

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	Hugulay Albuquerque Maia
Project title	Temporal changes in the reef fish assemblage of a neglected marine hotspot: São Tomé and Príncipe, Gulf of Guinea
RSG reference	18424-1
Reporting period	November 2015 – October 2016
Amount of grant	£4,988
Your email address	hugulaymaia25@hotmail.com
Date of this report	October -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
To investigate accounts of indiscriminate use of blast fishing in São Tomé Island			X	Through informal conversations and fishermen interviews, we could not only confirm that blast fishing is widespread in São Tomé Island, we have also discovered that it is a common practice in the much less populated Príncipe Island. This is preoccupying for Príncipe island hosts a UNESCO Biosphere Reserve and depends on touristic enterprises to generate revenue for local communities.
To resample fish assemblages at São Tomé Island using the same method and in the same sites as the 2006 expedition aiming to investigate possible changes in response to human population (and likely fishing effort) growth and apparent use of blast fishing			X	<p>Besides having a much reduced field team (three in 2016 compared to six in 2006), we were able to resample five out of the seven originally sampled sites. We obtained 51 underwater visual surveys of fish at Sete Pedras - Catedral, Sete Pedras - Pedra Branca, Ilhéu de Santana, Kiá do Ilhéu das Cabras and Diogo Vaz.</p> <p>During the onset of this field expedition we had the opportunity of taking part in a parallel expedition to Príncipe Island led by the California Academy of Sciences. As components of the field team, we surveyed fish, benthos and behaviour. We obtained 156 underwater visual surveys of fish in seven sites (Ilhéu dos Mosteiros, Pedra da Galé, Boné do Joquei, Ilhas Tinhosas, Ilhéu Bombom, Praia</p>

				Banana and Pedra da Galé).
To interview a representative sample of fishermen at São Tomé Island aiming to evaluate if there have been declines in fish catches and/or fish sizes in this island in the past decades			X	We interviewed 151 fishermen (circa 7% of the total number of fishermen) in eight of the most important fishermen communities of São Tomé Island (Praia de Santa Catarina, Praia Brita, Praia de São Pedro, Praia Melão, Praia Messias Alves, Praia de Angolares, Praia de Ribeira and Praia de Porto Alegre).
To interview a representative sample of fishermen at Príncipe Island aiming to evaluate if there have been declines in fish catches and/or fish sizes in this island in the past decades			X	We interviewed 42 fishermen (circa 14% of the total number of fishermen) in five of the most important fishermen communities of Príncipe Island (praia da Lapa, praia das Burras, Santo António, praia de Abade e praia Seca).
To obtain historical reports, photographs and records of fish and fisheries in the Gulf of Guinea		X		We visited multiple times the Direcção de Pescas and Biblioteca Nacional de São Tomé and Príncipe, but few historical mentions and photographs were collected. However, in an opportunistic study trip to Lisbon, Portugal, as part of my Doctoral Program funded by Fundação Calouste Gulbenkian, I had the opportunity of visiting other key institutions: Museu Nacional de História Natural e da Ciência, Biblioteca Central de Marinha, Arquivo Histórico Ultramarino, Instituto Nacional de Estatística for around 15 days. This yielded additional photographs and, especially, a fisheries monitoring report from the 1960s. Older information in the temporal scale of centuries, however, was limited.

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

During the implementation phase of the project, we faced two main types of problems:

- (1) Fishermen from three of the eight fishermen communities in São Tomé (Praia de São Pedro, Praia Melão and Neves) initially refused to be interviewed unless a financial contribution was made available. In some regions of São Tomé, especially in large fishermen communities, it is a common practice for politicians to offer fishermen money in exchange for votes. The interviews were undertaken during the elections period, what might have raised their expectations for rewards. Also, local NGOs often gift fishermen communities with, for example, fishing lines or food during participation in specific awareness campaigns. After long explanations about the nature of the present project we were able to garner the involvement of some of the fishermen in these communities. In all other communities in São Tomé and also in Príncipe this type of problem did not occur.

- (2) We experienced shortage of historical information at the Biblioteca Nacional de São Tomé e Príncipe and the Direcção Geral de Pescas. The main reason for that, according to the librarians of these institutions, was that most of the important material from the period São Tomé was a Portuguese colony (which lasted until 45 years ago) was directed to institutions in Portugal. Following an opportunistic visit to Lisbon in the context of my doctoral programme, we were able to have access to some historical information, especially relative to the early and mid 20th century. Older information (centuries), however, was scarce even in these institutions. One of the reasons raised by librarians to account for this was the large-scale loss of historical documents after the 1755 earthquake that hit Lisbon.

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

Within this project:

- (1) We were able to assess economic gaps and opportunities associated to fisheries activity in both São Tomé and Príncipe. When confronted with the impacts of destructive and unsustainable fishing, as well as the possible benefits of establishing Marine Protected Areas (MPAs) - young fishermen were particularly open to alternative sources of income (such as tourism). This raised the possibility of future work in cooperation with fishermen in direction to establishing MPAs and creating tourism opportunities that reach fishermen communities.

(2) We established partnerships with a diverse set of institutions, from governmental and non-governmental institutions to touristic operators and fisheries communities. For example, the Roça Belo Monte Resort at Príncipe Island provided lodging, food and diving infrastructure to perform some of the sampling in this island. They have made this support available for future field trips also. Partnerships with fishermen communities allowed access to fishermen willing to be interviewed and secured future access to these communities. All of these partnerships will facilitate further activities to be executed in the islands in the next years.

(3) In a preliminary evaluation of the scientific results obtained we can highlight three main findings: 1) We confirmed not only that blast fishing is widespread in São Tomé Island, but also that it is a common practice in the much less populated Príncipe Island; 2) In general, fishermen did not report declines in catches or in fish size in the last decades. In fact, even the older fishermen seem to have had their best catches or largest fish captured relatively recently. We believe that this is an advent of increased access to technological improvements to fishing (such as nylon lines and nets and boat motors). However, a decline in the abundance of sharks was mentioned by most of the fishermen, including some of the youngest ones; and 3) *In-situ* underwater surveys of fish did not reveal abrupt declines in health indicators of fish assemblages such as total abundance or biomass. Further data analysis shall review if determined fish species have changed in one of these descriptors. Altogether, these preliminary findings suggest that São Tomé and Príncipe's reefs have been subjected to overexploitation only recently.

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

Both the talks and interview made at the fishermen communities required a considerable level of local involvement. In both situations, people agreed to stop their daily activities to engage in these parallel activities. It was particularly rewarding to notice that many of these people would feel interested by the topics developed, the pictures and videos shown by the researchers. We felt that by answering some of their genuine curiosities regarding the marine environment we could be benefitting them. This was confirmed by warm thanks received after some of the talks. We also perceived this type of involvement and sensation of being benefitted during the interviews. The will of fishermen to share 20 minutes of their time to talk to researchers without receiving anything other than reciprocal information is the main proof of this involvement. In many instances these fishermen would keep on talking much longer than the actual interview, asking a variety of other questions related to the marine environment or fishing activities. In these instances, similarly to the talks, it was clear that these people felt benefitted with the

knowledge exchange. It was also a frequent situation for the recent interviewed fisherman to help locate experienced fishermen and convince them, on behalf of the project, to also concede interviews. We believe that these actions reflected a high level of involvement.

5. Are there any plans to continue this work?

Yes. In the short term, we intend on applying for the second round of funding with Rufford Foundation. This will involve accomplishing mainly three objectives: (1) mapping the occurrence of gorgonian and black coral forests at São Tomé and Príncipe through underwater sampling and fishermen interviews; (2) performing meetings with fishermen communities and touristic operators to evaluate in details their interest and willingness to establish a capacity building program for local snorkeling tourist guides; (3) preparing an identification slate of marine organisms to be used to support these possible future touristic activities. In the long term, after I conclude my PhD in March 2018, I shall be integrated as a lecturer at the Universidade Pública de São Tomé e Príncipe where I intend on creating a laboratory focused on the marine biodiversity of the Gulf of Guinea, from its evolutionary origin to conservation strategies development. This project, therefore, fits in my career plans in the sense that it will pave the way for a permanent programme to support creating Marine Protected Areas in the country and also building local capacity to integrate tourism revenue to local communities. To make this strategy viable, I will start pursuing economic partnerships.

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

I am presently in the process of writing publications for scientific journals disclosing our findings. One of the manuscripts, describing an unreported ecosystem discovered during this expedition has already been submitted and is being considered for publication in the journal Coral Reefs. In July 2016, I attended a scientific meeting at Instituto Gulbenkian de Ciência, in Lisbon, Portugal, where I presented the partial results of my doctoral project. Moreover, I have plans to present my work and results from the recent fieldwork funded by Rufford Small Grants at the partner institutions at São Tomé (Direcção de Pescas, Universidade de São Tomé, local NGOs) in December 2016 and also at the Oceans Past VI International Conference to be held in Lisbon in 2017). These plans, however, will depend on the availability of further travelling resources. Altogether, my thesis will hopefully help the government of São Tomé and Príncipe with scientific tools to establish marine ecosystems conservation goals.

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

I started to use RSG with the booking of flights and purchase of materials in December 2015 and kept on for the duration of my fieldwork in São Tomé and Príncipe, from January till April 2016. My anticipated time scale in the proposal was to carry the project between December and October 2016.

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
International travelling	£1,687	£970	+£717	This refers to flights from Brazil to São Tomé and back to Brazil. Flights for one field assistant were bought with RSG funding. Flights for the grant recipient were provided by CAPES - Brazilian Government, and flights for a secondary field assistant were provided by the California Academy of Sciences in the context of a parallel expedition to Principe Island.
Local travelling (Flights)	£348	£500	-£152	This refers to flights from São Tomé to Príncipe and back to São Tomé for two people. The difference in the forecast and the actual budget in this item stems for increased price of tickets and the need to buy extra weight for both ways. For the local flight company, extra weights meant that an additional ticket had to be acquired.
Local travelling (Car rental)	£248	£381	-£133	Car rental, car insurance and fuel. A largest part of the budget was allocated for car rental due to the necessity of more fieldwork days to account for fishermen interviews and, especially, the talks at fishermen communities. This

				involved 15 days of car rental instead of the predicted 10 days.
Lodging and feeding	£1,065	£1,687	-£622	Differences here are due to an increased need of lodging and feeding during fishermen interviews and associated fishermen communities' talks (15 days instead of 10) and a slightly higher price per day.
Diving	£1,640	£1,450	+£190	Price per dive was slightly cheaper (around EU\$48, instead of EU\$55).
Total	£4,988	£4,988	0	

The exchange rate of Santomean dobra (STD) to the euro (EUR) is: 24500STD=1EUR (fixed). The exchange rate used to convert the euros (EUR) to the pound sterling (GBP) is: 0,725 GBP=1EUR.

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

I believe that the three next steps will be:

(1) From a scientific point of view, to keep on improving knowledge of marine organisms of São Tomé and Príncipe with a focus on gorgonians and black corals. As far as we know, the Gulf of Guinea islands are the only islands in the South Atlantic Ocean that harbour gorgonian dominated ecosystems. During this recent field expedition, we discovered gorgonian dominated and black coral dominated ecosystems in mesophotic depths of both São Tomé and Príncipe (the description of these ecosystems has been submitted for publication). During the fishermen interviews in São Tomé e Príncipe, we have listened to various accounts on the trade of gorgonians for decoration of local shops and, especially, for the Chinese market. These accounts were confirmed by local authorities (Direcção Geral de Pescas and Direcção Geral de Conservação). All these factors and also threats from blast fishing make it urgent to map the extent of gorgonian and black coral dominated ecosystems and to assess their immediate and future threats.

(2) From a social point of view, we found that many young fishermen believe that the future of fishing in São Tomé and Príncipe is compromised. According to them, this is mainly due to overfishing and destructive fishing, and is worsened by the lack of alternative livelihoods. I believe that this scenario sets the stage for the development of a capacity building programme focused on training local fishermen community members as touristic guides in snorkeling activities. Implementing this would be a mid to large-term programme to start next year with mapping of the real interest of different fishermen communities in such a programme, the touristic

features that could be explored and the economic viability and interest of, for example, tourism agencies in supporting such a programme.

(3) From an involvement and conservation point of view - It was found that many fishermen do not know the diversity of reef organisms of the islands. Most of them only know commercial fish. Since it is hard to convince people to protect what they do not know, we propose that producing and distributing informative material disclosing the diversity of organisms in these people's own backyard would be crucial. Additionally, the same material would provide the basis for the capacity building in touristic activities described in point 2. As a concrete example of how such materials are critical for the proposed activities, we have come across the case of a young fisherman in Angolares community (São Tomé Island) that worked as a tour guide with the help of materials from the Touristic Center of Artisanal Fisheries (Voador Panhá). After this center closed, the young man ended up without a job, eventually becoming a fisherman again.

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 logo of the Rufford Foundation was used in the talks to the fishing communities of São Tomé and Príncipe (e.g. the Praia das Burras - in Príncipe and Praia Porto Alegre and Angolares - in São Tomé), to the Biology students at the Universidade de São Tomé e Príncipe and at the Instituto Gulbenkian de Ciências in Lisbon, Portugal. Moreover, Rufford Foundation is explicitly thanked in the manuscript we have submitted for publication recently.

11. Any other comments?

I would like to express my gratitude to The Rufford Foundation for the chance to carry out fieldwork in my home country. This trip was of extreme importance for the completion of my doctoral project. In addition, the data obtained will serve as baseline for future works in São Tomé and Príncipe.