

Final Project Evaluation Report

| Your Details | |
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| Full Name | Nupur Kale |
| Project Title | Monitoring green turtles (<i>Chelonia mydas</i>) and developing conflict mitigation measures for the conservation of seagrass meadows in the Lakshadweep Islands |
| Application ID | 23920-1 |
| Grant Amount | £5000 |
| Email Address | nupur.kale03@gmail.com |
| Date of this Report | 31 st August, 2020 |

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 |
|--|--------------|--------------------|----------------|---|
| To monitor the green sea turtle demography, structure and distribution | | | | <p>We were unable to obtain animal handling permits on time and the tagging, morphometric and photo-identification initiative could not be undertaken.</p> <p>In order to understand distribution, we altered the methods to include line transects in the lagoon to estimate turtle encounters at each island. We also started a photo-identification initiative with professional divers in Lakshadweep islands.</p> <p>We used belt transects to determine turtle presence in the different lagoons and regions (near shore, mid-lagoon, reef) within the lagoons.</p> |
| To determine green turtle diet | | | | <p>We obtained samples from Agatti and Kalpeni where turtles were abundant.</p> <p>Fragments of leaf sheath and leaf blades of <i>Thalassia hemprichii</i>, <i>Cymodocea rotundata</i> and <i>Halodule uninervis</i>. We found some cloth, plastic sections, coconut husk and rhizomes. Some calcareous pieces were also found in the faeces.</p> <p>We recorded some filamentous green algae and animal fragments in the faecal samples.</p> |
| To employ methods to reduce the fisher-turtle conflict | | | | <p>We changed the method for this objective as fishers were not comfortable having a female researcher on board the fishing vessel. Instead, we asked fishers to mark fishing and turtle observation site on maps. In addition, we also marked some fishing and turtle observation sites while snorkelling.</p> |

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|--|--|--|--|---|
| | | | | This information was shared with local fishers to check if it will help them avoid turtles while fishing. In addition, we spoke to fishers to understand how they react when they encounter turtles. |
| To explore techniques for recovery of seagrass communities and dependent fauna | | | | 0.5 x 0.5 m enclosures were used to protect seagrass while ensuring that the turtles do not feed on seagrass. The exclosures would get compromised during high tide and would wash up on the beach. Although we could not see any discernible change in shoot length, we were able to record some minor changes in shoot density while we were there. |

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

- a) Some of the methods did not work in field as expected due to local conditions. These methods were then altered to achieve parts of the objectives.
- b) As a result of delay in obtaining research permits in the first field season and elections in the country the following year, we were unable to receive animal handling permits. Although there is no substitute for the tagging component, the methods were changed to include transects which gave a measure of turtle abundance and their distribution within the lagoon for each island. Moreover, we initiated a photo-identification programme with local divers to assist in the monitoring efforts without the requirement of a handling permit.
- c) The enclosures would get compromised due to strong currents in the lagoon. In order to avoid this, we plan to use the help of youth to ensure that the exclosures do not get removed during the monsoon and till the commencement of next field season.
- d) In both years, the amount of time to conduct fieldwork was short due to a delay in obtaining permits [2 months in 2018 and 3 months in 2019]. In order to fulfil the objectives satisfactorily, fieldwork needed to be conducted for a longer duration.

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

- a) It was observed that green turtle abundances vary after every few years (in addition to information from previous studies) indicating that they move from one island to the other depending on availability of foraging resources, mainly seagrass. Moreover, some turtles were observed to remain in the

islands despite the meagre seagrass resources. We also found seagrass on the eastern sides of the islands which also explains the presence of some turtles in the lagoons. This suggests that this foraging green turtle population shows preference towards its forage and change their foraging sites every few years. Moreover, it indicates a need to understand how they search for and find their different foraging grounds.

- b) Previous studies had indicated green turtle preference towards *Thalassia* and *Cymodocea*. The findings from this study also showed the presence of *Halodule uninervis* which had not been observed previously, in addition to some filamentous green algae in some samples. This indicates that green turtles show individual variation in their diet which in turn, will help understand how these turtles cope with the loss in their foraging resource. Plastic fragments and cloth pieces were also found in the faecal samples indicating a further need to ban plastic and to control waste pollution.
- c) The exclosures helped in preserving seagrass communities from sea turtle grazing. However, the exclosures should be used for extended periods to allow seagrass to grow sufficiently to help associated fauna survive. Different materials can be tested to ensure longevity and to make the exclosure environment friendly. Moreover, it highlighted the need to understand green turtle movement to understand their range and the possibility of seagrass recovery in the islands.

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

Members of the local communities participated in the survey on local knowledge about turtles in Lakshadweep islands. Towards the end of the surveys, questions raised by them about green turtles were answered to increase their awareness and understanding of green turtles and its role in the marine ecosystem.

Some members have also been requested to assist in the maintenance of the seagrass exclosures to improve seagrass numbers and eventually, associated flora and fauna.

Maps generated from the turtle-fisher mitigation exercise will aid them in avoiding turtles during fishing expeditions. This exercise will ensure that fishers do not incur losses caused by turtles getting caught in nets and will maintain the green turtle population.

We also started a photo-identification initiative with professional divers in Lakshadweep islands.

5. Are there any plans to continue this work?

Yes. We will be continuing this work in order to fulfil the objectives that could not be achieved in these field seasons and take up more detailed study of green turtle ecology (such as their movement and generating a database of their facial profiles)

in the Lakshadweep region for its management and to determine their local conservation status.

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

The results of the work will be shared in form of reports to our funding agencies and the governmental departments of the Lakshadweep islands. The reports will also be publicly available on the project webpage. Some of the results will also be shared as conference papers and popular/scientific articles.

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

The grant was used over the period of 18 months as anticipated. At the end of 18 months, we had planned to use the remainder of funds for another field season; however, due to the Covid-19 pandemic, these plans had to be cancelled and the funds were reallocated to develop new transmitters customised for studying turtle movement on the islands.

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.

| Item | Budgeted Amount | Actual Expenditure | Difference | Comments |
|---------------------------|-----------------|--------------------|------------|--|
| Travel within the islands | 136 | 18 | -118 | Field travel was restricted due to the Covid-19 pandemic, funds were reallocated for equipment |
| Accommodation | 201 | 200 | -1 | |
| Boat hire charges | 500 | | -500 | Field travel was restricted due to the Covid-19 pandemic, funds were reallocated for equipment |
| Food expenses | 70 | 70 | | |
| Equipment | 500 | 1411 | +911 | As requested prior to project completion, new equipment to monitor sea turtles were manufactured during the disrupted field season |
| Salary | 2993 | 2987 | -6 | |
| Data charges | 100 | 4 | -96 | |
| Printing charges | 200 | 4 | -196 | |

| | | | | |
|----------------------------------|-------------|-------------|----|---|
| Overhead and contingency charges | 300 | 309 | +9 | |
| TOTAL | 5000 | 5003 | +3 | * The local exchange rate used was £1= Rs. 84.3 |

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

It is crucial to study different aspects of the green turtle ecology for this region, mainly their movements and diet. This information will assist in planning seagrass recovery as well as the management of the green turtle population. There is very little data on the green turtles in the Arabian Sea; further studies on their ecology will also provide their regional conservation status.

Collaboration with fishers and youth will prove useful in monitoring turtles as well as seagrass recovery. This will ensure longevity and success of the objectives along with initiation of local monitoring efforts.

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?

- a) Reports- Project reports submitted to the governmental departments and to the other funding agencies mentions the funding assistance from The Rufford Foundation.
- b) Presentations on the project- Presentations detailing some aspect of the project featured the Rufford Foundation logo.
- c) Project webpage- The project webpage mentions that the project was funded by the Rufford Foundation.

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

Dr. Kartik Shanker was instrumental in the planning and execution part of the project. His expertise in the field helped in determining and finalising the methods to fulfil the objectives. He provided the use of a laboratory and equipment for faecal sample analysis. Moreover, accommodation at Agatti island was supported by him.

Mr. Muralidharan helped in the planning and execution of the project activities. He helped in acquiring research and entry permits to work in the Lakshadweep islands. In addition, he provided his expertise in determining the analysis and interpretation of the results.

Project assistants - **Shafeehulalam** and **Moa Zachariah** assisted on the project in 2018 and 2019 respectively. They helped out with fieldwork and mainly in conducting surveys with the fishers.