



Pacific Ecosystem-based Adaptation to Climate Change (PEBACC)

From the Project Manager

As we compile the final PEBACC newsletter, our small team has much to reflect on. Some of us have been with PEBACC since its inception in 2015 while others have come on board in the last 12 months. We have built relationships with governments, communities, scientists, donors and civil society groups and facilitated governance arrangements that we hope will endure.

PEBACC has set in motion a growing awareness amongst communities of the imperative to work with nature, based on sound science and scientific understanding, both traditional and contemporary. Many of our communities no longer view the environment as something to take for granted, but appreciate the ways in which they depend on their different ecosystems. Those previously living with highly degraded freshwater systems and low-yield agricultural soils are now becoming empowered to redress past mistakes.

Maintaining momentum of activities beyond the life of a funded project has many challenges. Without dedicated personnel and funds, maintenance and repairs of physical structures and convening of governance arrangements can be a challenge.

We hope that by helping communities see for themselves the value of ecosystem based approaches, we have instilled an ongoing commitment to continuing the work that has commenced. Partnerships with and support of government and non government groups, combined with strong community leadership will be essential.

Over June and July, our communities and partners have been very active as COVID-19 restrictions were lifted allowing inter-island travel. This final edition of our newsletter highlights some of this work as well as our findings as we complete our monitoring and evaluation work with our communities.

Given the good outcomes delivered under PEBACC, SPREP has been actively seeking ways to continue with the project and I am pleased to announce that a proposed PEBACC Phase II has been approved by the Kiwa Initiative. Phase II, which will see continued support to a selection of the current PEBACC EbA Demonstration Projects as well as expansion to new sites and countries (New Caledonia and Wallis & Futuna), is expected to come on stream in 2021. We are delighted that PEBACC II will allow us to build on the gains from PEBACC including strengthening our relationships with you – our valued project stakeholders, partners and beneficiaries. In that sense it is not goodbye, but rather *lukim yu bihain pukpuk*.

Herman Timmermans
PEBACC Project Manager



KUKUTIN RIVER ENTRANCE TO WAGINA VILLAGE. WATER RESOURCE MANAGEMENT IS KEY TO BUILDING RESILIENCE FOR THE COMMUNITIES OF WAGINA ISLAND.

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The Pacific Ecosystem-based Adaptation to Climate Change Project is a five year initiative implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP) in partnership with the governments of Fiji, Solomon Islands and Vanuatu.

The project is part of the International Climate Initiative (IKI). The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative on the basis of a decision adopted by the German Bundestag.

The Project focusses on strengthening and protecting the role of natural ecosystem services to enhance resilience to climate change.

Supported by:



based on a decision of the German Bundestag



PEBACC hands over Taveuni's Mua Native Tree Nursery



YOUNG NATIVE PLANTS THRIVING INSIDE THE NEWLY ESTABLISHED MUA NURSERY. ©USAIA TUKANA.

The Mua Native Tree Nursery was officially handed over to the Government of Fiji by the Secretariat of the Pacific Regional Environment Programme (SPREP) Pacific Ecosystem-based Adaptation to Climate Change Project (PEBACC) at a ceremony held at the Mua Agricultural Research Station in Taveuni on Wednesday 29 July.

The Fijian Government was represented by the Ministry of Forestry and Ministry of Agriculture.

With the current phase of PEBACC coming to a close at the end of July, the two Ministries are committing to an inter-Ministerial cooperative approach to the management, maintenance and further development of the nursery.

This includes the appointment of a permanent Nursery Manager and delivery of seedlings to partners. The nursery is housed at the Ministry of Agriculture's Research and Development Centre at Mua on the island of Taveuni.

In his opening address, Ministry of Forestry Director North Mr. Moape Lotawa said, "Native trees are part of our culture, our identity and heritage. Through logging and other less



MINISTRY OF FORESTRY DIRECTOR NORTH MR. MOAPE LOTAWA. © MIN OF FORESTRY.

sustainable means, our native tree stocks have become low and scarce to the point that it becomes difficult to show the younger generation the value of these trees when they don't grow as abundantly as they once did."

"This nursery will help restore the balance by restocking native trees in identified deforested areas in Taveuni."

"Native trees adapt well to the local Fijian climate so trees like Vesi and Bauvudi will once again stand tall in our forests," he said.

The Ministry of Forestry has pledged to maintain and develop the nursery as part of its mandate for sustainable forest management and in pursuit of its 30 million trees in 15 years national programme.

Echoing similar sentiments, Ministry of Agriculture Senior Research Officer Mr. Rohit Lal, said, "Replanting of agroforestry and native trees are part of sustainable farming systems which the Ministry advocates. And for this reason the Ministry of Agriculture supports this initiative, of setting



CHIEF GUESTS WITH COMMUNITY MEMBERS IN FRONT OF THE NEWLY UNVEILED SIGNBOARD FOR THE MUA NATIVE TREE NURSERY IN TAVEUNI. ©MIN OF FORESTRY



MINISTRY OF AGRICULTURE SENIOR RESEARCH OFFICER MR. ROHIT LAL SIGNS THE HAND OVER AGREEMENT WITH MINISTRY OF FORESTRY DIRECTOR NORTH MR. MOAPE LOTAWA AND PEBACC PROJECT MANAGER MR HERMAN TIMMERMANS. © MIN OF FORESTRY.

up the Native tree nursery at Mua, Taveuni.”

“The Nursery will not only supply native tree seedlings to our farmers but will ensure reforestation of our Garden Island. These in return will ensure sustainable land and farm management for our future generations”.

The Native Tree Nursery was constructed by SPREP through the PEBACC project in collaboration with the Ministry of Forestry in 2018. The nursery was constructed to supply seedlings to the Taveuni Reforestation and Agro-forestry Programme, an ecosystem-based adaptation (EbA) programme under PEBACC supported by Ministries of Forestry, Agriculture

and iTaukei Affairs.

The nursery can hold up to 50,000 seedlings. Currently, native trees being nurtured in the facility include Vesi, Yasi, Dilo, Tavola, Kaudamu, Dakua makadre, Sea, Dawa, Duvula, Male, Ivi, Moivi and Kaunicina. Seedlings of Soursop, Avocado and Vetiver grass are also grown in the nursery.

“The Nursery provides communities with access to viable healthy native tree seedlings to help efforts to rehabilitate their watersheds and agricultural lands,” said Mr Herman Timmermans, PEBACC Project Manager.

Through PEBACC support, to date over 4,000 native and fruit tree seedlings have been planted in the Taveuni districts of Wainikeli, Cakaudrove and Vuna.

The Taveuni Reforestation and Agro-forestry Programme was further supported by Conservation International, SPC Land Resources Division and Scientific Forestry Services who were contracted by the project to assist the respective Communities in their outplanting efforts.

University of Newcastle Study reveals new information on Dreketi River Sedimentation

The University of Newcastle has released its report Hydro-sedimentological modelling of the Dreketi river catchment and management implications.

The Dreketi River catchment discharges its water in the Qoliqoli Cokovata, which covers a marine area of 1349 km², and is part of the Great Sea Reef located along the northern coast of Vanua Levu. The catchment is one of the main contributors of sediment into the qoliqoli.

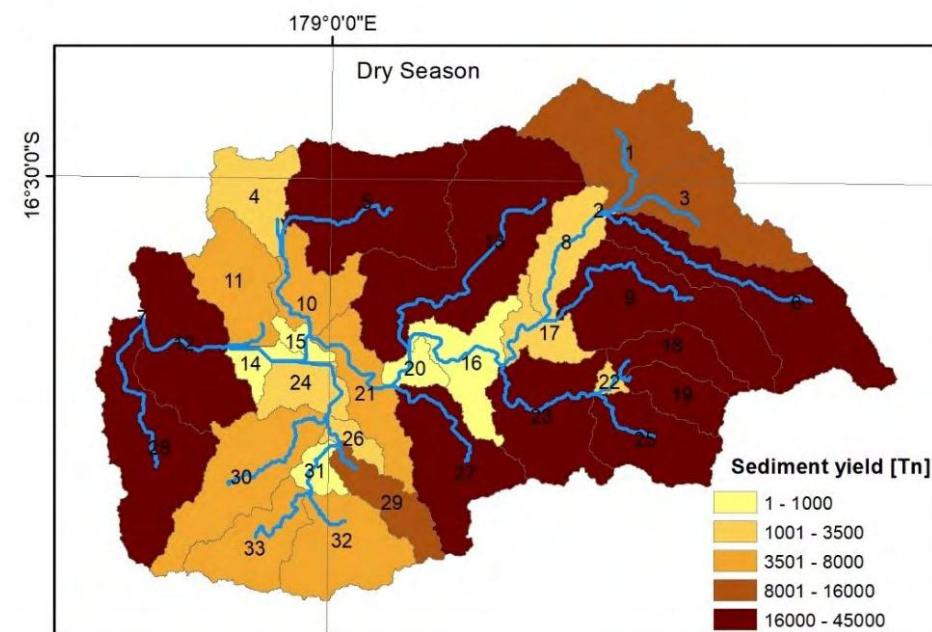
The University of Newcastle study, which was commissioned by PEBACC, aimed to estimate the annual production of sediments and identify and quantify the individual storm sediment yield, under various current and future scenarios.

Using models based on available remote sensing data and meteorological information, the study found that three of the sub-catchments closest to the Dreketi river mouth are the biggest contributors of sediment discharge into the qoliqoli.

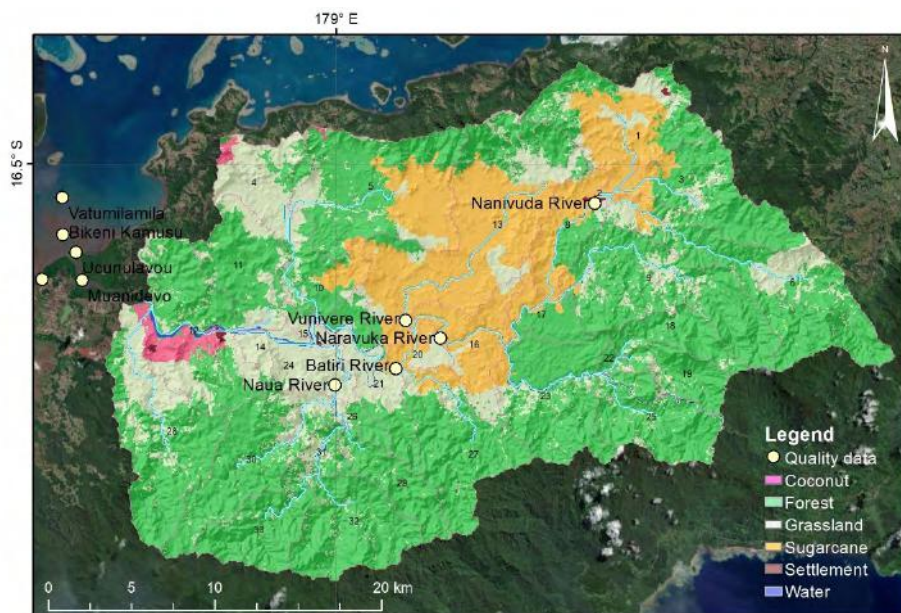
PEBACC Project Manager, Herman Timmermans says, "This was a surprise finding as we have generally been assuming that the bulk of the sediment was coming from the sugarcane and steeper areas inland."

The study found that while sedimentation is indeed taking place in the upper catchments, it appears that this does not reach the river mouth – rather it gets deposited along the river banks during flood events.

It was also found that the land cover that produces most of the catchment sediment is the forest, which is mostly located in the headwaters of the catchment and typically on steep slopes. Logging and cultivation in these areas were found to be the main sources of sediment contributing to the river's sediment load. However,



AVERAGE ANNUAL SEDIMENT YIELD AT SUB-CATCHMENTS DURING DRY SEASON 1973 – 2017 (MAY-OCT) (2)



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

SAMPLE POINTS OVERLAIED WITH THE LAND COVER LAND USE MAP SHOWING SOURCES OF SEDIMENTATION

because of internal deposition within the catchment, most of the sediment from headwaters will not reach the catchment outlet.

Along with the water quality surveys and GIS mapping work and the farmer consultations, the outcomes of the hydro-sedimentological

model will contribute to the Dreketi River Integrated Catchment Plan which WWF is developing. This plan in turn will feed into the Qoliqoli Cokovata Ramsar Management Plan which requires that terrestrial land-use land-based sources of pollution be included.

Farmers empowered by sustainable replanting techniques

In June, 19 cane farmers from Seaqaqa district, which is part of the Dreketi River Catchment located in the province of Macuata, participated in a two-day intensive training activity as part of efforts to improve the health of the Dreketi river, which drains out to Fiji's Great Sea Reef.

Organised by WWF-Pacific with funding support from the Secretariat of the Pacific Regional Environment Programme (SPREP) through the Pacific Ecosystem-based Adaptation to Climate Change (PEBACC) project, the Dreketi Catchment Sustainable Land and Forest Management Training focused on strengthening the capacity of farmers towards understanding the importance of their role in the conservation of the Dreketi River and the Great Sea Reef (Ramsar site) as well as reinforce greener agricultural practices.

Topics of discussions ranged from the importance of sustainably managing land clearing by encouraging rehabilitation of deforested areas through the prevention of runoff from the land and into the Dreketi river.

It also provided discussions amongst other cane farmers on identifying Community Land Care Champions in addition to creating a Dreketi Community Land Care group.

The Land Care Champions will be used as role models to promote the use of sustainable land management and sustainable forest management practices within the catchment to reduce the impacts of unsuitable farming practices that have negative impacts on the marine and terrestrial ecosystem.

A site visit provided participants with an understanding of the need to apply sustainable farming practices especially in protecting the buffer zones beside the Dreketi river.

"All participants went for a field trip to Mr. Jai Narayan's farm in Seaqaqa;



CANE FARMERS IN SEAQAQA © VINESH KUMAR-WWF PACIFIC



CANE FARMERS FROM SEAQAQA DISTRICT WHICH IS PART OF THE DREKETI RIVER CATCHMENT IN MACUATA ATTEND ONSITE TRAINING TO IMPROVE THE HEALTH OF THE DREKETI RIVER. © VINESH KUMAR-WWF PACIFIC



FARMERS COMMITTED TO PLANTING TREES ON THE BUFFER STRIPS. © VINESH KUMAR-WWF PACIFIC

the exercise included planting assorted fruit trees, which was done on the buffer zone beside the Dreketi river," said WWF-Pacific Project coordination officer Vinesh Kumar.

Kumar added that the farmers are committed to planting trees on the buffer strips as this was a major subject of discussion during the training.

"To address food security and strengthen alternative livelihoods, vegetable seeds such as cowpea and watermelon were also given to the farmers."

Fruit seedlings which included lemon, guava, tamarind, soursop, tarawau and mango were provided to the participants for them to plant on their farms.

He added that each of the farmers were provided with a notebook, to record the planting of fruit trees and vegetable seeds as an effort to promote record keeping, farm planning and budgeting.

Facilitators for the training were from the Ministry of Forestry, the Labasa Cane Producers Association, the Secretariat of the Pacific Regional Environment Programme and WWF.

Dreketi River Monitoring

In June, three community workshops were conducted in the Dreketi Catchment to train villagers on how to monitor the quality of their freshwater (rivers and streams). Participants were from : Nava Settlement, Naravuka, Saivou, Lomaloma, Navesidrua, Nasuva, Buavou, and Nasealevu Villages. These villages are located within river systems that drain into the Dreketi river.

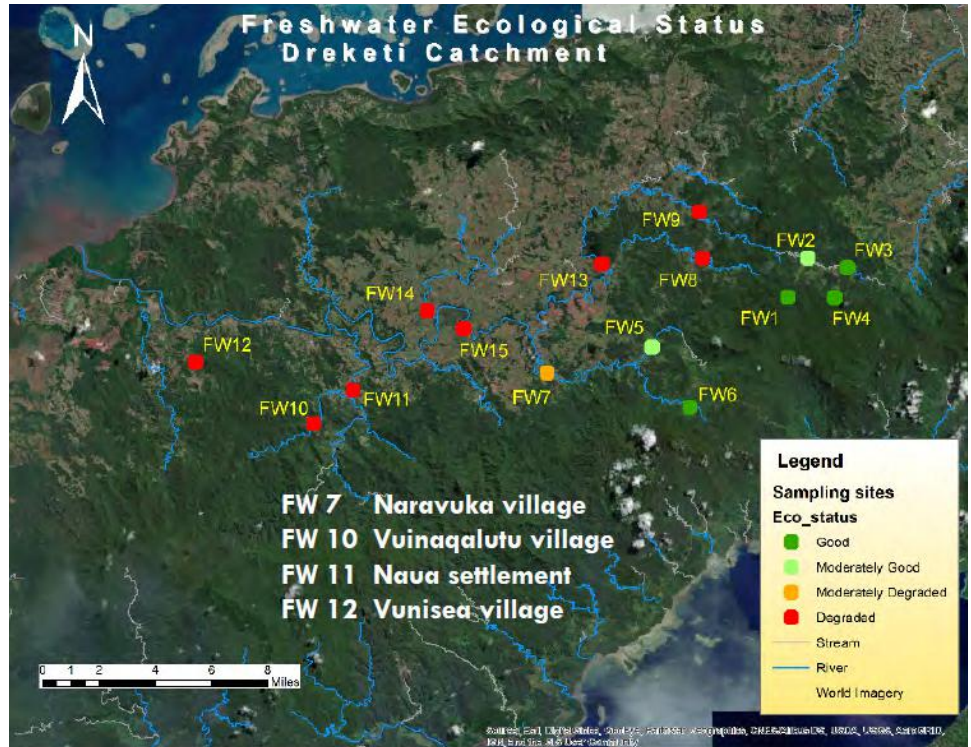
The workshops were organised by WWF-Pacific in partnership with the Macuata Provincial Office with funding support from PEBACC.

Freshwater invertebrate scientist, Bindiya Rashni, provided information on the different types of macro invertebrates (insects, crustaceans) that live in Fiji's freshwater streams and rivers.

The presence (or absence) of particular macro invertebrates are an indicator of the health of the freshwater and its surrounding vegetation. She shared the findings of the macro invertebrate survey conducted in the Dreketi river estuaries in February this year.

The results of the survey were compiled onto a map arranged in three indicator colours. The colours represent the level of degradation of the water system (green = healthy water, yellow = slightly degraded, red = degraded water system). The map indicates that water quality is healthy at the headwaters and becomes poorer near the river systems in the Seaqaqa district.

Participants from the respective villages were able to know the current status of health of their river system and identify unsustainable practises on land. The contributing factors to poor quality of water as identified by



FRESHWATER ECOLOGICAL STATUS MAP USING THE COLOUR INDICATORS.

participants at the two-day workshop included the degradation of river systems by farm animals, especially in removing riparian vegetation.

Additional factors included logging, gravel extraction, domestic waste water and un-sustainable farming practices employed by sugar cane, dalo and yaqona farmers.

Participants were trained on how to carry out biomonitoring themselves, using a bioindicators guide developed for the purpose. Through a series of guided activities, they were able to map the water quality at the test site and identify some of the causes for low quality water in some areas (for example, pigs tied up close to the river banks).

Each village that was represented was given a set of equipment to assist them in monitoring their river system once a month. This included a recording book, a sieve, bucket and hand lens.



PARTICIPANTS FROM SAIVOU VILLAGE.

The participants showed great interest in the river monitoring activity as they were better able to understand the impacts that they were having on their riverine ecosystem and the services they depend on.

Climate Change Projection Maps for Fiji Launched

In July, SPREP, in partnership with the Fiji Meteorological Service presented a series of climate projection maps for Fiji to Permanent Secretaries at a function held at the Suva Business Centre in Suva.

The maps provide projections, using models based on data collated by CSIRO, of the average temperatures, annual rainfall and average rainfall for the wet and dry seasons for different parts of Fiji for the years 2050 and 2090.

They are visual representations of more complex data and can be used for planning in various government sectors as well as at the local/ community level.

Speaking at the opening of the event, Permanent Secretary of Waterways and Environment, Mr Joshua Wycliffe commented that in order to make sensible adaptation decisions, decision makers need to understand how the climate might change and what risks this will pose to our development priorities.

“Understanding how the climate will be behaving in the future will help agencies adapt policy making and resources including budgets, recruitment of personnel and determining what type of training they will need for the future.”

The importance of integrating nature based solutions in helping communities address impacts of climate change was also highlighted.

Permanent Secretary for Infrastructure and Meteorological Services, Mr. Taitusi Vakadravuyaca stated that 2016 and 2019 were globally the warmest years on record. Fiji’s average temperature has increased by 0.9 degrees Celsius between 1959 and 2019. He highlighted the need for people to be able to understand the implications of these changes and projected changes.



THE PERMANENT SECRETARY FOR INFRASTRUCTURE AND METEOROLOGICAL SERVICES, MR. TAITUSI VAKADRAVUYACA.

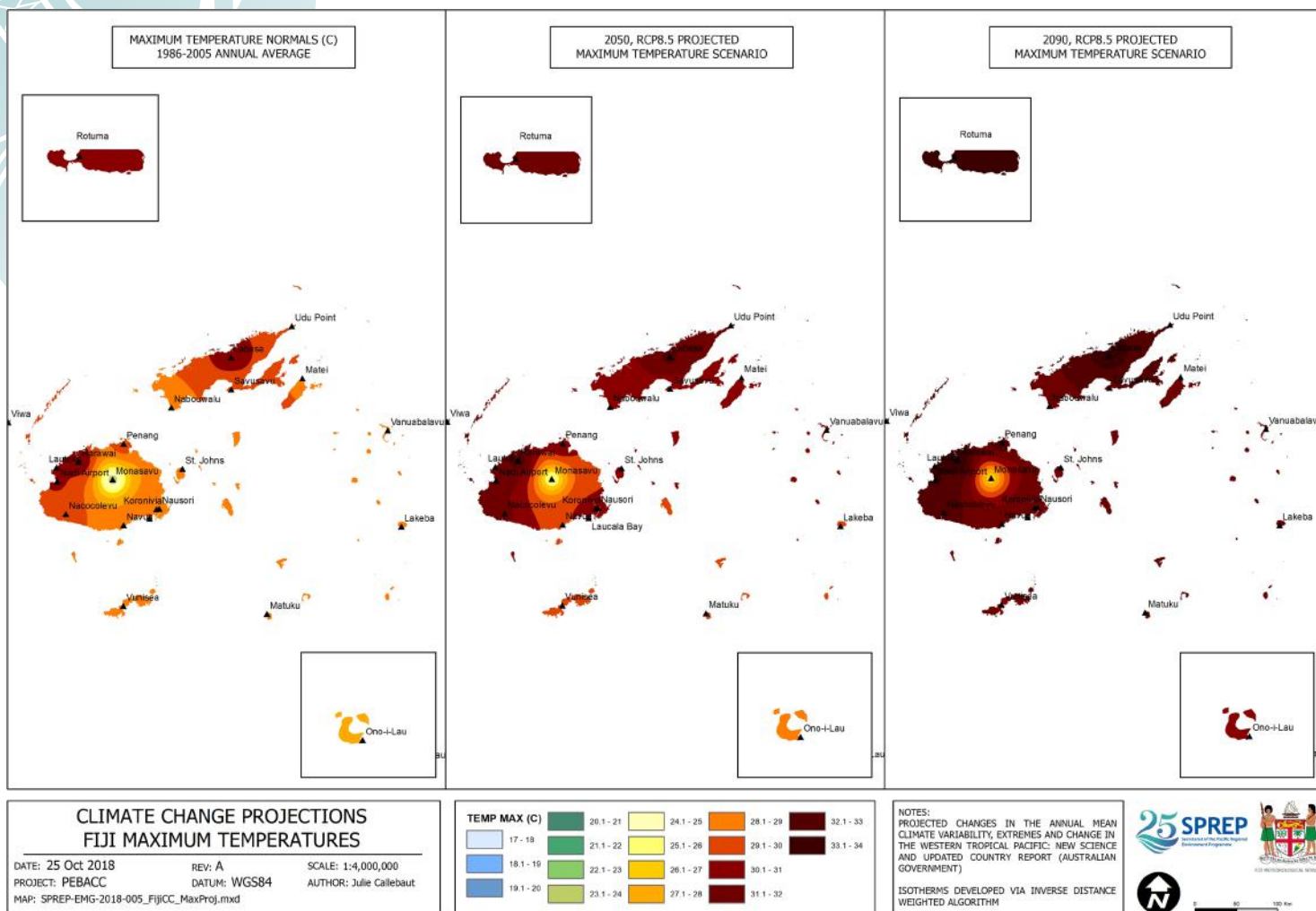


THE PERMANENT SECRETARY FOR WATERWAYS AND ENVIRONMENT, MR JOSHUA WYCLIFFE.

“One of the most effective building blocks for effective climate change adaptation is climate change science and projections,” he said.

“The climate projection maps are a visual tool to help communicate and promote understanding at

the local level of the projection information. They will help in greater uptake of climate change projection information in planning and decision making in areas such as agriculture, infrastructure development and disaster management.”



Mr Herman Timmermans Project Manager for the Pacific Ecosystem-based Adaptation to Climate Change Project (PEBACC) said, "Currently data is presented at national level only and projections are technical and not effectively communicated or understood in terms of practical relevance to those who would benefit from this information."

Mr Bipen Prakash of Fiji Meteorological Service, discussed the types of data and the modelling methodology used to develop the projections. He highlighted the progress over the years that has resulted in the availability of more precise "higher resolution" global climate models, which enables projections to be made for specific locations within a country.

This has great significance for a country like Fiji, which has communities spread across a wide area. Overall the projections show increased average

surface air temperatures across the 23 weather station locations of 1.3 degrees by 2030 and 2.7 degrees by 2090 under a continued high emissions scenario. Wet season rainfall is expected to increase by 2% by 2050 increasing to 8% by 2090.

Mr Prakash cautioned that these are projections which will be refined as understanding on climate dynamics and more data becomes available.

A key point highlighted during discussions was the need to obtain observation data from more locations across Fiji and the Fiji Meteorological Service urged agencies represented to consider helping to collect and share data from those remote areas where they may have access.

Attendees also discussed the various ways in which the maps could be used at community level and their possible distribution to areas where they are

most needed.

Ms Leba Gaunivivaka from the Common Sensing Project showed how the climate projection data can be used to show impact on specific sectors such as the sugar industry.

"It can be used as a prediction tool to assist farmers around investment planning and diversifying production," she explained.

She noted the rising temperatures will mean changes to environmental conditions, threatening farmers' ability to sustainably produce and maintain quality crops/commodities.

The data will be available freely and a suitable space for housing it will be explored. The SPREP - PEBACC project was applauded for its initiative in developing the maps and giving the datasets meaning to the average Fijian.

From the Country Manager...

"I am helping communities manage, protect and rehabilitate their respective ecosystems such as rivers and streams, watersheds, urban green spaces and forests. These ecosystems will in turn continue to provide ecosystem services such as fresh water, food, building materials, cooler urban environments, income, soil fertility and protection from extreme weather events in the face of climate change impacts."

Impact

On Wagina Island in Choiseul Province around 2,000 people in four communities now have a water resource management guideline and action plans to help them manage and sustain their water sources which include springs, rivers/streams, wells and watersheds.

In the Guadalcanal Province, the establishment of the Barana Community Nature and Heritage Park is helping to improve watershed management in the upper reaches of the rivers on which Honiara depends.

Through PEBACC, the people of Barana are establishing forest ecosystem protection, land use management and livelihood activities. An environment and resilience centre has been built as a place for information sharing and discussing EbA interventions. A nursery, also with PEBACC support, provides the seedlings needed for revegetation.

These efforts will help preserve the forest and watershed while empowering people in income generation through tourism and sustainable agricultural activities.

Also in Honiara, the all-important Mataniko River is being rehabilitated with a focus on revegetation of riverbanks, and waste management. Over 3,000 people live along the Mataniko River banks.

The Honiara Botanical Garden has had a facelift through improved governance arrangements and



FRED SIHO PATISON, SOLOMON ISLANDS PEBACC COUNTRY MANAGER

development and implementation of a management and business plan. A nursery has been built and landscaping work completed, resulting in a more enticing, new-look Garden in the city centre.

The Botanical garden is a major urban green space for Honiara city and plays an important role in regulating increasing temperatures from climate change in the city. It is also a major watershed and supplies water for Honiara city CBD.

At the national level, we have supported the Government of Solomon Islands and its stakeholders with policy advice and helped them realise that ecosystem-based adaptation and nature-based solutions are cost-effective and environmentally appropriate

approaches to building climate resilience.

Through these projects we were able to make the case for including ecosystem-based approaches in sub-national and national policy, which include:

- Solomon Islands National Ocean Policy 2019
- Solomon Islands National Waste Management and Pollution Control Strategy 2017
- Honiara Urban Resilience and Climate Adaptation Plan
- Choiseul Province Medium Term Development Plan 2017
- Revision of the National Biodiversity Strategic Action Plan 2016 (NBSAP).

Water Resource Management Guidelines pave the way for resilience of Wagina Communities



A NATURAL WATER SPRING ON THE ISLAND OF WAGINA.

The people of Wagina have formulated a resource management guideline and action plans to help protect their water resources. The action plans provide practical steps to address groundwater contamination, proper and sensible use of rivers, springs and streams and the general use and management of rain water from tanks and important water catchment sources. Implemented together, the plans will help improve natural ecosystems and human health.

"Before the project from SPREP, people just did not care about the water sources," says Patricia Ka'ake, a community representative.

She says after taking part in consultations, workshops and awareness campaigns, she now fully understands the need for such an undertaking.

"The most common illness for our children is diarrhoea," she says.

However, she says that women are



RAISING AWARENESS ON WATER RESOURCE MANAGEMENT ON WAGINA ISLAND.

more conscious about how they use their water in terms of maintaining good health practices and are passing on the knowledge to their children.

"When we use the groundwater wells, we do not wash clothes or bathe our children close to the wells," she explains.

"We carry our buckets further from the wells. Even for the water tanks,

we try as much as possible to save water and most of the water wells now have protection and are raised to keep the water safe from animals and livestock," she says.

Patricia says her only wish now is to have water pipes installed on their island as well as have proper sanitation facilities built for the villagers on Wagina.

Status Update from Barana Community Nature and Heritage Park



PEBACC COUNTRY MANAGER, FRED PATISON, GIVES AN INTERVIEW IN THE PEACEFUL SURROUNDS OF THE BARANA COMMUNITY NATURE AND HERITAGE PARK.

At the Barana Community Nature and Heritage Park on Guadalcanal, Melinda Kii, who manages the Park, says the park has grown from strength to strength since PEBACC's intervention.

"From our Facebook page, we are receiving more enquiries than before from people wanting to visit the park", she says.

She says the villagers are more appreciative of the environment they live in and are advocating more for conservation and sustainable use of their resources.

Chief Peter Tabiru says the villagers now have more respect for the rivers and streams.

"In the past, the blokes here used chemicals to kill prawns in the river. After the awareness by SPREP they have now stopped these sorts of activities. We have come to realise the importance of such habitats in the ecosystem.

Since stopping some of the activities

that destroy the habitat, we now see more of the butterflies as well as birds," Tabiru says.

He says it is good to see these creatures. Tabiru has a lookout built in his area up at Barana.

"I hope we can have a good road so that people are able to come up to the lookout site".

The lookout provides an excellent stopping spot for hikers. A sanitation facility has been recently built, much needed in this isolated location.

"One can come out here to enjoy the views and get in touch with nature," he says.

Currently the park is not charging entrance fees, however there are plans to do so with the recent completion of a Management and Business Plan for the park. The fees earned from visitors to the park, along with other planned activities, will help in maintenance of facilities and potentially provide income for the community.



MELINDA KII OF BARANA COMMUNITY NATURE AND HERITAGE PARK.

From the Country Manager

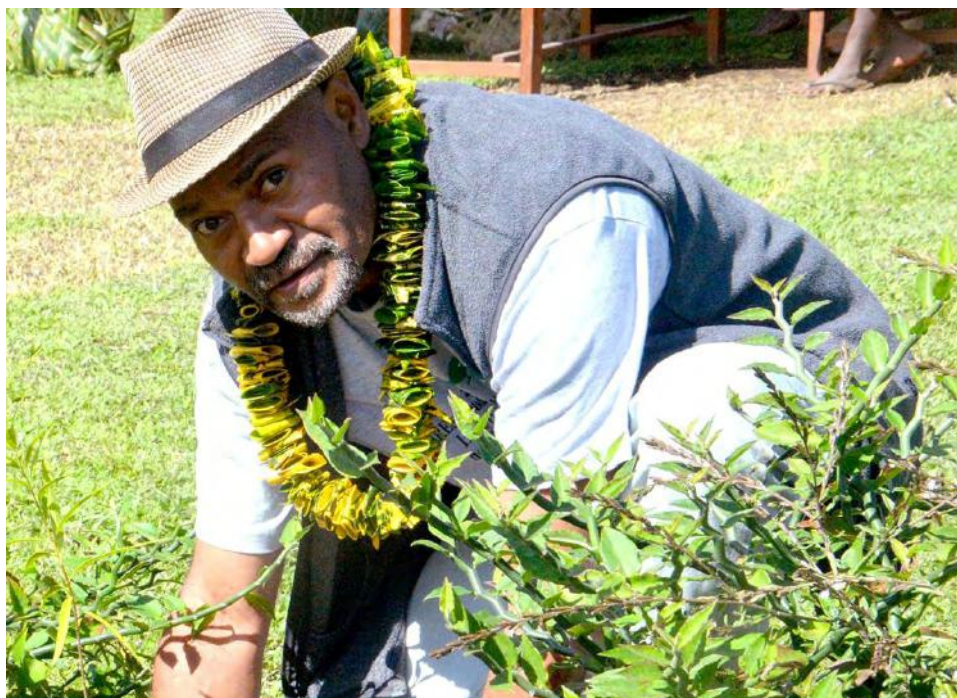
"We live with and depend on one another – be it human and human or human and the biota in any ecosystem that surrounds us. Having a robust ecosystem is thus critical for human survival.

In this century it is imperative that everyone understands that ecosystem survival is human survival".

I joined the project in 2019 and am pleased to have had the opportunity to build on the work started by former Country Manager Dave Loubser. PEBACC has helped lay a science-based foundation for implementing ecosystem based adaptation with vulnerable communities in Port Vila and at Port Resolution on Tanna Island. I also acknowledge the commitment and dedication of Australian Volunteer, Margaret Morris, who led much of the community consultations, awareness-raising and training work with our participating communities. Margaret was instrumental in maintaining the momentum of PEBACC during her time in Vanuatu.

It has been heartening to see the enthusiasm of many of our communities and the commitments by partners. As PEBACC rolls to a close in this first phase, we can be confident that the work that has been started will continue to flourish.

One of the most significant environmental challenges for Port Vila is the rehabilitation of the heavily deteriorated Tagabe river ecosystem. The river, which is located in peri-urban Port Vila, has seen a drop in water level and deterioration in water quality due to the numerous developmental activities and removal of trees within the immediate river banks as well as in the upper catchment. PEBACC has been working with the many communities along the river to encourage revegetation of the river banks. Significant efforts have gone into awareness raising and bringing together the different Government departments, provincial Government, NGO's and community representatives and chiefs to agree on the project. The communities of Blacksands and Destination have been particularly involved in re-vegetating



WILLIAM BANI ARUDOVO, VANUATU PEBACC COUNTRY MANAGER .

the coastline and the riparian zones. The work will continue post-PEBACC with the assistance of relevant government institutions such as the Department of Forests.

In our effort to reduce ecosystem disturbances, we have partnered with the Department of Agriculture, Horticulture and Rural Development (DARD) to establish backyard garden models in peri-urban Port Vila. This has attracted much attention recently and one can now witness the sprouting of vegetable gardens in town. Our backyard garden project with DARD jointly addresses sustainable ecosystem management as well as the notion of food security which is one of DARD's core goals at the national policy level. We want to encourage the idea that backyard gardens are not meant only for urban centres but for wherever one might reside in order to reduce disturbances to our ecosystems.

On Tanna Island, the six communities of Port Resolution have established a community conservation area towards conserving their depleting marine resources as a means of adapting to the impacts of climate change. A CCA



AUSTRALIAN VOLUNTEER ON THE PROJECT, MARGARET MORRIS, WITH THE CHIEF OF IFIRA AND OTHER CHIEFS FROM THE SURROUNDING AREAS.

management committee is now in place and rangers/wardens have been appointed. A CCA Management Plan is nearing completion and will be launched in September. Seeing the communities taking pride in the specific projects is very satisfying.

At national level, we have provided policy support, communications and training, working across different government agencies and supporting other project work. We have also contributed to the Department of Forests' policy goal to plant one million trees per year by helping to expand the holding capacity of the DoF central nursery in Port Vila.

Tagabe River rehabilitation activities

PEBACC has been implementing restoration activities in the Tagabe river riparian zones and along the Blacksands coastline since mid-2019, following an ecosystem assessment of the wider Port Vila area, which identified the Tagabe river and the Blacksands coastline as the most impacted areas in comparison to other areas studied, such as the Mele Bay and Erakor and Eratap lagoons.

The whole of Port Vila's population depends on water pumped from the Tagabe river by UNELCO. However, the immediate river and its upper catchment are severely impacted by development such as cattle ranching and farming (upper catchment) and human settlements (on the immediate river banks).

A programme was established to restore the riparian zones with trees and other riverine plants. This will protect the river banks and provide a buffer to the settlements from flood impacts. When the trees are fully grown and the crown cover closes, it will suppress growth of the high light demanding invasive water hyacinth and other vegetative invasive species currently found in the river.

The ultimate goal is to keep the river flowing and see an improvement in water quality for the immediate residents of the river as well as greater Port Vila.

Since revegetation commenced and until the national tree planting day on 21st June this year, over 3,000 trees, palms and other plants such as vetiver grass have been planted along both the Blacksands coastline and from the river mouth up to the Destination area, according to PEBACC country manager, Bani Arudovo.

The tree planting activities were carried out by residents and students from schools in the area with assistance from PEBACC and the Department of Forests. The Ifira Marine Management Committee (representing the customary landowners) and the SPC



VICTORY HOPE SCHOOL TEACHERS AND STUDENTS WITH SEEDLINGS FOR PLANTING BLACKSANDS COASTLINE.



DEPARTMENT OF FORESTS OFFICER JUDY KALOTAP ASSISTING A STUDENT TO PLANT A TREE – BLACKSANDS' COAST.

Ridge-to-Reef project personnel are also involved in the rehabilitation activities.

It is due to such mutual understanding that the PEBACC project has been assisting the Department of Forests with the extension of its base nursery at Tagabe," says Mr Arudovo.

To ensure a constant supply of seedlings, PEBACC is supporting the Department of Forests to extend the capacity of its existing forestry nursery, which will also support urban forestry work in wider Port Vila and SHEFA province in general.

Backyard gardening field-day promotes healthy eating and saving ecosystems

On Friday 3 July the Department of Agriculture and Rural Development (DARD) with the support of PEBACC, organised a field day for the communities of Pango, Erakor, Freshwater, Sea Side and the Good Will School to visit the backyard garden project established in front of the DARD offices at Tagabe.

The DARD backyard garden project was initiated to increase awareness amongst the public that anyone can utilise their backyard to grow vegetables and in doing so have access to healthy meals, save money and reduce the impact they pose on their surrounding ecosystems.

Peter Iesul, DARD's soil agronomist said the project came at just the right time when people have been restricted in their movement due to COVID-19 and hence, can make use of their time at home to plant vegetables for the good health of their families.

Bani Arudovo, PEBACC Country Manager, reiterated that development in all aspects threaten the ecosystems that we depend on, such as the Tagabe river which supplies water to the whole of Port Vila's population. He explained that the urban garden project is aimed at encouraging maximum utilisation of small plots of backyard land and to leave ecosystem buffers such as the Tagabe river riparian intact.

"The PEBACC project aims to bring back buffers to the Tagabe river in an effort to save the river and improve the quality of water for the immediate residents," said Mr. Arudovo.

Well over 100 participants showed keen interest in the back yard garden initiative and PEBACC via DARD is assisting the communities of Erakor, Pango and Fresh Water with setting up their own demonstration gardens.



BACKYARD CAPSICUM PLOT



HEALTHY LOOKING VEGIES DEMONSTRATED IN BOTH VERTICAL AND HORIZONTAL GARDENING TECHNIQUES

Study highlights risks to introduction of Tilapia at Port Resolution

In July 2019, following a series of consultations, the six communities of Port Resolution on Tanna Island established a community-based Marine Community Conservation Area (CCA) as part of their aspirations to build resilience to impending impacts of climate change and other influences.

The CCA aims to reverse the deterioration of fish stocks and improve the quality of the marine environment in general. To be effective, it will require placement of tabus in the regular coastal fishing grounds, which will reduce the options available to the people, who have historically relied on coastal fisheries for much of their protein.

PEBACC has supported the consultations and establishment of the CCA and committed to helping to identify and establish alternate livelihood activities that will also address the reduction in protein from the marine environment. One of the alternative livelihood/access to protein projects requested by communities was Tilapia aquaculture.

Tilapia species are considered to be an invasive species in many parts of the world and therefore, PEBACC commissioned an environmental safeguards study to assess the risk of the introduced strain escaping into Lake Eweya and coastal waters and degrading associated ecosystems.

The species proposed to be introduced for aquaculture in the region is the Nile Tilapia, *Oreochromis niloticus* (GIFT strain), a genetically modified strain that has very fast growth rates.

The Mozambique Tilapia, *Oreochromis mossambicus*, has existed in Lake Eweya in Port Resolution for approximately 50

years and is one of the least preferred Tilapia species for aquaculture due to its relatively slow growth rates.

The study found that the risk of the introduced species escaping from ponds and finding its way into the lake and coastal waters was high. It also found that the introduced species is capable of hybridising with the species currently in the lake.

The resulting hybrid species would have high marine water salinity tolerance, which would give it the ability to establish a self-sustaining population and compete against other species in the wild. It would also have enhanced ability to disturb

riverbanks and existing marine habitats.

Based on these and other factors, the study recommended against the introduction of the GIFT species of Tilapia into Port Resolution Bay to prevent negative impact on the marine ecosystem.

PEBACC has thus made the decision that it cannot support the introduction of Tilapia aquaculture as an alternative livelihood/protein source in Port Resolution Bay. Instead, other activities such as poultry farming, a small piggery and native tree nurseries are being supported under the project.



NILE TILAPIA *Oreochromis niloticus*



GENETICALLY IMPROVED FARMED TILAPIA (GIFT)

THE STUDY SUGGESTS THAT THE INTRODUCED GIFT STRAIN COULD EASILY REPRODUCE WITH THE EXISTING STRAIN OF TILAPIA IN LAKE EWEYA TO PRODUCE A MORE AGGRESSIVE HYBRID HARMFUL TO PORT RESOLUTION'S MARINE ENVIRONMENT



THE NATIVE TREE NURSERY WHICH WILL PROVIDE PLANTS FOR FOOD AND HELP MANAGE THE AREA'S EROSION ISSUES.



ECOSYSTEM-BASED ADAPTATION

PROMOTING NATURAL SOLUTIONS TO CLIMATE CHANGE

MANGROVE FOREST, VANUATU
PHOTO: DAN LAFFOLEY

WHAT IS ECOSYSTEM-BASED ADAPTATION (EbA)?

“Ecosystem-based Adaptation is the use of biodiversity and ecosystem services, as part of an overall adaptation strategy, to help people to adapt to the adverse effects of climate change... it aims to maintain and increase the resilience and reduce the vulnerability of ecosystems and people in the face of adverse effects of climate change.” CBD 2009

What are the benefits of EbA?

Having a healthy environment around us secures our supply of freshwater and other natural resources.

These are called ‘ecosystem services’ and are the added benefits that do not come when ‘hard’ engineered adaptation solutions, such as when seawalls are built.

But what is adaptation?

Adaptation is making changes in order to reduce the vulnerability of a community, society or system to the negative effects of climate change.

When is EbA the best adaptation option?

There are many different approaches to adaptation. The best option will reduce the vulnerability of a group of people in the most cost effective way over the long term.

This could be through conventional adaptation, EbA or a combination of both.

The ability to compare EbA with conventional solutions will need to be built through effective monitoring of and evaluation of current EbA projects and by building the capacity of local decision-makers to select the best adaptation options available.

In the Pacific, how can EbA help us adapt?

By protecting intact ecosystems, managing natural resources and restoring degraded ecosystems.

For example, steep slopes in our region are often stabilised by deep rooted vegetation. As rainfall is expected to be more intense in the future, this natural buffer protects communities from flooding and landslides and also ensures that reefs are healthy by reducing the impact of sediment flows from erosion.

Keeping forests intact, or replanting them, also provides a source of building materials, crops and firewood.

Water catchments are also protected and in the sea, healthy reefs can then support greater fish populations.

Where can I get more information?

For further information about EbA and the PEBACC Project, visit www.sprep.org/pebacc.

About SPREP

SPREP is the primary intergovernmental environmental organisation working in the Pacific. Visit www.sprep.org for more information about the work of SPREP in the region.