

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. 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. 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	Abhijit Das
Project title	Herpetofaunal distribution pattern along an elevational gradient in Barail Hill range, Northeast India: evaluation in the context of conservation priority
RSG reference	11648-B
Reporting period	July 2012-August 2013
Amount of grant	£10,000
Your email address	abhijitdas80@rediffmail.com
Date of this report	22 September 2013

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
Herpetofaunal survey			Yes	<p>Recorded reptiles and amphibian diversity from Barail landscape now goes up to 124 species!</p> <p>We have conducted herpetological survey in fifteen sites between 150-3000 m. We collected spatial distribution data along the elevational ranges that will be helpful for future conservation priority of the landscape. We are able to record species new to science, new country report and discovery of lost species.</p> <p>Although species accumulation curves showed a marginal asymptote in-between 1500-2500m zone, however, the collector's curve doesn't reach asymptote at lower elevation zone especially between 150-1000 zone. Rarefaction plots also gave us similar results indicating that further survey likely to record hitherto unrecorded species in this hyper diverse landscape.</p>
Elevational distribution pattern			Yes	<p>The distribution of herpetofauna is found to be greatly influenced by the variation of elevation. There is a monotonous decline in species richness along the elevational gradient of Barail hill range. Maximum number of species occur at lower elevation (0-600 m), followed by low to mid elevation (601-1000 and 1001-1500 m). Lowest number of species occurs at higher elevation. Cumulative species richness also found to increase with the increase in elevation up to 2500 m and then shows saturation with no further addition of species with the increase in altitude. Certain species such as <i>Polypedates himalayaensis</i>, <i>Oreocryptophis porphyracea</i>, <i>Rhabdophis himalayanus</i>, are distributed from low to mid elevation up to upper limits (~ 2800 m). These widely distributed species presumably have a wide ecological tolerance enabling them to disperse at a wider habitat types available at different altitudinal grades. It is Interesting to note that most of the unique species occur at lower elevation (0-500 m) and at mid</p>

				<p>elevation (~1500m). This presumably reflect towards a significant species boundary along the elevational gradient of the region with lowland species are largely replaced with the highland species. At species level this pattern of distribution can be observed in the genus <i>Rhabdophis</i>, where the species <i>Rhabdophis subminiatus</i> is distributed at the plain to mid elevation, <i>Rhabdophis himalayanus</i> is distributed from foothills up to higher elevations (100 m -2500 m) and <i>Rhabdophis nuchalis</i> is only found at higher elevations of the region (>1700 m). On the other hand, at the upper reaches, although the diversity is low but it also supports a unique set of highland adapted species. It may be concluded that the lowland and highland components of the herpetofauna have differentiated substantially making them as unique ecological assemblages and deserve conservation measures. A detail scientific report on this aspect is in preparation.</p>
Awareness and Publicity		yes		<ol style="list-style-type: none"> 1. During the project activity, we could visit new field sites that help us establish better conservation network at field level (in at least 10 new field sites). 2. We organised village talk and community meeting especially in Upper elevation areas (falling in Nagaland state) where much of the landscape belongs to local community. Although few communities have already protected forest (community reserves such as KNCTS), we urged other such communities to declare certain forest area for community conservation. Forest department officials participated in our' Turtle conservation workshop" where prioritise Barail landscapes for conservation of endangered turtle such as <i>Manouria emys</i> and <i>Cuora mouhotii</i>. 3. Barail herpetofauna project able to generate pioneering diversity and distribution information for the Lower elevation ranges especially in

				<p>and around Barail Wildlife Sanctuary. Thus, herpetofaunal diversity and distribution and information on unique species were provided for evaluation of the area as an “ecological sensitive area” a conservation initiative taken up by Assam Forest Department.</p> <p>4. We conducted regional level workshop to prioritise threatened chelonian conservation in the region. Various stakeholders such as forest officials, research scholars, professors, young students, NGO leaders, media and community leaders participated in the meeting. We also arranged popular talk and orientation programme with school students to generate conservation interest.</p>
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

As a recent development, any foreign funded biodiversity project needs to get approval from respective State Biodiversity board first. This is a development that started from 2012 in Assam. Thus, it took extra time to get the approval from the Assam Biodiversity Board, which was not visualised at the beginning of project. After approval of the Biodiversity Board, Assam Forest department can give the research permit in protected areas.

However, we managed to receive Forest department permission quickly from Nagaland Forest Department. That helped us to begin our work in protected areas of Nagaland. And we already had permit to conduct research from local community, so we did not loose our field days.

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

- We discovered a new species of high elevation dwelling Torrent Toad and named it as *Duttaphrynus chandai* after one o the pioneering amphibian Biologist of India named Dr. Shyamal K. Chanda. The species can be differentiated from all other congeners in showing hidden tympanum. The unique reproductive mode of the species is under study.
- We are in the process of describing a new species of Rhacophorid and a new species of Ranid from lower elevation area of Barail hill range. This is also seems to be an important outcome of the project. Beside, we published our findings on new distributional records of Wolf snakes such as *Lycodon zawi*, *Lycodon septentrionalis* and megophryd frog *Leptobrachium smithi*. During the survey, we came across first country report of an elapid snake species and a colubrid species and the finding is in press. Beside, research scholars from local universities got interested in the Barail landscape and started their doctoral thesis work on aspect of vegetation, butterflies etc of Barail wildlife sanctuary.
- We are in the process of publishing overall finding of the project in the form of detail report and also in peer reviewed journals. The species distribution records allow answering

fundamental questions in ecology and macro-ecology, such as patterns of relative abundance, rarity, richness, and species turn-over and assemblage composition at different spatial scales of Barail hill range.

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

With our earlier involvement with the local community of Upper reached of Barail range, we moved forward and established contact with local communities of almost 10 new areas. We conducted village meetings describing Biodiversity values at Pungro and Thanameir at the base of Saramati Mountains. Local communities involved with us while we conducted survey and trekking on Saramati mountain range.

We also had discussion at Chezami (Nagaland) and Putsero. Where we have interacted with members of NGO called Northeast Network. We also had meeting with and Thanameir Students Union and Khonoma students Union.

As most of the villages are dependent of Terrace cultivation, thus we invited experts who gave them hands on training on organic farming and production of bio-fertilisers. Our experts demonstrated techniques for paddy cum fish culture and techniques for vermicultures. This presumably helped many villagers in developing their agricultural skill. We also supplied high yielding variety seeds of fruiting trees and vegetables to many villagers of Dzuleke, Khonoma and Zakhama.

5. Are there any plans to continue this work?

Tropical forest of Barail landscape (up to 1000 m) elevation is exceedingly diverse and complex. At the same time these forest areas are extremely threatened and acting as biodiversity refuges. Getting a clear picture of the herpetofaunal community therein presumably is job of a lifetime. However, as we have already gathered significant amount of baseline data and thus we can now formulate objectives and targets of a monitoring plan for the landscape.

We are planning for more intensive survey method to gather data from difficult to sample habitats such as canopy, rocky terrains. In the coming days we plan for a evergreen forest canopy sampling project and other methods such as bound quadrat to record most of the species in a plot (density estimation) along gradient and measures to record saxicolous and burrowing species.

This is also necessary because ongoing research activity helps generate much awareness among the local people. They can feel the importance of forest and wildlife. And local community sometime gets marginal financial benefit as they become local guide or research assistant. Continued research activity also helps pass on field level information to forest department. It helps attract national and international attention and above all, makes other interested to do research on Biodiversity components.

Thus, the show must go on!

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

We are going to publish the detail result of the finding in the form of a detail report and survey findings will be depicted in a field guide book. Beside, the field metadata will be shared in a global platform though publication in pensoft journals.

Following papers are available on request at (protobothrops@gmail.com):

- **Das, A., M. Chetia, S. K. Dutta, S. Sengupta.** 2013. A new species of *Duttaphrynus* (Anura: Bufonidae) from Northeast India. *Zootaxa* 3646 (4): 336–348.
- **Das, A.** 2013. Notes on rat snakes from Northeast India. In: Schulz, K-D. (ed.): old world rat snakes. A collection of papers- Bushmaster publication, Germany, Berg SG: 309-336. ISBN Number: 978-3-87429-435-5
- Dutta. D., S. Sengupta, A. K. Das and **A. Das.** 2013. New distribution of records of *Lycodon zawi* (Serpentes: Colubridae) from Northeast India. *Herpetology notes.* 6:263-265.
- Dutta D., **A. Das**, A. Dutta, J. Gogoi and S. Sengupta. 2013. Taxonomic status and distribution of *Leptobrachium smithi* Matsui Nabhitabhata and Panha, 1999 (Anura: Megophryidae) in India with new locality records. *Tropical Natural History.* 13(2): (in press for October issue)

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

The project “Herpetofaunal distribution pattern along an elevational gradient in Barail Hill range, Northeast India: evaluation in the context of conservation priority” having reference number 11648-B was approved by RSGF of 8th June 2012.

We received the grant amount on 1st July 2012 and proposed a timescale for project activity between August 2012 and August 2013.

The Fieldwork actually started from September 2012 as it took slightly more than a month to get permission from Nagaland Forest Department as well as we completed our reconnaissance survey in new field sites.

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.

Assumed expense as per budget GBP 1 = 76 INR)

Item	Budgeted Amount	Actual Amount	Difference	Comments
Transportation	1530	1600	-70	An increase in transport amount involves repair/maintenance charge of a field vehicle after we came from few field trips.
Fuel	600	700	-100	Fuel charge (petrol) kept on increasing almost every fortnight in India; also field vehicle used was a petrol one.
Lodging	500	350	150	We saved some money by staying in community facility and traditional house, forest camps etc.
Honorarium	2000	2200	-200	We had to increase our number of field staff especially in new localities, to have a representation of local community in the team.
Per diem	2000	2100	-100	There was slight increase in per diem as there was an increase in our team members.

Instruments	120	120	0	
Stationary (batteries, chemicals)	1000	1050	-50	We spend a bit more as we bought some more museum materials and chemicals and batteries.
Endemic Herpetofauna Poster and flagship species Stickers	500	300	200	200 GBP left will go to printing of the Pictorial guide. 300 GBP went to printing of Turtle leaflet.
Publication of Survey report and colour leaflet	500	500	0	We did not print colour leaflet, However the 500 GBP went to the cost of Field guide printing (ongoing)
Insurance and Unseen expanses	150	250	-100	Unseen expanse increased in survey to remote areas such as we donated some money to local community for various traditional occasions in Nagaland.
Awareness, village meet, slide show	350	200	150	The money saved went in other head where deficit seen.
workshops at educational institute	500	400	100	We paid money and food at Indian Institute of Bank Management for a day long programme. Saved money went in other head (unseen expanse)
Overhead expense	250	250	0	
TOTAL	10000	10020		

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

- Design and implement effective sampling strategies for difficult to sample habitats such as forest Canopy (at below 1000 m elevation), rocky outcrops (especially in higher elevation areas ~1700 – 2500 m), fast flowing streams especially in monsoon season. This will help us discovery of hitherto unknown cryptic reptile and amphibian species.
- Initiate ecological and biological studies on some unique restricted range species such as Assamese water skink (*Tropidophorus assamensis*). This rare and unique water skink is found to be relatively abundant in lower elevation of Barail range where future studies can be designed. Similarly at higher elevation, *Rhabdophis nuchalis* has a very narrow distribution. However, it is relatively abundant only in a very small pocket between 1800-2600 m elevation zone of Barail ranges.
- Determine the conservation status species recorded so far based on the rarity index. We started categorising each species into three traits-geographical range, Habitat specificity and local population size. This will help determine conservation status of herpetofaunal species of the mountain range.

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?

The RSGF logo was used in all my power point presentation on “Barail Herpetofauna” at national and international level. We are producing pictorial guide to Herpetofauna where RSGF logo will go as one of the funding agency for the book. We have done with ~80 ground work for the book. We are looking forward to publish this within December 2013. I also used RSGF logo in the Final Technical

report (front page) and in the field guide book (back side page dedicated to funders) which are under preparation. I felt immense pleasure to acknowledge the support extended by RSGF in all my peer reviewed scientific publication so far and also in the publications to come.

11. Any other comments?

Thanks to Rufford Small Grant Foundation for continuous support that help generate a decent database useful for further research and conservation. I would like to thank Nagaland Forest Department, Assam Forest Department and Assam Biodiversity Board for dealing with my permission to conduct research work. Special thanks to Chief Wildlife Warden, Nagaland and staffs of Pulibadze Wildlife Sanctuary, Nagaland for support. I am always thankful to Aaranyak for logistic support. For support I thank, villagers of Thanameir, Pungro, Khonoma and Dzuleke, Maruah, Barkhola, Naraincherra, Bijoypur and Doloo Tea Estate. For field assistance I am thankful to Vivosile Meyese, Kevi Meyese, Nikhocho, Tsile Sakrie, Seno, Abhishek Das, Kolbinuse Pothmy For taxonomic, Museum and literature help I thank Indraneil Das, S. K Dutta, Frank Tillack, Saibal Sengupta, Aaron Bauer, Ulrich Manthey B. H. C. K. Murthy, Kaushik Deuti, and Sujoy Raha. My sincere gratitude to Arup Kumar Das, Nilam Dutta, Rajeev Basumatary, Mayur Bawri, Firoz Ahmed, Bibhab Talukdar, Pranjit Kumar Sharma, P. C. Bhattacharjee, Pratyush P. Mahapatra, Manoj V. Nair and Sonali Ghosh.