

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	Hari Prasad Sharma
Project title	Red Panda Conservation in Nepal: Integrating human knowledge and scientific evidence to assess wildlife population health
RSG reference	18218-B
Reporting period	August 2015-March 2017
Amount of grant	£9650
Your email address	himalayanhari@gmail.com
Date of this report	March 21, 2017

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
<p>Genetic diversity and gene flow</p> <p>(Still we have some samples and will work for new primers and different optimization process).</p>				<p>We were not able to isolate DNA from red panda faeces at first experiment. We collected two sets of samples from each main sample. We examined one set of samples to existing available primers. However, we don't get good results. Still we have one set of samples, we are planning to develop new primers. On the other hand, there may be a problem due to sample quality: mainly getting fresh faeces (It is difficult especially for endangered species: however, we collected two sets of 88 faeces), sample storage (we don't have fridge in the field and we spent many days in field after some sample collection for searching other possible samples) and takes time to take them to the laboratory at Kathmandu, and possible degrading samples (In our experience, we found more mucus on the outer surface of faeces of red panda and inner part is dry) and this outer layer expose to sunlight, get contamination and also get wet (because red panda lives in moist and swampy places) and it results DNA quality degradation.</p>
<p>peoples understanding on potential risk of livestock-red panda disease transmission</p>				<p>We found high percentage of livestock grazing inside red panda habitats and unreported livestock diseases. Our survey indicated that >90% of the 142 interviewees had</p>

				<p>positive attitudes towards red panda conservation, which was lower in the protected areas (PA) than non-protected areas (non-PA) and among the women than men. The less positive attitudes in the PA and among the women may be due to a lower level of knowledge about red pandas.</p>
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

We did not have any difficulties except DNA isolation. The problem may be due to three factors. Firstly, sample quality: mainly finding fresh faeces. It is difficult to get fresh faeces for endangered species: however, we collected two sets of 88 faeces. Remaining set will be used in different ways sample optimization and identifying new primers. Secondly, sample storage (we don't have fridge in the field and we spent many days in field after some sample collection for searching other possible samples) and takes time to take them to the laboratory at Kathmandu. Thirdly, degraded samples (In our experience, we found more mucus on the outer surface of faeces of red panda and inner part is dry) and this outer layer expose to sunlight, get contamination and also get wet (because red panda lives in moist and swampy places) and it results DNA quality degradation. Similarly, we faced Nepal blockade during the project especially for travel problem and also due to earthquake disaster we did not go Dhading district and Gaurishankar Conservation Area.

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

Our molecular work for identification of genetic diversity and gene flow is still in work. We are searching for appropriate primers.

Livestock grazing was prevalent across the study sites except community forest in Ilam. More than 90% of the interviewees in both protected area (PA) and non-protected areas (non-PA) had livestock. Their livestock size was similar between PAs and non-PAs (PAs: median livestock size = 10; non-PAs: median livestock size = 11). A majority of the interviewees allowed their livestock to graze inside the red panda habitats (PAs: 100%; non-PAs: 79%). Proportionally more interviewees in non-PAs than PAs noticed livestock disease, suggesting a higher disease risk of the livestock in non-PAs and or a higher knowledge and concerns for livestock health among the people in non-PAs. Of the 105 interviewees (out of 142) that had noticed disease, less than half would seek veterinary services. This will increase possibility of disease

transmission to wildlife because common type of parasites are reporting between wildlife and livestock (See our report of Rufford grant 14617-2 for red panda and <http://www.nepjol.info/index.php/JIST/article/view/16053> for musk deer).

More than 90% of all interviewees had positive attitudes towards red panda conservation, and the support was stronger in non-PAs than PAs (Fisher exact test, $p = 0.02$) especially for getting benefit from tourism and ecosystem balance. More interviewees in non-PAs than PAs had red panda sightings (Fisher's exact test, $p = 0.03$). People are generally unaware of the conservation status of the red panda as a threatened species by IUCN and/or Government of Nepal, however, interviewees in non-PAs were more knowledgeable than those in PAs (Fisher exact test, $p = 0.007$). Although many interviewees were unaware of the conservation status of the red panda, they knew that killing red panda or keeping them as pets should be punished by law (Fisher's exact test, $p = 0.06$). This knowledge was gained primarily through government officials, family members and researchers in the PAs and non-governmental organizations, media, family members and researchers in non-PAs, indicating that the governments and NGOs play a key role in the PAs and non-PAs respectively educating people about red panda protection.

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

Interaction with local people and herders was imperative. We interviewed only those people who knew about red panda for our data. We did not take interview to those people who did not recognize red panda's photo/didn't know name and even didn't listen about red panda. However, we taught them about the red panda, benefit of red panda in their communities and how can they work for red panda conservation.

5. Are there any plans to continue this work?

We are still working for genetic diversity and gene flow. Hope we will get success to isolate DNA from our samples. This is one of my graduate study work and still working to find appropriate primers for red panda. This work is necessary to continue the project to determine the gene flow, which help to establish corridor to the populations where genetic diversity is low.

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

We are preparing the manuscript (people's attitude towards red panda conservation) for publication in international peer-reviewed journal from this project. I participated poster presentation for international conference Wildlife Disease

Association 65th Annual International Conference in August 2016 in New York to disseminate one of the findings of our project (<http://www.wda2016.org>). In addition, I am planning to participate at international conference to present findings of people's attitude towards red panda conservation (abstract accepted for oral presentation in 12th International Mammalogical Congress in 2017, Perth, Australia). The result of this project will be available for broad international and national audience through Research Gate and academia.edu and also through library.

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

We spent the RSG throughout the project cycle for field and lab work, manuscript preparation and international conferences. A large amount of the grant was spent during the field research and lab work especially for sample collection and chemical for laboratory, however, it becomes difficult for DNA isolation. Travel (during this period, we faced problem due to transportation blockade), accommodation and field assistants' salary was big amounts spent at that time too.

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 from Taiwan to Kathmandu (Nepal) and Kathmandu to Taiwan.	210	300	-90	Travel fair became high while buying ticket in short time period.
Travel from Kathmandu to different fields (Jajarkot district, Rara National Park, Dhorpatan Hunting Reserve, Langtang National Park, Ilam, Panchthar, and Taplejung district)	1950	2000	-50	Travel cost increased slightly than I proposed due to lack of regular flight, transportation strike and fuel shortage (During this time Nepal blockade by India and everything were in shortage). We didn't go Dhading and Gaurishankar Conservation area due to earthquake and the cost allocated in these areas help to maintain to other areas.

Logistic Accommodation of PI and assistants	2150	2210	-60	Due to our past project and relation to the area it becomes cheaper for this time, however, strike and Nepal blockade increased rate.
Subsistence payment for a local assistant	940	940		I maintained this
Equipment including microtubes, pipette tips, DNA extraction chemicals (Qiagen DNase kit), reagents and stationary	3800	2350	+1450	Faeces collecting tubes was provided from Shaner's lab NTNU, Taiwan. The cost difference is due to cost fluctuation. Still we have to work for remaining samples.
Workshop, seminars, and press conference	600	1050	+300	I got £ 750.00 from Ministry of Science and Technology, Taiwan for international conference for New York (http://www.wda2016.org). We didn't do formal press conference, however our work is published in daily (newshttp://therisingnepal.org.np/epaper/view?paper=risingnepal).
Total	9650	8850	+1550	I will use this money to isolate DNA for remaining samples.

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

First I have to complete my remaining work. This work is important because effective conservation and management of the red panda requires in-depth knowledge of the current level of genetic diversity and gene flow among the populations. No genetic studies have been conducted on this species in Nepal so far. So, there is urgent need of genetical study for the determination of the level of genetic variation, population structure and gene flow among populations throughout the Nepal.

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

I have used the RSGF logo in my presentation in conference and also mentioned name in daily news which published our work. The RSGF received some publicity during the course of this project. I mentioned the RSGF's name in all applications filed to get a permission to carry out research. Also, I mentioned RSGF's name to the local people (at conference too) when they asked me about the funding source. I recommended them to apply for the grant if they wish.

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

12. Any other comments?

The project was partially successful till now. We got good results from people about their attitude for red panda conservation and their opinion about possible disease transmission between livestock and red panda and vice-versa. Hope, we will get success for genetic diversity and gene flow for red panda in remaining samples. It is the first work on red panda and, I would like to thank The Rufford Small Grant Foundation, London, provided funding for this study. Ministry of Forest, Department of National Parks and Wildlife Conservation, Nepal, Global Hospital Laboratory, permitted this research. I thank Ashok Bam, Bishnu Bajagain, Rudra Tiwari, Gazo lama, Bishnu Achhami, Badri Panta, S. Pun and staff of Rara and Langtang National Parks, Dhorpatan Hunting Reserve for their support. I appreciate the cooperation from local people, community leaders and herders. I thank Dr Pei-Jen Lee Shaner for her input in every aspect of project.