

Final Evaluation Report

We ask all grant recipients to complete a project evaluation that helps us to gauge the success of your project. This must be sent in **MS Word and not PDF 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 – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please DO NOT fill in and submit this form until the project has been completed.

Complete the form in English. Note that the information may be edited before posting on our website.

Please email this report to jane@rufford.org.

Your Details	
Full Name	Radhika Nair
Project Title	Examining the impact of reef fisheries in the Lakshadweep archipelago
Application ID	41863-1
Date of this Report	06-01-26

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
Characterise reef fish assemblages across the Lakshadweep archipelago		Yes		<p>Reefs of a total of 5 out of the originally planned 10-12 atolls were sampled using in-water surveys characterising the reef fish assemblage. This was because of a significant delay in receiving permits from local authorities and a lack of availability of ship and flight tickets for travel to the Lakshadweep in 2023-24. As a result, we started our surveys in mid-January, 2024 instead of November, 2023 as planned. Due to this delay, we also did not conduct key informant surveys as planned, and used interviews that had been conducted in the previous field seasons to understand fishing impact. We sampled a total of 40 sites, 20 deep sites and 20 shallow sites, across 5 atolls.</p> <p>We had 3 key findings with respect to fish assemblages:</p> <ul style="list-style-type: none"> (i) Reefs of inhabited atolls had significantly lower biomass as well as abundance of predator species (commonly targeted in the fishery). (ii) Reefs of Kavaratti, the capital atoll, had significantly fewer medium and large-sized fish (iii) Fish assemblages on heavily fished reefs were structured were different in composition, being dominated by small-bodied fish of lower trophic levels. Less-fished reefs, on the other hand, still retain large numbers of species belonging to higher trophic levels.
Understand the impact of the data-poor reef fishery in			Yes	<p>Despite our reduced sampling effort (in terms of number of sampled atolls), our sampled sites represent the diversity of reef scapes and of human population densities across the Lakshadweep. We used key informant surveys from previous field seasons (conducted by me as part of my MSc thesis),</p>

the archipelago using a mixed-methods approach			conducted across 3 islands that span a gradient of human population density and urbanisation. These helped characterise spatial patterns, intensity of fishing and perceptions and practices associated with the fishery. Using a combination of these approaches we were able to assess the impact of fishing. Our results are therefore, robust and informative about the state of Lakshadweep's reef fishery and reef fish community.
Communicate results through a manuscript, a report to relevant authorities and to the local community.		Yes	<p>The writing of popular articles to communicate our results to the local community and the wider public is yet to be done. Our work has been published in a peer-reviewed journal <i>Biological Conservation</i>. We have written up reports and presented our work to the Department of Environment, Forest and Climate Change in Lakshadweep and other government officials as well.</p> <p>Our work has been published as an open access article in <i>Biological Conservation</i> and can be accessed using this link: https://www.sciencedirect.com/science/article/pii/S006320725007128</p>

2. Describe the three most important outcomes of your project.

a). We have found that a long history of low-level, subsistence fishing has depleted target fish groups, namely predators such as groupers, snappers, emperors, jacks and sharks, on inhabited islands. This depletion is starkest for the most densely populated capital island of Kavaratti. This has caused commercial fishers to seek out distant, uninhabited reefs, perceived to be higher in catch, for extracting enough fish to make a profit. Our results show that there is an urgent need for local management, without which Lakshadweep's reefs are vulnerable to severe declines in fish populations and may see consequent impairment of ecosystem function. Our research article on the study titled '**Fishing patterns shaped by history, place and access leave lasting ecological signatures on reef fish assemblages**' was recently published in the journal *Biological Conservation* as an open access research article.

The article can be found here: doi.org/10.1016/j.biocon.2025.111675

b). Communication of our results to the Ministry of Environment, Forest and Climate Change through yearly reports submitted, through informal meetings and through official presentations made to members of the department, has been done over the course of 2024-25. Our results also inform our team's broader ongoing engagement with the local community and have shaped how we communicate ideas of sustainability and habitability through our outreach programs.

c). Addition of data from previously unsampled atolls to the ongoing long-term reef ecological monitoring, which is currently being used to understand the impact of climate change-related disturbance events on reef fish assemblages and ecosystem function.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

We experienced significant delays with field data collection due primarily to a delay in receiving the relevant research and entry permits required to start the project. While we expected to receive permits by October and begin data collection by November 2023, we received permits only in December, 2023. After this, there was a further delay in getting to the Lakshadweep due to flight and ship tickets (the only modes of transport to the islands) being largely unavailable until January. As a result, we started field data collection in mid-January and sampled a smaller subset of atolls ($n = 5$) than originally planned ($n = 10-13$) and could not conduct key informant surveys with the local fisher community. However, the sampled atolls were representative of the different kinds of reef sites, types and intensities of fishing pressure in the archipelago and we bolstered our dataset with fisher interviews that were conducted in previous field seasons. Thus, despite the delay and reduced sampling, our broader objectives have been fulfilled well.

There were also small changes in the spending over equipment procured for the course of the project, as some of the SCUBA diving equipment we needed for the in-water surveys were in dire need of repair and servicing and some had to be replaced altogether. Thus, after consultation with Jane Raymond of Rufford's Foundation, we reallocated funds from the 'Scuba tank filling charges' and 'Speed vessel tickets' budgetheads to purchase an additional set of Regulators and Buoyancy Control Device (BCD).

1. Describe the involvement of local communities and how they have benefited from the project.

We have understood the spatial patterns and intensity of reef fishing in the archipelago, and the interplay between subsistence and commercial reef fishing through key informant surveys with members of the local community. Thus, this work would not have been possible without the knowledge that fishers in Lakshadweep have shared with us.

Furthermore, our in-water surveys would not be possible without the group of local fishers that take us out on their boats to sample the reefs. This project required us to visit two uninhabited atolls which could not have been possible without the care and guidance of people on the islands who accompanied us.

Reef fisheries in the Lakshadweep have expanded in the past decade through the influx of 'collector boats' that export reef fish to mainland India. This has created a new market and incentivised commercial reef fishing. However, this fishery remains poorly documented and monitored, and given the great dependence of local

communities on reef resources for everyday needs and nutrition, the lack of assessment and monitoring not only harms reef ecosystems but can compromise the community's ability to utilise these resources well into the future. Our study remains one of the very few that examines the ecological impact of reef fisheries in the region. While we have communicated our results to the local authorities, communication of our results to the local community is being carried out through a broader engagement with ideas of sustainability and island habitability, as fishing is a sensitive topic and requires a nuanced approach.

2. Are there any plans to continue this work?

As detailed above, our results provide critical insight into the state of reef fisheries and their ecological impact in the region and feeds into our ongoing outreach and engagement with the local community. We plan to carry this work forward through engagement with fishers, among other local stakeholders, over the next couple of years as part of our outreach.

The data collected over the course of this study also provides insight into the effects of climate change-induced disturbance events on reef fish assemblages and will be part of our ongoing long term reef ecological monitoring program.

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

Our results will feed into our outreach and engagement plans over the next few years. Aside from our close, ongoing engagement with relevant local authorities, we hope to communicate with members of the local community through workshops, posters and articles. We also plan to communicate our findings to a wider audience through a popular article that will be published soon after our research article is published and publicly available. We will also be applying to present our work to the wider scientific audience at relevant conservation and ecology conferences.

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

There is an urgent need for local management of reef fishing, as our results show a clear depletion of fished groups on reefs of inhabited islands, where most people fish for daily needs and nutrition. As fishing is a deep part of islanders' identity, livelihood and daily needs, it is important that our engagement is conducted thoughtfully and as part of the broader umbrella of sustainability and island habitability. Nuanced and sensitive communication of our results to local stakeholders is the next step. Our team is currently in the process of ideating and planning for future stakeholder engagement.

There is also an urgent need to understand how climate change is affecting reef fish assemblages, ecosystem function and how that will affect the future sustainability of this fishery that islanders depend on so deeply. Thus, we are also working on analysing our long-term dataset to understand this.

8. 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?

We have used the Rufford Foundation logo in a poster on our work on reef fisheries, that I presented at the British Ecological Society (BES) Annual Meeting, December 2025. Furthermore, we have acknowledged the funding support provided by the Rufford Foundation in our research article, soon to be published in the journal *Biological Conservation* (February 2026 issue).

9. Provide a full list of all the members of your team and their role in the project.

Dr. Rohan Arthur and Dr. Teresa Alcoverro – Senior researchers, have overseen the project and have been involved in conception, data collection, interpretation of results and writing.

Rajeswari Bhai B. T – Senior Research Fellow at NCF, helped in conceiving, executing and interpreting key informant surveys with fishers.

Mayukh Dey – Senior Research Fellow at NCF, helped in conception, data collection, interpretation of results and writing.

Wenzel Pinto and Siddhi Jaishankar – Research assistants at NCF, have helped in forming study design, data collection, interpretation of results and writing.

Later addition to the team: Harshul Thareja – Research assistant who joined in late 2024 and helped complete in-water surveys.

10. Any other comments?

Despite the unforeseen delays and change in plans, we have been able to successfully fulfil our objectives. I would like to acknowledge my advisors, Dr. Rohan Arthur and Dr. Teresa Alcoverro for their guidance and constant support, and my team for all their help, encouragement and support as well. This work would not have been possible without the support of The Rufford Foundation.

ANNEX – Financial Report
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