



ADAPTING TO CLIMATE CHANGE IN THE PACIFIC: THE PACC PROGRAMME



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SPREP Vision: The Pacific environment, sustaining our
livelihoods and natural heritage in harmony with our cultures.

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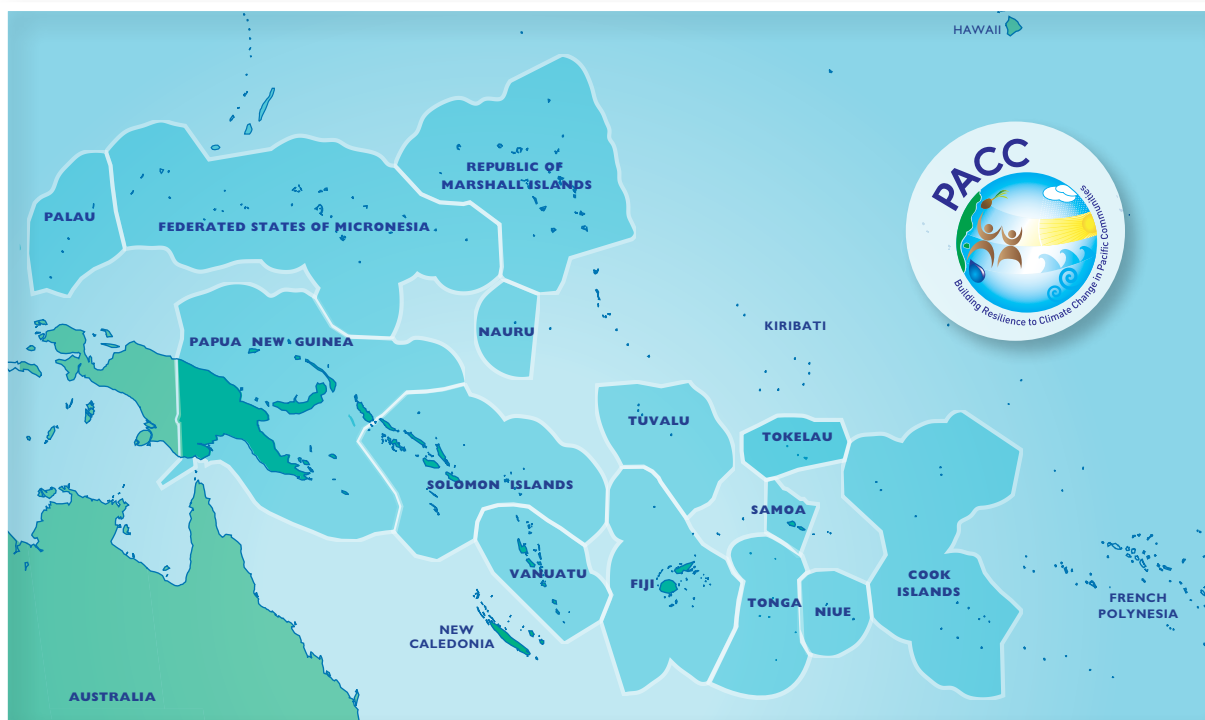
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BACKGROUND

The Pacific Adaptation to Climate Change (PACC) programme began in 2009 as a regional response to the climate change threat. It is currently the largest climate change adaptation initiative in the region, with activities in 14 Pacific island countries and territories. The programme is building an integrated and coordinated approach to the climate change challenge through three main components: practical demonstrations of adaptation measures, driving the mainstreaming of climate risks into national development planning and activities, and sharing knowledge in order to build adaptive capacity.

After four years of hard work, many of the demonstration projects are well under way, completed, or close to completion. Lessons and best practices are being documented and shared, thus establishing a knowledge base for Pacific adaptation. Mainstreaming efforts are also beginning to reap rewards, as countries move towards integrating climate into their policies and planning.

This is a time to take stock of achievements so far, and look at how these will be consolidated over the final 18 months of the programme, to ensure the programme's success as a foundation for climate change resilience into the future.



ADDRESSING VULNERABILITY THROUGH AN INTEGRATED APPROACH

The Pacific islands region is highly vulnerable to climate change. The vast majority of the islands' inhabitants live on or near to the coast, including in low lying areas or river flood plains. Sea level rise, storm surges and severe weather are therefore a common threat to homes, communities, livelihoods, infrastructure and national economies. National and local economies of Pacific islands rely heavily on natural resources, which are extremely vulnerable to climate variability and change. Many islands, particularly the low-lying atolls, have limited water resources and depend on rainwater for their needs, a strategy which is increasingly precarious as the climate changes.

The vulnerability of the islands is already evident, with flood destruction in Fiji, drought impacts in the Marshall Islands, and the recent cyclone damage in Samoa providing painful evidence. Indeed, the climate risk is now recognised to pose a threat to all ongoing development efforts. Building capacity and knowledge to plan ahead and better cope with climate-related risk will therefore have immediate benefits, as well as contributing to longer term coping strategies for climate change.

Climate change has been recognised for decades, and efforts to address the challenge of climate variability and change are not new to the islands. The vulnerability of Pacific islands however, is increasing due to the growing impacts of climate change related events and trends. Prior to the PACC programme, efforts to try and reduce vulnerability were piecemeal and were not seen to be contributing to an overall strengthening of adaptive capacity across the region. Business-as-usual development did not integrate climate change adaptation at national (state) or community (municipal) level planning, resulting in infrastructure being easily damaged by climate variability and extreme events.

The PACC programme was developed to lay the groundwork for a more coordinated and integrated approach to ensure that vulnerabilities are reduced and that development activities achieve their social, economic and ecological goals. The programme addresses Pacific island priority actions for climate change adaptation by: (1) demonstrating practical 'on the ground' measures; (2) promoting climate-sensitive national policy; (3) strengthening community or municipality coping capacity; and (4) building resilience at the level of national and state economies.

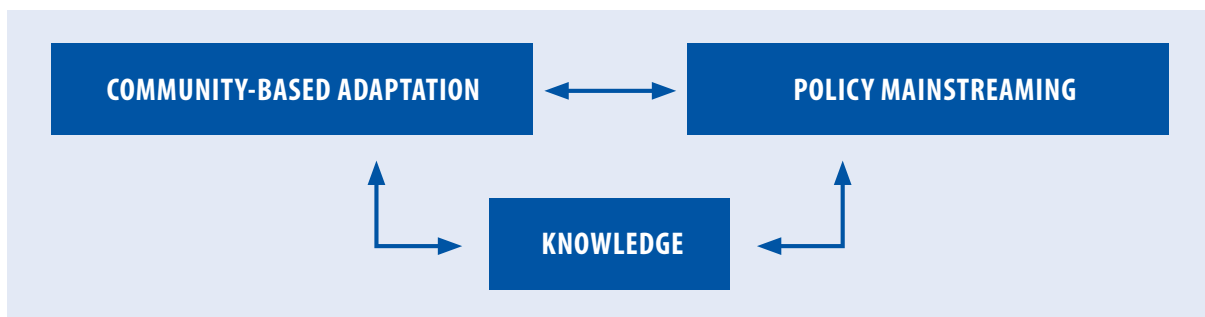
Working in 14 Pacific island countries and territories and across three critical climate-sensitive sectors, the different facets of the programme combine to provide a comprehensive, multilayered framework for adaptation in the region.

GOAL AND OBJECTIVES

The overall goal of the programme is to reduce vulnerability and to increase adaptive capacity to the adverse effects of climate change in the key development sectors identified by participating countries, namely coastal zone management, food security and food production, and water resources management.

The three outcomes that the project is striving to achieve are:

- Policy changes to deliver immediate vulnerability-reduction benefits in the context of emerging climate risks are defined in all PACC countries ('mainstreaming').
- Demonstration measures to reduce vulnerability in coastal areas (Cook Islands, Federated States of Micronesia, Samoa and Vanuatu), food production (Fiji, Papua New Guinea, Palau and Solomon Islands) and water management (in Marshall Islands, Nauru, Niue, Tonga, Tokelau and Tuvalu) are implemented in selected communities ('demonstrations').
- Capacity to plan for and respond to changes in climate-related risks are improved ('knowledge').



Repairing water infrastructure on Tuvalu.



The FSM PACC national coordinator addressing policy makers.

PACIFIC ADAPTATION TO CLIMATE CHANGE PROGRAMME (2009–2014)

- Funded through the Global Environment Facility's Special Climate Change Fund (US\$13 million) and the Australian Agency for International Development (US\$7.8 million)
- Implemented by national implementing agents in 14 participating Pacific island countries and territories: Cook Islands, Federated States of Micronesia, Fiji, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Solomon Islands, Samoa, Tokelau, Tonga, Tuvalu and Vanuatu
- Regional implementing partner: SPREP
- Implementing agency: UNDP
- Based on national climate change priorities and priorities from national sustainable development strategies
- Priority sectors: agriculture, coastal management, water



COUNTRY ACTIVITIES

During the initial planning phase, the participating countries each identified their highest priority from three critical climate-sensitive sectors – coastal zone management, food production and food security, and water resources management – and further identified the linkages of each priority area to the socio-economic, ecosystem, and governance context of the pilot sites and the whole country. Activities are aligned with the three key outcomes of the programme, that is, 'mainstreaming', 'demonstration' and 'knowledge' (although these are interlinked). The following pages briefly describe country activities, and progress to mid-2013, for each of the participating countries.



Raising awareness in Tuvalu through the radio.



Community-based coastal protection in Samoa.



A trial of salt-tolerant taro in Palau.

SUMMARY OF THE ON-THE-GROUND ADAPTATION MEASURES BEING PURSUED THROUGH THE PACC PROGRAMME

Climate-induced disturbances in water supply and security are being reduced through:

- Capturing and storage of rain and groundwater resources (individual household and community storage capacities) [MARSHALL ISLANDS](#), [NAURU](#), [NIUE](#), [PNG](#), [TOKELAU](#), [TONGA](#), [TUVALU](#)
- Reducing leakage of reticulated systems and water storage facilities [MARSHALL ISLANDS](#), [NIUE](#), [TOKELAU](#), [TONGA](#), [TUVALU](#)
- Water saving (e.g. introducing compost toilets, demand management through awareness raising) [NIUE](#), [TONGA](#), [TUVALU](#)
- Water quality enhancement and assurance
 - Solar water purifier [MARSHALL ISLANDS](#), [NAURU](#)
 - Groundwater quality monitoring [TONGA](#)
- Salt water reticulation [NAURU](#)

Climate-induced disturbances in food supply and security are being reduced through:

- Development and use of climate-resilient crop species and varieties (resilient to drought, waterlogging, saltwater, pests), including techniques for their consistent supply (germplasm collections, nurseries) [FIJI](#), [PALAU](#), [PNG](#), [SOLOMON ISLANDS](#)
- Farming and land use techniques facilitating soil and water conservation (e.g. mulching, organic farming, mixed cropping, drainage) [FIJI](#), [PALAU](#), [SOLOMON ISLANDS](#)
- Food storage and processing techniques [PALAU](#), [SOLOMON ISLANDS](#)
- Aquaculture techniques [PALAU](#), [VANUATU](#)

Climate-induced degradation and erosion of coastal areas and infrastructure are being reduced through:

- Protective coastal structures [FIJI](#), [SAMOA](#), [VANUATU](#)
- Coastal vegetation [FIJI](#), [SAMOA](#), [VANUATU](#)
- Reinforcing existing coastal infrastructure (climate proofing of roads and harbours) [COOK ISLANDS](#), [FEDERATED STATES OF MICRONESIA](#), [VANUATU](#)
- Relocating coastal infrastructure to less-exposed areas [VANUATU](#)
- Coastal resource use changes (e.g. reducing sand-mining by local communities, conserving reefs and coastal wetlands and forests as natural protection barrier) [SAMOA](#)



National implementing agency: Ministry of Infrastructure and Planning

Demonstration: Climate-proofing Mangaia harbour

In the Cook Islands, the demonstration project focuses on coastal management on Mangaia Island. Mangaia's harbour – the transportation hub and entry point for all supplies to the island – was destroyed by tropical cyclones in early 2005. The project intervention was to develop a stronger and safer harbour that can withstand current and future climate-related threats.

At mid-2013, the project has completed extensive preparatory work and is ready to begin construction of the new 'climate-proof' harbour.

During the preparatory phase, the project has developed and used key tools to help with the engineering design of the harbour:

- A 'geospatial assessment framework', to better understand the shape and height of the foreshore, offshore and nearshore topography and bathymetry of Mangaia, which will help understand the climate change impacts on Mangaia and its infrastructure over the next 10 years.
- The Cook Islands Coastal Calculator, which is used to provide information on waves and water levels and circulation, including undercurrent, using current variability, frequency and future scenarios. Understanding extreme water levels and wave conditions, how likely they are to behave and react during cyclone and large swell events, and how these two parameters influence wave set-up, wave run-up, overtopping and over-washing at the shoreline is fundamental in understanding and assessing inundation of land areas, and impacts on other coastal assets.

These tools have potential application across the region, and for other coastal infrastructure as well as harbours. They are already being used by the Ministry of Infrastructure and Planning at other islands and coastal sites in the country, and will be further developed and applied beyond the project to support engineering and design of climate-proof coastal infrastructure.

In parallel to the Mangaia Harbour practical demonstration, the project has also been working to develop a whole of island coastal management policy that incorporates climate risks and resilience considerations. The Mangaia Integrated Coastal Management Plan is under development and is being informed by the geo-spatial assessment, socio-economic assessments, ecosystem assessments as well as the views and preferences of the people of Mangaia, including the specific priorities and needs of gender specific and vulnerable groups.



The harbour at Mangaia, Cook Islands, which was destroyed by cyclones in 2005.



The people of Mangaia, Cook Islands.



National implementing agency: Department of Infrastructure & Transportation

Demonstration: Climate-proofing Kosrae's coastal road

The demonstration project in FSM focuses on improving the coastal road on the island of Kosrae, which is part of the main transport route on the island. The road in recent years has frequently suffered from damage due to flooding and erosion resulting from intensive rainfall, flooding and sea level rise. The implemented activity was identified following comprehensive vulnerability and adaptation (V&A) and socio-economic assessments where risks to the three pillars of sustainable development were considered. There was a need to improve the quality and design of the road through raising its height, changing the specifics of the building materials, adding culverts and installing proper drainage. Careful consideration was also placed on run-offs and how it may impact on coastal vegetation.

By mid-2013, the road improvement works are under way. The most vulnerable road sections are being elevated and culverts and other drainage measures are under construction. A sea level tide gauge and rainfall and radiation gauges have also been installed under the project allowing Kosrae to monitor sea level, tides and surge characteristics to inform predictions and thus, infrastructure development.

In parallel, the project has been raising awareness of climate change impacts and the need to build resilience, and particularly targeting students, women, men and other groups. The project also raises awareness and shares information through its blog, at <http://fsmpace.blogspot.com/>.

The project attracted international attention when it was featured in 2012 during the United Nations Framework Convention on Climate Change Conference of Parties meeting in Qatar.

Through its demonstration of safer and more durable road design, the project is pioneering resilient coastal infrastructure in FSM and is ready to share and transfer the lessons and knowledge to the other islands of FSM and the region.

The project has also been highly successful in its efforts to promote mainstreaming. With the support of the Kosrae State Government, the Kosrae State Climate Change Act was endorsed in 2011. Regulations for development projects are currently being amended to incorporate climate risks, as are the state's environmental impact assessment guidelines. The project team was also asked to revise the existing Kosrae Shoreline Management Plan to incorporate climate change risks. As with the demonstration project, these activities serve as a model for the rest of FSM and efforts to replicate in the other states are underway.

BETTER COASTAL MANAGEMENT IN KOSRAE WITH TIDAL PREDICTIONS

Kosrae has a new set of tide and sea-level forecasts available, based on measurements from a new water level sensor funded by the Pacific Adaptation to Climate Change project at the Lelu Marina, Kosrae.

The instrument records the sea level every ten minutes and sends it via satellite to the National Institute of Water and Atmospheric Research Ltd (NIWA) in New Zealand. There the data are analysed and tide tables are produced, which predict the high and low tide heights and times for the next three months.

“This is the first time Kosrae has ever had this type of automatic monitoring equipment, we can now rely on our own data instead of having to seek it from elsewhere,” said the FSM PACC National Coordinator, Mr Simpson Abraham. “Our plan now is to replicate the work we are doing in Kosrae, in the other three states of FSM – Chuuk, Yap and Pohnpei. We’ll need the support of sustainable financing to bring this about.”

The tide predictions can be made for many years in advance. The spreadsheet developed to do the tide predictions for Kosrae can do so for any month up until 2030. However there are only seasonal sea-level forecasts from Hawaii up to three months ahead hence the tide and sea level fluctuations.

Information on the daily tides is also distributed to the Kosrae Public Radio Station where they are broadcast twice a day.

The tide tables also highlight the dates of expected very high tides. This enables planning for possible flooding events that can have negative impacts on the coastal population, vegetation and infrastructure.

“Given the amount of development and infrastructure located within the coastal margins of Kosrae, having good sea level information to underpin adaptation decision-making is vital,” said Doug Ramsay of NIWA. “Even with just one year of sea-level data collected Kosrae is benefitting from improved tide predictions and is leading the way in the region in producing three month forecasts combining tide predictions and seasonal forecasts of mean sea-level fluctuation.”

The tide tables of Kosrae can be accessed at www.kosraecoast.com

Adapted from a success story published on the SPREP website on 10 April 2013



Left to right: A new culvert built by the PACC project; Roadworks on Kosrae, FSM, carried out by the PACC project; Raising awareness about climate change with young people in FSM.



National implementing agency: Ministry of Natural Resources and Environment

Demonstration: Community-based integrated coastal protection

The Samoa PACC project is working with the government to implement a community-based integrated coastal protection model, to increase the resilience of its coastal communities and infrastructure to the impacts of climate change. The project is working at three sites – Tafitoala village on Upolu and Lefagaoalii and Lalomalava on Savai'i – and activities include re-vegetation of coastal areas, building protection structures, and community awareness, consultations and engagement. A water resource bylaw, linked to their coastal protection programme, has been formulated and endorsed for the village of Tafitoala, providing for enforcement of both water and coastal resource management at the community level by the community themselves.

By 2013, many of the activities have been completed and monitoring and evaluation is under way. However, a cyclone in December 2012 caused some setbacks to the project, and provided some valuable lessons. As a result, the project is looking at the whole community such as through 'ridge to reef' and ecosystem based approaches, expanding activities to include watershed management and rehabilitation, and is also revisiting the community bylaw to ensure it addresses river protection challenges such as encroaching on river flood plains, activities up-river and coastal resource management issues.



WATER RESOURCE BYLAW – EMPOWERING COMMUNITIES TO SAVE RESOURCES

A water resource bylaw is now in place for the small community of Tafitoala in Samoa as part of the integrated coastal management approach established under the Pacific Adaptation to Climate Change Project. The bylaw is one of the provisions within the Water Resource Management Act 2008 and is taking on a ridge-to-reef approach to manage environment resources from the mountain ridges all the way down to the reef, recognising that land-based activities have a significant impact on our coastal and marine resources.

Ministry of Natural Resources and Environment (MNRE) Principal Water Policy Regulatory Officer Mr Malaki lakopo said that there is always a fear of coastal infrastructures impacting on marine life therefore through the bylaw and the Integrated Water Resource Management, MNRE hopes to build the resilience of the coastal ecosystems such as coral reefs and sea grass beds, by managing and limiting impacts caused by land based activities.

This is an example of mainstreaming climate change issues down to the grass root level and promoting community ownership and engagement of the PACC Project, additionally improving the management of natural resources.

“The bylaw was created by the community members, for the community and enforced by the community,” said Moira Faletutulu, National PACC Coordinator for Samoa. She added that the decisions and village rules will be recognised in the court system as it is an enforcement vehicle for the main Water Resource Management Act.

The bylaw will hopefully put an end to unsustainable activities such as the clearing of priority forest areas and vegetation, contamination of water quality in rivers through the use of chemicals, wastes from cattle farms and other activities that contaminate the water sources.

“There are people that cut down trees without taking into account the consequences, I have learned a lot from the consultations and I see this as an important program for our people, they need to be aware about these things,” said Mr Pepe Utai, a member of the Tafitoala community.

“This initiative is very important as we need to take care of our resources,” said Ms Taituuga Limasere, a member of the Tafitoala community.

PACC Samoa is taking an integrated approach to coastal management under climate risk considerations and the bylaw the Tafitoala community is putting in place will ensure that upstream activities do not adversely impact coastal resources that people depend on for their livelihoods. The PACC Samoa project is being assisted by the Water Resource Division of the MNRE to put the bylaw in place.

Adapted from a success story published on the SPREP website on 3 July 2012



National implementing agency: Department of Environment and Conservation, Ministry of Lands and Natural Resources

Demonstration: Enhancing resilience of coastal infrastructure and community assets

The target for the demonstration project in Vanuatu is national roads on the island of Epi. Flooding and coastal erosion on the island have been causing increasing damage to the roads, and the project is working with local communities to develop appropriate solutions that work now and into the future.

The Vanuatu team has worked hard to build community ownership of the project. One particularly successful approach to engaging communities has been three-dimensional participatory mapping, which helps understanding as well as participation in decision making. Another initiative is the Epi Island Climate Change Committee, established in March 2013, which includes representatives from community and government.

At mid-2013, the project is working with the community to progress implementation. The road improvement strategies and its surrounding environment were based on the community mapping exercise, vulnerability and adaptation assessments and environmental impact assessments. The design work has been completed, and the communities themselves will be contracted to build the new roads using locally available materials and with guidance and training from the PACC project. A guideline has been produced for use by communities, which explains soft engineering options for coastal protection. This capacity building is seen as key to building resilience at the community level.

A new project, the Vanuatu Coastal Infrastructure Adaptation Project, is being developed that will build on the PACC project to replicate the activities in all six provinces of Vanuatu, as well as continuing activities in Epi.

The project is developing a guideline to be used by at the national level as part of the environmental impact assessment process for future coastal infrastructure development.



Making the 3-D map.



Community members adding information to the 3-D map.

3D COMMUNITY-BASED GEO-SPATIAL TOPOGRAPHY MAPPING SYSTEM EMPOWERS LOCAL COMMUNITY

A community-based geo-spatial topography mapping system using a 3-dimensional (3D) model has empowered the people of the island of Epi in Vanuatu's Shefa province to make informed decisions on road designs better suited for coastal communities impacted by climate change.

While this model is still at its infancy in terms of its use in the Pacific, the Pacific Adaptation to Climate Change (PACC) project has piloted the new tool in Vanuatu working with the communities on the island of Epi.

Sharing lessons learnt from the project, PACC assistant co-ordinator Ian Iercet said the Epi project was successful because of the full participation, at all levels, of the local community. "We ensured that the community participated fully in the decision making process. We also wanted to incorporate traditional knowledge with science to work out the best solutions for the community," Iercet told PACNEWS, a member of the Pacific Media Team 2013.

Building the model was totally the work of the community – students of the local high school, women, village elders and chiefs. "We used cardboard to cut out contours and traced them using carbon and glued them to form the different layers of the landscape of the island. We asked community leaders to identify areas where the impact of climate change is happening and how they've addressed these problems using traditional knowledge. We then try and incorporate these traditional form of action with the science," said Iercet.

He said they found that bringing various communities together led to better consensus building on issues that affect their livelihoods. "At the end of the exercise, community leaders agreed to consider relocation of coastal villages and the high school to higher ground. This decision was by consensus. Even before we developed the 3D model for the community, the islanders have used their own hand tools to cut roads in higher ground. The people are now using the road and the PACC will improve it to an acceptable standard," said Iercet.

To show their commitment, chiefs and leaders in Epi publicly offered their resources such as sand, water and quarry materials free of charge from royalties or any other form of payment, to build new roads for the island. Chiefs on the island also assured they will not claim compensation for any damage or removal of fruit trees or commercial crops such as kava and peanuts from their land, if the road relocation goes through their land. The chiefs of Epi could foresee the impact of PACC project in terms of building their resilience and adaptive capacity far outweighs the compensation in the long run, according to a report on the project by the Vanuatu PACC team.

Iercet said the 3D modeling is a very cost effective tool that saves money and time as assessments are based on the local knowledge of community members.

Lessons learnt from Epi Island will be replicated in the other outer islands in Vanuatu.

Adapted from a news story published on the SPREP website on 2 July 2013.

FOOD PRODUCTION AND FOOD SECURITY

FIJI



National implementing agency: Land and Water Resource Management Division of the Ministry of Agriculture

Demonstration: Integrated approaches to improving crop resilience through addressing the problems of the drainage systems in lowland farming areas

In Fiji, sea level rise and flash floods are already affecting low-lying farms and coastal communities, and current drainage networks cannot cope. This is having a direct impact on food and cash crops, threatening food security and damaging the economy. The PACC project is helping to develop better drainage systems and guidelines that take into account population pressures both upland and in the flood plains and the additional pressures (such as extreme rainfall events and sea level rise) caused by climate change. The project is also testing crops and crop varieties for tolerance characteristics, for example saltwater- and waterlogging-tolerant varieties.

By mid-2013, dredging of creeks (to reduce sedimentation load) and crop trials (taro, cassava and sweet potato) are underway in two pilot sites.

The project team has also been dedicating time and resources to raising awareness and promoting climate change mainstreaming at the community level. This includes addressing human activities and how these interact with climate variability and change to increase community vulnerability to flooding. In March and April 2013, the PACC team and government partners carried out awareness raising activities with ten schools and eight communities, reaching more than 3,300 students, 150 teachers and 168 community members. Community development plans have been developed in seven of the communities which incorporate climate change adaptation and disaster risk reduction activities.

The project has also had great success working with community 'champions', who act as project facilitators, linking the project team with the communities. This approach is enhancing community ownership as well as building sustainability for the project.



Land preparation at a demonstration site.



An experimental crop trial.

CLIMATE-RESILIENT ROOT CROPS TRIALLED IN FIJI

Three varieties of climate resilient root crops have been piloted in two communities in Fiji, thanks to the work carried out by the Pacific Adaptation to Climate Change (PACC) and Fiji's Agriculture Ministry. Village communities in Nakelo in Tailevu and Deuba in Serua are successfully planting three varieties of dalo, cassava and kumala, said Api Tuwai, PACC Coordinator in Fiji.

"PACC came in and introduced these crops that are resilient to water-logging. The PACC project worked closely with the Koronivia Research Station that tested these root crops and PACC distributed them to farmers. However, we are facing some problems with the distribution of these planting materials because of the demand."

These two particular areas were chosen because they are flood prone areas and encounter severe rainfall all year round. They are prone to floods and also inundated from saltwater because they are near the coast. Tuwai said the drainage system in these two locations existed more than 30 years ago at the height of rice farming in Fiji.

"After the rice industry collapsed, these areas were left idle. Most of the current farmers are small scale farmers going into commercial and semi-commercial farming and they are not able to support the maintenance of the drainage system. What we found with this project is that most of the drains have clogged water ways with flood gates that were not working therefore."

To fix this problem of clogged drainage, PACC is working on a model of drains that can easily adapt to changes associated with the climate in the coming 30-50 years, said Tuwai.

"From the data collected for Suva and Navua, predictions show that rain will continue to increase for the next 30-50 years. What we need to do is to adapt to these future changes. We need to have in place drainage system that can withstand the increase in rainfall. We need community partnership to maintain these drains."

"We need to remodel drain and floodgate to accommodate the increase in sea level and the rainfall intensity that is going to increase in 30-50 years," said Tuwai.

Lessons learnt from the PACC project were shared with regional participants attending the 2nd Pacific Meteorological Council meeting in Nadi this week.

Adapted from a news story published on the SPREP website on 2 July 2013



National implementing agency: Palau Community College (Cooperative Research & Extension.)

Demonstration: Land to sea approach to climate change adaptation

In Palau, sea level rise and saltwater intrusion are making the soils more saline in coastal growing areas, making it harder to grow food and other important crops. Increasing sea surface temperature is also having a negative impact on important food species such as rabbit fish and crabs. The PACC project is addressing the problem through various activities. The project is working with the Secretariat of the Pacific Community (SPC) and farmers in Ngatpang state to identify and test varieties of taro which can grow in saltier environments, and is also constructing dikes to reduce saltwater intrusion.

By mid-2013 the taro trials are underway, with results so far indicating that three varieties have tolerance to saltwater. Dike construction is ongoing at the taro demonstration sites, reducing saltwater intrusion and extending the area available for growing taro. Aquaculture trials with mangrove crabs are also in progress, as well as trials with ridge systems for cassava.

The PACC team has also been promoting mainstreaming, carrying out a food security gap analysis and policy review.



Taro trials are identifying saltwater-tolerant varieties.



Dikes are helping to reduce saltwater intrusion in the trial sites.

SALT-TOLERANT TARO VARIETIES IDENTIFIED IN PALAU

Three varieties of Colocasia taro, namely Dungersuul, Dirrubong, Kirang, were identified as salt tolerant in a research trial carried out in Ngimis, Ngatpang in Palau with funding support provided by the AusAID International Climate Change Adaptation Initiative (ICCAI) through the Secretariat of the Pacific Community (SPC) and the GEF and AusAID funded Pacific Adaptation to Climate Change Project through SPREP.

The research is led by Dr Aurora Del Rosario, Researcher/Extension Specialist of the Palau Community Colleges Cooperative Research and Extension (PCCCRE) in Koror, in collaboration with Palau Ministry of Natural Resources, Environment and Tourism (MNRET) and SPC through its Genetic Resources and Crop Production, Extension and Climate Change Teams of the Land Resources Division.

The salt tolerant screening trials implemented at two different sites in Ngimis Nagatpang and Ollei, Ngarchelong both conducted evaluation of local taro varieties for tolerance to salt and one trial looked at screening SPC taro varieties in Ollei.

Suckers from three salt tolerant varieties were distributed to farmers, mainly women, for further distribution to outer islands.

A total of sixteen crop varieties – Colocasia taro (8), swamp taro (6) and Xanthosoma (2) – including salt tolerant varieties were transferred to SPC in March this year as tissue culture material to be included in CePaCT's climate ready collection. Salt tolerant taro varieties identified will be virus indexed at SPC CePaCT before they become available for sharing and to be incorporated in future breeding programmes. These new lines will be sent back to Palau for further evaluation as well as to other atoll countries facing similar problems with salt intrusion.

Adapted from a news story published on the SPC website on 18 June 2013

PAPUA NEW GUINEA



National implementing agency: Department of Agriculture and Livestock (Land Use Division)

Demonstration: Drought-resilient crops and farming systems

The PACC project in PNG is focusing on the issue of drought, which has caused major food shortages in recent years in parts of the country. Initial work focuses on the three village communities of Kivori in the Kairuku-Hiri District of Central Province. Activities include improving seed supply systems of drought-tolerant varieties, and promoting groundwater and surface water management including conservation practices.

At mid-2013 the project is working closely with national partners and related projects to deliver results. At the regional level the project is partnering with the SPC/GIZ project, Coping with Climate Change in the Pacific Island Region (CCCPIR). National partner, the National Agricultural Research Institute (NARI), has established two 'resource centres' – seed multiplication and distribution centres, which also have demonstrations of permaculture methods and use of groundwater for irrigation – at Kivori Kui and Hereparu. These centres will supply local communities with drought-tolerant crop seeds in addition to building knowledge of permaculture practices through the demonstrations. The resource centres will also supply seeds and planting material to other parts of Central Province in the event of droughts.

The project has contributed to two major policy documents – a strategy document on addressing food security in drought-prone areas of PNG, and a climate-smart agriculture development policy framework for the country.



Consultations with the women in Kivori during preparations for the PACC project. Preparing the soil for drought-tolerant crops at one of the resource centres.



Top: Land preparation for the multiplication of drought tolerant crops.
Bottom: Planting in Kivori Poe.

SOLOMON ISLANDS



National implementing agency: Ministry of Agriculture and Livestock (MAL)

Demonstration: Resilient atoll agriculture

In Solomon Islands the PACC Project is focusing on enhancing food production in low-lying areas, with a first pilot in Ontong Java trialling different permaculture farming systems.

Progress at mid-2013 includes the establishment of four demonstration plots, and two further plots which were added by the community, totalling six on-farm trials. The first harvests from these plots have been well received, and planting materials are in high demand. There are also plans to replicate the trials at a second site.

The on-farm plots weave together the elements of microclimate, annual and perennial plants, water and soil management, and the needs of the people. Also, the on-farm plots are deliberately designed to be energy-efficient, low-maintenance, high-yielding, and interconnected, taking into consideration extreme events and climate change trends.

The project has also set up a hybrid solar drier in Honiara to demonstrate preservation of food by this method, which can then be shipped to atoll communities in times of need. Training in processing and preservation is also being carried out, with a focus on women's groups.

A major achievement in mainstreaming has been the drafting and then endorsement of the national climate change policy, which is now being implemented.





PACC demonstration.



Planting on Ontong Java.

SENIOR OFFICIALS HEAR GOOD NEWS FROM PACC DEMONSTRATION TRIALS

Senior government officials from the Ministry of Agriculture & Livestock (MAL) heard positive news from the Solomon Islands PACC demonstration trials, delivered to them personally by farmer Mr Chris Babasi. Mr Babasi, who is one of the lead farmers for the trials in Pelau in Ontong Java Atolls, travelled to Honiara to share his experiences with the high-level delegation.

Set up 7 months ago, the trials focus on improved farming methods and crops that will contribute to food security in the face of climate change. Demonstrations include intensive agroforestry systems suitable for low-lying areas, growing crops under coconut, and improving nutrients in swamp taro systems. The officials – MAL Permanent Secretary Mr Frank Wickham, Under Secretary Technical Mr Jimi Saelea, Director of Research Mrs Helen Tsatsia, Director of Extension Mr Michael Ho’ota, the PACC Project Management Unit and other senior MAL officers – heard how the community is benefitting following the first harvest.

“Most of the field crops and tree crops have performed well even though the soil needs improvement. We have harvested some of our taro plants and distributed some of the suckers to other interested families” said Mr Babasi.

“Our biggest challenge in our demonstrations is salt-water intrusion and lack of soil nutrients. At the moment, the giant taro is not performing well since salt water intrusion has affected our gardening areas, however, taro plants are becoming popular and there are times when we are out of taro suckers when the demand is high.”

“Currently, we have four demonstration plots that were set up last year, now we are establishing another two ourselves. From our experience working with the project team and MAL research officers, we feel it’s time we established and managed our own.”

Mr Wickham and Mr Saelea commended Mr Babasi for his efforts in managing the demonstrations and ensuring that families benefited from the first harvests. Mr Michael Ho’ota assured the team that extension officers will be available to assist when it comes to dealing with pests and diseases that may threaten the demonstrations.

MAL Research Officers and the PACC project management team are currently planning a monitoring visit to the demonstration sites to provide technical support to the lead farmers.

Adapted from a news story published on the SPREP website on 13 August 2013



National implementing agency: Office of Environmental Planning and Policy Coordination

Demonstration: Improving water storage systems and facilities

The Marshall Islands is an atoll nation with very limited groundwater supplies and any reduction in rainfall puts the nation at a high risk of drought. The PACC Project is working to increase water storage in the country and to improve existing water systems to conserve the limited water that they have. The initial focus is on awareness raising of climate change, and improving and increasing the storage capacity of a key reservoir on the main atoll of Majuro.

By mid-2013, the project has carried out a series of consultations and other awareness raising activities targeting local government, senators, landowners and local communities on Majuro and the outer islands.

A cost-benefit analysis and a vulnerability and adaptation assessment have been completed for the airport reservoir, and activities are under way to procure suppliers to begin the upgrading work.

The project team has contributed to development of a national water and sanitation policy, a climate change policy, and the joint national action plan for disaster risk management and climate change.



Celebrating World Water Day in the Marshall Islands with the President.



Coastal erosion and salt water inundation is becoming common place in the Marshall Islands.



National implementing agency: Department of Commerce, Industry and Environment

Demonstration: Efficient management of the nation's water supply

Nauru has highly variable rainfall, and drought is becoming a major problem. This is exacerbating ground-water contamination by saltwater, and the situation could get worse with climate change. The PACC project has therefore focused on improving management of the island's water supply in terms of both policy and practice. Key 'on the ground' measures include the use of solar purifiers to provide household drinking water and saltwater reticulation systems to reclaim seawater for appropriate uses. Alongside the practical demonstrations, the project is supporting effective planning for water management to promote best use of potable and non-potable water from different sources.

By mid-2013, the project has carried out successful demonstrations of solar purifiers in the district of Aiwo and saltwater reticulation systems are about to be installed in Aiwo and Denig. The Japanese Government was particularly impressed with the solar purifiers and is providing funding for expansion of these activities to other districts.

The project has also had some major mainstreaming achievements through its contributions to the endorsement of three key documents – the National Water, Sanitation and Hygiene Policy, which incorporates climate change; the Water Sector Climate Change Action Plan; and a Drought Management Strategy.

The project team has also helped to set up a Water Unit, a Water Technical Committee, and other coordination mechanisms that are contributing to mainstreaming climate change into the water sector.

The project team has also carried out a great deal of awareness raising on the island, taking advantage of opportunities such as World Water Day, and lobbying successfully to incorporate water conservation into school curricula.



The Nauru PACC national coordinator discussing water policy with stakeholders.



Demonstrating the solar panels used for water purification.



Solar panels used for water purification.

FAMILY MAN HAPPY WITH NEWLY INSTALLED SOLAR PURIFIERS

Fredrick Cook, a father of nine, would go a long way in ensuring there is quality water for him and his family. Like other small islands in the Pacific, Cook's island home Nauru, faces water problems and has many water safety and conservation concerns. Under the Pacific Adaptation to Climate Change Project newly installed solar purifiers have helped address these concerns and for Cook, this has helped supply more quality drinking water for him and his family.

"We're very happy with the results of the Solar Water Purifiers, we use the water for drinking and cooking and we are looking forward to having the water outlet directed to our water tank." He added they now collect at least 30 to 40 litres of drinkable water daily.

Solar water purifiers use direct sunlight to convert any source of contaminated water such as sea water and bore water into drinkable water using no filters and electronics. In September 2011, the first of twenty Purifiers were installed in the district of Aiwo. The project needed to first test the success of the Purifiers by installing them in a few households such as Mr Cook's feedback and proved this innovative intervention very useful and helpful. Aiwo was chosen due the high level of ground water contamination and phosphate dust levels.

PACC Project National Coordinator Ms Mavis Depaune said that the solar purifiers are currently on trial and it's been almost eight months since they were installed for the Aiwo community, and they are seeing positive results of the initiative. "The solar water purifiers are working well and are providing a safe, clean and viable source of water for use in the community."

Prior to installation last September community members were trained by a Sunsure Water Consultant Mr Steve Watts to caring and maintaining the solar water purifiers. Like most equipment exposed to harsh and unforgiving conditions, the Purifiers need proper care to ensure it maintains durability also allowing the PACC team field workers to assess its success.

PACC Nauru continues to trial the solar purifiers in Aiwo and results from that will assist the project in replicating it in other areas of the island.

Adapted from a news story published on the SPREP website on 11 June 2012



National implementing agency: Department of Environment

Demonstration: Improving household water security

In Niue, the PACC Project is working to increase rainwater harvesting and water storage capacity of individual households. It is doing this by raising awareness on issues such as water conservation and water protection related to climate change, and also through the manufacture and moulding of rainwater storage tanks in Niue.

At mid-2013, the project and partners have carried out several very successful awareness campaigns on water issues. Diverse materials have been produced targeting different audiences, village workshops have been held, TV ads and a music video produced, sports events sponsored, and a church service was held that focused on the theme of water, among other activities.

The demonstration project has also progressed, and a workshop is under construction for moulding water tanks. When completed, it will have capacity to produce water tanks at half the cost of shipping from New Zealand (the current supplier).

The project has completed a climate change policy document, which has been approved by Cabinet and, which clarifies lines of responsibilities and coordination mechanisms. PACC is also involved with a policy consultation on gender, and is contributing to the country's joint national action plan for disaster risk management and climate change.



Heavy swells inundate the wharf on Niue. [Photo: Haden Talagi]



Old infrastructure, such as this water tank on Niue which dates from the 1960s, contributes to vulnerability of communities.



Top: Raising awareness at a sports day at Niue primary school.
Bottom: The water tank moulding workshop under construction.



National implementing agency: Government of Tokelau

Demonstration: Water security at the household and community level

Tokelau originally identified coastal zone management as its priority, but the increasing threat of drought led to a switch of focus to water resources management. Thus the project is now directed towards strengthening water availability and making sure water infrastructure is resilient to changes in climate at both the household and community level. The project works on all three of Tokelau's atolls, and activities include improving water harvesting and guttering of households, expanding rainwater harvesting infrastructure, and reducing leakage of water systems and storage. Activities are aligned with the Tokelau National Strategic Plan.

By mid-2013 the project is well underway with Tokelauans beginning to reap the benefits.



Water diverters installed by the PACC project.

IMPROVING WATER ACCESS IN TOKELAU VIA THE PACC+ PROJECT

If you can imagine a festive season in the Pacific islands without water, then you can imagine the relief of a family who visited Tokelau for festivities in 2012 and happily discovered a healthy water supply. “My whole family is thankful for the PACC+ project – not only did the project provide us with a water tank, but it also installed first flush diverters that improved water quality. PACC+ is one of the best projects that has had immediate positive impacts for the people on the island.” (Mikaele Mavaega Maiava, Tokelauan resident).

PACC+ is has been helping Tokelau residents deal with the negative impacts of climate change such as prolonged droughts, for example.

On Tokelau, an atoll territory that has taken the lead in renewable energy with their 100% solar energy supply, the PACC+ initiative has worked to improve water access and water quality to ensure adequate supplies of clean water and healthier living through community-based actions. Through the PACC+ project, household water tanks have been standardized, additional water tanks have been installed for older homes, and ‘flush diverters’ have been identified as a solution for a clean water supply. With the aid of PACC+ activities water flow is now healthier and free of bacteria and sediment. The benefits of the PACC+ project are evident especially to those Tokelau communities that suffered the severe water shortage in September 2011.

Adapted from a news story published in UNDP’s Climate Change Adaptation Bulletin Issue 13, June 2013





National implementing agency: Ministry of Land, Environment, Climate Change & Natural Resource

Demonstration: Improving water systems and infrastructure at Hihifo

Changing rainfall patterns in Tonga mean that water shortages have become a recurring problem, especially for the northern region of Hihifo district. The PACC project is using climate change models, technical expertise and traditional knowledge to enhance the current Hihifo water infrastructure, and ensure that people in Hihifo have access to good clean water.

By mid-2013, the project has taken delivery of and installed three 45,000 litre water tanks at the southwest of Kolovai. The local rugby team was enlisted to help carry the huge tanks to their installation site when it became clear they were too large to be carried by vehicle. An overhead tank holding 22,500 litres has also been installed, as well as 30 smaller tanks that hold 10,000 litres each, in six villages.

The project has contributed to mainstreaming of climate change in the national water policy which has been endorsed by Cabinet, and a national water bill is under discussion. A national water management plan is also being drafted.



One of the 10,000 litre tanks.



The three 45,000 litre tanks installed.



A pumphouse (top) and one of the 10,000 litre water tanks (bottom).



National implementing agency: Public Works Department, Ministry of Natural Resources and Environment

Demonstration: Climate proofing water management plans for Lofeagai community

With limited groundwater, people on Funafuti atoll depend heavily on rainfall to supply all their water needs. A period of two to three weeks of no rainfall can cause serious water shortages, affecting livelihoods and agricultural production. The PACC project in Tuvalu focuses on improving the water infrastructure, to assist people to better cope with droughts.

By mid-2013 the project had achieved a major step with the instalment of a large cistern to supply the community of Lofeagai. A water pump is also ready to be installed, and a village water management plan has been developed for review by the community.

The project team has also been working on raising awareness, through radio programmes and World Water Day and Biodiversity Day activities, among other activities.



Testing water quality.



The new cistern holds 700,000 litres of water.

ADAPTING TO CLIMATE CHANGE: 700,000 LITRES OF WATER FOR LOFEAGAI, TUVALU

A cistern that can hold 700,000 litres of water has been gifted to the community of Lofeagai in Tuvalu. This will help build resilience and reduce vulnerability of the community when it comes to water shortages. Last year Tuvalu went through one of its driest spells ever with very little rainfall over an 8 month period, bringing the country into a national state of emergency.

It is challenges like these that the regional PACC project hopes to empower Pacific communities to address. “We frequently experience water shortage in Tuvalu so the PACC support has come at a critical time to help us tackle this and address these issues on the spot,” said the Tuvalu PACC Project Coordinator, Ms. Loia Tausi. “Through this project, we have managed to give the people of Lofeagai a major reserve of 700,000 litres of water so they have this extra supply to fall back on in their time of need.”

In Tuvalu water resource management was the priority area selected after much consultation. While the average person is estimated to consume 100 litres of water per day, in Tuvalu due to the water shortages they are limited to 40 litres per person per day. In times of extreme drought events this is lowered even further to 20 litres of water per person per day.

“Having a community tank in Lofeagai will help the community in many different ways. When there are severe water shortages people must travel to the government offices and line up in order to purchase water. All of this is done at their cost, time and often, inconvenience, but water is life! We need it for everything we do! The people of Lofeagai now have this extra water source to help them all. This is a good thing.”

Along with supplying the community with the water cistern, the PACC project also embarked on a nationwide awareness campaign promoting wise water use. “We’ve worked to help ensure the mindsets of people in Tuvalu are geared towards responsible and wise water use, especially in the times of extreme trouble where we have had cases of water theft. We know that communications and education play a large role in ensuring the sustainability and good practices of this community cistern.”

Adapted from a news story published on the SPREP website on 20 February 2013



REGIONAL ACTIVITIES

At the regional level, the programme management team based at SPREP in Apia, Samoa provides overall coordination and management, as well as technical and other support to the country projects. This has included training and support in areas such as cost-benefit analysis, gender integration, knowledge management and mainstreaming efforts, as well as more project-specific assistance.

In 2013, to support mainstreaming across the region, the regional team produced 'Mainstreaming climate change adaptation in the Pacific: A practical guide'. Developed with the help of the country projects and drawing on many of their experiences so far, the guide will contribute to scaling up of this vital activity. The guide is aimed at country practitioners, regional governments and organisations, and development partners across the region, and provides a step-by-step framework for incorporating climate change risks into development planning and decision-making processes at both policy and project levels.

Cost-benefit analysis is an important tool for supporting decision making, and a training programme for the country project teams was completed in 2012. Publications detailing the capacity building process and synthesising the results will be published later in 2013.

The regional team has facilitated several training sessions on gender, and is assisting projects to incorporate this vital aspect into all activities. As a result, country project teams are now collecting sex-disaggregated data and have developed gender-sensitive indicators for monitoring and evaluating progress. There is also general awareness among project teams of the importance of taking into account the different vulnerabilities and different skills and knowledge of men and women with regards to climate change and coping strategies.

As the programme moves towards its final phase, the regional team is embarking on a drive to capture and share the knowledge generated by the PACC programme. Experiences, lessons and innovations will be captured in a variety of different ways, and shared widely through different channels. This will form a vital part of the adaptation knowledge base on which the Pacific island nations can build.



Participants of the PACC Socioeconomic Assessment Training at Kosrae, FSM.

ADAPTATION INNOVATIONS SHOWCASED AT PROJECT REVIEW MEETING

Participants at the annual review meeting of the Pacific Adaptation to Climate Change (PACC) project last week shared their most promising innovations during a highlight session of the meeting. Drawing on experiences in the 14 PACC country projects, the session included a 'Coastal Calculator' developed in the Cook Islands, participatory 3-D mapping used in Vanuatu, and community facilitators or 'champions' in Fiji, among others.

Now in its fourth year, emphasis in the PACC project is moving towards sharing of such innovations to promote replication and upscaling. "The projects are producing a wealth of experience, lessons and innovations," said Regional Project Coordinator Taito Nakalevu. "The challenge now is to capture and share these throughout the region. This will be one of the key activities for the next 18 months."

The showcased tools illustrate the diversity of the PACC project. The Cook Islands Coastal Calculator is a tool to help with designing climate-proof infrastructure. In The Cook Islands, where the PACC project is assisting with design and building of a harbour on Mangaia Island, the tool will help ensure that the harbour can withstand assault from cyclones and storm surges well into the future. The 3-D mapping tool, by contrast, is an aid to engaging communities and enabling their participation in decision making – in the Vanuatu project, this has been used in deciding on whether to relocate roads and villages further inland. Meanwhile, in Fiji, engaging community facilitators as a link between the project team and communities has proven to be a masterstroke, enhancing community ownership as well as sustainability of the project.

"We will be gathering and documenting these tools into a 'PACC toolbox'" said Gabor Vereczi, UNDP Regional Technical Advisor and member of the PACC Project Board. "One aim of the PACC project is to lay foundations for successful adaptation in the region, and these tools are an important part of that."

Adapted from a news story published on the SPREP website on 27 August 2013



Participants at the PACC annual review meeting in August 2013.

BEYOND PACC

PACC is due to end in December 2014. From the outset, however, there has been a focus on laying foundations for ongoing adaptation across the region, and the programme is now focused on building and securing these foundations. The legacy of the PACC programme will be the capacity and knowledge that is left behind when the programme is completed.

In the final 18 months the individual country projects are working to ensure sustainability and continuity of their achievements. The projects are founded on partnerships with government and non-government agencies, providing a key element for sustainability beyond the life of the programme. Community engagement and participation has also been a characteristic of the PACC country projects, with a strong sense of ownership evident in many of the projects, which will ensure continuity.

Beyond sustainability, the programme is promoting replication and up-scaling of best practices and innovations, within countries and across countries as appropriate. Some promising adaptation solutions are already being replicated, for example the solar water purifiers in Nauru which have moved beyond the pilot communities. Training and other capacity building activities are contributing to the replication and up-scaling efforts, as well as documentation and sharing of project experiences and lessons. The Australian Government has made an additional contribution to PACC, known as PACC+, which specifically supports replication and up-scaling.

Capturing and sharing knowledge generated by the programme is vital for sustainability, replication and up-scaling, as well as for establishing a knowledge foundation for all future adaptation across the region. The programme is exploring innovative ways to share and build on this knowledge, for example through the Pacific Climate Change Portal and the Pacific Solution Exchange.



Raising awareness of climate change issues in Fiji.



THE CHALLENGES OF PACC

Taito Nakalevu, PACC Project Manager

“With such a large and diverse programme there have inevitably been many challenges. At the regional level we have had to work hard to assist all the individual country projects and maintain an overall coherence to the programme.

We’ve come up against lack of expertise in various areas, for example with mainstreaming and in some technical fields. But we’ve worked through on a case-by-case basis and found some good solutions. We’ve brought in regional partners and consultants when needed, and developed guidance materials and training processes tailored to country needs.

In an ideal situation projects follow a cycle of planning, implementation and monitoring, but because of the complex nature of the PACC programme this has not been always possible. We have had to adjust and adapt to make things work. But this is part of the learning process we are all going through.

I’m proud of the programme. We’ve come a long way in four years, even though it hasn’t always been easy. But things are definitely taking shape. We are building a foundation for adaptation – a people-centred approach to the diverse challenges that climate change will bring to our region.”

PACIFIC ADAPTATION TO CLIMATE CHANGE (PACC) PROGRAMME

The PACC programme is the largest climate change adaptation initiative in the region, with activities in 14 Pacific island countries and territories. The programme is building a coordinated approach to the climate change challenge through three main areas of activity: practical demonstrations of adaptation measures, driving the mainstreaming of climate risks into national development planning and activities, and sharing knowledge in order to build adaptive capacity. The goal of the programme is to reduce vulnerability and to increase adaptive capacity to the adverse effects of climate change in three key climate-sensitive development sectors – coastal zone management, food security and food production, and water resources management.

RESOURCES

PACC webpages: www.sprep.org/pacc-home

The Pacific Climate Change Portal: www.pacificclimatechange.net

Vital videos

- **Vital Roads:** <http://www.youtube.com/watch?v=x0kpPxAf3SY>
- **Vital Water:** <http://www.youtube.com/watch?v=ri2SelgJiXg>
- **Vital Food:** <http://www.youtube.com/watch?v=EcZU3HfNfak>

