

The Rufford Small Grants Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants 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	Rohit Naniwadekar
Project title	Hornbill Hotspots: Identifying distribution patterns and conservation needs of five hornbill species in Arunachal Pradesh, Eastern Himalaya
RSG reference	18.01.08
Reporting period	March 2008 – July 2010
Amount of grant	£6,000
Your email address	rohit@ncf-india.org
Date of this report	2 August 2010

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
Current distribution of five hornbill species in the region			√	To assess the distribution of hornbills, we surveyed seven Protected Areas, six Reserve Forests and six Community Forests across the state. This gave us an understanding of hornbill status across the three different administrative regimes. Based on the hornbill presence locations of the species, ecological niche models were developed for four species of hornbills using the MAXENT program which have yielded predicted distribution maps of the four species.
Relative influences of hunting and logging in determining hornbill presence			√	Based on the findings of the state-wide survey wherein we detected stronger influences of hunting than logging, we did a small-scale study (in eastern portion of Arunachal Pradesh), where we selected sites across a gradient of logging and hunting and monitored hornbill abundances over a period of time to validate the results of the large-scale survey.

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

Several delays occurred during field work due to frequent and heavy rains and problems were also faced in accessing all study locations regularly due to logistic reasons at the study site where all field work is carried out on foot.

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

The three most important outcomes of the project are:

- a) The survey revealed that hornbills, especially the great hornbill, were facing significant threats from hunting (whose tail feathers/ casque are used by the locals in their local traditions). The questionnaire surveys revealed that even in parts of two Protected Areas, they were not detected in the last 5 years. The rufous-necked hornbill, whose tail feathers and casque are occasionally used by the locals, had also not been detected at two sites in the last 5 years. In addition, the smaller species of hornbills, the brown and Oriental pied hornbill, had not been detected at one and two sites respectively. Protected Areas fared better than Reserve Forests (high logging but low hunting pressures) and Community Forests

(logging and high hunting pressures) by having higher encounter rates of hornbills. The Community Forests which are managed by the local communities had the lowest encounter rates of the hornbills.

- b) Study at local scale across 16 sites in eastern Arunachal Pradesh confirmed the finding of the larger-scale study, that hunting had a significant negative influence on hornbill encounter rates. This study was carried out from November 2008 – May 2009 across sites along a gradient of logging and hunting. Sites in Namdapha National Park acted as control sites. The study failed to detect significant impact of logging on the encounter rates of hornbills in non-breeding season. The densities of great hornbill in the control site (Namdapha National Park) and an area which faces only logging pressures (Tengapani RF) were comparable reinforcing the findings of the larger-scale study, wherein Protected Areas (low hunting and logging pressures) and Reserve Forests (low hunting pressures but high logging pressures) had higher encounter rates of hornbills as compared to the Community Forests (high hunting and logging pressures). Along with other species of hornbills, we have also estimated densities of the globally endangered rufous-necked hornbill (IUCN Redlist – Vulnerable) in Namdapha National Park (6.0/km²). These are the first estimates of densities of this bird from the region and will serve as a baseline for monitoring hornbill populations in one of the most important area for the species in north-east India.
- c) We estimated harvest rates of hornbills in a village (November 2009 – April 2010) where locals used tail feathers of hornbills to adorn their traditional caps. The estimated harvest rates of the three species of large hornbills (great hornbill, rufous-necked hornbill and wreathed hornbill) were unsustainable. We estimated the threshold level of harvest rates beyond which the hunting is certainly unsustainable using the Robinson & Redford model (1991).

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

During the survey across sites, we employed local hunters (25) in the villages closest to the survey sites to survey the areas. Interviews were conducted with local hunters to assess the presence/absence of hornbills at each site.

Since 2008, we have employed 13 local villagers (Lisu community) in Namdapha National Park. They have helped us immensely during the study period to monitor hornbill abundances and in vegetation sampling in Namdapha National Park and surrounding areas. Most of the local staff were past hunters and have now given up hunting.

At one site outside the Namdapha National Park, we have encouraged four students to participate in the hornbill monitoring exercise in the Miao RF. They have been working with us on weekends since 2008.

At two sites (which had high hunting pressures) called Rima and Manmao, we employed one local hunter at each site to monitor hornbill abundances in the area. They have been working with us since 2008.

5. Are there any plans to continue this work?

This study has given us useful insights into numerical responses of hornbills to hunting and logging. However, there are still many issues which remain unaddressed.

- a) Though, we failed to detect any pattern of hornbill abundance with logging, we expect that logging should have significant impact on hornbills because logging often results in loss of hornbill food plants as well as nest trees. The responses of hornbills to logging might vary with respect to species, with species more dependent on figs, being less affected as compared to species depending on the non-fig food plants which are often targeted by logging. The responses of logging to the nest availability might not vary across species because most hornbill species prefer larger trees for nesting. We plan to look at how logging affects the foraging (in terms of fruit availability and shifts in diets) of hornbills in terms of (impact on hornbill food plants, fruit availability across seasons and its effect on hornbill diets in logged vs. unlogged sites) and impacts of logging on availability of nest sites for hornbills.
- b) In addition, across the different tribes in Arunachal Pradesh, there are some tribes which attribute values to hornbill body parts, while some do not. Most tribes also have specific taboos (for instance, abstaining from hunting during the breeding season of hornbills). Thus, hunting pressures on hornbills might vary from one area to another depending on the dominant tribe inhabiting the area. We also wish to compare the harvest rates of hornbills in sites where local tribes attribute value to body parts of hornbills as against sites where locals do not attribute any value to body parts of hornbills to determine the magnitude of impact which demand of body parts have on certain species of hornbills after controlling for other variables (population size of the village and habitat).

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

We are in the process of writing two manuscripts for publication in peer-reviewed journals from this work. We have written a popular article titled '*A ficus full of life*' in the Nature Conservation Foundation newsletter 'Bushchat' which was published in July 2010. We also plan to write another popular article on this work highlighting the impacts of hunting on hornbills.

In addition, we have already, presented the work at two conferences (Young Ecologists Talk and Interact 2009, Bangalore) and (Students Conference on Conservation Science 2010, Bangalore) in addition to presentations made at the Annual Research Meeting (2009 & 2010) at the Nature Conservation Foundation, India.

We have submitted a report to the Arunachal Pradesh Forest Department highlighting some of the important findings of the study.

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

The funds were used from May 2008 – June 2010. We used the funds for the duration of the project as anticipated.

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
Stipend for Research Scholar and salary of field assistants	935	3385	+2450	Based on the findings of the survey, we had to modify some of the methods, so as to rigorously test for some of the survey findings. This involved hiring of extra staff for longer periods of time, which resulted in higher expenditure under this head.
Per diem in field and for rations & field supplies	1120	506	614	Most of the expenditure was cut down on this head because we were camping in remote interior areas. We had to make do with basic rations on most occasions.
Travel	250	276	+26	
Vehicle fuel, repair & maintenance	1950	440	-1510	As we were using an old vehicle, we had anticipated higher expenditure under this head. However, the vehicle did not require much repair. Also much of the field work was done on foot, which also saved a lot of money on fuel.
Accommodation	450	390	-60	
Equipment (GPS, laser range finder, canopy densitometer, hard drive)	345	360	+15	
Stationery & Photocopying	150	68	-82	
Field consumables	200	400	+200	Latter part of our work involved substantial amount of effort in accessing, camping and working in remote areas in eastern Arunachal Pradesh. Thus there was a need for setting up camps and providing basic field gear to the staff. As we had to employ more people for the field work for longer time, there was a rise in expenditure under this head.
Communication	150	110	-40	
Report and paper writing	250	0	-250	We did not need to print multiple copies of reports as was

				needed earlier for submitting reports to the Forest Department. We provided the department with softcopies of our report along with one printed copy of the report which resulted in no expenditure under this head.
Contingency	200	65	-135	
Total	6000	6000		Exchange rate 1 £ sterling = 78.28 INR

During the course of the project, some of the results we found were interesting and needed more data to validate those results. This resulted in additional effort on our part to confirm these findings. This was not anticipated and therefore, there have been some heads under which the expenditure has shot up more than we had budgeted for and some where the expenditure was lower than we had anticipated. However, we have been extremely judicious in using the grant and we have done this to meet the project objectives successfully and completely.

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

The two important threats which hornbill habitats, especially the lowland forests of Arunachal Pradesh, are facing are habitat conversion (to tea plantations and orchards) and habitat degradation primarily due to logging. Anecdotal observations and informal conversations with the locals have highlighted rampant illegal logging in the area, it is necessary to ensure stronger checks to prevent rapid degradation of hornbill habitats. Therefore, there is an urgent need to first, estimate the rates of forest loss and secondly, to stem this.

Hunting as has been clearly highlighted is affecting all the species of hornbills. Even the wreathed hornbills, whose body parts are not utilized in the local customs and traditions, are harvested at unsustainable rates for their meat. It is necessary to stem this. Hunting has strong cultural roots amongst the Arunachali tribesmen, and it will need sustained and multi-pronged efforts to reduce the hunting pressures. In the case of hornbills, in most areas, they are hunted for various reasons (for casque, tail feathers, meat and body fat), thus for instance just substitution of body parts by artificial ones might not result in reduction of hunting. Creating conservation awareness and finding alternative livelihoods for the hunters through the means of ecotourism and professional bird tours might be able to reduce hunting pressures in select areas.

In Namdapha National Park, we have found evidence that wreathed hornbills' range over large distances seasonally. Their abundance in the study area (500 to 1500 m) declines in the breeding season (March to September) and they are primarily sighted in the non-breeding season (October to February). Our ongoing observations on hornbill abundance in the area suggests that this species may be nesting in lower elevation areas outside the protected area, while it may also be using some habitats located in adjacent Myanmar. The protection level, threats and status of the various habitats used by the hornbills are likely to be different from that in the protected area. The identification of nesting habitats, stopover sites and movement routes and distances moved by the visiting wreathed hornbills will greatly facilitate in identification of important areas for long-term conservation of the species.

Our survey has indicated that even in the Protected Areas, the future of hornbill might not be secure. It is necessary that there is a stronger enforcement of the existing stringent law to ensure that the Protected Areas harbor viable populations of hornbills. Some of these areas also face pressures from encroachments within the park boundaries. In addition, the survey highlighted that in spite of the degraded nature of the Reserve Forests, they continue to harbour hornbills, which highlights the importance of these habitats for hornbills. Hornbills are large vagile birds which are known to cover large distances to track their food resources. For instance, wreathed hornbills are known to move over a distance of 30 km on a daily basis in south-east Asia. Reserve Forests along with Protected Areas will thus ensure that hornbills have large areas. It is therefore also necessary to ensure reduction in degradation of these Reserve Forests which might serve as breeding and feeding grounds of hornbills along with Protected Areas in future.

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

We have used the RSGF logo on all the five presentations (1 poster + four talks) we made. RSGF logo was also used in the Report to the Arunachal Pradesh Forest Department.