

## The Rufford Foundation

### Final Report

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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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

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Grant Recipient Details	
Your name	Rajendra Dhungana
Project title	Human-Leopard Conflict in the Vicinity of Chitwan National Park, Nepal
RSG reference	20954-2
Reporting period	January, 2016 to December 2017
Amount of grant	£ 5000
Your email address	rajendra.dhungana2@gmail.com
Date of this report	January 21, 2018

**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
Characterize spatio-temporal patterns of human-leopard conflict			√	A paper is under preparation which will be submitted in an international peer-reviewed journal
Examine correlates of human-leopard conflict			√	
Analyse economic losses from human-leopard conflict			√	
Analyse compensation payments made for livestock losses from leopard attacks			√	
Raise public awareness for leopard conservation through workshops, group meetings, school programmes, and poster preparation		√		Altogether 15 local awareness workshops, group meetings, school programmes and sharing workshop were conducted. Posters on leopard conservation were prepared and disseminated

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

The devastating flood that occurred in the study area in July and August, 2017 affecting wildlife (including about 10 rhinoceros flooded down to India) and damaging roads and other infrastructure created difficulty in conducting fieldwork. For this reason, we had to postpone the scheduled activities by about a month.

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

The project assessed the scenario of human-leopard conflict in surrounding areas (buffer zone) of Chitwan National Park (CNP) during 2007-2016. A total of 379 livestock (goat, pig and cattle) were reportedly lost to leopards during the 10-year period, with goats sharing nearly 87% of all kills followed by pigs (9.5%) and cattle (3.7%).

Main outcomes of the project are briefly described as follows.

**3.1** The study analysed the spatio-temporal patterns of livestock depredations by leopards in the buffer zone of CNP. Spatial analysis using ArcGIS 10 programme

showed variation in intensity of livestock depredations across the buffer zone. Barandabhar area located in the north and Madi area in the south of the CNP suffered significant livestock losses, and these areas are identified as "depredation hotspots". Barandabhar area comprising of the corridor forest that connects CNP to the forested areas outside the CNP showed an increasing trend of livestock depredations with that area alone sharing nearly 50% of all livestock depredations by leopards in 2016. This is most likely due to frequent use of Barandabhar corridor forest by leopards for migration, dispersal and mobility between CNP and the areas outside it. The notable livestock losses in madi area might be partly due to greater proportion of forested areas therein serving as leopard habitat.

Temporal analysis involving generalised linear model using R 3.4.1 showed a general decreasing trend of livestock depredations during 2007-2016, but with fluctuation among years. Such decrease might be due to decreasing livestock population, better husbandry practices (improved corral, better vigilance and herding, and awareness), and increased wild prey population resulting from habitat management interventions inside the park and improved community forests in the buffer zone. Chi-square test showed no significant variation in livestock kills among seasons (summer, monsoon and winter) and months.

**3.2** The project examined socio-ecological, landscape and meteorological correlates of human-leopard conflict. The livestock depredation was correlated (positively) with livestock population and forest area in the buffer zone, but not with other correlates including human population, national park frontage (defined as the length of village municipality/urban municipality boundary in the buffer zone abutting CNP), rainfall and temperature.

**3.3** The study investigated economic losses due to livestock depredations and compensation payments made towards such incidents. Livestock killings by leopards during 2007-2016 resulted in a total reported loss of US\$ 21,565 (US\$ 2156.5 per year) distributed among 279 livestock heads killed. Of this, goats shared 82.5% of all economic losses followed by pigs (10.2%) and cattle (7.3%). A total of US\$ 15,839 was paid towards compensation for livestock losses during the 10-year period. More than 88% of all compensated amount was paid towards goat losses, followed by 9.2% for pigs and 2.4% for cattle. Of all incidents, 52.5% of incidents received payments that covered whole economic losses while rest incidents received partial payments.

In addition, the project helped to raise conservation awareness among local people and students. Local people were informed on ways and means of minimising human-leopard conflict.

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

The school students were involved in school programmes, and local people mostly from conflict-affected areas were involved in local workshops and group meetings conducted for conservation awareness. The participants were made aware of conservation importance of leopards, ways to minimise human-leopard conflict and

provisions of existing compensation payment scheme. Four local youths were employed for questionnaire surveys and accompanied the researcher during field works. As such, local youths developed data collection skills.

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

Yes. I have plans to continue the work on mega carnivores (especially leopard and tiger) possibly in Chitwan National Park and adjoining Parsa National Park. The intended future project would include the study on dietary aspects of carnivores, participatory local conflict management plan preparation, local attitude survey on carnivores, and awareness campaigns, among others.

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

The preliminary findings of the study were shared among the local communities. Key results were shared with CNP officials. One paper is under preparation and in near future will be submitted to a peer-reviewed journal for publication (probably in *Oryx*). I have plans to share the research results with the officials and protected area managers of the Department of National Parks and Wildlife Conservation (DNPWC) and the Ministry of Forests and Soil Conservation (MFSC), Kathmandu, Nepal. I will also catch up any relevant workshop/conference to share the research findings.

**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 grant was used for conducting scheduled project activities between January 2017 and December 2017. Previously scheduled timescale (December 2016-November 2017) has to be postponed by 1 month due to devastating floods that occurred in the study area in July and August, 2017 affecting some fieldwork.

**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
Travel costs (vehicle hire and fuel)	1540	1650	+110	Flooding in the study area slightly increased costs of vehicle hire
Tea and Snacks for awareness programmes, and sharing workshops; and prize for school programmes	1270	1145	-125	One group meeting (out of seven planned), and one sharing workshop (out of two planned) could not be conducted due to flooding and nation-wide general elections
Accommodation for	1560	1620	+60	Flooding slightly increased costs

researcher, and accommodation and allowance field assistants				of accommodation
Stationeries	330	300	-30	
Leopard conservation related posters (flex-type) producing and distribution	160	145	-15	
Report preparation and submission (Printing, binding)	140	140	0	
<b>Total</b>	<b>5000</b>	<b>5000</b>		<b>1 £ Sterling= NRs. 142.20</b>

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

Leopard has been enlisted in "vulnerable" category of IUCN Red List of Threatened Species and its global population is decreasing. Fortunately, its population in Nepal is reported to have increased in recent years mainly due to increasing forested area coverage (44.7% in 2015) in the country. In CNP, leopard shares habitat with tigers, with the former reportedly often occupying disturbed forested areas in the buffer zone and the tigers occupying core area of the park. As such, the chances of conflict with humans are imminent who depend on such buffer zone forests for various resources and for livestock grazing. The leopards might also wander into human settlements and crop fields (e.g. sugarcane, banana farms) in the buffer zone.

The next steps should therefore focus on conduction of conflict prevention and mitigation efforts through active people participation and community awareness, tracking of conflict-prone leopards, and promotion of stall feeding of livestock, among others. Similarly, grassland and wetland habitat management activities should also be conducted in the buffer zone forests in addition to the core areas of the park so as to improve the prey base for leopards. These efforts should be reinforced by research on leopard ecology and conservation, enhanced coordination among park authorities, local communities, NGOs, and relevant government agencies, and promotion of alternative livelihood opportunities for conflict affected local communities.

### 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?

I used the RF logo in leopard conservation poster and in the presentation slides used in presenting the research results among local communities and CNP officials. The RF logo will also be used in slides during presentation of research results among the officials of the DNPWC and MFSC, and the workshop/conference where I will present the findings.

Yes, the RF got publicity during the course of our work. The participants of the awareness programmes were informed about the RSGF and support received from

the foundation. The government institutions were informed about RF while requesting for research permit.

**11. Any other comments?**

None.