IW R2R PROJECT VANUATU REHABILITATION MINI REPORT 2019

PREPARED BY: ERICKSEN PACKETT, IW R2R NATIONAL PROJECT MANAGER

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Acknowledgment

The International Waters Ridge-to-Reef (IW R2R) Project Vanuatu would like to convey its appreciation acknowledgement to these following implementing partners; Department of Environmental Protection and Conservation (DEPC), Department of Forestry (DoF), The Tagabe River Management Committee (TRMC), SPREP PEBACC Project, Ifira Marine Management (IMM), FAO ISLCM Project (STAR), The Pacific R2R Regional Project Coordination Committee (RPCU), The Department of Water Resources and Tanavasoko Area Council (Shefa Province) and to the Chiefs and People of Tagabe River resident communities. Through your technical assistant and to this collaborative partnership towards the rehabilitation programs for Tagabe Watershed Catchment.

Basic Data

Activity Name	Vanuatu IW R2R Project Rehabilitation Programme			
Project Site/Location	Tagabe River Catchment Area, Port, Vanuatu			
Contributing to/Achieving Project Objectives	Component 1	Strengthening coordination in support of the development and implementation of the Tagabe River Management Committee (TRMC)		
	Outcome1.2	Replication of Best Practices and Lessons Learned from IWRM Sarakata Catchment Demo Project		
	Targets End of Project	Buffer and Protected Use areas established and adhered to.		
	Component 3	Establishing partnerships for sustainable coastal area development.		
	Outcome 3.1	A multi-sectoral partnership that should revive the Existing Botanical Garden providing environmental and educational benefits to the Tagabe River Catchment		
	Targets End of Project	Existing Botanical Garden preserving Vanuatu's floral biodiversity and operating as a self-sustaining entity for the national botanical garden. 30 hac established and planted with rare endemic species in Vanuatu.		
Financial Expenditures	1st Collection		VUV 70,250	USD 600.74
	2nd Collection		VUV 240,000	USD 2,052.33
	3rd Collection		VUV 41,900	USD 358.30
	1st Tree Planting		VUV 50,000	USD 427.57
	Blacksand Coastal Tree Collection and Planting		VUV 20,000	USD 171.03
	Nursery & Field Maintenance		VUV 22,000	USD 188.13
	Extension to Nursery house (Potting House, Hardening House and Nursery Double-Decks). Labor, materials and supply included.		VUV 260, 994	USD 2,231.86
	Potting Activities		VUV 69, 835	USD 597.19
	Total		VUV 774,979	USD 6,627.15

IWR2R Project Vanuatu Rehabilitation Programs

As per components 1 and 3 from the National Log Frame, the projects as in specific two (2) rehabilitation activities schedule to accomplish within its durations.

1. ***Restore Buffer Areas of Tagabe River and Degraded Areas.***
   Specifically will restore at least 30m buffer areas along Tagabe River. Its significant is to stabilize the riverbanks from which buffer areas are to be recognized. This should be accountable for mitigating soil erosions, improve surface water quality, restore fresh water fauna species as well overall restoring and maintaining quantity of Tagabe River. Restoration of native forest in MWPZ1 intentionally to improve the quality and quantity of surface and underground water. The native forest itself will be restored in Matnakara Water Protection Zone 1 (MWPZ1) with areas of atleast 14.6 hectors.

2. ***Rive the Existing Botanical Garden.***
   This rehabilitation will ensure to revive and maintain the existing Botanical Garden in MWPZ1 design by the DoF. For such purpose, the botanical garden should accommodate mostly endemic flora species that will be protected and conserved within this legally protected area for future references as a living Herbarium.

Rehabilitation Sites

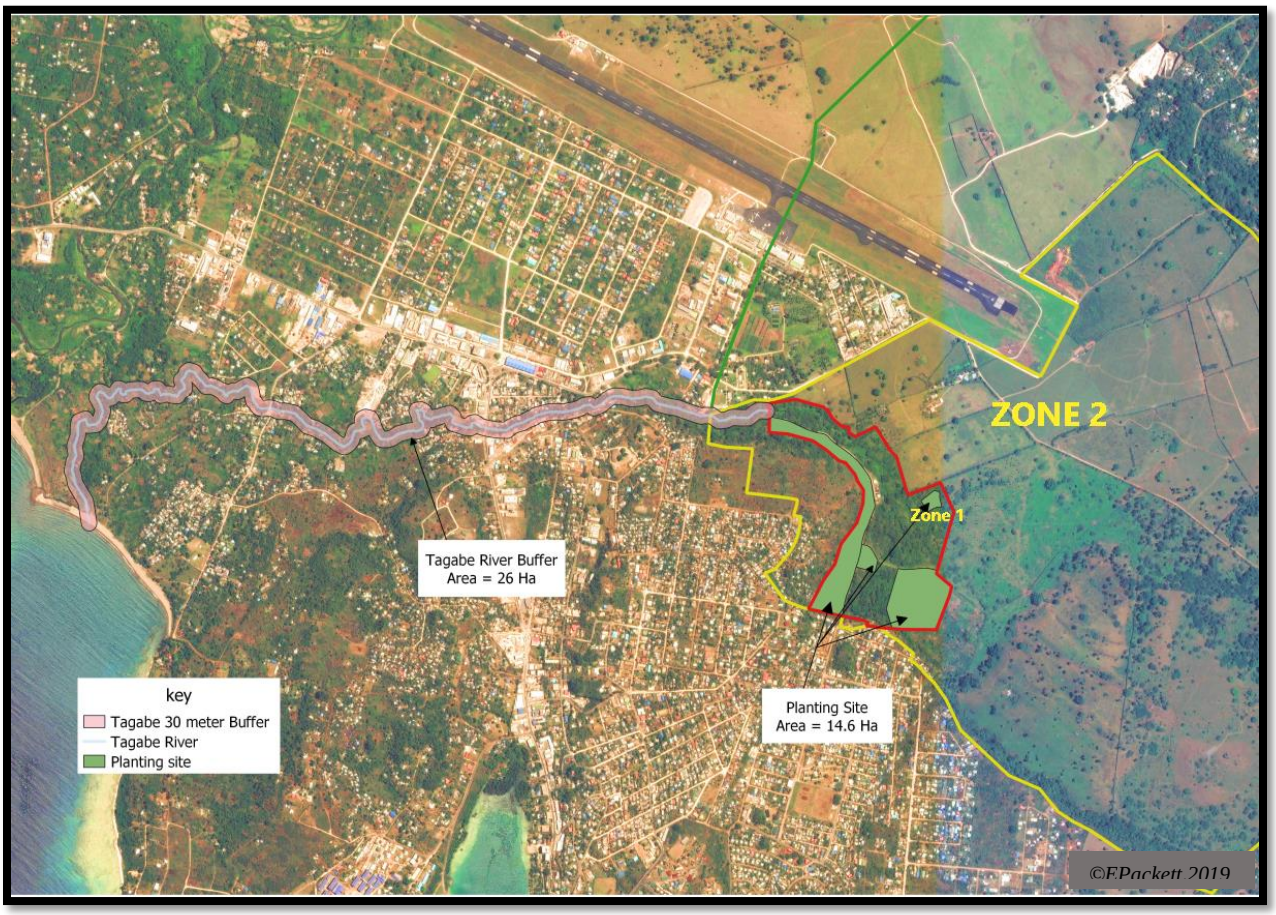

Figure 1 Shows IW R2R Rehabilitation Sites Indicated in Red (Rehabilitation Activities 1 & 2.

The map shows the areas of which the project's habitat restoration activities should deliver. A total of 26 hectors for the buffer areas and 14.6 hectors for the revegetation of Zone 1. The Botanical Garden should be at least 3 Hectors

Methodology

Tree Collection

The project for this purpose does not collect seeds nor either propagules or even cuttings from any desired or interested flora species to be raised in the nursery. Instead to reduces time and ensure rehabilitation targets are met within the minimum duration of the project, the project and its technical expertise, mainly from the Department of Forestry decides to further fasten the process through this commonly known procedure, "Wildling and Seedling Collection". This method is reclusive to the collection seeds but rather collection wildlings and seedlings, which can be define as young and immature trees having successfully

survival and adaptation to conditions of the natural landscape from which they are spatially distributed in. This report will outlined the precise procedures affiliated to overall methodology.

1. Identify sites of collection. The collection sites should take into accounts relevant spatial distribution proximity between each collection sites to ensure maximum diversity is reached in proximity as well as with differences in topography during collection.
2. Collection techniques:
    I. Asses and Identify wildlings/seedlings height within the range of 15cm-75cm.
    II. Slowly and firmly with a firm grip, uproot (pull) the plant at an angle of 90 degrees. This step has to be done so much thoroughly with great procession to ensure the root systems, i.e. especially the lateral roots are not damaged.
    III. The plant is then placed in container of water to be transported back to the nursery where it'll be transplanted into a poly bag. In cases where transportation may take at least two or three days, it is required that the plant roots system is wrapped in toilet paper and then soaked in a container of water before it can be transplanted.
3. The new collection needed to be groom before being transplanted into the polybag.
4. Transplanting into polybag.

Note: Steps 2 and 3 are observed for individual plants.

Figure 2 Outlines Steps 2.1, 2.2, 2.3 and Step 3 during wildling collection in the field

This picture was taken during the 3rd Collection on the 16th November, 2019

Figure 3 Transplanting of Newly Collected Wildlings into the Polybags prepared in the Nursery

Nursery

Once the plants are transplanted into the polybag, stocking is now necessary in the nursery house. It is critically important to ensure plants are appropriate stocked in the nursery beds. Stocking arrangement also plays a major role during the nursing period. The position and arrangement of plants in the nursery house should enable air circulation and equitable sunlight access to individual plants. For the first three (3) weeks in the nursery, it is equally crucial to consistently water the plants in the morning before sunrise and in the afternoon during which the sun is about to set. On such occasion, the new collection should remain in the nursery for at least 3 months before they can be transplanted.

Figure 4 Shows stocking in the Nursery House of newly collected Wildlings

The nursery house is constructed to provide with suitable conditions for the plants to be nursed after their relocation from the natural habitat. Therefore it is shaded with a green net. The green net is accountable for only 50% of the sunlight penetration which then provides a suitable conditions for the newly collected. In adjacent, it also regulates other physiological conditions such as temperature, humidity, and wind velocity as well as air circulation, rapidly introducing an adaptive environment for them plants to steadily grow and survive.

Figure 5 Shows Nursery Construction on the month of December, 2018

Once the plants have fully grown and seen fit, they will now move to the hardening house. Hardening process is purposely essential to avoid environmental shock from the plants. It is yet another extension of the nursery house shaded with 70% sunlight intrusion green net. Here the plants slowly experience a transition of conditions with another pace higher. While reducing the consistency in watering and preparing them for the field planting.

Implementation

1. Collections

Date	Activities	N0. Of Plants/Wildling Collected	Type of Species
1st Collection			Native, Endemic and Threatened. This include trees, shrubs and Vines
Friday, March 8, 2019	Collection from Central Pentecost	491	
2nd Collection			
Monday, April 15, 2019	Collection Around Efate Island	2000	
3rd Collection			
Monday, December 16, 2019	Collection Around Efate (South and West of Efate Main Land)	400	
Total		***2,891***	

Table 1 Showing Wildling Collection Programs.

The collection of wildling and seedlings collectively happened during the first half of the year. In March, 2019 the first collection happened in the Island of Pentecost. Pentecost is a well-known for growing and supplying kava predominantly in the domestic market, and thus local kava farmers cleared large area of lands to grow kava. In order to preserve, conserve and protect much flora species geographically found in Pentecost from land clearing due to pressure from kava farming, the first collection was an opportunity to kick start at the island of Pentecost. Floral endemism is also high in Pentecost with relatively abundance in Native and threatened species.

Second and third collection happened around the island of Efate. To certain degree of understanding, Efate is accommodates the capital city of Vanuatu, Port Vila and so much recognized as the hot spots of many development categories. Therefore it would be appropriate to restore a native in MWPZ 1 with many of its own native and endemic flora species.

2. General Monitoring

Nursery Monitoring & Tree Planting					
Period of Nursery Raising and Monitoring	***Mortality Rate***	***Number of Plants Survived***	***Number of Plants Planted***	***Number of Plants Still Need to be Transplant***	***2019 Target (Not Achieved)***
Months (March-October, 2019)	1,387	1,107	457	650	3,000

Table 2 Showing Nursery Monitoring and Number of Trees Planted.

Tables 1 (above) is a sophisticated reference of the wildling collection. First and Second collection of wildings from the first half of this year sums to 2491 plants. However table 2 reflects on a high mortality rate (1100) while the wildlings were being nursed in the Nursery until seems fit to be transplanted. It usually take an average of 3 months or more nursing the collection. On such period, there has been challenges and lessoned learned that are of course the result of the mortality rate.

I. Soil Composition.
II. Method/Strategies of Collection and Transplanting into polybags.
III. Stocking of Plants in the Nursery.
IV. Availability of relevant local expertise.

The method of collecting wildlings/seedlings and then raised in nursey which will be later transplanted in the field is a familiar methodology in a small scale off course. However in this case where we consider this practice in much larger rehabilitation scale, it is a totally new experience from which I think documenting.

Coastal Tree Planting

Site	Collection	Coastal Planting	Types of Plants
Blacksand Coastal Area	600 Plants	600 Plants	Coastal Trees, Shrubs and Grass

Table 3 indicates the number of coastal trees planted during the coastal clean-up campaign in the month of November.

The coastal tree planting happened on the 17th November, taking together surrounding coastal communities and Victory Hope Primary School students. A total of six hundred coastal species were collected and then directly transplanted on such date. Collections composts of mainly coastal species in which is to restore coastal vegetation and more likely a coastal forests.

3. Field Monitoring

Rehabilitation Sites	Mortality No. of Plants	Plants Survived	No. of Plants Replacement
Blacksand Coastal Area	519	81	22
Matnakara Water Protection Zone	20	457	0
Total	***539***	***538***	***22***

Table 4 Outlines a mini statistics of the field monitoring conducted on both sites of rehabilitations

According to the field monitoring schedule after each transplanting at each sites, these where the result outline above. Obviously, the result indicates high mortality rate for coastal rehabilitation. In which it is a reliable statistical figure (519) since the wildlings were collected and then directly transplanted to the preferred site. Introducing the collection to a stress full environment, without proper nursing them in the nursery as the common practice reduces their chances of surviving and adapting to the physiological conditions and setting of the desired area of rehab. Collection and handling techniques may be the inclusive factor resulting on the high rates of mortality.

Tree Planting

The first ever tree planting for the project happened this year, 2019 on the 6th & 7th November. A total of 457 trees were planted at such date. These were predominantly mixed species type which can be categorized has either endemic, native or threatened species identified and found in their natural habitat from which they were collected. Noting that majority of this plant species are trees and not shrubs or climbing vines. Four (4) meter was the observer-able spacing distance between each plants.

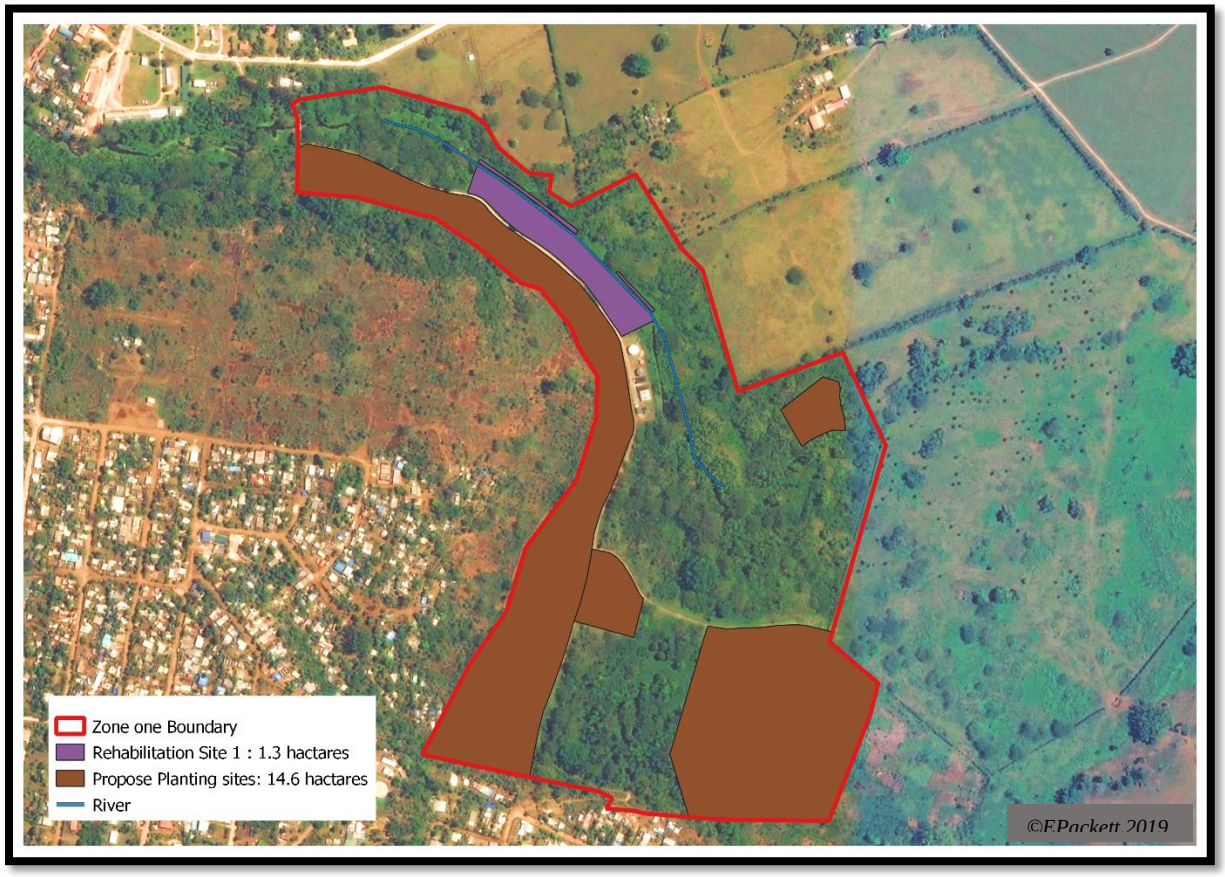

Figure 6 shows in purple colour the current rehabilitated sites

On the map above is a roughly shows a total of 1.3 hectors of area coverage of which the 457 plants has been transplanted to the allocated area highlighted in purple. Another 14. 6 hectors are degraded grasslands which are proposed site to be rehabilitated

Morever, the numerical spacing is necessarily needed to abide to since the functional interest not only lies with the root function of trees to improve quality (through filtration) and quantity of the underground water but also minimize evaporation rate through canopy cover. Trees are planted as far as towards the river bank as to also shade the water body, stabilize the river banks during adverse flooding but also minimizing soil erosion. An assessment report (attached) speculating on fresh water invasive species thriving in Tagabe

River recommends restoring the river bank to ensure sunlight does not reach the water body favoring the growth and distribution Water Lettuce. So this was a good initiative and a resolution to this report.

In addition, another alternative rehabilitation that recognizes coastal tree planting was part of another one day activity program schedule with coastal communities of Blacksand and Victory Hope School. At such date, 17th September, the project and its stakeholders engaged both the school and communities with an awareness, coastal clean-up campaign and ended that with a tree planting along the shores of Black sand. Its purpose is to restore a coastal forest to combat climate change, and help coastal communities to be more resilient against coastal erosion and sea level rise.

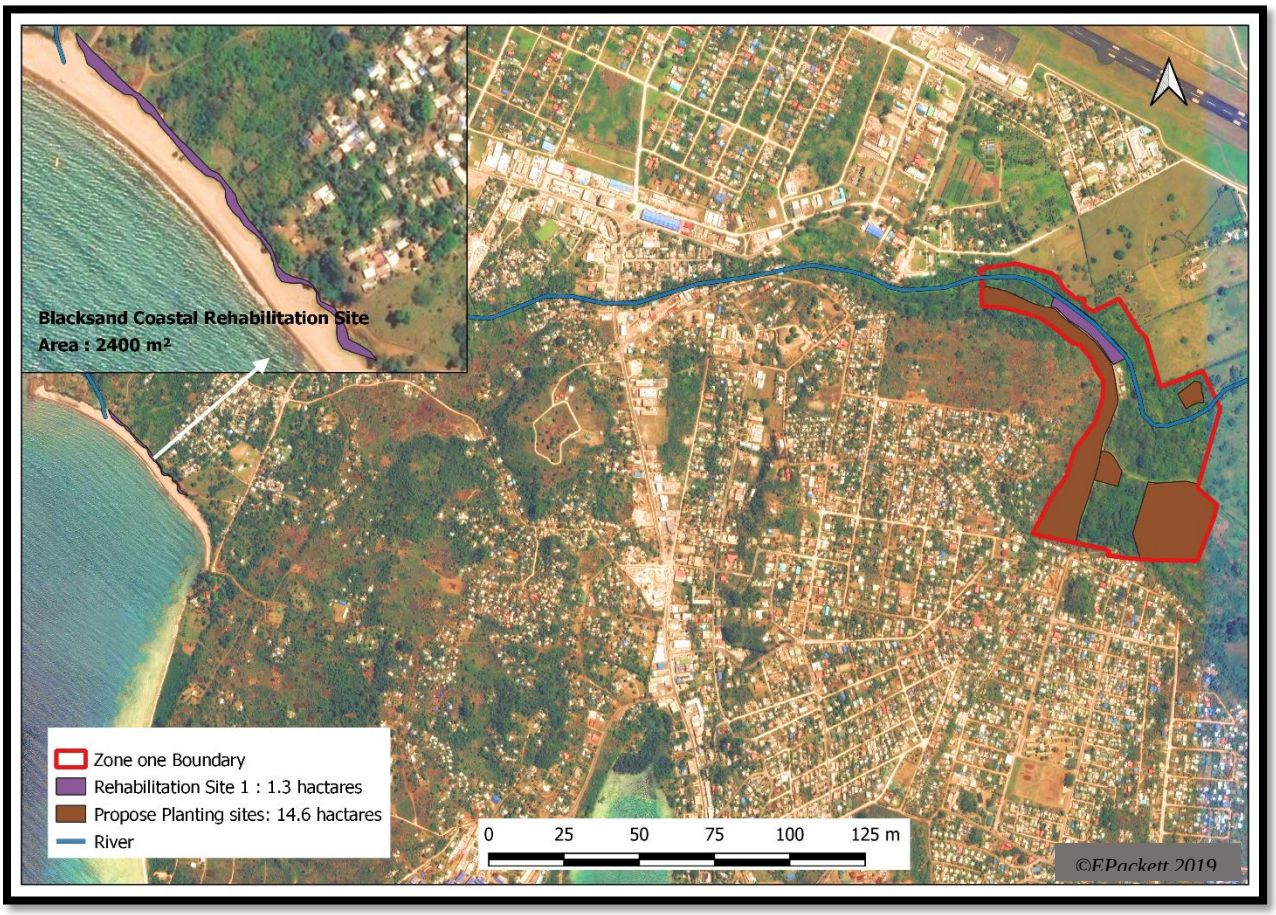

Figure 7 Shows and maps the coastal shorelines of Blacksand where the coastal rehabilitation coverage took place on the 17th Sept, 2019

An area of 1.3 hectors was rehabilitated with a total of 600 coastal plants. However, the progress was a down concerned after the recent field monitoring which is further justified in tables 2&4 of this document. Replacement are currently ongoing to ensure such area is restored with native coastal species.

Conclusion/Summary

The target set for 2019 is deliverable to transplant 3000 plants to allocated areas for both rehabilitation program. The challenges highlighted above encountered during nursing of plants in the nursery justify why such target cannot be reached. However, there is still 408 Plants to be planted this year. Therefore 1, 391 plants totals up for the planting this year.

The project has gained enough experience and has learned a lot from this methodology and thus we should roll off next year to fully implement this activity and achieve the overall project targets within sufficient time left (if the no-cost extension is approved).