

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	Rachunliu G. Kamei
Project title	Community education and conservation of neglected fauna in a neglected hotspot – caecilians (Order Gymnophiona) of North East India
RSG reference	Project ID 15255-1
Reporting period	May 2014 to December 2015
Amount of grant	£5617
Your email address	kamei.chun@gmail.com
Date of this report	22-03-2016

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
Dispel myths about caecilians			√	<p>I believe that this objective was successfully achieved. After the talks, people (young and old, literate and illiterate) would come up and express that they were convinced that caecilians were not venomous, as mistakenly believed for a very long time, passed down through several generations by oral tradition. Participants also regularly expressed their appreciation and amazement of how one could devote one's career to studying these "loathsome squiggly animals" (as caecilians are popularly referred to by people in NEI), which in a way contributed to their acceptance that these animals must indeed be special and deserve to be preserved.</p> <p>Please see response to "Q. 3" below for more information on dispelling the mistaken belief about caecilians.</p>
Local capacity building			√	<p>In recent times, farmers in NEI (although not as much as in other parts of the world) are becoming to rely more and more on agricultural 'promoters' such as fertilisers/pesticides and are gradually abandoning traditional farming practices. This project gave me a unique opportunity to educate the farmers about maintaining the beneficial resident biota through utilisation of natural and organic farming practices, and simultaneously maintaining the reproductive sites of caecilians, and general health of the total native biota.</p> <p>I was able to emphasise to the locals and farmers the major potential long-term detrimental effects that chemicals (can) have on the native fauna, including caecilians. Although there is no direct scientific evidence so far published (as caecilians still remain very poorly studied). I believe I was able to convince most of the locals and farmers that caecilians are 'beneficial' soil biota, and to let them be on their land.</p> <p>Locals were trained how to safely release a caecilian if they came across one in their field, on the roads, etc.</p> <p>I also did a small survey to assess local knowledge, by</p>

			asking farmers to what extent they would associate caecilian presence with 'good' agricultural soils, and whether there is any perceived correlation between environmental quality/fertility and presence/absence of caecilians, but there was not much success on this aspect as the locals/farmers I interviewed did not seem to have such observations.
Community education - public outreach to the general public		√	<p>During the first year (2014) I addressed 500+ people mostly people in villages, local farmers and to some forest department officials. In the second year (2015), I mostly concentrated on public lectures in educational institutions. Through approximately 30 popular science talks I directly addressed over 6,000 members of the general public in six of the eight NEI states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, and Tripura; see Appendix I for list of places where the talks were held).</p> <p>My audience was varied including the non-literate farming communities, bureaucrats, university students, but a great majority were school children. I believe it was quite a rare and special occasion for NEI to have a home-grown and woman scientist interact with the public about science. To the best of my knowledge, it was the first large-scale public outreach on biodiversity science done in NEI by a single person. The campaign received intense local media coverage. Additionally, a 30-minute documentary on caecilian research in the NEI is currently being made by the Government of India's national television channel, Doordarshan Kendra, Kohima (DDK), partly inspired by the success of this project.</p>
Additional field data on caecilians of North East India (NEI)		√	<p>This project enabled me to collect additional field data on caecilians of all except one species (<i>C. darlong</i>) from NEI. The species are, <i>Chikila alcocki</i>, <i>C. fulleri</i>, <i>C. gaiduwani</i>, <i>Ichthyophis alfredii</i>, <i>I. daribokensis</i>, <i>I. garoensis</i>, <i>I. husaini</i>, <i>I. khumhzi</i>, <i>I. moustakius</i>, <i>I. nokrekensis</i>, <i>I. sendenyu</i>.</p> <p>These additional field data will contribute to reassessments of the conservation status of the caecilians species of NEI. The reassessments will be done by liaising with the IUCN-Amphibian Specialist Group's (ASG) Amphibian Red Listing Authority (ARLA), using the IUCN Red List Categories and Criteria.</p>
Printing and distribution of didactic material (wall poster, A4 size field		√	I was able to print and distribute all of these didactic materials as planned. I made 250 high-quality wall posters (size 26.5 x 20.4 inches, and laminated), 3000

<p>identification pamphlets and stickers)</p>			<p>stickers and 60 laminated A4 size field identification pamphlets of NEI caecilians for farmers.</p> <p>I got a good bargain from a professional designer who owned a digital press and had recently acquired a world-class machine. I negotiated with the manager that my printing work was for 'purely educational purpose'. I was given a generous discount. This enabled me to print high-quality posters within the marked budget (in the proposal it was budgeted for a lower printing quality).</p> <p>The original objective was to make bilingual (English and Hindi) posters but I eventually decided to print all in English as I gathered that it would be more effective to make them in very simple English as a large section of people did not normally know the basic Hindi scripts. And also, the cost would be higher if made bilingual.</p> <p>The wall posters and stickers that I made from this project have been widely disseminated. Those who were given the posters appreciated the good quality. All the state Forest Departments in NEI have been given the posters and stickers for their several forest range divisions. Schools, colleges and university where I presented my talk were presented with poster(s) and stickers, and the posters were also sent to many major scientific research institutes in India.</p> <p>The poster is also being displayed in several places like The Natural History Museum, London (where I am currently working); The Natural History Museum, Seychelles; in an NGO's office in Sri Lanka, and several other places.</p> <p>I attended several conferences recently (e.g., Amphibian Conservation Research Symposium, ACRS, 2015, at University of Cambridge; Systematics Association Conference in University of Oxford; etc.) where I gave some posters and stickers to researchers from countries as varied as Ghana, Australia, Seychelles, South Africa.</p>
<p>Train teachers</p>	<p>v</p>		<p>This objective was not achieved, unfortunately. It was very difficult to organise and to meet the teachers before or after my talks because their schedules were typically full of morning to evening. Also, I did not have sufficient time to wait on them to get free, or have my own transport to go back to my base (as there was no public transport available, I would hire a cab for a few hours but not for the whole day as they were very expensive). So logistically and practically, it was not possible. Also, a majority of my</p>

			audience were from quite remote places with no/basic infrastructure and so e-communication etc. is not possible.
As suggested by RSG in project pre-approval addition questions, to include “a monitoring approach to assess the impact of my awareness campaign and to then be able to evaluate its uptake”	✓		I did plan to incorporate some kind of a monitoring approach to the project. I had a simple questionnaire prepared to distribute and gather answers, but it was quite simply beyond the practical limits of a one-person team to distribute, explain the questions, and collect the questionnaire back. The field assistant could not help much more (complicated a bit by language barriers, as different tribes speak completely different languages) than by giving general assistance carrying luggage/equipment during teaching.

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

There were multiple unforeseen difficulties and I was compelled to eventually request for an extension of 1 year. The unforeseen difficulties and how they were tackled are listed below:

1. Volatile political situations:

On several occasions, fieldwork and /or talks were cancelled at the last minute due to political and civil unrest in NEI states. To cite a few examples, I made two attempts (first during the last week of July 2014, and second attempt during the first week of September 2014) to reach Manipur state, an important target state where several talks in schools and colleges, and meetings with forest officers were scheduled, but on both occasions there was sudden political turmoil resulting in violence and *bandhs* (= strikes with complete transport shutdown). In September first week of 2014, police shooting protesters at a peace rally led to local people declaring “indefinite *bandh*” that continued for several weeks. A few links to news about the unrest are provided at the end of this section. It is unfortunate because I was scheduled to address a significantly large crowd in this state (e.g., invited to address one whole school of 2,000+ children [Areca School in Imphal, Manipur]). Similarly, my talk in Don Bosco College, Tura, Meghalaya, where 250+ students and faculty were to attend along with media coverage by The Shillong Times was cancelled on the eve of the talk date (14th August 2014) due to terrorist activities, unpredictable violence and kidnappings of a locals which triggered a state-wide *bandh*. We could not schedule the talk to another date due to unavoidable reasons although the college keenly looked forward to it, and the coordinator had already made a banner and other arrangements for the scheduled talk. As with all institutions that were expecting me, this college is very keen to have me interact with the students and the faculty on a later date (which I intend to do).

Areca school in Imphal, Manipur was scheduled again (my third attempt!) for 13th July 2015 but violent protests broke out in agitation for implementation of the Inner Line Permit System in the state. The ILP is a special permit originally introduced by the British to protect commercial interests (especially in oil and tea) that is required to enter some of the NEI states (“Restricted/Protected Areas”, as mentioned in my project proposal). ILP continues till now particularly as a mechanism to firewall the tribal peoples and their cultures from 'outsiders'.

Some news links on riots, curfews in NEI during the project period:

<http://northeastmirror.com/index.php/news/india/615ukhruldeclarationindefinitebandhinnagaarea sdeclaresramkashingandmayopamasmartyrs>

<http://www.assamtribune.com/scripts/detailsnew.asp?id=aug1414/oth050>

<http://indianexpress.com/article/explained/inner-line-permitwhy-manipur-is-on-the-boil-again/>
<http://www.thehindu.com/news/national/other-states/38hour-manipur-bandh-over-students-death/article7471766.ece>

<http://www.thehindu.com/news/national/other-states/38hour-manipur-bandh-over-students-death/article7471766.ece>

When riots break out in NEI life comes to a standstill. There is nothing one can do except wait and watch for the dust to settle and resume work when it becomes safe to move about. The granted extension of the project timeline was the only way I could achieve the projects goals.

2. Permit issues:

It is incredibly challenging to obtain permits to legally work with wildlife in India. Without a permit, in some of the states (for example Assam, Mizoram, Tripura) no field activity or handling caecilians can take place. By the time the project was due to begin (2014) I had confirmed permits for only four states. Considerable time and effort were spent communicating, travelling to, submitting proposals as required by their respective state guidelines, and presenting my work to higher forest department officers (the permitting authorities) of Assam and Tripura states. Despite their initial enthusiasm, for reasons that were not clearly stated, they eventually unfortunately refused to give the necessary permits for their states.

3. Delay in having didactic materials due to language barrier:

Language barriers led to a major miscommunication with the printing press people for the wall posters. They incorrectly printed a test file that I gave them during price negotiations and print quality check. Since the mistake was from their side, without any additional charge, they subsequently printed the correct poster, but this glitch caused major delays. As a result, I was unable to distribute the posters and the stickers during 2014.

4. Health issues:

During the first year of the project I fell ill for an extended period that required regular medical attention. This compelled me to travel back and forth across the country (between Delhi and NEI) to obtain the necessary treatments. Also, my spinal disc problem (prolapsed discs) became aggravated (by two fall injuries in the field and carrying heavy backpacks) and started to affect my daily activities and I was prevented from travelling to remote areas with extremely poor dirt road, and from digging.

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

1. Dispelling the myth:

I believe the most important outcome of this project is the new level of awareness about caecilians obtained by the local people of NEI whom I had contact with, and more importantly, their realisation and acceptance that these amphibians are harmless. The field (digging) interactive demonstrations

were really helpful. Local people were given an opportunity to see live caecilians, see the breeding sites of caecilians, observe their natural history, such as - where eggs are laid; how big they are; how the embryos / babies look and behave; what the subterranean nests look like and at what depth, their proximity to water sources; how the mothers brood their eggs etc. Participants were mostly fascinated by how one could see the “babies” through the egg membranes. They appreciated how much more vulnerable the eggs and babies were because they do not have a protective hard shell, but only a fragile and translucent membrane. Many participants of the demonstration programme had the rare opportunity to touch caecilians with their bare hands, and to see for themselves that they don’t bite. This was widely successful in dispelling the prevalent irrational fear of caecilians typically wrongly perceived to be venomous.

A large majority of my audience were school and university students (aged 9–25). Children were absolutely thrilled to learn about caecilians and had endless questions. Forest officers equally found the awareness interactive talks interesting and timely – their amazement at how a group of animals could be so poorly known and understood biologically was expressed regularly. A head of a state forest department where I gave my talk said the research work and the talk was “an eye-opener and extremely interesting” and requested two more talks in his department, and to provide a hands-on field training programme (where to dig, how deep to dig, etc.) to the 40 newly recruited forest guards in his department, so that they may better survey and monitor these elusive animals. It was motivating and fulfilling to see young forest guards enthusiastically assembling new spades. Almost all learned about caecilians for the first time, and mostly expressed willingness to be more sympathetic to caecilians, and to take active responsibility towards nature preservation.

2. Biodiversity science and conservation awareness: The concepts of biodiversity and conservation sciences, unfortunately, have not yet percolated many of the NEI societies, most especially the states of Manipur, Nagaland, and Arunachal Pradesh. In these states, the locals have yet to develop a concern for or appreciate the consequences of a vanishing biodiversity. Especially in these former NEI states, forests have been indiscriminately devastated for many years. In many areas mammals and birds have visibly disappeared and people (illiterate and educated) still continue to poach the few remaining wild animals, as bush meat is considered a delicacy and sold at exorbitant prices. However, in Meghalaya, Assam, Mizoram, Sikkim, and Tripura the general public, local leaders and state officers are more aware of biodiversity roles and the need for conservation. Audience members regularly expressed appreciation for the effort to conduct this awareness campaign, that the talk and discussions have been invaluable and that they would be more proactive towards the preservation of biodiversity in general, and caecilians in particular. My hope is that the basic knowledge the audience acquired during the brief interactions and trainings will be self-sustaining, at least to a certain extent.

3. Woman in Science: Due to NEI’s remoteness (particularly beyond Assam), poor civilian and academic infrastructure, challenging terrain, and partly precarious political situations, the region is far behind the rest of India. Until very recently, the only sought-after careers have been government jobs and government-sanctioned jobs (viz., engineering and medical doctors). People only sought for careers that provide money, stability, power, esteem. Also, women in NEI are still quite traditionally bound mostly to the domestic spheres of life.

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

I believe the newfound appreciation about biodiversity (and its conservation) acquired by many members of the local communities will have at least some long-lasting impact on the biodiversity of the region.

A large section of the local communities I addressed were not aware of the scientific discoveries made from NEI. The local people were thrilled to learn that research in recent past had led to the discovery and naming of several taxa new to science– all from their own region. Many locals clearly expressed a sense of pride and feeling of ownership. The local communities I interacted with had a different and positive attitude towards the animals that they previously disregarded or feared (caecilians, frogs, snakes etc.), after clarification of their many superstitious beliefs and myths.

5. Are there any plans to continue this work?

Yes. There is an urgent need to do more awareness campaigns in the near future in other parts of NEI where I could not cover in this first phase of the project. I was well aware of the challenges (as also pointed out in response to Q.1 above) but my experience during this project made me realise that I would need a colleague or, at least, another person who can give more support in organising and coordinating the campaign. It is a bit too challenging and stressful for one person to organise such a large-scale multi-state public awareness programme given that the region is quite remote, communication is extremely poor and people are yet to acquire the means of e-communication. Each event requires many phone calls to arrange and coordinate.

The awareness programme was very well received (the media coverage also greatly helped spread the news) and I have several outstanding invitations to visit additional institutions and interact with their students sometime in the future. The institutions where talks were cancelled (e.g., Areca School in Imphal, Don Bosco College in Tura, Don Bosco College in Tamenglong) expressed their disappointment to have missed out on the education programme and have asked if I can try again to visit their institutions at some point in time.

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

A scientific paper has already been published in internationally respected, peer-reviewed scientific journal. More manuscripts (at least three) are in advanced stage nearing submission. The following publication can be made available on request to r.kamei@nhm.ac.uk

Kamei, R.G. & Biju, S., 2016. On the taxonomic status of *Ichthyophis husaini* Pillai & Ravichandran, 1999 (Amphibia: Gymnophiona: Ichthyophiidae). *Zootaxa*, 4079(1), pp.140–150.

The results of this project have already been extensively shared through the media. A journalist attended a couple of the talks and provided full coverage of the events. A television channel (DDK) team was also present for some footage in the documentary they are making. For about three weeks the campaign news was carried in local dailies nearly every 2 days. The media coverage helped further in mass spreading the knowledge about caecilians, about conservation, and about NEI's special and threatened fauna, and also the "three most important outcomes...project" (Q. 3), viz., (1) Dispelling the myth, (2) Biodiversity science and conservation awareness, (3) Woman in Science.

I am currently a postdoctoral fellow (a Marie Skłodowska-Curie Postdoctoral Fellow) at the Natural History Museum, London. I plan to do a “Nature Live” on my RSGF project. ‘Nature Live’ is a daily NHM programme, where researchers at all levels give short informal presentations about their research to public audiences of interested museum visitors in the state-of-the-art Attenborough Studio. Some of these presentations are also broadcast on the Internet. ‘Nature Live’ is well attended by visiting school children and provide a great opportunity for direct interaction with all levels and age groups.

‘**Science Uncovered**’ is an annual free festival that aims to bring scientists and the general public in contact. This festival attracts nearly 10,000 visitors each year. The NHM, London hosts an evening where scientists make themselves available to chat informally about their work. I plan to attend this event this year as a participating scientist, where my RSG project will also be featured. I have received invitations to give a talk about my research in other institutions in Europe (e.g., ZSL London Zoo, University College Dublin, Vrije Universiteit Brussel, Belgium). I intend to attend the 8th World Congress of Herpetology, in China in August this year where I will present an invited talk; this public outreach programme will be highlighted. This project is also listed on my profiles in social networking site for scientists and researchers (such as ResearchGate, Google Scholars, Academia.edu, LinkedIn, Elements page in NHM web page, Facebook)

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 original project timeline was 8 months (May to December 2014—four months community education and four months report writing). The funding was released on 30th April 2014. However due to unseen difficulties explained above (Q. 2) a project extension (that includes the monsoon season, May to July / August) was required and was kindly granted by the RSGF.

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 Assistant daily wages @ Rs. 500 (£4.90) per day x 100 days	489	500	-11	
Local guide for respective localities @ Rs. 300 (£2.90) x 100 days	293	334	-41	Local guides usually wanted a friend to join as a companion in the field (they tend to be quite shy to go with a woman to the field). So, when this cannot be dissuaded I paid Rs. 200 per person/day.
Food allowance for myself, Field Assistant & Driver @ Rs. 400 (£3.90) per day x 3 persons x 100 days	1174	1100	+74	Whenever hosted by local people and I buy the provisions myself, it turns out to be less expensive than staying in hotel or guesthouse accommodations. So, I

				managed to save some money.
Accommodation for myself, Field Assistant and Driver (two rooms/night): 1500 (£14.7) x 100 days	1467	1400	+67	Some money was saved from staying in locals' homes.
Portable projector for presentations	245	280	-35	The portable projector suitable for the purpose (and that could be shipped to India [a lot of international online stores do not ship to India]) was available only in the USA. Shipping charges turned out to be costly.
Display accessories: VGA cable, remote x 1	39	42	-3	
Digital calipers for species identification	145	145	0	
UV water purification kit	78	80	-2	
Wellington boots for Field Assistant, rain ponchos, spades, torches	18	25	-7	
Return flight for me from residence to NEI (Delhi - Guwahati - Delhi) x 1	98	98	0	
Rail and road transport (trains, busses, jeeps and taxis) @ Rs. 40,000 (£3,265.3) per month x 3 months	1174	1184	-10	
Caecilians of NEI Wall Poster (30 X 18 inches) x 250	147	155	-8	
Thick laminated A4 size field identification pamphlets of NEI caecilians for farmers x 60	15	15	0	
Conserve the caecilians stickers x 3000 pieces	49	49	0	
Postage, stationery, communication	39	39	0	
Report printing (hard copies to respective forest departments)	69	75	-6	
Batteries, collection jars, plastic ziplock bags, etc.	78	85	-10	
Forex taxation, commission, Forex taxation service	Not budgeted	5	-5	
Total	5617	5611		Exchange rate: £1 GBP = ₹100.48

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

As mentioned in response to Q. 5 (“...plans to continue this work?”), there is certainly a necessity to further spread the knowledge about caecilians and conservation to more people in NEI. Large areas of NEI remain biologically under/unexplored. Further fieldwork is essential to uncover hidden diversity at risk of being lost, especially due to the relentless habitat destruction; obtaining more biological data (life history, ecological requirements, etc.) is essential for more robust conservation assessments of species, and to identify their conservation needs, if any. I hope to apply for a follow up second Rufford Small Grant or a Booster Grant in the future to extend this work into states that were under/not represented in the first phase of this project. I will again appeal for the necessary permission from state forest departments that did not permit me to include their representative states in this education programme. The hands-on experience that students, locals and other participants obtain by seeing and interacting with the live animals is unquestionably an essential part of promoting interest in this seldom seen and underappreciated group of animals. It is my hope that I can convince the state authorities of its importance, and to provide the necessary permits. I would also like to incorporate other largely persecuted or over-harvested animal groups (e.g., snakes, and certain lizards and frogs) into the awareness programme. These animals are each other’s predators and prey, and I can better demonstrate how successful conservation of one species, requires the protection of all in a given habitat. It will give me the opportunity to better dispel widespread myths about these animals and teach about how their preservation directly improves the lives of or people who share their environment. I wish to emphasise more on local capacity building, incorporate a monitoring approach, and train staff of state forest departments on surveying and monitoring techniques, and further enthuse the village youth. For the follow up project, I plan to have one additional person to further maximise the project outputs.

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?

The Rufford Foundation logo was used in all my presentations. RSGF was acknowledged at each event. The logo was also used in all didactic materials that I printed (wall posters, stickers, field guides). RSGF was acknowledged in the scientific peer-reviewed publication and will be acknowledged in the additional manuscripts that are being prepared. RSGF also received publicity through the media when I was given the opportunity to influence the contents, however several were published without my knowledge, or without prior contact from the journalists so I could not inform them to acknowledge RSGF.

Appendix I.

List of institutions/places where the campaign was held.

Audience	State
Assam Don Bosco University	Assam
Assam Forest Department	Assam
Christian Grammar School	Manipur
Pretty Lamb Institute	Manipur
St Joseph School, Khumhzi	Manipur
Trinity School, Tamenglong	Manipur
United Builders School, Tamenglong	Manipur
Pearly Dews School	Meghalaya
Sherwood School	Meghalaya
Shillong Public School	Meghalaya
Meghalaya Forest Department	Meghalaya
Nagaland Forest Department	Nagaland
Northfield School	Nagaland
Patkai Christian College	Nagaland
Sazolie College	Nagaland
Science College	Nagaland
Tripura State Forest Training Academy	Tripura
Sepahijala Wildlife Sanctuary	Tripura
Tripura FD forest guards, Tripura	Tripura
Aziuram village public talk and discussion	Manipur
Village talks: Rengsangre, Te.obrongre, Rome, Dobakkol, Asanang, Aziuram, Nriangluang, Pange, Jotsoma, Dzüleke, Mereima, Swanram.	Arunachal Pradesh, Manipur, Meghalaya, Nagaland