Final Evaluation Report

Your Details	
Full Name	BEVA Grilante
Project Title	Trial of seagrass restoration techniques in Ranobe bay South-west of Madagascar
Application ID	36345-1
Date of this Report	30th June 2023

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
Raising awareness among local communities about the conservation issues and techniques for restoring seagrass meadows.				The meetings with the local communities took place twice in each village (Beravy and Ifaty) during June 2022. More than 500 peoples were sensitised during this project.
Prospecting of collection sites and the site for seagrass meadow restoration.				The prospecting of sites was carried out in two villages to identify suitable locations for the collection and transplantation shoots of seagrass. This step was conducted for two days at each site during June 2022.
Collection of sediment samples.				The grain size analysis was performed to assess the characteristics of the seabed at the collection site and transplantation site for seagrass meadows.
Implementation of seagrass meadow transplantation.				Two sites of restoration (Ifaty and Beravy) were selected for the implementation of seagrass transplantation. The transplantation was carried out using three different techniques: sediment-based, staple and bamboo grid. At each site, 192 seagrass shoots were transplanted using the sediment-based technique and 486 shoots were transplanted, with 243 using the staple technique and 243 using the bamboo grid technique.
Monitoring of the planting site.				The site was monitored monthly for a period of 8 months, from September 2022 to April 2023. During this monitoring, the survival rate and growth of the plants were assessed, along with the physicochemical parameters of the water, such as temperature, salinity, and turbidity. Additionally, the monitoring of organisms associated with seagrass meadows in the restored areas was

				conducted after 8 months of plantation.
Monitoring of the control site of seagrass.				The monitoring of the control site allows for the assessment of the impacts of seagrass shoot collection on the donor sites.

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

Improvement of local communities' knowledge, mastery of a more effective restoration technique, and positive evolution of seagrass meadow coverage are the three most important outcomes of this project. These results demonstrate the effectiveness of our approach and the relevance of our project in the preservation and restoration of seagrass meadows.

a). Improvement of local communities' knowledge about seagrass meadows: Through our efforts in raising awareness and environmental education, this project has contributed to enhancing the knowledge of local communities. Over 500 individuals, including fishermen and local guides, have participated in awareness and environmental education sessions. This approach is crucial in informing local communities about the importance of seagrass meadow conservation and the necessary actions to protect them. It has also led to a positive change in behaviour, including reducing destructive fishing practices and promoting more sustainable practices to preserve this ecosystem.

Photo 1: Meeting with local communities during the awareness session.

b). Masters of the most effective seagrass transplantation technique: Among the three techniques for seagrass transplantation (sediment-based, staple and bamboo grid), the sediment-based technique has proven to be the most relevant for restoring the seagrass ecosystem due to its high survival rate. This result is crucial in providing necessary tools for seagrass conservation. Thus, an area of 144m^2 has been restored using these three techniques in the Ranobe Bay during the implementation of this study. This result is essential as it contributes to the

improvement of the seagrass ecosystem's condition and enables sustainable conservation of this ecosystem.

c). Increase in seagrass ecosystem coverage: Through our seagrass transplantation activities, the coverage of the seafloor has evolved over time. This result is significant as it provides habitat for marine fauna species such as fish, crustaceans, echinoderms, and molluscs. In this context, the restoration of this ecosystem is necessary to preserve the habitat of these marine animals.

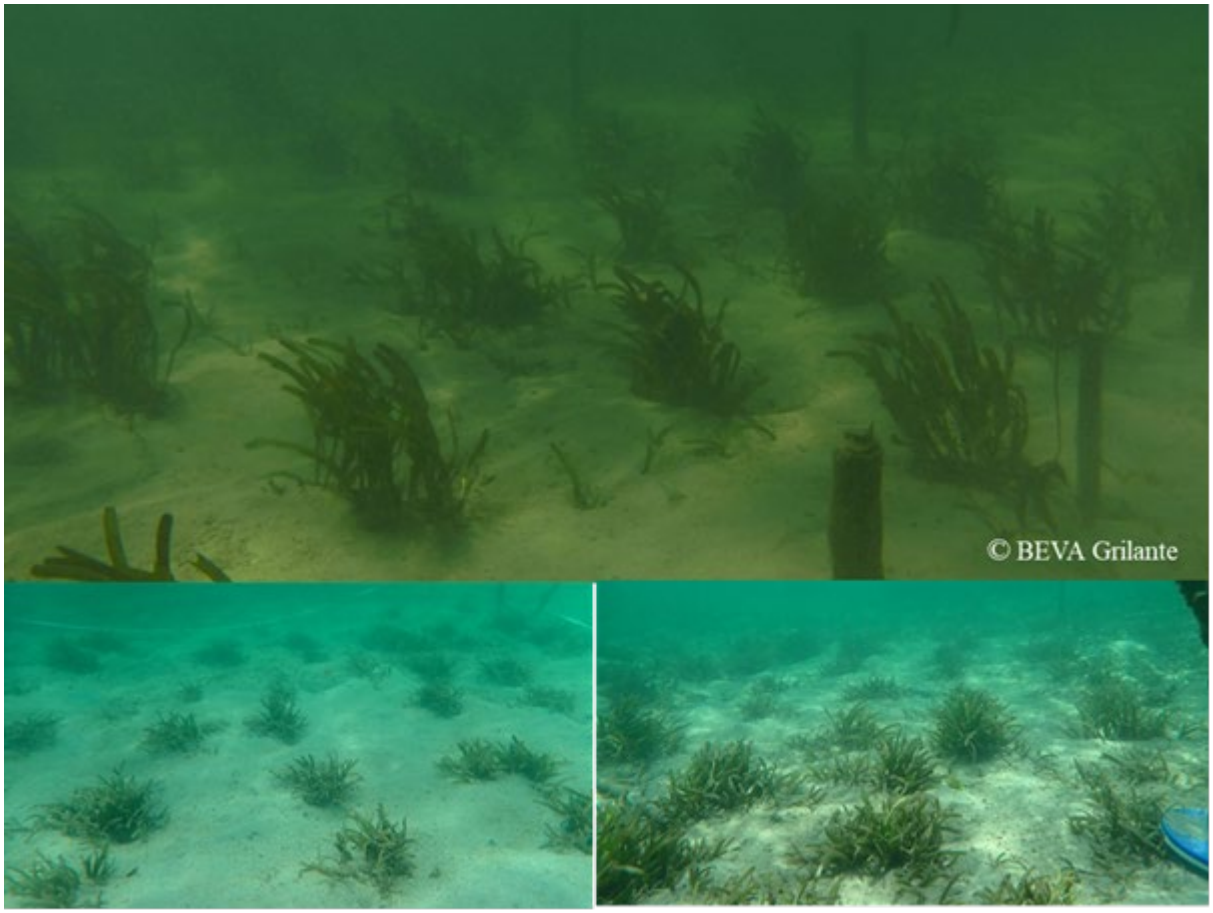

Photo 2: Evolution of seagrass coverage in the restoration zone (Top: Restoration site after 2 weeks of planting, Left: Restoration site after 1 month of planting, and Right: Restoration site after 5 months of planting).

The most significant achievement of this work is the successful restoration of seagrass beds. Our ability to restore an area of 144 m^2 of degraded seagrass habitat helps preserve this ecosystem and maintain its vital ecological functions. Seagrass beds harbour a high diversity of marine species, including fish, crustaceans, and molluscs. Restoring this ecosystem provides essential habitat for these species and contributes to maintaining marine biodiversity. By restoring this ecosystem, we create an environment conducive to the survival and regeneration of numerous marine fauna, including fish, certain marine invertebrates, molluscs, and certain species of echinoderms.

This work was carried out in close collaboration with local communities. They were trained and mobilised to actively participate in seagrass restoration efforts. Involving local communities in this project improves their knowledge of seagrass beds and also fosters their awareness of the importance of marine conservation and environmental preservation.

The success of a seagrass restoration technique in Ranobe Bay, southwest Madagascar, can serve as a model and inspiration for other seagrass ecosystem restoration initiatives. The lessons learned and best practices developed during this project can be shared and replicated in other areas where seagrass beds are threatened.

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

The first difficulty encountered during the implementation of this study is the increase in fuel prices in our country starting from August 2022. This increase has led to transportation management issues for fieldwork implementation. As a result, the field activities had to be rescheduled to meet the objectives of this project.

The second problem encountered in the implementation of this project is the conflict with fishing communities. The seagrass meadow areas are fishing zones for small-scale fishermen. To address this conflict, we worked in collaboration with the fishermen and the local communities. After raising awareness among the local communities, the fishermen have become aware of the importance of conserving and restoring the seagrass ecosystem.

The passage of a cyclone in the southwestern part of Madagascar in early March 2023 poses a major problem for the success of this project. Seagrass meadows are vulnerable to the effects of severe storms. This problem has a significant impact on the survival and growth of the plants, as well as on the assessment of the restoration area's coverage rate. However, finding solutions to this problem is challenging. In light of this situation, it is recommended to conduct transplantations during the colder season so that the plants can adapt to the strong storms of the cyclone season.

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

In the implementation of this project, we worked closely with local communities, recognising their essential role in its success. The local communities were provided with training on the techniques of seagrass transplantation. They were actively involved in project activities, with some interested individuals from the community working as field assistants and local collaborators throughout the project's duration. Their active participation allowed them to develop new skills and engage in marine environmental preservation.

As a result of our awareness-raising activities, the knowledge of local communities regarding seagrass beds has improved. The fishing communities are now aware of

the impacts of destructive fishing gear on seagrass areas. They play a vital role in monitoring the restoration sites, ensuring the sustainability of the project's efforts.

The collaboration with local communities has been instrumental in building local capacity and fostering a sense of ownership and responsibility towards the marine environment. By involving the communities in the project, we have empowered them to become stewards of their own coastal resources, contributing to long-term conservation efforts.

5. Are there any plans to continue this work?

Yes, we plan to continue this project, especially in regard to environmental education, including both children and adults, training local communities in the most effective technique for seagrass transplantation, as well as implementing a community-based restoration project for seagrass ecosystems. The aim is to mobilise coastal communities in the restoration and conservation of seagrass areas. As part of my doctoral preparation, I would like to work in this field by conducting an in-depth study on seagrass ecosystems, particularly analysing carbon sequestration in the restoration zone.

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

This study was conducted as part of my master's thesis in marine and fisheries sciences, with a specialisation in sustainable biodiversity and environmental management. The defence of my thesis is scheduled for September 2023. At that time, all the results of this study will be presented to the public. Additionally, the findings of this study will be written up as a scientific article for publication in a journal, so that it can be accessed and consulted by everyone.

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

The next steps of this project in marine seagrass conservation include:

- Continuing environmental education and awareness activities with local communities to enhance their understanding of the importance of seagrass ecosystems and the long-term conservation challenges associated with them.
- Training local communities in seagrass transplantation techniques to mobilize their involvement in habitat restoration efforts (community-based restoration) and expand the restoration areas in Ranobe bay.

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?

Yes, I have used the Rufford Foundation logo in all the materials produced for this project. The Rufford Foundation logo was displayed during the community awareness session, as well as during the participation in the Blue Carbon workshop held at the Institute of Fisheries and Marine Sciences, University of Toliara, in

partnership with the Indian Ocean Rims Association (IORA) on November 27th to December 2nd, 2022.

Photo 3: Examples of events where the Rufford Foundation logo was used (Left: Presentation during the community awareness session, Right: Presentation during the Blue Carbon workshop at the Institute of Fisheries and Marine Sciences, University of Toliara, Madagascar).

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

Full name	Roles in the project
BEVA Grilante	Team leader et photographer, Data analyst
RANIVOARIVELO Lantoasinoro	Supervisor
RAKOTONJANAHARY Fidèle	Technical supervisor
RAVELOHASINA Helga Bergulie	Technical supervisor
PEPIN Jonathan and MASOAVA Joël Arnaud	Jonathan actively participated in implementing community awareness regarding our objective. He also took part in the transplantation of seagrasses in Ranobe Bay. Additionally, Masoava also contributed to the implementation of this study during the monitoring phase.
ANDRIANOTAHINA Banistan	Banistan worked with us as a local collaborator and assistant during the implementation of this project. He actively participated in the transplantation of seagrasses and also during the monitoring of site.

10. Any other comments?

I would like to express my gratitude to The Rufford Foundation for funding this project and to our institution (Institute of Fisheries and Marine Sciences, University of Toliara, Madagascar) for supporting me throughout this study. With your support, I have been able to achieve significant results in understanding methods for the restoration and conservation of seagrass meadows.

Furthermore, our project for the restoration of seagrass meadows in the Bay of Ranobe, southwest Madagascar, continues thanks to the grant from the GoodPlanet Foundation. At now days, we have successfully restored a total area of 2500 m^2 of degraded seagrass areas in Ranobe Bay. Two species of seagrass including *Cymodocea serrulata* and *Syringodium isoetifulium*, are used for this project. It is carried out in close collaboration with local communities, ReefDoctor NGO, and our institution (Institute of Fisheries and Marine Sciences). During the implementation of this project, the sediment-based transplantation technique is applying, and 20 members of the local community were involved, and volunteers from ReefDoctor also participated in this activity.

Find below some photos during the implementation of project "community-based restoration" in Ranobe Bay, Southwest Madagascar:

Clods of seagrass were collected with a shovel. (Left: Cymodocea serrulata species, and Right: Syringodium isoetifulium species).

Seagrass was planted in Ranobe Bay after two weeks. (Left: Syringodium isoetifulium species, and Right: Cymodocea serrulata species).

Plantation of seagrass.

Restoration area of 25 x 25 m.