#### **Final Evaluation Report**

Your Details								
Full Name	BEVA Grilante							
Project Title	Effectiveness for communities-based seagrass restoration in Ranobe Bay, Southwest of Madagascar							
Application ID	41766-2							
Date of this Report	March 2025							

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

Objectives	Not achieved	Partially achieved	Fully achieved	Comments
Raising-awareness and environmental education among local communities				195 people's members of local communities attended on raising- awareness and environmental education session during the implementation of this project.
Training on seagrass restoration approach among the local communities.				85 peoples have been trained about seagrass restoration approach in Beravy and Ifaty villages. This training allowed them to understand the best practices for collecting and transplanting seagrass by method with sediment and also the selection criteria of suitable site for seagrass transplantation.
Identification and demarcation of suitable site for transplantation				The suitable site for seagrass transplantation had been identified and demarcated in Beravy and Ifaty. This had been carried with local communities. This also allowed us to evaluate the characteristics of the restoration and collection site of seagrass at $t_0$ .
Seagrass transplantation process in Beravy and Ifaty, Ranobe Bay Southwest Madagascar				3,300 square meters of degraded seagrass area have been restored in Beravy and Ifaty. A total of 1,224 seagrass shoots have been planted by local communities. 70 peoples from community members participated in the transplantation campaigns.
Monitoring- Evaluation and Learning.				The data from the monitoring campaigns, including survival, recovery, canopy heigh evolution and associated macro-invertebrates, are being analysed. The data collection on the physicochemical parameters of the ocean is in progress. The writing dissertation of this project is currently being processed.

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

The main objective of this project was to enhance the capacity of local communities for conservation and restoration of seagrass meadows in Ranobe Bay, Southwest Madagascar. The three most important outcomes with this project are describe in below:

### a). Empowering capacity of local communities in the seagrass restoration initiative in Ranobe Bay:

The training sessions provided to local communities have strengthened their capacity in seagrass transplantation techniques. These sessions have enabled participants to understand the most effective approaches to seagrass restoration, including the criteria for selecting transplantation sites and collection areas, as well as optimal techniques for harvesting vegetative shoots and conducting transplantation.

Furthermore, our efforts to raise awareness among fishing communities have significantly enhanced their understanding of the benefits associated with seagrass ecosystem conservation and restoration. The active participation of local communities in restoration initiatives has contributed to the successful rehabilitation of 3,300 square meters of degraded seagrass meadows in Ranobe Bay (Fig. 1).



Figure 1: Local communities participating in seagrass restoration in Ranobe Bay, Southwest Madagascar (©BEVA Grilante).

### b). Understanding the effectiveness of community-based seagrass restoration:

The community-based seagrass restoration in Ranobe Bay was carried out on May 2024. Monthly monitoring was performed at the restoration site to assess survival rates, canopy height dynamics, and coverage. After nine months of transplantation, the average survival rate varied depending on the restoration site, reaching 28.90 ± 10.80% in Beravy and 73.40 ± 8.25% in Ifaty. Despite the low survival rate of transplants in Beravy, seagrass coverage increased from 4.11 ± 6.86% in April 2024 to  $8.03 \pm 11.70\%$  in February 2025. The coverage rate in Beravy is lower compared to Ifaty where the coverage increased from  $15.20 \pm 19.90\%$  in April 2024 to  $37.60 \pm 26.60\%$  in February 2025. The evolution of canopy height varied according to the restoration site. In Beravy, the average canopy height decreased from  $13.20 \pm 5.24$  cm in April 2024 to  $7.23 \pm 2.78$  cm in February 2025. On the over hand, in Ifaty, the canopy height initially decreased from  $12.70 \pm 3.52$  cm in April 2024 to  $10.50 \pm 1.68$  cm in June 2024, then it increased gradually, reaching to  $12.10 \pm 2.42$  cm

in February 2025. This study provides valuable insights into the effectiveness of community-based seagrass restoration before scaling up restoration efforts. This pioneer study has the potential to be an effective approach to the restoration of this key habitat with significant awareness of the local community through their active participation.



Figure.2: Evolution of seagrass recovery at the restoration site: (left) recovery after two months, and (right) recovery after five months of planting. Photo taken in transplantation site lfaty.

### c). Identifying the factors that influence the success of seagrass transplantation:

The mains factors contributing to seagrass transplants mortality are highly depending on site specific characteristics. For instance, in Beravy, transplant mortality was mainly attributed to high sediment input, which inhibits the transplants growth. Additionally, errors in the collection and planting of vegetative shoots during transplantation campaigns may also affect survival rates and rhizome extension. The identification and analysis of others factors, such as temperature, salinity, visibility, etc., that may influence the success of seagrass restoration are currently underway.

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

The first difficulty we encountered during the implementation of this project was ensuring the protection of the transplantation site. Despite our efforts to raise awareness among the fishing community, some of fishers continued to operate within the restricted area (Restoration site). To address this issue, a patrol campaign was conducted during the low spring tide in partnership with the local community. Additionally, a local convention, called « DINA », was established to reinforce the protection of the transplantation site.

Secondly, despite our effort to train locals communities regarding the technic for seagrass transplantation and collection of vegetative shoots, some participants in the transplantation campaigns lacked expertise in the technique of collecting vegetative shoots. To maximize the project's success, we selected people proficient in these techniques for collection and transplantation. Furthermore, we provided intense training for all those interested in participating in the transplantation campaigns to ensure the project's long-term sustainability.

Moreover, storm events, such as cyclones and strong currents in Southwest Madagascar, posed a significant problem for fieldwork planning, as they could delay the implementation of certain activities. To mitigate this issue, we regularly consulted the Windy weather forecast before scheduling fieldwork.

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

This project was carried out in collaboration with local communities and local association as FI.MI.HA.RA. Their implication played a crucial role for the implementation of this project and its success. The local communities were sensitized on the importance of conservation and restoration of seagrass ecosystem. This increased their knowledge about seagrass ecology and their understanding of the benefits provided by this ecosystem. The local communities have gained training on seagrass restoration technique; this allowed them to master the best practices for restoring seagrass.

The local communities participated on the training had the opportunity to participate on the campaigns of transplantation seagrass. So, 10 communities' members have been engaged per day during the campaigns of transplantation and they received a compensation and a total of 70 peoples gained these opportunities during the campaigns of the transplantation. Additionally, 3 peoples from FI.MI.HA.RA association worked with us as local guide during this project and they received a training about the monitoring of transplantation site.

#### 5. Are there any plans to continue this work?

I plan to continue my research on the conservation and restoration of seagrass meadows not only in Ranobe Bay but also around the coast of Madagascar like in Northwest. One of the key challenges was mastering the best techniques for seagrass restoration in Ranobe Bay. In this case, I would like to explore the feasibility of seagrass restoration by planting *Thalassia hemprichii* seeds.

In Ranobe Bay, the fruiting season for *Thalassia hemprichii* seeds occurs from January to March each year. Understanding this reproductive cycle is crucial for optimizing seed collection and improving restoration efforts. This research will provide valuable insights into the potential of seed-based restoration. The findings will contribute to the development of sustainable restoration strategies, enhancing the resilience of seagrass ecosystems and promoting their long-term conservation across Madagascar's coastal regions.

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

I plan to share the results of my work through multiple channels to enhance the visibility of my research and to make it accessible for interested people. I plan to share the results of this project to local community by organizing a meeting or workshop to show them the impacts of the project. I plan also to organize a workshop to the stakeholders and to the public, in Toliara, to inform them the results of effort for conservation of marine biodiversity and marine ecosystem. I am willing to present the results of this project at the 13<sup>th</sup> scientific symposium in Mombasa Kenya on 28<sup>th</sup> September to 3<sup>rd</sup> October 2025, a symposium organized by the Western Indian Ocean Marine Science Association (WIOMSA). Additionally, results from this project are now analysed and I will write an article based on it to be submitted at the African Journal of Marine Science or Elsevier.

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

Looking ahead, the important next steps for this project will be:

- Analysing all the data obtained from this project and writing a paper,
- Collecting supplementary data such as sea water temperature, salinity and current to analyse the factors influencing the mortality of transplants. These data will be analysed with appropriate software such as QGIS and R&Rstudio.
- Organizing workshop with local community to present the results of this project.
- Collaborating with the local community, the Ministry of the Environment and Sustainable Development, and the Ministry of Fisheries and Blue Economy to establish a management plan for seagrass ecosystem in Ranobe Bay and establish a local convention for protecting seagrass ecosystem 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, The Rufford Foundation logo has been displayed and properly acknowledged during all materials produced for the implementation of this project. It was used during the training workshop held on September 4<sup>th</sup> – 5<sup>th</sup>, 2024. I also used it for my poster presentation at the 7<sup>th</sup> International Marine Conservation Conference (IMCC7) in Cape Town, South Africa, in October 13<sup>th</sup> – 18<sup>th</sup>, 2024. The RSG logo will also be used in the presentation at WIOMSA 13<sup>th</sup> scientific Symposium, which will take place from September 28<sup>th</sup> to October 3<sup>rd</sup> of this year in Mombasa, Kenya, based on the acceptance of my abstract. I will also include the logo on the cover of the slideshow for the presentation results of this project to local communities in April 2025.



Photo 3: Examples of events where the Rufford Foundation logo was used; Top : Slide cover presentation during the community awareness session in Mangily Ranobe Bay, Bottom : Support used during environmental education on school children in Ifaty.

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

**BEVA Grilante**: a marine biologist and conservationist, specializing on seagrass restoration. BEVA is the project leader, data manager and analyst, writing final report and photographer. His role is crucial for the success of this project.

**Dr. RAKOTOMAHAZO Cicelin**: Marine biologist and conservationist with a research interest in blue carbon ecosystems. Cicelin is National Technical Lead of Community-based Mangrove Management at Blue Ventures NGO, Madagascar, and he is the Blue Forests Coordinator at Blue Ventures in the Southwest of Madagascar. He also played a role as technical supervisor for the implementation of this project.

**RAVELOHASINA Helga Berjulie**: a PhD student at Institut Halieutique et des Sciences Marines (IH.SM), University of Toliara Madagascar and at University of Liège, Belgium. Helga is a technical supervisor of this project.

**RAKOTONJANAHARY Fidèle**: a PhD student at Institut Halieutique et des Sciences Marines (IH.SM), University of Toliara Madagascar. His research concern uses and management of seagrass ecosystem in Ranobe Bay, Southwest Madagascar. His role also is a technical supervisor of this project.

**ZERAMBAY Sarah**: a gradued student in fisheries and marine science (Master degree). Passionate about the conservation of marine ecosystems like seagrass meadows and she participated actively in this project as technical assistant for raising awareness among local communities, transplantation of seagrass and for the monitoring and evaluation of this project.

**RANDRIANJAFISOA Faniry and RAMISIMAMONJY Tsinjo**: Master students at Institut Halieutique et des Sciences Marines (IH.SM), University of Toliara Madagascar. They worked with me for this project as technical assistants during the monitoring and evaluation.

**ANDRIANOTAHINA Banistan and FERDINAND, ARMAND Justin:** fishermen living in Ranobe Bay, Southwest Madagascar. They worked with us for the implementation of this project as local guide and local assistants. They participated actively in the campaigns of transplantation and monitoring of transplantation site.

**Dr. RANIVOARIVELO Lantoasinoro:** senior lecturer at Institut Halieutique et des Sciences Marines (IH.SM), University of Toliara Madagascar, she is a specialist on blue carbon ecosystem. For this project, Lantoasinoro played the crucial role of supervisor.

#### 10. Any other comments?

I would like to express my gratitude to The Rufford Foundation for its invaluable and generous financial support for this project. I would also like to thank the project team and the local community in Ranobe Bay, particularly in Ifaty and Beravy villages, for their participation in this initiative.

Furthermore, I wish to continue my research on seagrass restoration by assessing the feasibility of restoring seagrass meadows through the planting of

Thalassia hemprichii seeds in Ranobe Bay. This innovative approach has the potential to enhance restoration efforts by promoting natural regeneration, strengthening genetic diversity, and increasing the resilience of seagrass ecosystems. Unlike methods based on vegetative shoot, seed-based seagrass restoration can be more effective and easily applicable in large scale, allowing the restoration of wider areas. This study will evaluate seed germination, seedling survival, and environmental factors influencing restoration success. The findings will contribute to the development of sustainable restoration strategies and the conservation of seagrass ecosystems. I would be grateful if The Rufford Foundation could support this study.

#### Somes photo taken during the implementation of this project



Divers measuring the canopy height and estimating the coverage rate of seagrass in restoration site: Left in Beravy, Right in Ifaty (© BEVA Grilante)



Transplant of seagrass after two months of plantation: Left in Beravy, Right in Ifaty (© BEVA Grilante)



Coverage of the restoration site after nine months of plantation: Left in Beravy and Right in Ifaty (© BEVA Grilante)



Associate fauna in seagrass meadows, Left is Synapta maculatta and Right is Hyppocampus histrix

#### ANNEX – Financial Report

Your Details							
Full Name	BEVA Grilante						
Project Title	Effectiveness for communities-based seagrass						
	restoration in Ranobe Bay, Southwest of Madagascar						
Application ID	41766-2						

Using the budget provided with your original application, please give a breakdown of budgeted versus actual expenditure. If there is a difference between the budgeted and actual amounts, please explain why.

If there are funds remaining, these should be returned to the foundation. We will provide details of how this can be done.

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.

All figures should be given in pound sterling, indicating the local exchange rate used.

Item	Budgeted amount as shown in your original application	Actual amount spent	Difference	Comments	
Slide projector	110	235,42	-125,42	Paid by co-funding	
Meeting room rental	220	303,99	-83,99	Paid by co-funding	
Ultraspan boots	300	530,59	-230,59	Paid with co-funding	
Others materials	150	57,85	92,15	Paid by co-funding	
Vehicle rental	840	718,51	121,49	Due increasing day of used vehicle for fieldwork	
Boat rental	630	1 252,79	-622,79	The boat rental coast increased during the implementation of this project.	
Team leader fieldwork allowance	560	508,48	51,52	To compensate the transport and fuel for transport during	
Technical assistants' fieldwork allowance	900	677,98	222,02		
Local assistants' participation	720	569,28	150,72	the fieldwork, the budget for fieldwork allowance and	
Accommodation for team leader	560	257,93	302,07		
Accommodation for technical assistants	900	515,85	384,15	accommodation was limited.	
Snorkelling mask	260	215,55	44,45		
Fuel	2 760,00	1 673,95	1 086,05	Paid with co-funding	
Others expense (bank transfer fees, and delivery fees)	-	129,72	-129,72		
TOTAL	8 910,00	7 647,91	1 262,09		

EXCHANGE RATE USED: 1 GBP = 5,427.89 MGA