

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 | Shivish Bhandari |
| Project title | Ecology and conservation of the striped hyaena (<i>Hyaena hyaena</i> Linnaeus 1758) in lowland, Nepal |
| RSG reference | 21369-2 |
| Reporting period | January 2017 to March 2018 |
| Amount of grant | £ 5000 |
| Your email address | Shivish.bhandari@yahoo.com |
| Date of this report | 05 March 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 |
|--|--------------|--------------------|----------------|---|
| To know status survey of striped hyena. | | | | Camera traps were installed in Mahottari and Dhanusha districts. |
| To know food habit of the striped hyena | | | | 18 scats of striped hyenas were collected and analysis is ongoing. |
| To know population status of striped hyena in Mahottari and Dhanusha | | | | Hyenas were captured by camera traps and results are in analysing phase. A total 41 camera traps were used. |
| To explore distribution pattern of the striped hyena. | | | | With sign survey, physical parameter of the striped hyena also noted to explore habitat suitability and distribution pattern. |
| To develop community conservation awareness programmes. | | | | Village Youth Club has been formed in Rautahat, Sarlahi and Mahottari districts of lowland, Nepal. |

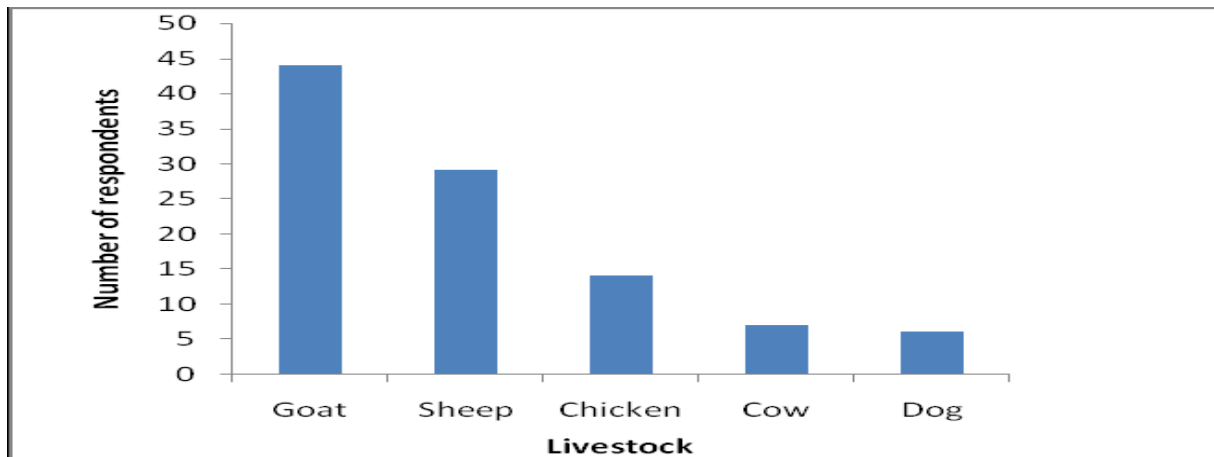
2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

Our three camera traps were stolen from the Study site (RT 003, MT 001 and MT 005) in March 2017, but we reinstalled another new camera traps in the same place.

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

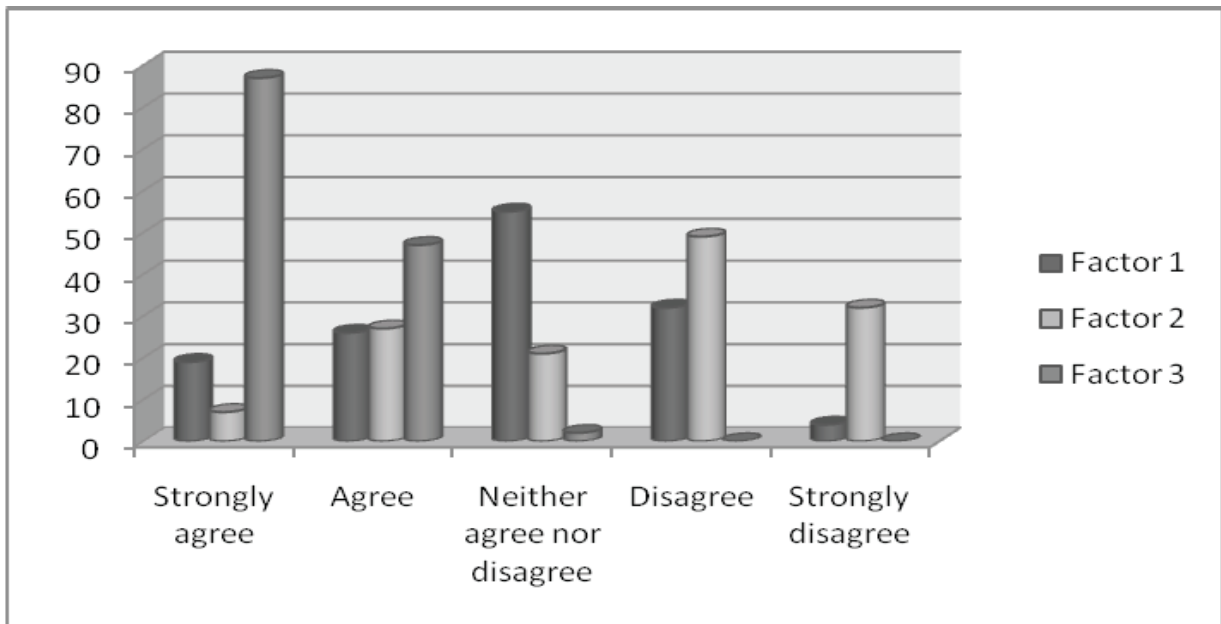
1. Involvement of Local People toward hyena conservation: Establishment of the **Village Youth Club (VYC)** and closely collaborating with community forests committee were the major success for nature conservation. These groups are working to control poaching and monitoring hyenas and their prey species. Furthermore, posters, brochure and t-shirts with conservation messages were distributed to these communities to increase participation of local people in hyena conservation in lowland, Nepal. Moreover, conservation importance of striped hyena will be highlighted among VYC, locals and Community Forests users. Approximately 650 people were directly oriented by those conservation outreach programmes.

2. Livestock preyed by striped hyena in the study site (n = 100): The major reason for human-striped hyena conflict in Nepal was the livestock predation by striped hyena. According to our latest paper (Bhandari and Bhusal 2017), it shows that most of the respondents argued that, goat was the most preyed animal and dog was least preyed animal by the striped hyena (Figure below).



3. Estimated hyena population, habitat suitability data and anthropogenic impact: There are approximately 9 (SE+/-02) individual striped hyena populations (density approximately 4.5/100 km²) in Sarlahi and Rautahat forests have been estimated. Moreover, also confirmed striped hyena in the Mahottari and Bara forests, which areas is directly connected to Parsa National Park (PNP), Nepal. We collected habitat suitability data based on presence of hyena. Based on signs, image, questionnaire survey, the distribution range of hyena in Nepal has been figured out. Anthropogenic pressure, human population growth coupled with expansion of agriculture resulted in habitat degradation through the loss of vegetation in the study site is a problem. Local people have high dependency on natural forests. We documented scientific data. Its habitats continue to shrink and fragment due to the anthropogenic pressure and human-hyena conflict in most part (especially Bara, Rautahat, Sarlahi and Mahottra districts' forests) of Terai, Nepal.

Our research relating to hyenas status was published by the Journal of Natural History Museum (Bhandari et al 2015) and it deals about local people stated their mixed opinion towards striped hyena conservation in and around of study site. This did not support to the conservation of striped hyena due to killings of livestock by hyena. Most of the people needed to conserve this species in and around the study site if conservation plan includes compensation schemes (below figure). The study area provides good habitat for striped hyena but are under threats due to habitat degradation, poaching, loss of prey species and livestock grazing. The high dependency of the local people on the natural forests especially government managed forests was also a major problem to the survival of the striped hyena and its prey species. Tolerance level of local people (n= 136), Factor 1: Increasing striped hyena population is good, Factor 2: I support striped hyena conservation even my livestock has been killed and Factor 3: Striped hyena conservation is needed to conserve outside the protected areas.



This project also explored diversity of mammals, birds and snakes in the study site:
List of birds in the study sites:

| | | |
|-----------------------------|------------------------|------------------------------|
| Black Francolin | Rock Pigeon | Black Drongo |
| Ruddy Shelduck | Spotted Dove | White-bellied Drongo |
| Fulvous-breasted Woodpecker | Eurasian Collared Dove | Greater Racket-tailed Drongo |
| Blue-throated Barbet | Common Greenshank | Oriental Magpie Robin |
| Indian Grey Hornbill | Green Sandpiper | Black Redstart |
| Chestnut-headed Bee-eater | Little-ringed Plover | Common Stonechat |
| Green Bee-eater | Red-wattled Lapwing | Pied Bushchat |
| Common Hoopoe | River Lapwing | Chestnut-tailed Starling |
| Indian Roller | Oriental Honey Buzzard | Common Myna |
| White-throated Kingfisher | Booted Eagle | Yellow-bellied Prinia |
| Pied Kingfisher | Common Kestrel | Ashy Prinia |
| Small Hawk Cuckoo | Black Stroke | Hume's Warbler |
| Asian Koel | Long-tailed Shrike | Great Tit |
| Greater Coucal | Rufous Treepie | Whiskered Bulbul |
| Lesser Coucal | Grey Treepie | Red-vented Bulbul |
| Rose-ringed Parakeet | House Crow | Plain Prinia |
| Alexandrine Parakeet | Indian Jungle Crow | Zitting Cisticola |
| Alpine Swift | Black-hooded Oriole | Common Tailorbird |
| Grass Owl | Large Cuckoo-shrike | Hume's Warbler |
| Spotted Owlet | Scarlet Minivet | Jungle Babbler |
| Lesser- adjutant Stork | White-browed Wagtail | Cattle Egert |

List of snakes found in study site:

| | | |
|-------------|----------------------------------|--------------------------------|
| Typhlopidae | <i>Ramphotyphlops braminus</i> | Common blind snake |
| Boidae | <i>Python molurus bivittatus</i> | Burmese rock python |
| Colubridae | <i>Amphiesma stolatum</i> | Buff-striped keelback |
| Colubridae | <i>Boiga trigonata trigonata</i> | common cat snake |
| Colubridae | <i>Dendrelaphis tristis</i> | Common bronzeback tree snake |
| Colubridae | <i>Coelognathus helena</i> | Common trinket snake |
| Colubridae | <i>Coelognathus radiatus</i> | Copper-head trinket snake |
| Colubridae | <i>Enhydris enhydris</i> | Common smooth water snake |
| Colubridae | <i>Lycodon aulicus</i> | Common wolf snake |
| Colubridae | <i>Lycodon jara</i> | Yellow-speckled wolf snake |
| Colubridae | <i>Oligodon arnensis</i> | Common kukri snake |
| Colubridae | <i>Oligodon erythrogaster</i> | Red -bellied kukri snake |
| Colubridae | <i>Ptyas mucosa mucosa</i> | Asiatic rat snake |
| Colubridae | <i>Sibynophis sagittaria</i> | Cantor's black- headed snake |
| Colubridae | <i>Xenochrophis piscator</i> | Chequered keelback water snake |
| Elapidae | <i>Bungarus fasciatus</i> | Banded krait |
| Elapidae | <i>Bungarus caeruleus</i> | Common krait |
| Elapidae | <i>Naja kaouthia</i> | Monocled cobra |
| Elapidae | <i>Naja naja</i> | Common cobra |
| Elapidae | <i>Ophiophagus hannah</i> | King cobra |
| Viperidae | <i>Daboia russelii russelii</i> | Russell's viper |
| Viperidae | <i>Cryptelytrops albolabris</i> | White-lipped Green Pit-viper |

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

Community support is very important in the field of conservation biology. In my project, interaction with local people, community forests users and district forest authorities were imperative. To continue monitor and conservation awareness for striped hyena as well as other wildlife conservation, the Village Youth Club (VYC) was established under the supervision of Community Forest Committee and District Forest Office – Mahottari, Rautahat and Sarlahi. The capacity building of local people and community forest users has been great achievement of this project. Furthermore, we look forward to promote alternative income generation sources, which would be helpful for conservation of striped hyena and other wild species.

5. Are there any plans to continue this work?

Of course, I have planned to continue study regarding to hyena and other wildlife conservation in lowland of Nepal. I wish to continue people based conservation work, such as wildlife tourism and agriculture and human hyena conflict mitigation programmes.

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

I am sharing results regarding wildlife conservation through social media pages, technical reports, national/local newspapers and radios programmes, national/international journals, Facebook page, Research gate Page, and Twitter.

The results of this work were published in some local newspapers and media. Moreover, the result of this work will be disseminated to the concerned authority such Department of National Park and Wildlife Conservation (DNPWC) and Department of Forest; Ministry of Forest and Soil Conservation with recommending future conservation actions. I have published two research papers in the National Journal, Journal of Natural History Museum and Journal of Institute of Science and Technology. Both are open access journal and widely used by university students in Nepal and south Asia. Moreover, our result was also published by Journal of Threatened Taxa (Bhandari and Chalise 2016). I hope these papers will be helpful to directly or indirectly for hyena conservation. Moreover, I have sent technical report to the District Forest Office – Mahotrai, Rautahat, Dhanusha and Sarlahi. I have also sent report (in Nepali language) to the seven community forest offices office.

I also plan to share our result and conservation works through short movie or documentary in near future.

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

I spend RSG throughout the project period for the field and data analysis. This period is more or less similar to the actual length of the project.

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 |
|------------------|-----------------|---------------|------------|-----------------------------|
| Food and accomm. | 1425 | 1480 | -55 | Extended field work |
| T-Shirts | 600 | 610 | -10 | Price was high |
| Vehicle rented | 405 | 650 | -245 | Due to fuel shortage |
| Brochures | 400 | 385 | +15 | |
| Radio program | 285 | 280 | +5 | |
| Travel | 216 | 250 | -34 | Due to fuel shortage |
| Posters | 200 | 200 | 0 | |
| Tents | 140 | 160 | -20 | Extra T-shirts were printed |
| Hoarding board | 100 | 110 | -10 | High cost |

| | | | | |
|----------------------|------|------|------|-------------------------|
| Laboratory cost | 260 | 110 | +150 | Helped from CDZ and HBN |
| Books and notebook | 140 | 120 | +20 | |
| Batteries for camera | 50 | 80 | -30 | |
| Topographic map | 20 | 20 | 0 | |
| Local guide salary | 600 | 500 | +100 | Used some Friends |
| Miscellaneous | 159 | 150 | +9 | |
| Total | 5000 | 5105 | 105 | Requested to ZSL, Nepal |

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

Wildlife poaching and trade is one of the major problems in most part of the Nepal, and lowland part is also facing poaching and hunting. Parsa National Park and its adjoining areas is also important site for hyena, therefore conservation and monitoring of hyena should be conducted in those areas. To minimise wildlife poaching, human-wildlife relationship must be positive. People should know that wildlife and nature must be saving for surviving of our life. I wish to work to develop human-wildlife relationship and engagement of local people (in the vulnerable areas) for alternative income generation sources, such as wild life tourism, home-stay, promoting agricultural resources (fishery, poultry, grass/wood farming, etc.) Which would be helpful for wildlife especially threatened species such tiger, leopard, rhino, elephant, wild dog, striped hyena conservation in eastern lowland, Nepal. Moreover, I wish to raise wildlife conservation message through different media, such as local radio, newspapers, hoarding bards, posters, wildlife documentary, etc. These works will be also helpful for conservation natural resources as well. I believe that those programs would be helpful to minimise human-hyena conflict in lowland, Nepal. Moreover, I wish to publish hyena works in national and international Journals.

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 used The Rufford Foundation logo in our publication, Journal of Threatened Taxa (Bhandari and Chalise 2016), t-shirts, posters, banner etc. I have mentioned The Rufford Foundation name in all papers, reports and programme related to this project.

Keywords: Carnivore, conflict, habitat degradation, questionnaire survey.

Nepali abstract: यस अध्ययनको उद्देश्य नेपालको तराई भूभागमा बाँचे स्ट्रिपीड हायनाको जनसुना एवम् वास्तव्य जे । कने बायका पासगरी तथा स्ट्रिपीडहायनाका बाया, पासरीक शरी, शय अतताको प्राणशयसं गरीने प्राणयका शयत बायका इयनवीरक ययतत बाकनन तथा शकनन पाये । यथापयथा वन प्राणीप्राण तथा सांख्यवायका स्वादीरक बाका तथाक बांके । कुनका जयका सनं करीय १०० पासितसकरीक पेटकाट पासियो र बायस बासियो । डेट बाका यमे ९१ पसिताको स्ट्रिपीडहायन बासितसक प्राणमा बांके वने १० पसिताका वने पसिता बासितसके कुनका बाकातक बांकासं बांके । स्वादीरकका स्ट्रिपीडहायना विविध बाकाका संके संके वने । कुनका वने यमे ९१ पसिताने बायका बाकाको प्रयास तथा वास्तव्यन फाके स्ट्रिपीडहायन जनन बासिया जाउने विचार बांके वने ९१ पसिताने बायकाको इयका बासितो पासिने संके वने ।
यस कुन बासितो, शय, नामस्वान नाम, इयनवीर

DOI: <http://dx.doi.org/10.11609/jott.2518.8.9.9125-9130>

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Conflict of Interest: The authors declare no competing interests.

Author Details: Mr. SHIVISH BHANDARI has completed a MSc in Zoology from Central Department of Zoology, Tribhuvan University, Kathmandu, Nepal and is currently working as a principal investigator in the field of wildlife research and conservation. Mukesh KUMAR CHAISE, PhD works at Central Department of Zoology, Tribhuvan University in the position of Associate Professor and has more than 25 years of experience in research and teaching in the field of wildlife ecology and behavior.

Author Contribution: Both authors equally contributed for the preparation of research, field study and writing of paper. First author lead field data collection.

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

Camera trapping, sign transect sampling and conservation awareness programs was conducted by PI with the help of two researchers and VYC members. Below are the details of the people who directly involved in my project:

Mr. Bishnu Thapa- M.Sc. in Zoology (Passed year 2015) from Central Department of Zoology, Tribhuvan University, Kathmandu, Nepal, major role: scientific data collection and lab analysis.

Mr. Ram Chandra Dhakal- M.Sc. in Zoology (Passed Year 2016), from Central Department of Zoology, Tribhuvan University, Kathmandu, Nepal, major role: scientific data collection, Field survey, Conservation outreach program, and Village Group discussion.

Including our team, VYC members (Pasang Tamang, Suraj Gautam in Sarlahi forest; Sikindra Shada, Netra Thapa Magar, Deelip Shrestha in Mahottarai Forests; Subarna Bhattarai, Madhav Baral in Rautahat Forest) were helped for GPS tracking, questionnaire with local people, conservation outreach programs and assistant for camera trapping. The President of the community forest user at Sarhali, named as Mr. Bharat Gautam helped us for site selection, site visiting, contacting to other local community and government persons, and technical support.

12. Any other comments?

The support provided by The Rufford Foundation was very helpful in field of striped hyena and nature conservation in Nepal. I would like to thank the The Rufford Foundation. I am hoping for similar support from The Rufford Foundation in the future. I am also thankful to Department of National Park and Wildlife Conservation (DNPWC) and Department of Forest; Ministry of Forest and Soil Conservation for providing permission letters. I am sincerely grateful to district forest office Rautahat, Sarlahi, Mahottari and Dhanusha, community forests users, VYC and locals people for their support in the field. I would also like to thank to Himalayan Biodiversity Network-Nepal and Central Department of Zoology, Tribhuvan University for providing laboratory, some camera traps and technical supports.







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