TRASS

THE TERRESTRIAL RESTORATION ACTION SOCIETY OF SEYCHELLES

COMMUNITY-LED REHABILITATION OF DEGRADED ECOSYSTEMS USING AN ECOSYSTEM-BASED AND RIDGE TO REEF APPROACH, PRASLIN, SEYCHELLES

1. Introduction/ Background

Dr. Victorin Laboudallon the Founder of Terrestrial Restoration Action Society chronicled how land degradation had taken place in the Seychelles and the efforts TRASS is taking to stop soil erosion so as to protect the future of Seychelles. Hill slopes are many in Seychelles and as a result soil erosion is prevalent especially in Praslin, Curieuse and Mahe. According to Dr. Laboudallon, “soil is a treasure that sustains human life, and the Seychelles cannot afford to lose any”. From the 1770’s until the 1990’s, the economy of Seychelles was agriculture, spices such as cinnamon, coconut and vanilla and food crops were grown in abundance. By the 20th century most of the original primary forests had been removed and replaced with introduced trees which today forms part of the secondary forests. Many native plants disappeared, and some became fragmented. Tourism was introduced in the 1970’s and 1980’s putting more pressure on the fragile ecosystem especially on the beaches where hotels are being built and roads as well.

Picture 1: Dr. Victorin Laboudallon the Founder of Terrestrial Restoration Action Society (on the left) and a representative of the landowner where one of the project sites is located.

The majority of the population, infrastructure and economic activities in Seychelles are in the coastal zone. The Seychelles coastline was affected by the 2004 Tsunami, several tropical storms and processes of erosion. In addition to this, coral bleaching has contributed to the loss of about 90% of the coral cover on Seychelles reefs since the 1990's. Coral mortality has resulted in waves reaching the shore and eroding the beaches and changing shape of the reefs as shown in Fig. 1a. Land degradation is one of the most pressing ecological challenges on Praslin and Curieuse islands (Fig. 1.b). Soil erosion processes are depositing most of the soil into the ocean. As this happens, physical and biological quality of land and soil become progressively worse. An additional problem is the invasion by alien species into these degraded lands destroying endemic species. Most of the land degradation is being caused by man-made fires, floods, tsunami and changes in the weather patterns. The land degradation processes are resulting in the loss of biodiversity, ecosystem integrity and productivity and as reported by some of the community members and government officials interviewed, the destruction of ecosystem integrity can release soil carbon into the atmosphere which contributes to climate change. Fig 1b shows one of the TRASS project sites in La Pointe Chevalier.

Fig. 1a. Severe beach erosion is common along the coastal zones in the Seychelles

Fig 1b: Degraded landscape at La Pointe Chavelier

Praslin Island, where the three TRASS project sites are located has been subjected to ecosystem threats due to loss of wetlands, soil erosion on degraded hills leading to sedimentation, of critical wetlands downstream. Invasive alien plant species in addition to native invasive species have encroached on the wetlands further reducing the ability of the wetlands to provide important ecosystem services. In addition, Praslin has suffered numerous human-induced forest fires which in turn have affected water supplies by increasing the pace of sedimentation as shown in Fig 2, 3 and 4. TRASS reports that 40% of Praslin is degraded and 90% of lowland wetlands in the Seychelles have been lost.

Fig 2: Degraded and eroded landscapes

Fig 3: Invasive species invading indigenous plants in the degraded areas.

Fig 4: The alien invasive species growing on the degraded landscapes.

Land degradation affects the population of Seychelles (100 000). Most of these people are dependent on the degraded land for food, water, tourism and other essential ecosystem services. Local government officials, private landowners and members of the communities who were interviewed agree that climate change, land degradation is undermining the livelihood of the communities and the country as a whole, affecting agricultural farming, and causing rapid and widespread loss of biodiversity. Most farmers have difficulties cultivating their crops and suffer losses due to the changing weather patterns. A restaurant – Paradise Sun is now in water due to the changes in the shoreline.

Given the urgent concern of land degradation, TRASS mobilised communities to restore the lands and halt the process of land degradation and soil loss. Dr. Elvina Henriette explained that “land degradation is an environmental process where the physical, chemical and biological quality of land becomes progressively poor over time. In the case of Seychelles, soil erosion, soil compaction, are great contributors to land degradation”. The land restoration programme being undertaken by TRASS seeks to repair the ecosystem.

TRASS realising that local communities have Indigenous knowledge which can be harnessed to achieve long term sustainable land restoration is organising community events to sensitise them on the need for environmental restoration.

Against this background, the TRASS project entitled Community led rehabilitation of degraded ecosystems supported by GCCA and SADC seeks to address the degradation of critical habitats along the northeaster side of Praslin, the most degraded areas on the island. It also aims to prevent the loss of wetlands by enhancing vegetation cover on degraded hills upstream. The overall project goal is to rehabilitate, manage and conserve marine coastal and terrestrial ecosystems for multiple benefits through the ecosystem and ridge to reef approach. The project engages local people to contribute to turning the red barren mountain sides into a green cover to combat the effects of climate change.

2. Objectives

Specifically, the TRASS project seeks to:

- Establish environmental conditions and prepare new or updated existing rehabilitation and watershed management plans-based n scientific data.
- Upgrade plant nursery infrastructure, equipment and transportation e.g., storing facility, staff amenity, solar powered irrigation systems, compost sheds, retaining walls etc.
- Rehabilitate 20 ha of degraded ecosystems – hills, wetlands coast.
- Develop biodiversity friendly sustainable activities, agroforestry, beekeeping, to rehabilitate degraded lands and ass ecological economic models to enhance local livelihoods.
- Train, educate and trial rehabilitation techniques amongst local communities and participating organisations.
- Set up a programme for transformative learning, community engagement and outreach to create lifelong learning leading to behavioural change in people's attitude towards their environment for positive impacts on people's lives.

3. Activities Undertaken

To achieve the land restoration in Praslin, several activities were undertaken. These include:

a) Preparation of Rehabilitation and Watershed Management plans (RWMP). This outcome is 85% completed. The only activity that is pending is the marine survey report and the scientific paper to be written and then published.
b) Site visits and mapping to plan rehabilitation activities and zoning of sites to identify sites requiring rehabilitation. A marine baseline survey and mapping of marine habitats in the marine park - fauna, flora and a habitat survey mapping was undertaken to establish baseline for long-term monitoring. This habitat survey mapping included the collection of seeds, seedlings, soil, humus and production of plants in nursery.
c) Clearing of Invasive Alien Species (IAS) in the degraded selected sites and replanting using indigenous / native plants on the degraded hillslopes was undertaken on the three project sites.
d) Clearing of strips of land within the dense thickets of bushes of alien species to make way for the planting of the indigenous species and agroforestry species was undertaken on all the project sites,
e) Establishment of nurseries of the plants to be grown on the degraded areas has been done to grow plants that are appropriate for the degraded landscapes. In many places, fruit trees are also being planted.
f) Planting of native seedlings in the strips and bare areas on the hill (20 ha).
g) Collection of GPS points of all plants planted is in progress as more plants are being put in the ground.
h) Monitoring of the plants planted onto the project site is underway continuously to ensure that the planted seeds survive the harsh conditions.
i) Establishment of anti-erosion barriers on steep slopes using palm leaves is taking place on selected sites.
j) Preparation of a walking trail around the wetland, across the river and uphill to the rehabilitated areas as part of a ‘nature experience tour’ .
k) On the site learning activities with communities, training of community members in plant identification, plant propagation, planting techniques and erosion control is ongoing.
l) Upgrades on the plant nursery infrastructure and staff amenities, the installation of the security system and the retaining wall for the nursery, and the nursery store
m) Production of communication and visibility materials
n) Production of training materials
o) Establishment of the Little Explorers club
p) Construction of storage building, nursery wall, and enhancement of staff amenities.

In all these activities, the local communities were engaged including plant propagation in nurseries and replanting activities. Most of the activities are undertaken by volunteers from the affected communities and in collaboration with government departments.

Communities at work, carrying the plants on their heads to plant in the degraded landscapes.

Fig 5: Plant transportation to cleared sites.

4. Key Results

4.1 Rehabilitation and Watershed Management plans (RWMP)

TRASS produced Rehabilitation and Watershed Management plans, four baseline surveys and reports. The plans set the objectives and activities to rehabilitate the sites.

4.2 Restoration of degraded landscapes

More than 20 ha of degraded land is in the process of being restored. Fig 6 is one of the project sites. Restoration is a process which requires a lot of work. It includes mapping the sites, preparing the sites, removing bushes, put in place barriers against erosion, planting the plants and constant maintenance of several thousands of plants. The plants themselves require constant monitoring. Using GPS technology, TRASS can locate the positions of the plants and monitor their growth. The success of the project depends on the extent to which monitoring and maintenance is carried out.

Fig 6: Halting Soil Erosion with palm leaves

TRASS established long-term terrestrial monitoring sites in two watersheds , within the Petit Cours water catchment at Anse Possession and the second one at Pointe Chevalier within the Mont Desir-Lazio water catchments.

4.3 Planting of endemic and indigenous plants

During the project, TRASS has planted more than 20000 plants. One volunteer reported that he had planted more than one thousand on his own. TRASS grows the plants in its nurseries. When the plants are ready, volunteers climb the degraded mountain slopes and plant them in cleared strips of land. Each plant is planted in an area where its chances of survival are high. A GPS system is used to locate all the plants. The plant nurseries are managed and monitored by TRASS staff and local volunteers. TRASS is putting a lot of emphasis on endemic species because if removed from their natural habitats, they affect the ecological balance of those areas. Endemic species are also very vulnerable and hence if not managed well , they become extinct.

The nursery facilities which were upgraded can now produce more than 15000 plants. The second nursery is still under construction but almost complete. Different species of plants to suit different habitats are being produced in the nursery. 10,000 fruit/crops/forestry trees grown on degraded land under rehabilitation.

Work to establish the agroforestry models is underway. The species are being produced in the nursery, but plantings were reduced as there was prolonged dry period until mid-December for the planting of agroforestry products.

Fig 7: TRASS nursery where the plants are being grown.

4.4 Development of infrastructure

The other activities which have been successfully completed include the fencing of the nursery and the expansion of the staff amenities, upgrading of staff amenities, the installation of a solar powered-irrigation system , composting shed the upgrading of the nursery retaining wall and the establishment of two agroforestry demonstration sites.

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4.5 Empowerment of the Community

The training and education programme of local communities and participating organisations on rehabilitation techniques is complete but will continue beyond the project. The two Little Explorers clubs with at least fifty kids to educate young children on climate change issues and environmental management were set up and all activities completed as per the target.

Fig:8 Little Explorers being taught how to remove the invasive alien species

A total of sixty community members were trained in restoration/rehabilitation techniques . A train the trainer programme was developed to empower more communities. The programme has produced training materials, and five practical field training sessions have been organised and held to date. The training was also extended to sixty members from Seychelles Parks and Gardens Authority, Pirogue Restaurant, Raffles hotel, Seychelles Civil Aviation Authority, Seychelles Petroleum as well as TRASS members. Discussions with some of the beneficiaries revealed a deep understanding of climate change issues.

“A tree does not need a human being. We need trees to give us oxygen, otherwise we die. No plants mean death for human beings. Plants will not die because they are okay with carbon dioxide’ . A quote from one of the beneficiary.

Private landowners who are participating in TRASS project of using palm leaves to halt soil erosion.

The most important success story of the empowerment program being run by TRASS is the commitment by the volunteers to the objective of environmental restoration. Interviews with some of the volunteers revealed a deeper connection between the volunteers and the environment. The perception is that they are restoring aspects of creation which have been destroyed. Men and women carried plants up the hills on their heads in high temperatures. Upon reaching the sites, the volunteers using hoes dug holes in dry ground to plant the trees taking utmost care when filling up the holes. The volunteers (university graduates, community members, youth, disabled persons, private landowners) that are working with

TRASS are the best part of the project. Upon being asked why the volunteers were spiritually connected to the environment, one of the volunteers indicated that by “spiritually connecting with nature, one’s fears are removed, and one becomes grounded. Furthermore, through the TRASS project interconnectivity with one’s community had been increased”. The TRASS project promoted close friendship bonds among the community and offered people a strong sense of community. The benefits of this spiritual connectivity with the environment include greater peace and calmness, more meaning in lives, connectedness with larger communities, improved relationships and good health”. This observation about the spiritual connectedness between communities working with TRASS was repeated in a discussion with local government officials who reported that “ the communities working with TRASS do the work that nobody else wants to do. These communities working with TRASS fight for the environment and act to ensure that the environment is not destroyed. They operate like environmental guardians and warriors”. This phenomenon of Eco spirituality is evident among the communities working with TRASS. The philosophy of eco spirituality as understood by the communities is that “ the environment helps people to experience “the holy in nature and to affirm their relationship as human beings with creation”. Members of one of the planting groups requested that photographs and recordings not be taken because of their respect for the ground and place where they were planting. Only one man below agreed to be photographed. This group refers to itself as the Nazarites.

Member of one of the planting groups who has planted more than eight thousand plants since TRASS was established.

4.7 Communication and Visibility

Trass is working with the tourism sector to sensitise both local and international groups on the restoration programme. On the 27th of September 2022, TRASS in collaboration with Raffles hotel and La Pirogue Restaurant planted eighty plants as part of the “Holiday with a difference initiative” which TRASS introduced. The launching received media coverage from the local broadcasting agency and broadcasted in the 8 pm news on the 29th of September 2022 https://www.youtube.com/watch?v=LYxBbQHE-Hc (at 28 min. 31 secs to 33 mins).

A second tree planting activity was carried out on the 7th of December 2022 and a total 205 plants were planted on the day. TRASS was joined by Pirogue restaurant for the planting. The Pledge wall will eventually be showcased at the Seychelles international airport and will be continued every year on the same date. A total of sevem activities for the ‘Holiday with a Difference’ has been carried out to date.

TRASS website is ready and was launched in December 2022. The other website for Gaea Seychelles who is a partner in the project was also. . A series of nature programme called Nature Connect is being done to be aired on the national media the Seychelles Radio (Radyo Sesel) in the ‘Environment programme’.

TRASS also publishes articles in the local newspaper (total four articles since the start of the project). The project’s activities appeared in the 8 pm news on three occasions (1 Holiday with a Difference and 2 Little Explorers).

5. Institutional Arrangements/ Project management. How was the Project managed at TRASS?

Dr. Elvina Henrietta is the project coordinator. The team is small but efficient. The project team as shown in the pictures undertakes various project activities to save on costs.

The Clearing and planting team

Table:1 Project Team

Dr. Elvina Henriette	Overall coordinator, ecologist, resource mobilisation, liaison with government departments
Mrs Vicky Athanase	Previous project manager. Assisted with all operations on Praslin
Ms. Staniella Henriette	Finance, human resources, assists with project implementation in Praslin and reports to coordinator.
Ms. Jeana Stravens	Research officer and monitoring of all plants on sites
Ms. Gina Cesar	Events coordinator organises outreach activities, trainings, , educational programs
Mr Ruddy Kabore	Driver and assist with supervision on sites as well as logistics.
Contractors	Clearing and Planting on all GCCA sites (Basin LouLou, Pointe Chevalier, Pasquiere and Anse Possession)
Contractors	Nursery plant propagation. Collection of seeds and seedlings. Caring of plants in nursery.
Nazarites Brothers	Clearing, planting and maintenance of project sites in collaboration with communities
Community Volunteers	Plants transportation and Planting on sites. Preparation of plants in nursery.

6. Challenges and Lessons Learnt

- Climate variability - Heavy rainfall, rapid surface runoff remove soil around seedlings, uproot plants or burry plants in sediments, dislodge stone barriers around plants. Hence, more maintenance activities to secure the seedlings. Secondly, the erratic weather patterns and rainfall affect the pace of restoration. Most of the plants depend on rainfall as the only source of water.
- Some of the degraded landscapes have deep pits left by fortune seekers. These pose problems for the planters.
- Encroachment of the new plantations by native creepers means that there is need for constant monitoring to ensure survival of the planted endemic species. This means heavy maintenance of the young seedlings.
- Illegal dumping of litter prior to the project means that in addition to planting, the communities have to remove the litter, and this slows down planting processes.
- Seychelles does not have legislation that obliges perpetuators to restore areas where they have done an offense such as illegal burning that results in adjacent forest being burnt or illegal tree felling that destroys particularly sensitive areas. This is a huge risk to the project.

7. Best Practices from implementing the Project.

- Recognising the country's vulnerability as a small island state, the government of Seychelles has been at the forefront of advocating for climate action and embracing the blue economy as a concept to boost sustainable development. The Seychelles Marine Spatial plan which was partly funded through the debt for nature swap and its embrace off Blue bonds is a clear testimony of its commitment. The policy environment and Government's commitment to natural resources management and restoration is a big enabler for the work undertaken by TRASS.
- The other critical success factor is the involvement of the communities. The collaboration between communities, local government, development partners contributed to the rehabilitation and management of degraded but critical coastal habitats.
- The training component was very critical to ensure that participants were well equipped with skills on rehabilitation techniques and monitoring which are important for the sustainability of the project. The level of awareness amongst the persons interviewed was very high. Every respondent noted that the problem in Seychelles was balancing economic/ commercial/ touristic interests with environmental sustainability.
- The project was acknowledged by both government departments and citizens as being very important in environmental restoration. TRASS is doing a very good job in recovering impaired, damaged and destroyed ecosystems.
- The project valorised and demonstrated the use of landscape level ecosystem-based approaches to ecological coastal rehabilitation, and the model can be replicated in other parts of the Seychelles and even in other countries facing similar challenges.

8. Conclusion and Recommendations and Lessons Learnt

The project is a true example of a *project carried out by the people for the people*. TRASS believes that the people need to act and be in charge of their livelihoods and communities. This way the people will stop complaining but become part of the solutions. The following are lessons learnt and recommendations arising from the implementation of the project:

- The coastal natural resources in Seychelles are under threat but they are essential for resilience, economic development and the livelihoods of coastal communities .The communities are aware of the dangers of neglecting the coastal and marine resources.
- The approach being used by TRASS of involving communities in the restoration processes has been very effective. The review of the rehabilitation plans and mapping ensured that TRASS had adequate information on the ecological problems that required restoration. This knowledge deepened their understanding of the rationale for restoration. The training program which is very hands on imparted knowledge to the local communities and tourists. The TRASS collaboration with key stakeholders such as government, communities, youth, etc enhanced ownership and deepened the group solving skills of the beneficiaries.
- The planting of endemic species in appropriate habitats ensures a higher chance for the plants. However, maintenance of rehabilitated sites (during and after the project) needs to be a core component of any rehabilitation programme.
- The palm leaf anti-erosion barrier is a cost-effective method against erosion on steep slopes and has attracted a lot of interest from other countries such as Mauritius.
- Continuous, life-long education and awareness activities that engage communities in interactive ways are needed. Fortunately, TRASS intends to continue with these even when the project ends.
- There is need for Government of Seychelles to have regulations for offenders to restore or financially contribute to the restoration of habitats that they have destroyed.

End