved in crop raiding. Hence, individual level identification of crop raiders is an important step towards mitigating the conflict by removing the crop raiders or by studying their behaviour. Also, we identified that the low-lying swamps are a key micro-habitat for elephants in Wayanad during summer. But swamps are degrading drastically due to uncontrolled livestock grazing, forest fire, and the spread of invasive plants. The degradation of swamps will have a far-reaching impact on the long-term survival of the elephant in the Brahmagiri-Nilgiri elephant landscape. Hence, it is important to demarcate all swamps in Wayanad and identify the pattern and drivers of its use by elephants. It is

important to continue the awareness programme for students, farmers, and forest department officials in Wayanad. Also, we noticed that there is a scarcity of resources in the local language to improve awareness of elephant conservation. Hence, we think it is important to write a book on elephants in the local language (Malayalam).

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, The Rufford Foundation had received publicity during my project work. The logo was used on data collection tools (questionnaires). On the published scientific manuscript and general articles, we acknowledged the support of the Rufford Foundation. In all the presentations we used the Rufford logo. Meanwhile, we are finalising two manuscripts from the project. This will soon be submitted to popular conservation journals. All scientific publications that we bring out in the future will acknowledge the Rufford Foundation's contribution. The logo will also be used in the documentary film prepared during the project.

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

Name	Role
Mr. Anoop NR	Principal Investigator (PI), Ph.D. student, ATREE
Dr. T. Ganesh	Co-Principal Investigator, Senior Fellow at ATREE. Thesis supervisor.
Mr. Anwar CS, Mr. Ajayan PA, Vishnu Mohanan	Research Assistants (RA). Helped PI with data collection and coordination of fieldwork.
Mr. Chandran, Mr. Suresh, Mr. Arun	Field assistants. Helped PI and RA for field data collection.
Mr. Babu, Mr. Dinesh	Drivers of the hired field vehicle

12. Any other comments?

We would like to thank The Rufford Foundation for providing the funding support. This project was a great learning experience for the entire team. Besides grassroots level conservation works supported by Rufford, it is also important for the career growth of young researchers, especially researchers from developing countries like India. Without the support of the foundation, we couldn't have successfully finished the project in Wayanad, one of the key elephant conservation areas in the Western Ghats. We are very much thankful to the Rufford Foundation for the support and we hope it will continue its support in the next phase.

Field photographs



Coconut tree (*Cocos nucifera*) damaged by elephants in the study area



Damage by elephants to a Paddy (*Oryza sativa*) field in the study area



Jackfruit in the agriculture field is the main attraction for elephants in Wayanad



Elephant raided banana plantation in the study area



A forest hamlet grows paddy, coconut, and areca palm in the study area.



A crop-raider feeding on paddy in a forest hamlet.



A stone wall erected in the forest and village boundary is damaged by elephants.



Elephant Proof Trench and fence erected on the boundary of village and forest.



Machan raised to guard paddy



Elephant dung survey in the study area



Field visit by the Co-PI



Field visit with the local NGO members, and forest department staff



Interviewing a farmer to understand HEC situation



Research team met farmers to raise awareness about elephant conservation



Conducted one day workshop on GIS, Earth Engine, and Remote Sensing for local NGO and forest department staff



Conducted half-day workshop on handling research equipment and Photoshop



Chandran, an experienced and enthusiastic tribal youth who worked as a field assistant in the project.



Banner in a public place indicating a rally to the forest department demanding action on mitigation of human-wildlife conflict.

Elephants photographed from Wayanad during the project: individual ID has been generated for bulls based on their external body features.



Fig 1. Map showing human-elephant conflict incidences around the study area.

