

## 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](mailto:jane@rufford.org).  
 Thank you for your help.

**Josh Cole, Grants Director**

---

Grant Recipient Details	
<b>Your name</b>	Lam Norbu
<b>Project title</b>	A Wetland of International Importance in Bhutan: Diversity and Abundance of Terrestrial Small Mammals in Bumdeling Ramsar Site", Trashi- Yangtse, Eastern Bhutan.
<b>RSG reference</b>	18824-1
<b>Reporting period</b>	30 <sup>th</sup> March 2016 to 2 <sup>nd</sup> April 2017
<b>Amount of grant</b>	£4955
<b>Your email address</b>	<a href="mailto:Lam.norbu@ymail.com">Lam.norbu@ymail.com</a>
<b>Date of this report</b>	2 <sup>nd</sup> April, 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
To determine the species composition, diversity, abundance and distribution of small mammals in Bumdeling Ramsar Site.				Small mammal live trapping activity was conducted in all seasons except summer. In summer because of continues rainfall couldn't carry out trapping activities. Therefore, cannot generalise species diversity, composition, etc. Further, bats were not studied although it is small mammals because of lacking expertise as well as not included in project.
To study the environmental variables that affects to the survival of small mammals in Bumdeling Ramsar Site.				The environmental variables were recorded from all study habitat types with 18 transects having 306 trap locations of 918 trap nights.
Assess the potential ecological threats that affects to the survival of small mammals in Bumdeling Ramsar Site.				The conservation threats were recorded from all trap locations of five habitat types. Threats from agricultural fields were excluded.
Small mammal conservation and outreach programme through awareness Campaign.				Education and small mammal conservation awareness was reached out to six villages - 130 people, one community area - 150 people, two lower and one central school - 322 students and 34 staff, two colleges - 83 students and few lecturers and one university - 85 MSc students including PhD scholars and few research scientists.
Training on small mammal				Through this project trained

<p>conservation research i.e. sampling design, survey and handling techniques, identification and record keeping.</p>			<p>10 schoolchildren, 45 BSc students, three local people (two women and one field guide), 10 foresters, three government officials and three research assistants (one forester and two BSc students) on ecological research and sampling design to study small mammals beside data collection.</p>
<p>Published education/          Promotional materials          (Leaflet, Brochures          Pictorial guide and Thesis          book on small mammals of          Bumdeling Ramsar site).</p>			<p>13 posters and 50 pamphlets /leaflets / brochures were published and disseminated to schools, colleges, communities and institutions. Four hard copies of MSc thesis were published and distributed to university, institute and park office library. However, guide books and other education materials couldn't include the volant (flying) small mammal species. Further, could not publish in reputed online journals and website except in <a href="https://fri.academia.edu">https://fri.academia.edu</a> and (<a href="https://fri.academia.edu/lamnorb_u">https://fri.academia.edu/lamnorb_u</a>). The paper will be soon submitted to Journal of Threatened Taxa and reviewed.</p>

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

The success and achievement of the project is challenged by many unforeseen difficulties. Firstly, due to lack of classified information keys of small mammals of Bhutan, identification of live captured animal was quite challenging in the field. Animals showed very aggressive behaviour but however, we have tackled the difficulties with great success at the time of data collection particularly whilst collecting the ecological data, taking animal photographs (ventral, dorsal, flank), animal handling and morphometric measurement. The recorded information was later shared with member of Small Mammals Specialist Group (SMSG) of Bhutan and small mammal researcher of Small Mammal Conservation Foundation, Nepal beside shared with small mammal focal person of Bhutan and project supervisor to aid rightly identifying of the captured species. Further, South Asian classification keys of Small Mammals, A Field Guide to Indian Mammals and Small Mammals and Checklists of Nepal were also referred to identify the live captured species because of lacking expertise and small mammal reference guide of Bhutan.

Importantly, whilst handling the live captured animal we came across many dangerous parasites on the animal's body, however we cautiously handled and tackled the animal using proper safety materials to avoid direct contact and getting the diseases as well.

In addition, the harsh and extreme climatic condition has caused high rate of animal mortality at trapping sessions, especially shrew species. In order to combat mortality, we had placed soft cotton inside the traps as bedding material to provide proper insulation. Further, deployed traps were covered properly with leaf mould and litter, twigs, branches and bark of tree to avoid direct cold on the traps and save animal mortality from freezing temperature especially in winter.

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

- 1. Document the species diversity and abundance of terrestrial small mammals in Bumdeling Ramsar Site.** The agricultural land had high species richness and relative abundance and the oak-dominated forest had high diversity of small mammals. Similarly, the micro-habitat used by small mammals was rock/piled stones and macro-habitats used were agricultural land followed by oak-dominated forest.
- 2. Assessed the potential ecological threats that affects to the survival of small mammals.** Both natural and anthropogenic conservation threats that affect the very survival of small mammals in Bumdeling Ramsar Site have been identified. The anthropogenic threats observed and recorded during the study in all habitats except agricultural field included 100% of livestock grazing which includes cattle and horses (N=68), 12% of timber collection (n=18), 19% of feral dogs (n=28), 16% of litter collection (n=24), 4% of fire (n=6) and 2% of road (n=3) respectively.
- 3. Trained small mammals ecological research, carried out conservation outreach programme on small mammals and published awareness materials.** In total, 74 participants (school and college students, local people, field guide, foresters, government officials and research assistant) were taught and trained on how to design the general wildlife survey design, impart practical field techniques for ecological studies and equipment and small mammals handling technique. The four hard copies of MSc thesis book that includes seven species were published and distributed to the library. The 13 posters and 50 pamphlets/leaflets/brochures which show eleven species were published and disseminated to different schools, institutions, departments and communities. Environmental education and small mammal conservation awareness were passed and reached out to more than 798 participants from all walks of life and informed them to pass the same message to their families, parents, children, relatives and society.

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

Local communities form a vital part of this project. Local people were enthusiastically engaged in small mammal conservation and awareness programme, social gathering and consultation meeting. Whilst asking query they responded politely. The participants were served with refreshments and lunch from the project. Beside, local school students were given stationeries and cash prizes those who have participated in the conservation advocacy.

Local people have also rendered full cooperation and ensured the traps are not removed or damaged purposely from the field. Local people also permitted us to undergo trapping activities in their agricultural field and fallow land which are also the sampling frames of the six major habitat types. Further, elders or local individuals informed villagers not dismantle and removed the trap from the field.

Besides, support and corporation, local communities furnish local information on types of small mammal species presence in the study sites and vicinity which aid the researcher to make a professional predict while identifying the animal. They were also engaged as local field guides and have provided porter services during the data collection besides giving information of small mammal local name. Likewise local people particularly women have help us in the field activities. The participants were rewarded financial benefit from the project besides providing food and refreshment.

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

This project is pioneer kind of conservation research to study terrestrial small mammals from eastern Bhutan. The project was the stepping stone to publication of classification keys of small mammals of eastern Bhutan and nation as whole. As a continuation conservation research on small mammals, I will study the seasonal (particularly summer and winter) differences in species diversity of small mammals in Bumdeling Wildlife Sanctuary. Similar project will be initiated in un-studied region of Bhutan in collaboration with small mammal focal person of Bhutan, Forest official and undergraduate students.

Besides, research will be also carried out to study the species diversity of small mammals along the different altitudinal gradients. I will also encourage more young people to develop interest on small mammal ecological research through field training, workshops and education advocacy.

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

As of now, the results and information were disseminated through different techniques/methods such as poster presentations, distribution of pamphlets/leaflets/brochures, class presentations and presentations of project findings. The poster was presented during the conservation advocacy attended by 27 participants. The project findings were presented to 85 participants of MSc

Forestry, Environmental Management and PhD scholars of Forest Research Institute University in India, as a part of MSc thesis presentation. The results and findings were also presented to the 18 foresters of two Forest Range Office (Bumdeling and Trashig Yangtse) and Bumdeling Wildlife Sanctuary. I have also made short presentation of the research findings during a research symposium in Bhutan in 2016. Likewise I plan to present again of the upcoming relevant workshops, seminars and symposiums within and outside Bhutan.

Moreover, different promotional materials were distributed to different schools, colleges, university, Forest Range Offices and parks for the references. The poster on small mammals of Bumdeling Ramsar Site in Bhutan was also shared and uploaded in website of <https://fri.academia.edu> or <https://fri.academia.edu/lamnorbu>. A public Facebook page title "Small mammals of Bhutan- Funded by Rufford Small Grant Foundation" was also created and added many people on this page for easy information dissemination to larger audience.

Further, copy of pictorial guide books of "Small mammals of Bumdeling Ramsar Site" will be distributed to the various colleges, university and Department of Forest, Bhutan. The article on small mammals of Bumdeling Ramsar Site will be submitted to RNR Journal of Bhutan and Website of Forest Research Institute University, Dehra dun-India. The research paper will be also submitted to Zoo Outreach Organization and Wildlife Information Liasion Development/RISCINSA/Small Mammal's Mail of South Asia for online publication. Besides, catalogue on small mammals of Bhutan will be developed very soon and distributes to different institutions, agencies and departments. The final paper will be submitted to the Journal of Threatened Taxa for review and publication.

The photography of small mammal species collected during the research/project will be used during the preparation of classification keys and catalogue of small mammals of Bhutan in later stage.

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

As the project activities were spread through the project period as per the activities prepared in the project proposal. The project fund was appropriately used all round of the project period. Major amount of the capital was spent to meet the cost for field equipment, training research assistants, and consulting meetings with local people and students besides advocacy. To collect data for all four seasons was bit challenging and demanded lots of field work which was difficult to complete within 12 months with approved grant. In precise, the Rufford Small Grant fund was used from 8<sup>th</sup> May 2016 to 20<sup>th</sup> February 2017.

There was no major deviation from the anticipated project durations except procurement of equipment.

**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 equipment & gadgets	£784	£790	-£6	Budget was insufficient because of cost escalation and £6 was adjusted from budget of safety equipment.
Standard field Kits/Stationeries	£120	£120	£0	Sufficient budget
Safety equipment	£56	£50	+ £6	Budget was adjusted for field equipment/ gadget purposes.
Field gears	£80	£80	£0	Sufficient budget
Training & awareness programme	£966	£966	£0	Sufficient budget
Data analysis & documentation of awareness material	£190	£190	£0	Budget sufficient
Wages & charges	£2759	£2759	£0	Budget was sufficient
<b>Total</b>	<b>£4955</b>	<b>£4955</b>	£0	

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

In Bhutan, small mammal research was carried out only in higher altitude or elevation where forest is mostly dominated by coniferous species. Therefore, small mammal research should be focus equally in lower altitude i.e. subtropical and tropical zone of Bhutan where forest is broadleaved so as to know exactly the types of small mammal species present in the country. It will be further benefited to develop complete small mammal classification keys and guide books of Bhutan. Importantly research should focus equally on bats in Bhutan which are also small mammals.

**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?**

Yes, I have used the Rufford Small Grant Foundation (RSGF) logo in all my presentations, and awareness materials (poster, pamphlet, brochure, leaflet and book) with proper acknowledgement of funding source provided for the study of small mammals in Bumdeling Ramsar Site, Trashy Yangtse- Eastern Bhutan. Thus, with this many Bhutanese students, school teachers, lecturers, foresters, biologists and conservationists were motivated and knew about your esteemed foundation. Many of them are looking forward and applying for RSG to conduct conservation research

in Bhutan. Further, I am hoping to disseminate the information widely to relevant audience in Bhutan.

### **11. Any other comments?**

I sincerely thank to the Rufford Foundation for providing the generous financial support necessary to complete the study project. The project has been a personal dream and professional achievements. Besides, this outcome of the project have seen very useful to the management of Bumdeling Range Office and Bumdeling Wildlife Sanctuary which will use the study result to enhance small mammal and Ramsar Site conservation. I hope to share further information on conservation importance and ecological studies of small mammals and about Rufford Foundation to the people of Bhutan. I also hope to publish in renowned international journals i.e. "Journal of Threatened Taxa" and get the papers from this project and will immediately share with the RSG Foundation.

Lastly, I look forward to a similar financial support in near future from your esteemed RSG Foundation where I am intending to submit another follow up project shortly.