

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	Bal Krishna Koirala
Project title	Study on diversity and spatial distribution of snakes, and analyzing public health problem
RSG reference	19388-2
Reporting period	Final Report
Amount of grant	£ 4990
Your email address	bkgelephu@gmail.com
Date of this report	6th July 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
investigation of medical data associated with snake bites				Medical data on snake bites were collected and number people died due to snake bite and total number of snake bite cases were investigated.
Analysis public opinion on snake conservation				Information on people's opinion was collected through interviews.
Create public awareness on conservation of snakes				People's understanding on snakes was promoted and there was positive change in attitude of people towards snakes and other local biodiversity
Identify trend of snakes population and possible reasons for this changes		√		Data were collected and analysed. However indentified reasons may not be sole reasons for changes of snake population, further study may be required.
Identify the snake species of potential threat to human health				Highly poisonous snakes of study area which are responsible for causing serious human health problems are identified
Investigate whether snake bites is true problems to the people of this locality.				Study suggest that snake bite is not as serious problems as it was perceived by people
Study the diversity of snake of the study area.				The diversity survey was completed covering the important habitats of the snakes.

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

Exploration of reptile's kingdom in Bhutan is quite a new journey, thus, identification of species at DNA level was quite difficult in the field. Thus, identification was done at taxonomic level using best field guide books and close consultation with professors from Wildlife Institution of India and College of Natural Resources.

To convince illiterate rural community about the project and its objectives was challenging because some of the people were not interested in conserving snakes at the beginning. However, problems had been resolved through public awareness meeting and convincing them about long term conservation goals of the project.

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

1. Baseline information-Southern Bhutan, where current study had need conducted is considered to be occupied largely by dangerous snakes only. Thus, species list and their spatial distribution produced from this project will be most reliable scientific information established and available for this region. As per our investigation, there are about five species of potentially dangerous snakes in the region, of which only three of them were involved in causing human health problems. This field reality was unknown to people before and many species whether poisonous or not were killed out of ignorance. With this findings many people were now aware of diversity of snakes available in their locality.

2. Public awareness- many conservation approaches were not been successful in the past due to the failure in integrating rural communities at appropriate level. Considering the significance of public participation and their necessary support in conservation, the rural residents of study area were made aware of the importance of conserving local biodiversity. Now more people are willing to support conservation programmes and they are more supportive even in rescuing reptiles and other wildlife, instead of killing as they used to do before. In addition, snake bite was perceived as one of the serious public health problems before, but findings of this project proved that it was more of false assumption than reality.

3. The reports and the list of snakes produced by this project will be used by the Royal Government of Bhutan and including the Park managers, Divisional forest managers, NGOs, developmental agencies, students and teachers and interested people to increase their knowledge about snakes and help in implementation of any development programmes without compromising the welfare of this important taxa. In addition, field experience and knowledge of field staff on this defined subject was enhanced. The field knowledge and experience are paramount aspects of human capacity to understand the nature in more scientific way and address the relative issues accordingly. Such field experience would indeed prepare author to conduct conservation work more effectively in near future.

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

We cannot deny the fact that human beings are integral part of ecosystem, thus, involvement of local communities in every conservation approach is considered significantly important. People from different community groups were invited during the awareness meeting and provided opportunity to discuss on their social and cultural beliefs, and their opinions on snakes that live in and around their villages. They were interviewed to gather information on identification of important sites of reptiles, types and number snakes they encounter annually, their opinion about the snake's conservation and any other relevant information on local biodiversity. As a result, local people had achieved basic knowledge about the harmful and harmless snakes that they encounter in their daily life and kind of species found in their locality. The local people who were involved in the project as a survey team and

porters were given monetary support for their hard work. Indeed, the project had helped rural people in three ways;

- Local community gained important knowledge about types of snakes found in their villages, and their significant role in agriculture as well as in ecology.
- With the findings of this project, people came to know that snakes bite not a serious problem as they thought of before.
- Financial support which they got from the project as a payment for their work was an important contribution to enhancement of their socio-economy.

5. Are there any plans to continue this work?

As mentioned before the field of herpetology in Bhutan is very new and we still have vast areas to be explored. Thus, I would like to continue study on similar subject matter (particularly in the field of herpetology) in future too. The species diversity of snakes of northern and southern is now being studied with the completion of my first and second project. Thus, my future plan is to expand similar study in central Bhutan covering larger area, fundamentally focussing on species inventory, public awareness, education outreach, and cultural significance of snakes in Bhutanese society. Therefore, I look forward for a similar grant from RSGF in future.

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

As mentioned before the report of this project would be made available to various relevant research and educational institutions such as Ugyen Wangchuk Institute for Conservation and Environment, College of Natural Resources, Sarpang Divisional Forest Office, and National Biodiversity Centre. Similarly, the information established by this project will be used by NGOs and government agencies such as Department of Forest and Park Services, Wildlife Conservation Division, and Hospitals and Basic Health Units. In addition, the findings of this project will be made accessible to park managers, foresters, schools, and mostly importantly to policy makers of the home country and abroad through publication and presentation. For instant, research paper of first project was already published in *Journal of Threatened Taxa*, and copy of it has been send to your organization.

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

Since fund was received on time, only minor adjustment with proposed time scheduled and corresponding activities was made. However, none of the planned activities were omitted while conducting the study.

1. Procurement of study equipment (June 2016).
2. Training to field staffs on data collection (July 2016).
3. Data collection (July 2016 to September 2016).
4. Awareness meeting to educational institutions (October 2016).
5. Species identification (throughout the project period, simultaneously).
6. Specimens preparation (throughout project period, simultaneously).

7. Data analysis (February to April 2017).
8. Field data collection on diversity (May and June 2017).
9. Report writing (June-July 2017).

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
Payment for supporting field staff for field survey & data collection (2 heads @ 10/day for 150 days)	£3000	£3000	0	The budgeted amount was sufficient.
Conducting public awareness campaign, providing food and refreshment	£300	£300	0	The budgeted amount was sufficient.
Conducting awareness campaign to educational institution, food and refreshment	£400	£400	0	The budgeted amount was sufficient.
Payment to local guides: (2 heads @ 9 for 30 days)	£540	£540	0	The budgeted amount was sufficient.
Purchase of Sleeping bags: 2 no.'s @ 100/bags	£200	£100	+\$100	The amount exceed by £100 and it was adjusted by procurement of guides books
Hiring suitable vehicle during field work and seeking approval from Government (40 days @ 10/day)	£450	£450	0	The budgeted amount was sufficient
Purchase of preservatives and Jars for preservation of specimens	£100	£100	0	The budgeted amount was sufficient
Procurement of Guide books (2 no.'s) @ 50	0	£100	-\$100	No budget was proposed, but found necessary, so budget was adjusted from sleeping bags
	£4990	£4990	0	

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

- In my opinion this kind of study should be continue and expand to other parts of country so that more comprehensive information is obtained. Study conducted so far cover only small geographical area of country and we still have areas to be explored.
- Frequent monitoring of the impacts of previous reach project also seen significantly important
- As a herpetologist, I feel we need to do more extensive study to produce more reliable information. More people need to be made aware of, and younger generation need to get educated on conservation significance on concerned taxa. Therefore, important next would be expanding similar study in unexplored areas with more added parameters.

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?

RF logos were used while making presentations in colleges and schools. Staffs, local people and participants were also informed about the support of RF. RF has been prominently acknowledged in the reports submitted for publications.

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

Team Members	Parent Organisation	Role/Functions
Park Manager	Jigme Dorji National Park	Chief facilitators of the project
Park Rangers	Jigme Dorji National Park	Field assistant, data collection
Park Rangers	Jigme Singey Wangchuk National Park	Field assistant, data collection
Student of Environmental Science	College of Natural Resources	Field assistant, data collection
Professors (Herpetologists)	Wildlife Institute of India	Guidance, species identification
Dean of Research and Industrial Linkage	College of Natural Resources	Guidance, species identification
Herpetologist (Bhutan)	Trashigang Forest Division	Guidance, species identification
Accountant	Jigme Dorji National Park	Financial arrangement and regulation
Local guides	Local area	Familiarization with new locality

12. Any other comments?

Indeed, I am extremely grateful to Rufford Foundation for being providing financial support to complete both first and second projects successfully. With rapid increasing human population, industrialisation, mechanised agricultural system, encroachment, and constant conversion and modification of biosphere is putting increasing pressure on all level of genetic, species, and ecosystem diversity. The emerging issue of climate change also posing substantial challenges in conserving our fast depleting environment and its biological assets. This kind of situation is demanding urgent field research but lack of fund is major problem faced by individuals, groups or country particularly in developing nations like Bhutan. The Himalayan country like Bhutan is very susceptible to both natural forces and anthropogenic activities due to its ecological fragility and economical marginality. Considering the above fact, I truly appreciate the role the RF has been playing in nature conservation all over the world.

Since the RF support field oriented activities, the information generated by individuals and small groups would be most reliable resources to established scientific facts to address present problems as well as develop future biodiversity action plan.

Lastly, the project has helped me in gaining incredible skill and knowledge in the field of herpetofauna which I believe is definitely a foundation step towards keeping my interest alive in studying herpetofauna more extensively across the country in immediate future.