



# Climate Change and Disaster Risk Newsletter



## Making disaster and climate resilient development a reality

The European Union (EU) announced a €19.3 million package to strengthen disaster risk reduction and climate change adaptation in Pacific Island countries (PICs) in September.

'It's a regional initiative, but it is country led,' says Mosese Sikivou, Deputy Director, Disaster Reduction Programme, Applied Geoscience and Technology Division. 'The countries determine their priorities and build on their existing commitments in the areas of disaster risk management (DRM) and climate change.'

Seventy-five per cent of total project funds will directly support countries, with the Forum small island states, Cook Islands, Kiribati, Marshall Islands, Nauru, Niue, Palau and Tuvalu, each receiving €600,000, and larger PICs, Federated States of Micronesia, Fiji, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga and Vanuatu each allocated €1.35 million.

The use of funds will depend on national decisions, but examples of potential uses include automatic weather stations, coastal protection, food and water security measures, early warning systems, emergency operations centres and radio communications, and the collection of scientific and technical data, including bathymetry, for tsunami and flood inundation modelling.

There is also a regional allocation to support collective Pacific Island country and territory led initiatives. Examples include strengthening the Pacific Islands Emergency Management Alliance and supporting the roadmap process for a post-2015 strategy for disaster and climate resilient development.

Both the countries and EU are keen to build on the planning momentum that has built up in recent years, including the development of Joint National Action Plans (JNAPs), says Sikivou.

The project will run for 55 months, starting September 2013, and is supported by the EU's 10<sup>th</sup> EDF Intra-ACP envelope for Disaster Risk Reduction.

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Dr Rodgers

Welcome to the second issue of the SPC Climate Change and Disaster Risk Newsletter.

During the third quarter of 2013, two noteworthy events were the adoption of the Majuro Declaration by Pacific Leaders and the release of the IPCC's fifth assessment Working Group I report. Both of these developments underscore the importance of scientific enquiry in the Pacific. SPC is proud of its long history of service, and the value of its contributions across a range of technical and scientific disciplines in climate change and disaster risk management is increasingly clear. Scientific information, data, future forecasts and projections provided by SPC technical and scientific programmes have assisted Pacific island countries and territories, and many in the wider international community, find solutions to many of the challenges they face.

In September, the Pacific Islands Forum in Marshall Islands included, for the first time, a High Level Panel of Experts on Climate Change. As a participant on the panel I used the opportunity to stress three points: the importance of strong political leadership in addressing the climate and disaster challenge through a 'whole of government and community' approach; the need to strengthen communication, cooperation and coordination between regional organisations and international agencies working in climate change and disaster management in the Pacific; and the need for donors, development partners and implementing agencies to support national objectives and initiatives. Only by investing in genuine and supportive partnerships that add value to national development outcomes at country level can we achieve the best results possible in Pacific island countries and territories.

For its part, SPC seeks to actively engage with its partners. To do so effectively, we have focused on enhancing our ability to deliver integrated services at country level by improving our own mechanisms for internal coordination and collaboration. I am pleased to report that excellent progress has been made in this regard and the results speak for themselves. A recent visit

by the Adaptation Committee of the UNFCCC to SPC projects in Fiji was an opportunity to showcase practical community-level integration of climate change and disaster risk reduction made possible through close-knit collaboration between SPC's Land Resources and Applied Geoscience and Technology Divisions, with support from other arms of the organisation.

We have also invested considerable effort in our collaborative work with key partners. The recent joint mission in support of the Government of Kiribati's 'whole of island' climate change approach in Abaiang is a good example. The mission team included specialists from SPC technical divisions and our partner Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) as well as staff from our close CROP partner – the Secretariat of the Pacific Regional Environment Programme. Working side-by-side under the leadership of the Office of Te Beretitenti in Kiribati, the mission was able to support Kiribati's chosen direction.

Finally, I am very happy to report progress on SPC's Emission Reduction Strategy. Over the past 18 months we have undertaken a detailed analysis of sources of emissions across all of SPC's office operations, including emissions associated with travel. The analysis has allowed us to set 2011 as our baseline year and we have established an initial target of reducing emissions by 30% below our 2011 base year emissions by 2016. I pay tribute to all SPC staff and their families for enthusiastically supporting this initiative and the setting of a realistic target for the organisation to achieve by 2016. This demonstrates our commitment and resolve to do our bit in supporting a more resilient and prosperous Pacific.

I hope you enjoy the stories and updates provided in this issue of the newsletter.

Dr Jimmie Rodgers  
Director-General, SPC

## New matrix now available

The anticipated 2013 edition of the *SPC climate change and disaster risk management support activities in Pacific Island countries and territories* is now available.

The document provides an overview of ongoing, recently completed and planned SPC climate change and DRM support activities in 23 Pacific Island countries and territories.

The matrix is intended to provide summary information to SPC member governments and further assist SPC divisions and programmes in developing integrated multi-sector approaches to service delivery.

It is also intended to inform other agencies in the region to facilitate greater cooperation and collaboration. It is available for download on the Pacific Climate Change Portal and here:

<http://www.spc.int/images/publications/en/Corporate/Matrix.pdf>





## SPC carbon emissions reduction strategy

The Secretariat of the Pacific Community is taking significant steps toward reducing its carbon footprint. The organisation has conducted a detailed analysis on all sources of emissions from its Noumea, Suva, Honiara and Pohnpei offices over a three year period. This includes information on energy use, paper consumption and air travel.

'It did take a lot of time to get all of the data and then calculating everything. Now we've got our footprint,' says Aude Chenet, SPC's Climate Change Technical Support Officer.

Chenet has been working since April 2012 to gather and analyse all of the data needed to establish a comprehensive carbon baseline. The baseline is an important step. To know with any certainty that emissions are trending downward requires an initial measurement that can be used for future comparisons. Establishing a baseline takes guesswork, assumptions and misconceptions out of the equation.

The next step was to set an emissions reduction target and implementation strategy. This was announced by SPC's Director-General on 2 October. 'We have set an initial target of reducing our emissions by 30 percent below our 2011 base year emissions by 2016,' Dr Jimmie Rodgers informed staff. He encouraged all staff members to apply practical and sensible measures to their working lives that will contribute

to the achievement of the target, including turning off lights and computers when not in use and setting air-conditioning thermostats to 24 degrees Celsius or above.

Chenet says the organisation has sought to address the issue of reducing carbon emissions comprehensively. 'Normally you don't have to put air travel in a standard greenhouse gas inventory but SPC chose to do it' says Chenet. According to standard carbon accounting practices SPC is not required to include these emissions as they count toward the airline company's carbon footprint.

'But we chose to' says Chenet, 'what it shows is that SPC is a responsible stakeholder. We are applying internally the sorts of messages we are recommending regionally.'

SPC is the first Council of Regional Organisations of the Pacific (CROP) agency to complete an emissions inventory and propose a comprehensive emissions reduction strategy. The lessons learned from this process will enable SPC to better serve its members and assist partners as they embark on similar processes.

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## Climate change 'whole of island' approach adopted in Kiribati

The Government of Kiribati is implementing a 'whole-of-island' approach to climate change adaptation and disaster risk management on the island of Abaiang, to the north of the capital island of Tarawa.

Community resilience to climate change and natural hazards is being addressed on Abaiang using an integrated programmatic approach designed to more comprehensively support people and the environment on which they depend for sustenance and livelihoods.

Representatives from the Office of the Beretitenti and the new Kiribati National Expert Group on Climate Change and Disaster Risk Management travelled to Abaiang in September. They were supported by specialist staff from SPC, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and SPREP.

Climate change adaptations were discussed and community members were invited to propose adaptations that they thought would support the resilience of environmental systems to help them cope with climate change. Local knowledge is combined with specialist technical advice to foster increased sustainability and community ownership of response initiatives.

The programmatic approach addresses multiple sectors of economic and social life including fisheries, agriculture, livestock, water resources, public health and education to

promote better coordination between the community, governance structures and donor-funded initiatives. It offers more effective outcomes and greater administrative efficiency compared to a project by project approach.

The 'whole-of-island' approach is a Kiribati-led initiative. The Government of Kiribati requested support from SPC and GIZ to assist their development of the concept in 2011. The partnership between SPC and GIZ is supported with funding from the Federal Republic of Germany. SPC developed a 'one-team approach' across its seven technical divisions to support Kiribati's 'whole-of-island' approach. The delivery of SPC services in scientific research, disaster risk management and climate change adaptation are supported by the European Union, the Federal Republic of Germany, the Australian Agency for International Development and the United States Agency for International Development (USAID).

SPREP was also requested to support the development and implementation of the 'whole-of-island' approach, in particular through an integrated water resource management project funded by USAID. The 'whole-of-island' approach in Abaiang is open for further partners to join.

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## News in brief

### Wallis and Futuna disaster preparedness strengthened

A two-year disaster risk management project in the French territory of Wallis and Futuna coordinated by SPC and supported by EU drew to a successful close in August. The territory's Administration supérieure commissioned a study to examine tsunami hazard throughout the territory. Specialists from SPC, the New Zealand National Institute of Water and Atmospheric Research, L'institut de recherche pour le développement (IRD) and the University of Sydney investigated tsunami scenarios that identified key risk zones, available reaction times and inundation patterns. Data produced by the study has allowed the government to update its disaster response and tsunami preparedness plans, strengthen crisis communications and early warning networks, and install appropriate signs in strategic areas. Maps produced by the study are being used to plan new evacuation routes and shelters.

### RESCCUE launched

A new project – Restoration of Ecosystem Services against Climate Change Unfavourable Effects (RESCCUE) – was announced in August. The project, which will include pilot sites in Fiji, New Caledonia, French Polynesia and Vanuatu, is aimed at maintaining and strengthening ecosystem services through better local governance and improved disaster management capabilities. A focus of the project will be integrated coastal zone management, including the establishment of payment mechanisms to recognise the value that ecosystem services provide to communities. The five-year project will receive €6.5 million in funding from the French Development Agency (AFD) and the French Global Environment Fund.

### Ten-station seismic network in Papua New Guinea

A new ten-station seismic network has been established by the Port Moresby Geophysical Observatory (PMGO), a branch of Papua New Guinea's Department of Mineral Policy and Geohazards Management. The network will be used to monitor seismic activity and related hazards. The stations are spread throughout the country in Wewak, Tabubil, Mount Hagen, Lae, Port Moresby, Alotau, Misima, Buka, Kavieng and Kimbe and use Telekom PNG infrastructure to relay data to PMGO. Geoscience Australia and Pacific Network Limited assisted in the project's design and build. The network was made possible with funding from EU and the project was implemented by SPC.

### LabNet identifies cause of deadly Kiribati diarrhoea outbreak

A diarrhoeal outbreak in South Tarawa and Betio in Kiribati in July caused several fatalities, mostly of young children. Detection of its cause was made possible by the Public Health Laboratory Network (LabNet), a function of the Pacific Public Health Surveillance Network (PPHSN), which is coordinated by SPC's Public Health Division in partnership with the World Health Organization. The Ministry of Health and Medical Services (MHMS) in Kiribati was unable to determine the causative pathogen so samples were sent to Mataika House Laboratory in Fiji, one of LabNet's four regional reference laboratories, where the cause was found to be a rotavirus.

SPC is currently assisting MHMS to upgrade its environmental health surveillance and response facilities and equipment through the GCCA: PSIS project funded by EU. The upgrade will strengthen MHMS capacity to monitor and respond to climate sensitive diseases.

### Bioreactor system improves production of breadfruit seedlings

A 'temporary immersion bioreactor system' purchased by SPC's Centre for Pacific Crops and Trees (CePaCT) with funding provided by the AusAID International Climate Change Adaptation Initiative (ICCAI) has demonstrated improved production of breadfruit seedlings. The bioreactor system consists of shelves, containing the plantlets in sterile containers, which tilt every few seconds aerating the liquid nutrient solution delivered to the plantlet's roots. The method produces more vigorous, sturdier and taller plantlets. Breadfruit seedlings produced using the bioreactor system have been distributed to Fiji, Nauru, Marshall Islands and Palau. Other crops, including taro and cassava, are now being trialled using the new system. In November, CePaCT will take delivery of four new bioreactor systems. The acquisitions are supported by the NZAid, USAID, the Australian Centre for International Agricultural Research, and the United Nations Development Programme.

### 'Lifuka Island – The Coastline of a Future Pacific' screens on Fiji TV

A documentary produced by SPC, which is being made available to audiences throughout the Pacific, aired on prime-time Fiji TV in September. The film examines the challenges faced by residents of Lifuka Island in Tonga following a 7.9 magnitude earthquake in 2006 that resulted in the island



subsiding rapidly by approximately 23 centimetres. Following the earthquake, the Government of Tonga asked for assistance from the Government of Australia to implement a project that would study the resulting effects on the shoreline and develop adaptation options. In turn, the Pacific Australia Climate Change Science and Adaptation Planning Program (PACCSAP) approached SPC, which put together an inter-disciplinary team of experts. The team produced detailed scientific data and analysis and examined social dimensions. A range of maps and information products on coastal vulnerability and long-term adaptation were provided for the community. The rapid subsidence of Lifuka Island and ensuing coastal erosion, and related issues, are seen as an approximation, or case study, of future challenges in the Pacific with rising sea levels projected.



More data needed on dual impacts of climate change and increasing fishing pressure.

A new *Status Report: Pacific Island reef and nearshore fisheries and aquaculture 2013* produced by SPC's Fisheries, Aquaculture and Marine Environment (FAME) Division has highlighted the need to develop monitoring tools and implement long-term national and regional monitoring programmes for climate change in the fisheries sector. Lindsay Chapman, Manager of SPC's Coastal Fisheries Programme, says population pressures are impacting the fisheries sector. 'Our problem is to collect accurate data on these fisheries – who is catching what, and how much are they taking?' he says. 'Without good data, it is difficult to establish reasonable limits and good management plans.' Chapman says the need for reliable catch information and sensible management is more important than ever, given the dual impacts of climate change and increasing fishing pressure.

The publication is available here:

[http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Anon\\_13\\_Status\\_Report.pdf](http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Anon_13_Status_Report.pdf)

## Climate forecasting tool for Pacific Island countries

Pacific Island meteorology departments are being equipped with a new forecasting tool developed for PICs by the Australian Bureau of Meteorology. SCOPIC – Seasonal Climate Outlooks in Pacific Island Countries – is a software package that can provide more accurate forecasts and indicate the likelihood of drought or heavy rain based on available data. The package, training and system updates are provided to meteorology departments with the support of the Australian government. A system upgrade is being developed by the Climate and Oceans Support Programme in the Pacific (COSPPac) and implemented in partnership with SPC's Applied Technology and Geoscience Division (SOPAC).

## New provincial emergency operations centres in Solomon Islands

New provincial emergency operations centres (EOCs) have been constructed in Lata and Kirakira and a third in Gizo is due for completion in October. The EOCs function as command and control facilities responsible for disaster preparedness and emergency coordination. The centres 'will strengthen the provincial governments' capacity to deal more effectively with disaster management', says Loti Yates, Director of the National Disaster Management Office (NDMO). 'We are grateful for the support of EU in making these funds available through this project.' Successful implementation of the project, which began in 2008, is a credit to the collaboration between Solomon Islands' NDMO in the Ministry of Environment, Climate Change, Disaster Management and Meteorology and SPC's Disaster Risk Reduction Programme.

## More EU support for renewable energy and energy efficiency in North Pacific

Further support for the North Pacific ACP Renewable Energy and Energy Efficiency Project (North-REP) was confirmed by EU during the Pacific Islands Forum in Majuro in September. An additional €722,000 has been agreed on to support North-REP initiatives across three countries – Federated States of Micronesia (FSM), Republic of Marshall Islands (RMI) and Palau. This comes on top of an extra €1.05 million allocation for North-REP in RMI and the original North-REP project agreement of €14.44 million. North-REP, which is implemented by SPC's Economic Development Division, is increasing access to electricity and reducing dependence on fossil fuels through improving energy efficiency and making commercially proven renewable energy technologies available. The project aims to improve the quality of life on outer islands and support national goals as well as progress towards the Millennium Development Goals.





## UNFCCC adaptation committee visits SPC activities in Fiji



United Nations UNFCCC Adaptation Committee with Naboutini community members

Members of the Adaptation Committee of the United Nations Framework Convention on Climate Change (UNFCCC) visited two SPC project sites in the Sabeto District of Fiji on 4 September 2013.

The purpose of the visit was to ‘showcase some of the adaptation measures and actions that are being taken by local communities in responding to climate change impacts,’ says Luke Daunivalu, who is the representative for small island developing states (SIDS) on the committee.

The Adaptation Committee members are nominated by their government and regional groupings and act in their personal capacity. Daunivalu is the Deputy Permanent Representative of Fiji to the United Nations stationed in New York.

Committee members travelled to Fiji from Austria, Bangladesh, Bolivia, Jamaica, Japan, Malawi, Maldives, Montenegro, Sudan and the United States.

Their first stop was the Vaturu District School in Nagado where the community, with assistance from SPC and the Fiji Ministry of Agriculture, has established a seedling nursery. School children and community members are learning agroforestry skills to increase yields and adapt farming practices to a changing climate.

Their efforts include propagating ‘climate-ready’ crop varieties supplied by SPC’s Centre for Pacific Crops and Trees (read more about these crops on page 9).

Next the Adaptation Committee visited the village of Naboutini where they sat side by side with community members at a disaster risk reduction training session. The training is integrated into adaptation initiatives because of the relationship between climate change and disaster risk management (DRM). Following the training, the communities coordinate with authorities to devise a community disaster plan (read more on page 11).

SPC is at the leading edge of an emerging global trend to integrate climate change adaptation and DRM objectives at the community level. In SPC this is being done through better coordination and mainstreaming of climate change and DRM across the organisation’s seven technical divisions.

The Naboutini locals answered many questions put to them by the Adaptation Committee, including: ‘What is your motivation for participating in the DRM training?’ and ‘What do you see as the benefit of combining DRM with climate change adaptation?’

Daunivalu says the purpose of the Adaptation Committee is to, ‘promote coherence on all adaptation-related activities under the Framework Convention on Climate Change and to a certain extent outside the Convention.’

The site visits were scheduled to precede the Fourth Meeting of the Adaptation Committee in Nadi, Fiji from 5 to 7 September 2013. ‘It is the first time many of them (committee members) have visited a small island developing state. It is a unique opportunity for Fiji to represent all of the SIDS and present the challenges they face,’ says Daunivalu.

SPC has 22 Pacific Island member countries and territories (in addition to Australia, France, New Zealand and the United States) and supports development partner funded climate change adaptation and disaster risk management initiatives throughout the region. In Sabeto, the communities are taking part in a USAID funded pilot project aimed at increasing the resilience of food production systems in the Pacific (more on page 11).

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## CePaCT assists drought recovery in Marshall Islands



Lab technicians at work in CePaCT's biosecurity controlled facility



Plantlets are multiplied and transferred to the field

On May 7, 2013, a state of disaster was declared in the Republic of the Marshall Islands (RMI) following months of drought. The New Zealand Red Cross reported at the time that breadfruit and coconut trees were dying, banana and taro crops were failing, and up to 11,000 people could be affected by crop losses.

SPC's Centre for Pacific Crops and Trees (CePaCT) has been assisting recovery efforts in RMI by sending planting materials from the climate-ready crop collection, which is used to help re-establish food crops on affected atolls.

'We were informed that 15 islands were affected in the north of the country and their crops had been badly damaged,' says Logotonu Waqainabete, Assistant Curator at CePaCT.

A scheduled delivery of plantlets (small plants) was sent from CePaCT to RMI's Ministry of Resources and Development in March with support from the New Zealand Aid Programme. Once in country, these plants are grown and continually multiplied through the use of cuttings. The established cuttings are then distributed to the islands in need.

The scale and urgency of the crisis required considerable resources, says Waqainabete. Plants were also being sourced from other islands in RMI that were not affected by drought but, 'they looked at what they had on the ground and it wasn't enough so they asked us to provide more,' she says.

SPC agreed to work in partnership with the United Nations Development Programme (UNDP) and the UN Food and Agriculture Organization (FAO) to support drought recovery. A CePaCT staff member travelled to RMI in July to provide on-the-ground technical assistance and deliver another batch of nearly 400 plantlets. 'We sent a number of different crops – bananas, taro, sweet potato, swamp taro – all from the climate-ready collection. We also provided other crops such as breadfruit and Irish potato that were requested.'

'The climate-ready collection includes crop varieties that have demonstrated tolerance to different climatic conditions in the Pacific. Some of the varieties come from Asia and they have also been evaluated in harsh conditions,' says Waqainabete.

With the agreement and assistance of SPC member countries and territories and in collaboration with the Biosecurity Authority of Fiji, CePaCT collects samples of crop varieties from throughout the Pacific. The plant material is catalogued and virus indexed using the centre's virus testing facilities.

Researchers at CePaCT evaluate crop varieties that have been

recommended by countries for their ability to grow in difficult conditions. These conditions, including high temperatures, drought, waterlogging and increased salinity, are simulated in the laboratory and the crops that perform well are further evaluated in field trials. Crop varieties that can tolerate difficult conditions and produce yields are added to the climate-ready collection.

These climate-resilient crops are mass propagated and distributed to agricultural ministries and farmers around the region to help them increase crop diversity and meet the challenges of climate change. The virus screening procedures at CePaCT ensure that the crops are fit for distribution.

A technical mission including the delivery of another batch of climate-resilient plantlets is being prepared for delivery through the SPC/UNDP/FAO partnership to RMI in October. CePaCT's support for RMI builds on its experience in providing similar drought recovery assistance to Tuvalu in 2011. The distribution of hardier crops to these remote communities is important in equipping them to cope with drought and other adverse climatic conditions in future.

The climate-ready collection was established in 2009 with funding from the Australian government.

CePaCT is now an internationally recognised germplasm research facility with the world's largest collection of taro and other aroids. Its unique collections and its status as the international gene bank for taro has encouraged support from donors, including long-term grant support from the Global Crop Diversity Trust. CePaCT distributes crops using the standard material transfer agreement of the International Treaty on Plant Genetic Resources for Food and Agriculture.

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## IPCC AR5 Working Group I report released



Dr Webb

The Intergovernmental Panel on Climate Change (IPCC) has begun publishing its fifth series of assessment reports. The process began with the report of Working Group I: The Physical Science Basis published on September 27, which states that human influence on the climate is clear, according to the IPCC.

Two further working group (WG) reports will follow in 2014 – WG II: Impacts, Adaptation and Vulnerability, due in March, and WG III: Mitigation and Climate Change, due in April. A synthesis report in October 2014 will complete the AR5 process.

Arthur Webb, the Manager of SPC's Oceans and Islands Programme and one of a team of eight authors preparing the small islands chapter of the forthcoming WG II report, says he is 'completely convinced by the importance of the (assessment reporting) process.'

'There is no other product in the world quite like it. There is ambiguity and confusion about the science of climate change and this is an opportunity – once every seven years – to draw a line in the sand and say "this is what we know at this time". It's an intergovernmental panel and the reports are internationally

agreed to. So it's a massive effort and I think it is hugely important because it sets the scene in terms of our understanding of climate change.'

Dr Webb became involved in the IPCC process through his work in coastal science and tropical shoreline systems in particular.

'Many of the tropical beaches on high and low islands in the Pacific are living tropical reef mediated systems, which is a specialist area of study and there aren't many practitioners working in this field. So I received a direct invitation to be involved with the IPCC WG II report.'

Like many scientists involved in the reporting process, his contributions are in addition to the demands of his regular job. 'The challenge is finding the time. SPC has supported the effort but given normal work commitments much of my input into the IPCC reports is done in my own time.'

The approved Summary for Policymakers and accepted final draft of the WG I report are available on the IPCC website <http://www.ipcc.ch>. Webb's contributions through the WG II report will be available toward the end of March, 2014.



## Measuring sea-level rise in the Pacific

Anticipating the effects of climate change on sea level is a pressing task, particularly in the Pacific. Getting hard data on sea level into the hands of decision makers and scientists is one of the roles performed by the Oceans and Islands Programme (OIP) in SPC's Applied Geoscience and Technology Division.

OIP works in partnership with the Australian Bureau of Meteorology and Geoscience Australia on the Climate and Oceans Support Programme, which is funded by the Australian government. The programme maintains and operates the Pacific Sea Level Monitoring (PSLM) array – a series of sea-level gauges in 14 Pacific Island countries. The project, which was established in 1991, currently produces a 24/7 stream of high-quality data including sea level, barometric pressure, wind direction, wind speed, air and sea-surface temperatures and GPS monitoring.

The sea-level gauges are affixed to a wharf or similar structure. An important part of the process is therefore ensuring that the gauges are measuring sea level and not the elevation or subsidence of an island due to an earthquake, for example. Part of OIP's work involves routine high-precision surveys between the sea-level gauge and a fixed GPS monument further inland. Ensuring that this relationship remains accurate permits the PSLM array to employ the Global Navigation Satellite System

to cancel vertical ground movement and produce sea-level measurements with a high degree of accuracy.

The data produced by the PSLM project provides critical information used in early warning systems, development planning, inundation modelling and research throughout the region.

The system's reliability is also important for scientists trying to discern a slow, incremental signal for sea-level rise amid huge daily and seasonal fluctuations. Arthur Webb, the Manager of OIP, explains this process.

'If we pick a location, let's say Fiji, you've got a tidal range of 1.5 to 2 metres. Sea level is shifting by this amount on a daily basis. Tidal change over months and years is a part of what we call natural variability and it is completely predictable,' he says.

'Over an annual cycle, we also have periods where the tides are either exaggerated or suppressed due to natural cyclic processes as the Earth completes its annual orbit of the Sun. The predictable higher, high tides are commonly referred to as a 'king tide', although this is not a scientific term. These tidal variations are also easily predictable.'

'There are decadal and multi-decadal cycles that influence sea level as well. These are more subtle and not so easily





Watching the shoreline in eastern Tongatapu, Tonga's main island

## Measuring sea-level rise in the Pacific (continued)

recognised, but they are also predictable and part of the natural regime of sea-level variability all over the world.'

'Now, superimpose meteorological variability on top of all this predictable variability. We have things like storms, which cause surge, and El Niño and La Niña seasonal effects, which can last for years or sometimes only months, and these can shift sea levels up or down by up to half a metre in some locations.'

'When you combine all of these inputs you get a very noisy signal over a large bandwidth, a couple of metres in the case of our example, Fiji.'

'Sea-level rise, on the other hand, is incremental and measured in millimetres per year and it's not the same all over the world. The global average is about 3 mm a year at present. When you try and chart a 3 mm change over this massive variability it can be a very difficult task. This is why it can be so difficult to describe accurately whether an impact is the result of climate change related sea-level rise or natural variability.'

As a result, says Dr Webb, 'we have an imperfect understanding of how meteorological variability may be changing, but we have quite a good understanding of historical variability. We know that variability is massive. Sea-level rise is incrementally shifting the baseline upward and we can expect the peaks to become worse over time. In other words, the extremes in sea level will keep getting incrementally higher in most locations. However, it is also critical to understand wave effects to predict flooding and inundation hazard. Most reported sea-flooding

events in the Pacific region are associated with extreme wind and wave events.'

The PSLM array is the only sea-level monitoring array in the Pacific. As well as providing highly accurate local data where the gauges are installed, this system also contributes to the calibration of satellite sea-level monitoring systems, which give complete coverage of the Pacific region and world.

'It is a really far-sighted, large and extremely important system for the region,' says Webb. 'Its value is recognised by IPCC, the governments of Pacific Island countries and many research groups.'

'Sea-level rise is not consistent and linear, and the new IPCC Working Group I report shows us that rates of sea-level rise are accelerating. So we need to continue measuring to ensure we are aware of regional rate changes in the Pacific Islands. It takes about 40 years of sea-level measurements to obtain an accurate rate of sea-level rise in any one location. At this time, the gauges have mostly been in the water for about 20 years. With each passing year, the data they produce becomes more and more valuable in assisting the region to understand the facts regarding sea-level rise.' v

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## Delegates talk national budget support for delivery of climate change finance



More than 60 participants from eleven Pacific Island countries and seven international organisations met at the Scenic Hotel in Tonga to discuss possible delivery of climate change finance through direct national budget support from international donors.

The meeting sought to demystify the often complex and convoluted flows and requirements of international climate change finance for delegates from Pacific Island government ministries.

Frances Reupena from the Ministry of Natural Resources and Environment in Samoa and Chanel Iroi from the Ministry of Environment, Climate Change and Disaster Management and Meteorology in Solomon Islands shared experiences and lessons learned from their countries. Both have successfully secured national budget support from EU.

Kevin Petrini, Regional Climate Change Advisor with the United Nations Development Programme, says the discussion will have tangible benefits. 'A regional meeting like this, which supports the call made by Pacific Leaders, really adds value because it brings international thinking on the issue (climate

finance) and shares it with the national level. And then it also takes national experiences and allows these to be shared among the other nations, especially the small island developing states.'

'The climate finance landscape is changing very rapidly since Copenhagen. I think there have been a lot of expectations built and not a lot of information about how countries can access and manage finance, and so I think it helps translate those international pledges and ideas and thoughts into national realities,' he says.

The meeting, which ran from 25 to 27 September, was organised by the Global Climate Change Alliance: Pacific Small Island States (GCCA: PSIS) project. The GCCA: PSIS is implemented regionally by SPC and supports nationally implemented climate change adaptation projects in nine Pacific Island countries with funding provided by EU.

### For further information contact:

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## More Global Climate Change Alliance: Pacific Small Island States news

During the July–September quarter 2013, GCCA: PSIS Project Design Documents for Niue and Tonga were agreed on and signed between SPC and the respective national governments.

In Niue, the government will provide locally manufactured 5000-litre water tanks to 214 households. The tanks will supply 45% of the island's population and complement two existing rainwater storage projects funded by the Global Environment Facility and the Australian government (Pacific Adaptation to Climate Change [PACC] and PACC+ projects). GCCA: PSIS will

complete the delivery of large-capacity domestic rainwater tanks to all of the island's 477 households.

In Tonga, the government will manage the establishment of coastal protection using a hybrid of hard and soft methods. The construction of permeable groynes and small detached breakwaters will be combined with sand replenishment and planting of site-appropriate plant species, such as mangroves. The pilot project in eastern Tongatapu will focus on six low-lying communities identified as vulnerable to the progressive effects of coastal erosion and sea-level rise.

The results of the project will be used to inform the preparation of a wider coastal management plan in Tongatapu.

The '3<sup>rd</sup> Planning and Steering Committee Meeting' of the GCCA: PSIS was held on Monday 30 September and Tuesday 1 October. The GCCA: PSIS project receives €11.4 million in EU funding and supports climate change adaptation projects in Cook Islands, Federated States of Micronesia, Kiribati, Marshall Islands, Nauru, Niue, Palau, Tonga and Tuvalu. These are implemented nationally by governments.





## Community Disaster Plans incorporated in climate change adaptation

Six communities in the Sabeto District of Fiji – Koroiyaca, Korobebe, Naboutini, Narokorokoyawa, Nagado and Natalau – recently completed a week-long disaster risk reduction training programme and produced community disaster plans.

The goal of the plans is to promote structures and coordinated action that will make each community safer in the event of a natural disaster. The plans were developed by a Disaster Management Committee in each community with guidance from the Office of the Commissioner Western and in collaboration with SPC, the National Disaster Management Office and the Ba Provincial Office.

The communities are part of the 'SPC Enhanced Climate Change Resilience of Food Production Systems in Pacific Island Countries and Territories' project funded by USAID. The project is integrating disaster risk reduction and climate change adaptation across pilot sites in Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu.

The project, which aims to promote climate change adaptation through agricultural innovation and planning, includes the use of satellite geographic information system (GIS) mapping and introduction of climate-resilient crop varieties and more resilient agroforestry farming techniques.



Following the successful establishment of community seedling nurseries in Sabeto, Fiji, specialists from the SPC Land Resources Division are working with staff from agriculture ministries in Samoa, Solomon Islands, Tonga and Vanuatu to establish community seedling nurseries and livestock units at pilot sites as a means to diversify terrestrial food production systems.

### For more information contact:

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## Stakeholders in Cook Islands discuss roadmap for disaster and climate resilient development



The Office of the Prime Minister in Cook Islands called a special meeting of the National Platform for Climate Change and Disaster Risk Management on Friday 4 October 2013. The purpose of the meeting was to give Cook Island stakeholders the opportunity to make suggestions about the proposed new regional strategy for disaster and climate resilient development in the Pacific (SRDP).

The development of the SRDP, referred to as 'the roadmap process', is led by Pacific Island countries and territories. Stakeholder engagement is being sought throughout the Pacific region in a variety of forums. During the Cook Islands meeting, participants had the opportunity to learn about the roadmap process and make suggestions concerning its development.

Teina Mackenzie is an Executive Board Member for the Te Ipukarea Society, an environmental NGO in Cook Islands. She says, 'The most encouraging aspect of the recent meeting is that

it seeks true engagement of stakeholders and the community at the outset of the proposed strategy.'

The meeting took place at the New Hope Church in Rarotonga and was attended by representatives from government, NGOs and the private sector. It was chaired by William Mocevakaca Tuivaga from Climate Change Cook Islands in the Office of the Prime Minister, and facilitated by Cristina Casella, Disaster Risk Management and Climate Change Policy Adviser with the Secretariat of the Pacific Community and Professor John E. Hay, a regional advisor working on the development of the SRDP.

The SRDP is the next step in addressing climate change and disaster risk management in the Pacific from 2016 onward. It will supersede the two current frameworks, the Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005–2015 and the Pacific Islands Framework on Climate Change 2006–2015, after they expire in 2015.

Further consultative meetings in other countries will be held in the coming months. These will include representatives from non-governmental and faith-based organisations, the private sector and development partners.

For more information please contact,

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## Staff profile



**Name:** Kilifi O'Brien, 38 years old

**From:** Fongafale, Funafuti Island, Tuvalu

**Position:** Greg Urwin Awardee professional attachment with SPC

Kilifi O'Brien is a recipient of the prestigious Greg Urwin Award 2013. The award, which is funded by AusAID, is open to Pacific Island nationals completing post-graduate study. It has enabled O'Brien, who received a Master of Science in Climate Change from the University of the South Pacific, to join SPC's Global Climate Change Alliance: Pacific Small Island States (GCCA: PSIS) project team for a 6-month period, beginning in July 2013. The GCCA: PSIS project receives funding from the European Union.

'Through my attachment with SPC, I'm getting a birds-eye view and seeing how climate change activities are coordinated across the different divisions of SPC, and how SPC provides assistance to its member countries,' he says.

'I'm learning leadership skills, project management skills, communication skills and influencing skills.

'I'm very thankful to God. It was an overwhelming feeling to receive the award. I am the first person from Tuvalu. My attachment with SPC is providing me with opportunities to travel and participate in professional workshops and high-profile meetings in countries around the region. I have also received training in specific areas like proposal writing. It's providing me with broad experience that will help me when I return to work in Tuvalu.'

O'Brien is currently on leave from his position as Deputy Secretary with the Ministry of Home Affairs in Tuvalu.

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## Development partners

SPC wishes to acknowledge the support it receives from the following development partners:

The European Union



The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)



The Australian Agency for International Development



The United States Agency for International Development



For more information about SPC and the activities of its divisions go to [www.spc.int](http://www.spc.int)

For more Pacific climate change information and calendar events go to [www.pacificclimatechange.net](http://www.pacificclimatechange.net)

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