# Final Project Evaluation Report

| Your Details | |
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| **Full Name** | Paulo Ragner Silva de Freitas |
| **Project Title** | Ethnoherpetology and influence of anthropic actions on the diversity and demography of lizards and snakes in a Caatinga area in Northeast Brazil |
| **Application ID** | 26258-1 |
| **Grant Amount** | £5,000 |
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| **Date of this Report** | 12th September of 2019 |

**1. 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 |
|---|---|---|---|---|
| Evaluate influence of regional anthropic actions on diversity and abundance of reptile species in Caatinga areas in the Northeast of Brazil. | | | ■ | When comparing species richness and abundance of individuals in both areas, we observed that in less impacted areas species richness was almost double (26 species) when compared to reptile richness in impacted areas (13 species). As for the abundance of individuals, there was no significant difference. In area I (most impacted) were recorded 303 individuals, distributed in 16 species. In area II (least impacted) 387 individuals were registered. Distributed in 25 species. |
| To analyse population size estimates of the *Ameivula acellifera* lizard species in the most impacted and least impacted areas. | | | ■ | Estimates of population size showed that the lizard *Ameivula ocellifera* had larger population sizes in the most impacted areas (247 individuals) when compared to the least impacted areas (86 individuals). This may be because this species has a high adaptive capacity in environments with high solar incidence and high temperatures. Characteristics commonly present in the most degraded areas. |
| Perform the monitoring of snakes *Boiruna sertaneja* and *Bothrops erythromelas*, endemic Caatinga species, by radiotelemetry, seeking to analyse if there is any influence of environmental characteristics on their displacements and consequently in areas of life. | | ■ | | During the field activities it was not possible to monitor the two proposed snake species due to the low number of collected individuals, however, we performed monitoring of other reptile species. Six individuals of *Boa constrictor* and two individuals of *Chelonoidis carbonaria* were monitored via radiotelemetry during the study.<br>We are still processing the analyses for this dataset. |

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| Conducting environmental education activities (lectures and exhibition of reptiles and preparation of educational booklet) | | | | Theoretical classes and lectures were held (covering topics such as the diversity of caatinga herpetofauna; biology, ecological importance of reptiles and species of medical interest). In addition to field activities with students, in which we visit preserved areas of this biome.<br>During the field classes students were invited to photograph the fauna and flora, to observe the eyes of these young people on the local biodiversity. All photos were used in the photographic exhibition "Caatinga: know to preserve".<br>The educational booklet (in the form of an e-book) is in the final stages of elaboration. |

**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.**

The sampling of the phyto-physiognomic estimates was taken from the project after realising that, although there was a lot of effort, the results were not extremely incipient. After the first sampling campaign, we concluded that the investment time, financial and human resources would not compensate, since the study area had high abundance but low species richness. The most common plant species were: *Anadenanthera colubrina*, *Ceiba glaziovii*, *Caesalpinia pyramidalis*, *Amburana cearensis*, Bromeliaceae and Cactaceae.

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

1. The results on wealth and abundance:
A strong correlation can be observed between the negative influences of human action on reptile fauna. In areas less impacted by human action, twice the number of reptile species (26 species) were found when compared to herpetofauna richness (13 species) in areas more impacted by goat breeding and agriculture. No significant difference was observed regarding the total abundance of individuals. This was probably due to the high frequency in which some species of generalist lizards (*Ameivula ocellifera*, *Tropidurus hispidus*, and *Gymnodactylus geckoides*) were found.

Even with a certain equivalence in population abundance, these results show us how much anthropic action can directly influence the extermination of microenvironments occupied by reptile species.

2. Radiotelemetry monitoring
Even without the definitive analyses, monitoring of the six individuals of *Boa constrictor* and two individuals of *Chelonoidis carbonaria* proved to be sufficient. These individuals were monitored during the dry and rainy seasons, and showed marked differences in their actual displacements and possibly living area.

During the monitoring of snakes, some individuals showed a behaviour of displacement of the forest to the planting areas, a fact that favours the encounter of these snakes with humans and the increase of conflicting relations between them.

It is also worth mentioning that the method used to fix the transmitters in the snakes proved to be efficient. During the study a monitored snake preying on a bird was observed. This shows us that this monitoring technique proved to be little invasive, not interfering with the activities and behaviour of individuals.

3. Environmental Education Activities
After the lectures at the two public schools, field classes and photographic exhibition, a reptile exhibition was held, in partnership with the institute "Museu Vivo Reptiles da Caatinga". During November 2018, an exhibition of 20 species of common reptiles of the caatinga biome was held, so that students and the local community had access to knowledge of all this species richness and the ecological importance of these animals in their habitat.

During the exhibition, the local community had contact with some species of snakes, also seeking to sensitize them about the myths involved with these animals.

To conclude this stage of environmental education the elaboration of the educational booklet (in the form of an e-book) is in the final stages of elaboration.

**4. Briefly describe the involvement of local communities and how they have benefitted from the project.**

Throughout the project, the local community acted actively.

In the field surveys, six community residents were hired to work on setting and monitoring the traps. In addition to the financial benefit, this partnership between researchers and the local community has brought a very positive exchange of experiences. Three students also participated in the field activities and about 25 students acted as monitors during the reptile exhibition.

**5. Are there any plans to continue this work?**

For future work we intend to increase the active search effort in order to monitor, via radiotelemetry, a greater number of individuals and species of snakes.

We also intend to increase the sampling time to at least 2 years of data collection. By increasing the sampling time and the number of monitored specimens, we may have more results on the behaviour and population pattern of these reptile species in environments with different degrees of environmental degradation.

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

1- In December 2019, the results of this project will be presented in my final doctoral presentation at the Federal University of Paraíba (UFPB), Brazil.
2- We are submitting papers to internationally recognised reptile and conservation journals to share our findings with the academic and scientific environment.
3- Submit the reports to the governmental environmental agencies.
4- Disseminate in all possible communication vehicles the educational booklet about our project, emphasising the problem with the main objectives and results, including the exposure of reptiles. In this e-book, I will explain the purpose of the project and thank Rufford Foundation for their support.
5- We intend to continue working on the influence of anthropic actions on the diversity, demography and population ecology of reptiles in the Brazilian caatinga and cerrado.

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

Funding was critical, timely, and fully utilised during the full 2nd year of fieldwork, as per the original workplan. In addition, it was also possible to use the resource at half of the first year of fieldwork. All activities were carried out smoothly. The complete project took place over 4 years (average doctoral degree in Brazil). The fieldwork lasted 2 years, of which one year was funded by Rufford Foundation, which accounted for 75% of the financial support for fieldwork.

**8. Budget: 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. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.**

Conversion Calculator Brazilian Real to British Pounds: 0.201

| Item | Budgeted Amount | Actual Amount | Difference | Comments |
|---|---|---|---|---|
| Educational booklets | 360 | 100 | -260 | We preferred to manufacture the booklet in the form of an e-book, as this would be more economical, we would reduce the production and use of paper and the booklet would be more easily distributed by electronic devices (cell phones). |

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| Radio Transmitter Kit | 1500 | 1500 | | |
| Visible Implant Elastomer Tags | 500 | 500 | | |
| Equipment for field activities and assembly of pitfalls | 800 | 955 | +155 | Extra equipment maintenance costs. |
| Fuel | 650 | 900 | +250 | Extra costs with staff transportation. |
| Field Assistants | 540 | 685 | +45 | Extra costs with adding one more field support team member. |
| Field Work Team Meals | 600 | 700 | +100 | Extra expenses with food. |
| **TOTAL** | **4950** | **5340** | **+390** | |

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

From the research point of view, we intend to publish the results obtained, and possibly extend the sampling time and the number of species monitored via radiotelemetry. Thus, we will have more robust data on spatial population dynamics and behaviour of reptile communities in environments with different degrees of environmental degradation.

We also intend to suggest the creation of a unit of a private reserve in the studied area.

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

I used the Rufford Foundation logo in presentations, events, posters and reports. The logo will still be used in the preparation of the final articles, in the educational booklet and during an international congress that will take place in November of this year.

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

**Paulo Ragner Silva de Freitas**: participated in the preparation of the project, field activities, application of questionnaires, data analysis, writing articles for submission to scientific journals and preparation of educational booklet.

**Reinaldo Faria Paiva de Lucena**: assisted in the elaboration of ethno-herpetological questionnaire and data analysis. It will also perform the correction of scientific articles.

**Washington Luiz da Silva Vieira:** assisted field activities, statistical analysis and suggested models for the preparation of educational leaflets. It will also perform the correction of scientific articles.

I think it is important to highlight that even not being part of the main research team, field assistants (**Adrian Nogueira, Nogueira Campos, Joselito Fernandes, Joao Paulo** and **Luiz Felipe**) were fundamental for the realization of this project.

**12. Any other comments?**

I would like to thank the Rufford Foundation immensely for believing in and supporting this research. The foundation's work was fundamental to this research. Rufford encourages research from countries with high biodiversity but very limited financial resources or those countries that do not invest in scientific research aimed at conservation, as in the case of Brazil. I would also like to thank Jane, who has always been very helpful in all contacts. I will always be grateful to this foundation for this support and wish you great success.

I would like to mention how much this project provided me with personal and professional growth, as well as the importance related to the pioneering of this theme in the region and the formation of knowledge multipliers. About 140 students benefited from the activities developed by the project. It is important to highlight that all field assistants were students or parents of students from the schools contemplated as the activities. I believe that the realisation of this project has sensitised students and other members of the local community about the importance of preserving the few remaining Caatinga native forest areas. Preserving the flora, we are automatically preserving the species that inhabit it.