

## 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	
<b>Your name</b>	Chimmi Dorji
<b>Project title</b>	Assess the effectiveness of electric fences as a mitigation measures to Human- Bear Conflict and basic ecology of Himalayan Black Bear
<b>RSG reference</b>	17763-1
<b>Reporting period</b>	July
<b>Amount of grant</b>	£ 5000
<b>Your email address</b>	cdorjirehab@gmail.com
<b>Date of this report</b>	

**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 document the effectiveness of electric fences as mitigation measures to Human- Bear conflict.	-	-	✓	The objective is fully achieved based on the primary information collected from the hermits and the camera traps and sign surveys. There was not even a single case of bear incidences and raid right after the installation of electric fences. The camera traps set near the electric fences didn't record any bear sightings.
To document the frequency of bear sightings in terms of time and season.	-	-	✓	This objective was successfully achieved. The black bears are found to be active during the warm summer months and they are nocturnal near human habitations.
To produce a cost benefit analysis on the cost incurred on the installation of electric fences and total loss of property in the conflict.	-	-	✓	The total loss of property in the conflict far exceeded the cost incurred on the installation of electric fences. Cost Benefit Ratio was 1.82 which indicates as a positive project.
Basic ecology of Himalayan Black Bears	-	-	✓	The basic ecology of the black bears was able to understand through the dietary analysis and camera traps.

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

There were not major unforeseen difficulties encountered during the course of the project as the plans of the project were made in consultation with the members of the project and the concerned agencies. Unavoidable hindrances like the rain and snow were the two difficulties that the project team came across but as the team worked for the same objective, this problem was not a big issue. The team worked extra days and nights to compensate the time wasted during the rainy and snowy days.

**3. Briefly describe the three most important outcomes of your project. Among the many outcomes of the project, the three most important outcomes of the project are:**

1. Documentation of the effectiveness of the electric fences as a mitigation measures to Human- Bear Conflict

On an average there were at least eight cases of raid in 2011 and seven cases in 2012 .But after the installation electric fences in 2013, the number of cases dropped down to nil. A paired samples t-test was conducted to compare the incidences of bear raid before and after the installation of electric fences. There was a significant difference in the scores before and after the installation of electric fences ( $M=14.78$ ,  $SD =3.11$ ,  $N=19$ );  $t (18) = 20.666$ ,  $p = 0.00$ . These results suggest that the electric fence is effective in preventing the bear raiding the huts. The number of cases dropped down to zero in both the conflict areas right after the installation of electric fences.

2. Documentation of the frequency of Black Bear sightings in terms of time and season and their basic ecology.

Understanding the movement of the black bears is one of the most important aspects in the management of the Human- Bear Conflict. The study managed to document the frequency of black bear sightings in terms of time and season. The peak months of the black bears start from May till September and the lean months from November till April. The Black bears are found to be nocturnal near human habitation as they are reported raiding and sightings from 7 pm till 5 am in the morning. The dietary analysis showed that their diet contains different food in different seasons. They feed on succulent vegetation in spring, insects and variety of shrubs and fruits in summer and nuts and acorns in autumn. They also feed on meat whenever they come across meat throughout the season. The fecal analysis of the bears showed the hairs of rodents in their faeces.

The data from the camera traps shows the maximum number of Himalayan Black Bears sightings from the areas of thick vegetation.

- Documentation of the cost Benefit analysis of the cost incurred on the installation of electric fences and the total loss of property in the conflict.

Year	Project cost	Project benefit	Discount factor (5%)	PV cost	PV benefits
1	1997793	360257 (558050- 197793)	0.952	188298(PCXDF)	342964 (PBXDF)

Table 1. Cost benefit analysis

The formula and the statement given below were used to calculate the cost benefit ratio.

Cost Benefit Ratio = PV benefit / PV cost = 342964 / 188298 = 1.82
CBR ≥ 1 Accept (beneficial)
CBR ≤ 1 Unacceptable (Not beneficial)

The study showed that the total net present value of the electric fences in Zongkha and Pelgiri was Nu 197,793.00 and the total value of losses in the HBC was Nu 558,050.00. The total net present benefit is Nu 360,257.00 and the cost benefit ratio of the project is 1.82. Therefore, the project proved feasible as the cost benefit ratio exceeded 1. (Refer Table 4.1). The loss of Nu 558,050.00 or more would still be continuing every year had the electric fences not installed in these conflict areas. The project can be replicated in other conflict areas where the total loss of property is more or equal to that of the loss in the HBC in Zongkha and Pelgiri maintaining the cost benefit ratio at 1.82.

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

The local communities were involved during the primary data collection as the respondents. During the primary data collection, the information were collected from the respondents through the use of structured questionnaires. Few community members also helped the project team in monitoring and taking care of the camera traps. All the community members were given the awareness campaign on bear ecology and educational programs on the importance of black bears in the eco-system. The students and kids of the community are given pants and shirts with bear stickers and this move has not

only managed to draw the attention of the community and their kids to the importance of bears but also managed to somehow provide them the clothing. The recommendation from the findings of this project will certainly benefit the community and other communities as such types of planned mitigation measures will materialize.

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

The continuation of this project is deemed necessary as understanding the Black Bear abundance, their habitat type and threats to habitats and the potential threats to the Himalayan Black Bears are more important to completely wipe out the Human- Bear Conflict. The publication of the findings of this project is also another important part in the ways here after. Therefore, the plans and the visions for the continuation of this project will solely be decided by the funding agency like Rufford and other agencies and I have big hope and expectation from the Rufford Small Grant and I assure that such financial help from the Rufford will make a big difference in the outcome of the continuation of this project.

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

I am planning to publish my work and this will solely depend on the fund that whether I would be able to get. I am also happier to share with anyone who comes to me and ask about the Black Bears and Human- Bear Conflict and the effectiveness of the electric fences. My big and most important plan through the use of my finding is to help the other communities where the human- bear conflict is still on the rise. I plan to advice the concerned agencies and recommend them on the installation of electric fences in those conflict areas. I also have plans to advocate the communities on the bear ecology, importance of black bears and the does and don'ts to live in close harmony with the bears.

**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 RSG was used for a period of one year. The planned and actual length of the project were found no difference as every activities were tentatively pre-planned during the time of the project proposal. However, there were few ups and down in the scheduled dates.

**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 survey (payment for the staffs, 5 men x 5months x£4.5	2370	3375	1005	As the Royal Government of Bhutan revised the Daily Subsistence Allowance from £3.16 to £4.5, therefore, the budgeted amount cannot make up to the actual amount. Therefore, the amount of £ 1005 is adjusted from other activities
Safety kids for staffs	254	0.00	254	Adjusted to field survey payment
Vehicle hiring charge	200	200	Nil	-
Educational outreach program to ( Group catering to 450 students and 300 local villagers)	600	600	Nil	-
Educational outreach (Materials for awareness training, banners, charts, printed pictures of bears and others	100	50	50	Adjusted to payment for field survey
Educational outreach (Caps and shirts with bear stickers)	700	350	350	Adjusted to payment for field survey
Fees for media program	52	0.00	52	Adjusted to payment for field survey
Sign boards on bear information and conservation	300	150	150	Adjustment made to field survey payment
Vehicle hiring charge for educational outreach program till the end of the program	265	265	Nil	-
Pamphlets	144	0.00	144	Adjusted to payment for filed survey
Laboratory fee for scat sample analysis	15	15	Nil	-
<b>Total</b>	5000	5005		

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

The most important next step that I feel is to continue this project on the topic “ Black Bear habitat types, habitat threats and fragmentations, potential

threats to bears and its habitats and Black Bear abundance in conflict areas” and the sharing of my findings from this project. Through these works I aim to full fill the objectives of the final destination of the nature conservation for the lasting good of men.

**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 have used the Rufford logo on all the materials used in educational outreach programs such as the sign boards, banners, shirts and pants, power point presentations slides and final report, and it was a great satisfaction for me to see my colleagues getting influenced to apply for RSG and I am more pleased to see their proposals getting approved and contributing for the cause of the nature conservation.

**11. Any other comments?**

RSG was a big blessing for me and my country in studying the effectiveness of the electric fences as a mitigation measures to human bear conflict and basic ecology of the Himalayan Black Bears. The outcomes from this project will surely serve as a base line for such studies and will immensely contribute towards nature conservation for all times to come which will have long term benefit to Bhutan in particular and the world at large. For this prestigious help, I thank the management of Rufford and shall always remain grateful to RSG organization. I look forward for such kind assistance in my future projects and continuation works too.

