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	Vivek Sarkar
Project title	Study on cicada diversity and preparation of country's first cicada call library in Garo-Khasi-Jaintia hills complex of Indian state of Meghalaya
RSG reference	21132-1
Reporting period	January 2017 to January 2018
Amount of grant	£4999
Your email address	viveksarkar87@gmail.com
Date of this report	27th April, 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 prepare an inventory of cicadas for the region along with natural history observations.				In 9 months (from February 2017 to October 2017), 60 species of cicadas are reported from the study area (33.86% of cicada diversity of the country) along with the species specific natural history observations.
To prepare the first call library of cicadas from Indian region.				Calls are recorded for 59 cicada species under this project, majority of which are recorded for the first time.
To document the cicada related folklores, and local Garo and Khasi names of different cicadas.				Folklore and common names of Garo and Khasi culture have been recorded for 27 species of cicadas.
Outreach to promote citizen science.				Presentations were delivered in the community gatherings, schools and colleges followed by talks with the participants. A talk was delivered from this work in a TEDx event as well. The papers and a popular article from this work are in preparation.

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

There have been three major difficulties that I faced during the tenure of this project.

First difficulty was the unpredictability of the weather conditions. The sporadic rains started at the end of February and more or less continued till October. This irregular rain hindered the recording and collection of nine species of cicadas (only heard during rains) that could not be included in the final lists.

Second difficulty was carrying out fieldwork in few parts of west and south Garo hills due to political disturbance and insurgency. Due to this, one of the proposed study sites *viz.,* Siju Wildlife Sanctuary in south Garo hills could not be surveyed. Similarly, the reserve forests in and around William Nagar and all Nokrek National Park in West Garo Hills but Tura peak region were avoided due to limited accessibility and insurgency. However, most of the preferred habitats of the cicadas in these un-surveyed regions are found in other surveyed parts which were surveyed thoroughly throughout the year leaving a thin chance of any new findings.

The third and most important challenge that was faced during the project was financial crunch towards the end of the project tenure as there were multiple breakdown of the field motorcycle due to bad road conditions and purchasing fuel from locals in double price or more due to lack of fuel stations in remote areas. UNESCO Category-2 Centre provided financial support to sort this problem. Apart from this, as mentioned in the proposed budget, there were provision for only two field assistants in the project but I had to engage four field assistants throughout the project and one temporary field assistant for couple of months. All this excess unforeseen expenses were taken care from personal savings.

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

A. India (including Bangladesh) altogether have 189 species of cicadas (Price et al 2016) and only 22 cicadas were reported from the study site *viz.* Meghalaya (Distant 1889, 1890, 1891. 1892, Kato 1932, Mathur 1953, Paiva 1917, Sen et al 1998). In 9 months (from February 2017 to October 2017), I have recorded more than 60 species of cicadas from the study site. Among these 60+ odd species, 44 are new report for Garo-Khasi-Jaintia Hill complex, eight are new report for India, and tentatively 11 of them are new to science*. (* The details of the species has not been shared in this report as all these new records are unpublished. The findings will be shared as they get published.)

A.1. References:

- Distant, W. L. 1889. Monograph of Oriental Cicadidae. Part I: 1-24.
- Distant, W. L. 1890. Monograph of Oriental Cicadidae. Part 3: 49-72.
- Distant, W. L. 1891. Monograph of Oriental Cicadidae. Part 4: 73-96.
- Distant, W. L. 1892. Monograph of Oriental Cicadidae. Part 7: 145-158.
- Kato, M. 1932. Monograph of Cicadidae: 450.
- Mathur, R. N., 1953. Indian Forest Leaflet (Ent.) 121(3): 138-187.
- Paiva, C. A. 1917 Rec. Indian Mus. XVI: 373-377.
- Price B, Allan E, Marathe K, Sarkar V, Simon C, Kunte K (2016) The cicadas (Hemiptera: Cicadidae) of India, Bangladesh, Bhutan, Myanmar, Nepal and Sri Lanka: an annotated provisional catalogue, regional checklist and bibliography. Biodiversity Data Journal 4: e8051. doi: 10.3897/BDJ.4.e8051.

B. None of the calls were ever described for Indian cicadas. As many as 59 cicada species were recorded under this project and majority were recorded for the first time. Not only the calls, but also the habitat preference, activity period, emergence timing and other natural history observations were made for every encountered species. All the calls and the observations will be published and soon after will be uploaded in www.indiancicadas.org website. The closest resemblance of this project is the work represented by Boulard in his book 'Cicadas of Thailand, Vol-II'. This is a decent number of species to initiate the making of systematic call library. It is an ongoing process and the call library will be up soon in the same website.

C. Most of the Khasi cicada names and all the Garo cicada names and related folklore have been recorded. These folklores and names were used in the public gatherings, meetings and presentations during outreach. In the upcoming publications, the origin of local names (based mostly on natural history of that species) will be explained.

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

In the study area, the autonomous district council is the head of the administration.

In Khasi hills, mostly the village headman, a few elderly people and school students were present at the meetings held under the tenure of this project. However, in Garo hills I got a better response from the community especially when they got to know that the common Garo names and folklores will be documented. The President of Garo Autonomous District Council, Mr Skylance, hosted a meeting where 23 members from Forest Department, District Nokma Council, Achik Literature Society and Garo Graduation Union participated. This was a great help for the project. All the documented folklores and the findings of the project have been shared with forest department and Garo Autonomous District Council and the publications will be shared with all the stakeholders of the landscape. The papers will have an abstract in native language as well.

5. Are there any plans to continue this work?

The preparation of cicada inventory is more or less complete from Meghalaya.

- The next step of this work is to conduct nature awareness camps in schools, colleges and universities and the material for this programmes will be developed from the outcome of this existing work. This is to primarily generate interest in youth to not only study under-explored taxa but also to inculcate conservation leadership among them. I would also like to engage the students in citizen science activities like bird watching, butterfly watching, listening to cicadas and exploring the backyard, and personal data keeping and data sharing to give them a proper field orientation (2018-2019).

- The long-term goal from the work would be to prepare the first ever regional cicada field guide from India in order to promote cicadology and to encourage common people to look into cicadas (2019-2020). We have one prominent example, butterflies, to quote here. Despite attractive colours, butterfly watching got very popular in India in recent time only, after the publication of few image based field guides (between 2005 to 2008) and presently butterfly study is one of the most happening trend in young ecologists and field biologists after bird watching.

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

The result of this project will be shared in four different platforms.

First platform is through the scientific report. This will be shared only with the forest department (park managers) and the village heads responsible for the management of the community forests.

The second platform is publishing the findings in the form of scientific publications in peer reviewed journals.

The third platform is through presentation and popular talks. The target crowd for this platform is local communities and youth. In addition, writing popular articles from the findings are a better way to share the information with common people.

The fourth platform is through social media as it has much broader reach and robust responses. I keep sharing interesting facts about cicadas and beautiful photos on FB groups such as Cicadas of India and Fulgurids of Thailand and on Instagram.

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 Rufford Foundation grant have been used from January 2017 to November 2017. In the original proposal, I have anticipated the time scale as January 2017 to January 2018. The actual time scale of the project was more or less accurately anticipated without any major drifts.

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
1 Project Coordinator	824	0	-824	Instead of taking this fund from the project grant it was utilised in other unforeseen expenses.
4 long term field assistant and 1 short term field assistant	1400	1820	420	As mentioned in the proposed budget, there were provision for only two field assistants in the project but instead four permanent field assistants and one temporary field assistant (for couple of months) had to be engaged throughout the project.
1 Mike	313	0	-313	This was an essential gadget to complete the project but due the unavailability for longer duration at the beginning of the project this gadget was not purchased and

				borrowed from a friend. The fund assigned to this was used in other expenses of the project.
Head phone	70	94	24	There was a decline in the exchange rate of the pound sterling since the time of the preparation of budget and due to this the actual fund spent on this was higher than expected.
GPS	192	241	49	There was a decline in the exchange rate of the pound sterling since the time of the preparation of budget and due to this the actual fund spent on this was higher than expected.
Rechargeable Battery	30	30	0	There was no difference from the estimated amount.
Hard disk	100	121	21	There was a decline in the exchange rate of the pound sterling since the time of the preparation of budget and due to this the actual fund spent on this was higher than expected.
Field trips	1000	1200	200	There was a decline in the exchange rate of the pound sterling since the time of the preparation of budget and due to this the actual fund spent on this was higher than expected.
Travel	681	1790	1109	The high difference in the estimated fund and actual fund spent is because of multiple breakdown of the field motorcycle due to bad road conditions and purchasing fuel from locals in double price or more due to lack of fuel stations in remote areas.
Outreach material	233	0	-233	All the outreach programmes were done in a form of talk and presentation in a village gathering and the expenses of outreach were covered under the field trip or travel budget heads.
Communication / Stationary	156	150	-6	The estimated and actual fund was more or less accurate.
Total	4999	5446	447	**1 Pound Sterling = 79.41 INR**

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

The first and foremost step now would be publishing the findings in scientific journals. And next step should be visiting more academic institutions from the study area to share the findings with the young students and aspiring ecologists so that they get a sense of ownership of their backyard biodiversity. I would also like to engage them in activities like bird watching, butterfly watching, listening to cicadas etc. and

personal data keeping and data sharing to give them a proper field orientation. Apart from that, these visits would also promote citizen science initiatives for documenting local biodiversity by the common people.

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

- All the presentations during the tenure of this project and even after, had a significant mentioning of The Rufford Foundation and all the slides had The Rufford Foundation logo in them.
- There were two different versions of presentation. First version was used for the students and for the common people and it was presented in the form of storytelling.
- The second version of the presentation was bit technical and used only for focused groups of people such as in training course of park managers (across India) hosted by Central Academy for State Forest Service (CasFos); Wildlife Enthusiast Course hosted by Wildlife Institute of India (WII) and also in field orientation programme for 'Indian Forest Service' Officers hosted by Indira Gandhi National Forest Academy (IGNFA).
- The origin of this work and the finding of this project have also been presented in a form of popular talk in an TED Event in November 2017, hosted by Indian Institute of Management, Sirmaur (IIM, Sirmaur). The link for the talk is https://www.youtube.com/watch?v=Vn8NwYwXL4M&t=73s
- The project and the work also got covered by one of the wildlife and conservation magazines, 'Saevus' in September-November 2017 Issue.

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

Mr. Vivek Sarkar (Coordinator): I coordinated all the project activities including field surveys, data collection, data analysis, writing and publishing papers and popular article, outreach programmes, administration of the project and financial management. All the talks and presentations were also prepared and presented by me. Presently, I am working on the call library to put it up on the 'Cicadas of India' website.

Field Assistants:

Mr. Santosh D. Sangma: He not only assisted in the field work in south Garo Hills but also facilitated the stay in different villages during the survey. He had been one of the keystone persons to organise village gatherings and discuss about the cicada and related folklores.

Mr. Tushar M. Sangma: He assisted in all the fieldworks in the South and West Garo Hills and managing the logistics as well. He worked as a bilingual interpreter as well in the village gatherings in order to explain the Garo folklores in 'Hindi'.

Mr. Kendis: He assisted in the field work in Balpakhram National Park in the month of June, July and August.

Rohdison Thangkhew and Blasting: Rohdison and his family hosted my stay in Ri-bhoi District and he and Blasting assisted during field work there.

The local people had been recruited on contractual basis for the period of 9 months to help with the field surveys. They have been trained in field techniques to spot and handle cicadas and to interact with local community to understand people's perception towards forests and wildlife conservation. They had been adequately oriented towards conservation and documentation and trained for long-term monitoring and awareness programs which they will continue in the landscape. On this note, it is mentionable that Tushar started doing butterfly, cicada and harpetofauna watching in Garo hills and he started assisting students, researchers and enthusiasts in their surveys and field ventures. Rohdison is now a PhD student in North Eastern Hill University who is looking at the Cicada Diversity in and around his Home town, Nongpoh Village of Ri-bhoi District, Meghalaya.

Mr. Tugo Riba (Intern): Tugo did an internship from August to October after completion of his graduation in forestry from Uttarakhand Technical University. It was more of a learning experience for him where he got an explicit field exposure. He has assisted me extensively in the field work during his tenure. Presently, he is doing his internship with WWF-India.

Dr. Krushnamegh Kunte (Advisor): Dr. Kunte played an advisory role to this project.

Mr. Pratap P. Singh (Co-advisor): Mr. Singh played one of the major advisory roles due to his experience in acoustics of birds. He has also helped extensively in selection of gadgets, lending of gadgets, using the equipment, analysis of data and representation of data.

Dr. Abhijit Das (Co-advisor): Dr. Das helped a lot in documentation of the cicada predator communities, specially the Herpetofauna group such as frogs, caecilians and lizards.

Dr. Manoj V. Nair (Co-advisor): Dr. Nair have helped a lot in documentation of the cicada predator communities, specially the odonata, mammals and birds.

Other Important Mentions:

Mrs. McDalin: Mrs. McDalin has been one of the major facilitators in the Khasi-Jaintia hills. She took care of everything in this areas during the tenure of the project.

Mr. Vicky Singh: Mr. Singh took care of the luggage transportation and other logistical supports in Khasi Hills and Ri-Bhoi region.

Mr. Abdul Rabb, Mr. Salman and Mr. Tahir Hussain: Mr Rabb, Mr, Salman and Mr. Hussain took care of the vehicle and maintenances in Uttarakhand, Khasi Hills and Garo Hills respectively during the project tenure.

12. Any other comments?

Although the major focus of this project was to study and record cicadas, documentation of common Garo and Khasi cicada names and related folklores and to popularize the study of this lesser known taxa, but in order to do it many other interesting taxa, natural phenomenon and folklores were recorded and documented. The interesting findings are as follows,

- Under the tenure of this project a check list of odonata community in the study area has been prepared consisting many interesting and exciting findings.
- Under the tenure of this project, vocalisation of many enigmatic frogs have been recorded and based on the images and calls a checklist of herpetofauna has also been prepared which have many new and interesting species report for the region.
- In the month of June, I have discovered few patches of thick primary forests in Garo Hills, hosting bioluminescence mushrooms. The evolutionary significance of this phenomenon is poorly understood as of today.