

The Rufford Small Grants Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. 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. 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 <u>jane@rufford.org</u>.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Raveendra Durgekar
Project title	Fisheries bycatch and its impact on marine biodiversity in the ecologically fragile Gulf of Mannar Biosphere Reserve, India
RSG reference	03.04.09
Reporting period	16.10.2010
Amount of grant	£5981
Your email address	ravind12@gmail.com
Date of this report	17.05.2011



1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not	Partially	Fully	Comments		
	achieved	achieved	achieved			
Identify major fish landing centres along Palk Bay, Tamil Nadu, where large mechanised craft operate			×	Preliminary visit to all the landing centre in Gulf of Mannar was carried out and only the major landing centre where large mechanised craft operated, and landed fishes were selected for carrying out our work.		
To observe the quantity of discards made per haul by different gears/ and also the bycatch landed			×	Data was taken by estimating the target and non-target species with special reference to discards through harbour survey and on- board participation. It was found that around 15% of the fishes are discarded back to sea in this area by trawlers operating in this area. It was also estimated around 75% of the total landings were non- target, consisting of bycatch, iuveniles and discards.		
Collection and preservation of discards/bycatch samples per haul for further analysis			×	The collected subsample of non target species were brought back to lab for further identification and were identified up to species level and quantitative analysis of the species also carried out.		
Identificationofvariousgroups/speciescontributingtothediscardsQuantifyproportion		×	×	During the study period it was found around 11 groups consisting of 25 species are discarded back to sea. Around 60% of target species were		
juveniles of commercially important species; estimate the loss to the fishery.				juveniles in nature. Estimating the loss of fishery by removing juveniles was not estimated as the actual price of the fishes were not been made available to us by the fishermen and because of time limit.		
Evaluate present utilisation of discards that are landed and find out ways and means to minimise waste (thrown back).			×	The present fishing scenario by trawlers in Gulf of Mannar region was quantified and a proposal was put forward for increasing the mesh of cod end from the present 10 mm square shaped to 35 mm		



			diamond shape to minimize the discards and juveniles.
Multivariate statistical analysis to evaluate the species diversity as well as quantify the catch landed/discarded.		×	Primer software was used to study the species richness, species evenness, cluster analysis and taxonomic distinctness of the species in this area. The negative impact of trawling on the trawl fishery was observed.
Document the results and propose suitable measures for efficient utilisation and management of discards.		×	The result is already presented to local fishing communities and better utilisation of the discards as manure in poultry and aquaculture has been presented.

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

The project started in November 2009 - work was carried out along the plan fulfilling the objectives. At first there was a lot of resistance from the fishermen to allow for participation on commercial boats or collect data regarding by catch as it was seen lot of endangered species are removed and sold illegally. Fishermen were unwilling to give the data because of illegal fishing practices in this area. A lot of time was taken to win over these fishermen, local fishermen leaders and fishermen's society and organisation were contacted and we explained the nature of work that was being carried out and its long term benefits were conveyed to the fishermen through these people; then only we were able to get the data and help from the fishermen.

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

- 1. The project started with the help of local communities. The outcome of the project was rapid assessment of over exploitation of fishing resources in the Gulf of Mannar. A total of 416 species of marine organisms which were caught in trawl net were recorded during the study period, of these 157 species were targeted, 248 species formed non-target and around 25 species were discarded in this region. In the present study, it was seen that using banned gears with a very low mesh size up to 10 mm were encountered in all the study sites. The trawling operations were generally carried out around the corals surrounding the 21 islands that are present in this area; almost all are losing corals species, which is a sign of great concern as this area is rich in marine fauna.
- 2. During our study period it was seen that 75% of the total catch were non-targets and around 15% of the total catch were discarded back to sea. Juveniles formed almost 60% of the total catch, which is the most alarming issue. Most of the non-target species were seen to be threatened and banned species. The gears that are operated by mechanised trawlers in the Gulf of Mannar area are prawn trawl, bull trawl, fin fish trawl and the Chank trawl. Particularly, Chank trawl was found to use rigid foot ropes consisting of iron chains that damaged the sea floor where it was used. This type of tough fishing gear which ploughs the seafloor was found to have a large-scale impact on marine benthic communities. In the time of study period the frequent deaths of endangered dugong were encountered in these areas. Non-targets are intentionally caught and brought back to fishing land centre to get



back more revenue. The percentage of juvenile caught was found to be more than mature one in most of the month in a year.

3. The present study reveals that the endangered species like sea cucumber, seahorse and some endangered fishes like sharks (especially hammerhead sharks), rays and catfishes (most of them juveniles) were found caught in huge quantities in the trawl net; surprisingly we could see these species were sold as bycatch because most of them were juveniles. Even the gastropods and bivalves, e.g. *Murex* spp., *Cardiun* spp., etc., which are nearly extinct from these coasts are caught as incidental bycatch and brought for some reasons that are not beneficial to anyone. As per the study results the endangered species sea cucumber particularly *Holothuria scarba* were confiscated by the local forest governments frequently. Most of the cases were noticed from the Rameswaram area in Gulf of Mannar region only. Since this study reveals that the availability of sea cucumber is very less in number in the confined fishing areas or grounds. Since then there is no possibility of fishing this species from this place. Whereas the confiscation of sea cucumber was not less than each and every time. Therefore, these species were caught from the Sri Lankan limit waters. If the tight security prevails by the concerned bodies the illegal landing of this species will be much less.

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

The livelihood of the local fishermen relies mainly on exploitation of fishes from this area. A lot of the government effort is spent educating the fishermen on the harmful impact of fishing through various government and non-governmental organisations. But during our study it was observed that illegal methods of fishing are still used. During the study we had direct contact with the fishing communities as we had participated on fishing operations and spent most of our time in fish landing centre. We could explain on site the impact they are creating on environment and to our knowledge we have been able to educate them about the importance of threatened species and as well as juvenile species and also the importance of corals and elasmobranchs and other threatened marine organisms.

The RSG grant helped fill a gap in the overall conservation of marine fisheries in Gulf of Mannar Area.

5. Are there any plans to continue this work?

As per the plan of the project the major landing centres for carrying out sampling was selected and bottom trawling was rampant in this area and as only trawlers were the major gear operating in this area, the impact of trawling on the benthic communities was assessed. But during the later course of our study we could come across the impact of bottom set gill net operating in this area which is removing tonnes of corals and other benthic flora and fauna and is being operated in remotely located areas in Gulf of Mannar region. So, I would like to educate the fishermen operating bottom set gill net and about the dangerous impact on the benthic communities by removing such fauna by this gear and would like to recommend the ban of this gear.

I would also like to further look at the economic loss to fishery by removing of juveniles by trawlers which could not be completed in this study. A further experimental study has to be conducted to study economic of fishery using experimental trawl net of 35 mm diamond shape trawl net which



will be compared to commercial net which is of cod end 10 mm. The purpose of this study would be looking at conserving the ecosystem without affecting the livelihood of the fishermen.

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

The initial findings of the project were discussed with authorities at the State Fisheries Department and results of the work presented. The output of the project will be presented to all the concerned authorities working in this area for development of fisheries. Besides this, I am planning to invite all the local fishermen's organisations working in Gulf of Mannar area and would like to present upon my results and immediate follow up needed to save the marine environment from illegal fishing in immediate future. The result of the project will also be shared among with the scientific community through publication in a peer-reviewed journal.

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

The project lasted 12 months as the plan of proposal.

Item	Budgeted	Actual	Difference	Comments
	Amount	Amount		
Personnel	1669.0	1669.0	0	
Core Technical	556.3	556.3	0	
Services	556.3	556.3	0	
Field and Laboratory equipment	417.2	417.2	0	
Publishing	347.7	347.7	0	
Boat Hiring	556.3	556.3	0	
Travel and related expenses concerning to the	834.5	834.5	0	
project				
Accommodation	417.2	417.2	0	
Other field expenses	278.2	278.2	0	
Contingency	347.7	347.7	0	
Total	5981	5981	0	

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.

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

The future work for the development of fisheries in Gulf of Mannar southwest coast of India:

- To identify the fishing gear that is susceptible to cause future damage.
- To carry out experimental trawling using commercial nets used and experimental nets which are having larger mesh size.
- To study the survival rate of discards.
- To assess the impact of fishing using bottom set gill nets around the coral island in Gulf of Mannar region and its damage to coral ecosystem.
- To educate the fishermen on wrong fishing practices on long term basis.



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

I have used the RSGF logo on a poster prepared on the impact of fishing on marine fisheries and the poster was distributed along the local fishermen and other fisheries organisation working in Gulf of Mannar. Besides this the logo was used during presentations of the work at Department of Marine Science at M.K. University. The logo will also be used in peer reviewed publications and the project report.

11. Any other comments?

This was the first project that I carried out in this area on impact of fisheries and I am grateful to the Rufford Small Grant Programme for providing timely funds and an opportunity to carry out this project. This has been a wonderful experience and helped me in many ways in terms of personal learning. I thank my field assistants and all friends who helped me in the project activities, especially Mr. Yokeshbabu, Research Scholar M. K. University and Dr P. U. Zacharia Head, Demersal Fisheries Division, CMFRI. My special thanks are to the fishermen of Gulf of Mannar for allowing me to carry out the work in this area. This project would have not been possible without their assistance, time, friendship and kindness.