Regional Synthesis Report

of the Implementation of the

Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005 – 2015 (RFA)

&

Pacific Islands Framework for Action on Climate Change 2006 – 2015 (PIFACC)

2016

Pacific Community
Communauté du Pacifique

SPREP
Secretariat of the Pacific Regional Environment Programme

UNISDR
The United Nations Office for Disaster Risk Reduction

UNDP

PACIFIC ISLANDS FORUM SECRETARIAT

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

EUROPEAN UNION

acp

GCCA
EU Climate Change Alliance

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Contents

Abbreviations

ACP	African, Caribbean and Pacific Group of States
AusAID	Australian Agency for International Development
COP	Conference of Parties
CROP	Council of Regional Organisations in the Pacific
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EDF	European Development Fund
EU	European Union
GCCA	Global Climate Change Alliance
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HFA	Hyogo Framework for Action 2005-2015 Building the Resilience of Nations and Communities to Disasters
IFRC	International Federation of the Red Cross and Red Crescent Societies
IPCC	Intergovernmental Panel on Climate Change
JICA	Japan International Cooperation Agency
JNAP	Joint National Action Plan for climate change and disaster risk management
NAPA	National Adaptation Programmes of Action
NDMO	National Disaster Management Office
NGO	Non-government Organisation
NOAA	National Ocean and Atmospheric Administration (Government of United States of America)
PICs	Pacific Island country
PICTs	Pacific Island countries and territories
PIFACC	Pacific Islands Framework of Action on Climate Change 2005- 2015
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RFA	Regional Disaster Risk Reduction and Disaster Management Framework for Action: An Investment for Sustainable Development in Pacific Island Countries 2005–2015
SIDS	Small Island Developing States
SPC	Pacific Community
SPREP	Secretariat for the Pacific Regional Environment Programme
SOPAC	South Pacific Applied Geoscience Commission (now SPC)
UN	United Nations
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
UNISDR	United Nations Office for Disaster Risk Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)
USAID	United States Agency for International Development
USP	The University of the South Pacific

Tables and Figures


Photo: SPREP

Introduction

This Regional Synthesis Report summarises progress made towards the implementation of the two regional frameworks:

- The Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005–2015 (RFA)
- The Pacific Islands Framework for Action on Climate Change 2006–2015 (PIFACC)

It was a deliverable of the Pacific Roadmap process agreed to in 2011, towards the development of the Framework for Resilient Development in the Pacific: An Integrated Approach to Address Climate Change and Disaster Risk Management (FRDP). This is the final report in a series of reviews, including midterm reviews, for each of the two frameworks.

In 2015, the Pacific Island Forum Leaders extended the RFA and the PIFACC for a year to allow time for the new Framework for Resilient Development in the Pacific – An Integrated Approach to Address Climate Change and Disaster Risk Management (FRDP) to be finalised.

This report is a synthesis of the key progress and lessons learned over the 11 years of implementation of the RFA and PIFACC at the regional level. The report also outlines key challenges faced for implementation and recommendations for moving forward.

Rather than reporting on the RFA and PIFACC separately, this report summarises the progress achieved in the implementation of both regional frameworks. Regional progress is reported against eight themes consolidated from the RFA and the PIFACC. Against each of these consolidated themes, this report provides a synopsis of progress using examples and lessons learned.

It is acknowledged that this report is not an exhaustive summary of efforts undertaken and lessons learned during the timeframe, but is rather a broad summary at a regional level with examples provided.

Key Progress, Challenges and Recommendations

Key progress

- Increased capacity of Pacific Island countries and territories (PICTs) to undertake action to address climate change and disaster risk through the development of governance arrangements within relevant national agencies such as National Disaster Management Offices (NDMOs) as well as creating national government offices for climate change, which are in some cases integrated with the NDMO.
- Many PICTs have a commitment to addressing climate change and disasters through national legislation, policies and plans such as Joint National Action Plans (JNAPs) for climate change and Disaster Risk Managemen.
- Regional coordination mechanisms have been established to provide avenues for more effective collaboration and coordination, support for the implementation of national and regional climate change and DRM priorities, and to share experiences – for example, the Pacific Platform for DRM, the Pacific Climate Change Roundtable, Pacific Meteorological Council, Water and Sanitation Consultations, Pacific Humanitarian Partnership (PHP) and the Pacific Islands Emergency Management Alliance (PIEMA).
- Progress has been made on developing and strengthening climate change and hazard data collection, observation systems and early warning systems that incorporate multiple hazards as well as improve the coordination and interoperability of responses to natural disasters, especially at the subnational and local agency level.
- The United Nations cluster system has been adapted and implemented in many Pacific Island nations in order to build coordination in relation to disaster preparedness, response and recovery. Interoperability has improved in relation to multi-agency response in times of disaster.
- Regional information portals have emerged and are increasingly utilised to provide mechanisms for collection and collation of knowledge and information exchange between stakeholders, and to assist in decision-making processes – for example, the Pacific Disaster Net, Pacific Climate Change Portal, Pacific Solutions Exchange, and the University of the South Pacific (USP) European Union (EU)-Global Climate Change Alliance (GCCA) Knowledge Hub.
- Knowledge, skills and understanding have increased in education systems, particularly through academic institutions formalising qualifications for both climate change and DRM. Technical skills training has been provided via stand-alone training programmes or through capacity building components of projects and programmes.
- Awareness of climate change, natural hazards and options for addressing them has improved across the region, with increased community, national, and regional level projects and programmes.
- Energy security has increased in many countries with policies and action to transition away from reliance on fossil fuels thereby also reducing the carbon footprint of energy supply.
- There has been a significant increase in the scientific assessment of risk and vulnerabilities as well as projects, programmes and initiatives to address them at the local, national and regional level. Community-based approaches to address climate change and DRM continue to be important mechanisms to build local capacity and ownership.
- Acknowledgement has grown regarding the different priorities, needs, challenges and experiences of vulnerable groups – including women, children, older persons and persons with disabilities, both in responding to disasters and coping with the impacts of climate change.
- Capacity of Pacific Islands to effectively engage, negotiate, and collaborate has increased in relation to international forums relating to climate change and Disaster Risk Management (DRM).

Challenges

The Pacific region faces inherent challenges to address climate change and disaster risks. Pacific Island nations are particularly vulnerable as they are exposed to geological and hydro-meteorological hazards such as earthquakes, volcanos, tropical cyclones and extreme weather. The small size, development constraints and geographic isolation of PICTs also present challenges to funding, coordinating, and implementing actions.

Challenges particular to the implementation of the RFA and PIFACC include:

- As many climate change and DRM priorities and needs are addressed through overseas development assistance or targeted environment and climate funds, they tend to be project based and remain, by and large, supply driven. The increasing number of partners and diversity of programmes offered in the area of climate change and DRM to the region continue to cause difficulties with coordination, cooperation and coherence.
- Efforts to mainstream integrated approaches to climate change and DRM into national planning and budgetary processes have been progressing at a national level. Nevertheless, though substantial national achievements have been attained, there are recognised limitations in capacities and resources to translate integrated approaches into national and sector planning, and local actions.
- At both the national and regional level, climate change and DRM have traditionally been the responsibility of different agencies or departments. This has created cooperation challenges, despite their interrelated nature, and led to inefficient use of resources and technical skills.
- Systematic monitoring, evaluation and reporting against national, regional and international frameworks and programmes relating to climate change and DRM presents a challenge for PICTs with limited capacity. This has meant limited recording of results and limited use of lessons learned.
- Investments in scientific data and information have been made in the past decade; however, better links to policies and actions are required.
- Limitations in collection and access to data in a user-friendly format to assist in decision-making, has presented a challenge for the region. Information such as demographic data, hazard mapping, weather and climate data and high resolution climate change projections is required for national and sub-national agencies to undertake evidence-based planning and decision-making and to implement climate change and DRM initiatives on the ground.
- Some PICTs continue to struggle with enforcement of various regulatory instruments such as environmental impact assessments (EIAs) and other mechanisms designed to integrate climate change and DRM into development planning.
- The cross-cutting nature of addressing climate change and disaster risks can pose challenges. For example, adaptation measures at the community level can be impeded by cultural factors such as land ownership, particularly if the measures are structural in nature, as is the case with coastal protection.

Recommendations

- Continue to enhance integrated approaches to address climate change and disaster risks within the context of sustainable and resilient development.
- Continue to build efforts to mainstream actions to address climate change and disaster risks within development planning and finance and across sectors. Empower sectors to take a leading role in resilience building through integrating consideration of climate and disaster resilience at all levels of sectoral initiatives, for example, in the design and maintenance of key infrastructure and community assets.
- Strengthen and build partnerships for resilience across stakeholder groups including national and subnational governments as well as the private sector, civil society, regional partners, development partners and communities. Opportunities for coordinated or network approaches to climate change and DRM projects can assist in addressing the challenges posed by increased development partners and funding.
- Facilitate inclusive processes for resilience building that: 1) directly involve vulnerable groups including youth, persons with disabilities and the elderly; 2) are gender balanced; and 3) build on and help reinforce cultural resilience and community knowledge.
- Robust and coordinated monitoring and evaluation are essential for measuring progress and recording lessons learned, which can then inform future design of policies and initiatives.
- Encourage continued good practice of joint reporting and joint in-country missions for reporting where practical, to reduce the burden on Pacific Island countries (PICs).
- Continue to develop and implement policies and practices that reduce the carbon footprint of Pacific Island countries (PICs), and increase energy efficiency and energy security, while preserving the natural capital of the region. This can be done, for example, through investing in renewable energy resources, improving waste management practices, and sustainably managing marine and terrestrial ecosystems.
- Strengthen capacity at the national level to improve scientific tools to inform hazard, vulnerability and risk assessments, and increase understanding of slow onset climate change effects, particularly through data collection and analysis of meteorological, hydrological, and seismological hazard and risk information, and communication to the public. Improve avenues for national and subnational agencies to link information to evidence-based planning and decision-making, which take into account climate and disaster risks. The coverage of vulnerability and risk assessment at the community level has been sporadic. Increase coverage of assessment and data collection to support evidence based planning and decision-making.
- Continue to develop, improve usability and maintain information portals at the country level to centralise climate change and DRM information and include vulnerability assessments and localised tools for addressing risks.
- Strengthen coordination in preparedness and response to disasters through avenues such as end-to-end early warning systems and a common management system for international, national, and local agency interoperability.
- Encourage and maintain efforts to embrace or revitalise traditional knowledge and coping mechanisms and integrate them into decision-making processes and assessments for natural hazard and climate change risks.
- Support community-based approaches to climate change and DRM and strengthen the capacity of communities to better coordinate projects and approaches and share lessons.
- Regional partners to continue to support PICTs in their efforts to develop or maintain appropriate governance and institutional arrangements that support integrated DRM and climate change adaptation according to PICTs' unique situations. Raise awareness at the national level of regional frameworks to promote effective implementation and ensure resources are allocated for this purpose.
- Consider ecosystem-based approaches to climate change adaptation to strengthen the linkages between adaptation and mitigation technologies.
- Continue to strengthen integration and interoperability of key response agencies to improve coordination. For example, through a unified system of command.

It is acknowledged that this report is not an exhaustive summary of efforts undertaken and lessons learned during the timeframe, but is rather a broad summary at a regional level with examples provided.

Background

Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005 - 2015 (RFA)

The Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005–2015 (RFA) was the regional framework for addressing natural hazards. Its vision set out to improve the preparedness and resilience of Pacific Island nations and communities to disasters, so that Pacific peoples may achieve sustainable livelihoods and lead free and worthwhile lives. The mission of the RFA was to build the capacity of Pacific Island communities by accelerating the implementation of disaster risk reduction (DRR) and disaster management policies, planning and programmes through: development and strengthening of DRR and disaster management including mitigation, preparedness, response and recovery systems; integration of DRR and disaster management into sustainable development planning and decision-making processes at all levels; and strengthening partnerships between all stakeholders in DRR and disaster management.

Themes of the RFA:

- Theme 1: Governance – organisational, institutional, policy and decision-making frameworks
- Theme 2: Knowledge, information, public awareness and education
- Theme 3: Analysis and evaluation of hazards, vulnerabilities and elements at risk
- Theme 4: Planning for effective preparedness, response and recovery
- Theme 5: Effective, integrated and people-focused early warning systems
- Theme 6: Reduction of underlying risk factors

The RFA did not have a specific monitoring and evaluation framework, however, it outlined that it would utilise the set of indicators and monitoring platforms from the global Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters (HFA).

This review is one of many reviews that have been undertaken as part of the reporting process on the HFA. Countries were encouraged to participate in biennial reviews commissioned by the United Nations Office of Disaster Risk Reduction (UNISDR) and where national reports were not completed, findings were included in regional reports developed by SOPAC (now Pacific Community, SPC).

The regional reports for the HFA were submitted to the Global Platform for Disaster Risk Reduction on a voluntary basis. The Global Platform for Disaster Risk Reduction is a biennial forum for information exchange, discussion of latest development and knowledge and partnership building across sectors, with the goal to improve implementation of DRR through better communication and coordination amongst stakeholders.

Pacific Islands Framework for Action on Climate Change 2006–2015 (PIFACC)

The Pacific Islands Framework for Action on Climate Change 2006–2015 (PIFACC) was the regional framework for climate change. It had a vision for Pacific Island people, their livelihoods and the environment to be resilient to the risks and impacts of climate change. The goal of the framework was to ensure Pacific Island people build their capacity to be resilient to the risks and impacts of climate change.

The initial edition of the PIFACC was designed for the expected outcomes to be achieved around six key principles, with national and regional actions. The 2010 review of the PIFACC recommended that these principles be described more as themes. The second edition produced in 2011 expanded the scope to include national, regional and international partners, and to mainstream climate change into regional and national policies and plans across specific sectors. The revised PIFACC provided themes, outcomes, national and regional outputs, an implementation strategy and a monitoring and evaluation framework.

PIFACC Themes:

- Theme 1: Implementing tangible, on-the-ground adaptation measures
- Theme 2: Governance and decision-making
- Theme 3: Improving our understanding of climate change

Theme 4: Education, training and awareness

Theme 5: Mitigation of global greenhouse gas emissions

Theme 6: Partnerships and cooperation

The monitoring and evaluation framework of the PIFACC outlined measureable indicators of national and regional outputs to achieve the expected outcomes. Reporting against the PIFACC took place via a number of mechanisms, which included the PCCR Working Group reports, country profiles, the SPREP annual report and the SPREP meeting, and the Pacific Meteorological Council reports. The Action Plan for the PIFACC identified the Pacific Climate Change Roundtable (PCCR) as the reporting mechanism to monitor the implementation of the framework.

Methodology

This report was compiled through desktop research and one-on-one semi-structured interviews with development partners, CROP agencies, civil society organisations and government representatives working on climate change, DRR and disaster management in the Pacific region. Lessons learned were extracted from one-on-one interviews as well as from the aforementioned evaluation reports.

This report consolidates the findings of existing reports for review of the RFA, HFA and PIFACC including:

- Regional Synthesis Reports:
    - 2005–2007 Regional Synthesis Report on the implementation of the HFA/RFA
    - 2007–2009 Regional Synthesis Report on the implementation of the HFA/RFA
    - 2009–2013 Regional Synthesis Report on the implementation of the HFA/RFA
- Midterm reviews:
    - 2010 Midterm Review of the RFA
    - 2010 Midterm Review of the PIFACC
- Technical working groups of the Pacific Climate Change Roundtable
- The regional workshop on the PIFACC monitoring and evaluation
- Performance monitoring and evaluation reports of SPREP
- Country profiles of the Pacific Climate Change Portal
- National reports on DRM and national communications to the UNFCCC.

Regional progress is reported in relation to eight themes consolidated from the RFA and the PIFACC using examples and lessons learned.

Table 1. Consolidated themes of the RFA and PIFACC

Section	Consolidated Theme	RFA Theme	PIFACC Theme
1	Governance and decision-making	Governance – organisational, institutional, policy and decision-making frameworks	Governance and decision-making
2	Partnerships and cooperation		Partnerships and cooperation
3	Improving understanding of climate change, hazards, vulnerability and risk	Analysis and evaluation of hazards, vulnerabilities and elements at risk	Improving our understanding of climate change
4	Education, training, and information and knowledge management	Knowledge, information, public awareness and education	Education, training and awareness
5	Implementing tangible, adaptation measures and the reduction of underlying risk factors	Reduction of underlying risk factors	Implementing tangible, on- the-ground adaptation measures
6	Effective, integrated and people-focused early warning systems	Effective, integrated and people-focused early warning systems	
7	Mitigation of global greenhouse gas emissions		Mitigation of global greenhouse gas emissions
8	Planning for effective preparedness, response and recovery	Planning for effective preparedness, response and recovery	

Synthesis of Implementation of the RFA and the PIFACC

1 Governance and decision-making

Good governance is central to the achievement of national development goals, as it is an enabler for efficient and effective approaches, management of climate change resources and the timely achievement of DRM outcomes. Both frameworks promote mainstreaming across sectors, across different levels of decision-making, at policy level, and at all levels of development processes. The RFA proposes 'whole-of-government' and 'whole-of-country' approaches to, and integration of, DRR and disaster management processes and decision-making at all levels and across all sectors.

Table 2. Themes of RFA and PIFACC

RFA Theme 1 - Governance – organisational, institutional, policy and decision-making frameworks	PIFACC Theme 2 - Governance and decision-making
a. Disaster risk reduction and disaster management mainstreamed into national policies, planning processes, plans and decision-making at all levels and across all sectors. b. Partnerships and organisational arrangements with and between government agencies, civil society, development partners, communities and other stakeholders strengthened. c. CROP agency partnerships coordinated, harmonised and strengthened to ensure country and outcome-focused delivery of services.[2] d. Good governance by all stakeholders in disaster risk reduction and disaster management at regional, national and local levels strengthened.	2.1 Strengthened national and regional climate change governance mechanisms (i.e. policy and institutional frameworks). 22. Enhanced cross-sectoral and multi-disciplinary coordination, collaboration and decision-making around climate change. 3.3 Enhanced integration of climate change risks into development decision-making processes and assessment cycles, sectoral planning and management at all levels.

1.1 Summary of progress under the RFA and the PIFACC

The region has particularly advanced at the national level with legislation, policies, and national action plans for climate change and DRM. Efforts have also been made to mainstream climate change and DRM considerations in sectoral policies. PICTs have also developed and improved national governance structures to manage climate change and DRM issues, and Council of Regional Organisations in the Pacific (CROP) agencies have improved their partnerships and coordination.

Many PICTs have developed and reviewed national legislation, policies and plans for climate change and DRM. For example:

Republic of the Marshall Islands (RMI) National Action Plan for Disaster Risk Management 2008–2018; Joint National Action Plan for Climate Change Adaptation and Disaster Risk Management; RMI National Climate Change Policy Framework 2011.

- Republic of Fiji National Climate Change Policy 2012; National Green Growth Framework 2015.
- Solomon Islands National Disaster Risk Management Plan 2010; the Solomon Islands National Climate Change Policy 2012–2017.
- Federated States of Micronesia Nationwide Integrated Disaster Risk Management and Climate Change Policy 2013; Joint State Action Plan developed for Yap, Kosrae and Pohnpei in 2014 and 2015.
- Palau National Disaster Risk Management Framework 2010.
- Papua New Guinea National Disaster Risk Management Plan 2012, Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management (KJIP) 2014–2023.
- Niue's Joint National Action Plan for Disaster Risk Management and Climate Change 2012.
- Vanuatu Disaster Risk Reduction and Disaster Risk Management National Action Plan 2006–2016; Vanuatu National Adaptation Project: Resettlement Plan 2012; Vanuatu's National Climate Change Adaptation Strategy 2011.
- Cook Islands Joint National Action Plan for Disaster Risk Management 2011–2015.
- Samoa National Action Plan for Disaster Risk Management 2011–2016; National Adaptation Programme of Action Samoa 2005.

[1] RFA outcomes b) and c) align with Theme 6 of the PIFACC, and outcome c) is the same as Outcome 6.2 of the PIFACC. The RFA outcomes will be reported together with the Partnerships and Cooperation theme in Section 2 of this chapter.

- Tonga Joint National Action Plan 2010–2015, Tonga Climate Change Policy – A Resilient Tonga by 2035.
- Tuvalu National Strategic Action Plan for Climate Change and Disaster Risk Management 2012–2016.

Some PICTs are developing an integrated approach to policy through Joint National Action Plans for Climate Change and Disaster Risk Management (JNAP). The Tonga Joint National Action Plan on Climate Change Adaptation and Disaster Risk Management for Action 2010-2015 was the first JNAP in the region. Many other countries have followed, for example, Cook Islands, Niue, Marshall Islands, Federated States of Micronesia, Kiribati and Tuvalu. Support for development of national action plans have been provided by the Government of Australia, the European Union and partners including SPC, SPREP, United Nations Development Programme (UNDP), and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

Many PICs have also developed national strategic development plans that integrate consideration of climate change and disaster risks. For example:

- Cook Islands National Strategic Development Plan 2011–2015 and the Cook Islands National Sustainable Development Plan 2011–2015.
- Kiribati Development Plan 2012–2015.
- Solomon Islands National Development Strategy 2011–2020.
- Tonga Strategic Development Framework 2011–2014.
- Strategy for the Development of Samoa 2012–2016; Tokelau National Strategic Plan 2010–2015.
- Tuvalu Infrastructure Strategy and Investment Plan 2012.
- Government of the Republic of Vanuatu, Priorities and Action Agenda 2006–2015.

Offices or units for climate change and DRM have been developed across the Pacific within government structures and in some circumstances integrated into one office. For example, Solomon Islands has established the Ministry of Environment, Climate Change and Disaster Management and Meteorology. The National Advisory Board of Vanuatu (NAB) on Climate Change and Disaster Risk Reduction was developed in 2012 to manage and coordinate programmes, projects and initiatives. The NAB provides an example of national action to integrate climate change and DRR to reduce duplication and increase collaboration and strategic management of priorities for Vanuatu.

A number of regional frameworks integrate disaster and climate resilience. For example:

- Pacific Framework for the Rights of Persons with Disability (PFRPD) 2016–2025, which addresses persons with disabilities in climate change adaptation measures and disaster risk management plans and policies.
- Towards an Energy Secure Pacific: A Framework for Action on Energy Security in the Pacific (2010), which aims to support the efforts of PICTs to work towards ensuring that all their people, at all times, have access to sufficient sustainable sources of clean and affordable energy and modern energy services to enhance their social and economic well-being.
- Pacific Islands Meteorological Strategy 2012–2021, which aims to ensure national meteorological services of the PICTs are able to provide relevant weather and climate services to their people so they can make informed decisions for their safety, socioeconomic well-being, prosperity and sustainable livelihoods.
- Western Pacific Regional Framework for Action for Disaster Risk Management for Health (DRM-H) 2015 calls for the implementation of the health component of risk management across prevention, preparedness, response and recovery efforts, and recognises the key role of the health sector in managing risks related to all hazards.

Tools have been developed that provide guidance for development of policy and mainstreaming of climate change and DRM. For example:

- Guide to Developing National Action Plans: A Tool for Mainstreaming Disaster Risk Management 2009 published by SOPAC (now SPC).
- Mainstreaming Climate Change into Development in the Pacific: A Practical Guide 2013, produced by the SPREP and UNDP.
- Risk Governance: Building Blocks for Resilient Development in the Pacific – A Policy Brief 2016, produced by UNDP through the Pacific Risk Resilience Programme (PRRP).

CROP agencies have undertaken actions aimed at readjusting their modus operandi to focus on country and outcome-focused delivery of services. For instance:

- SPC has collaborated with each of its members to develop joint country strategies that outline the scope of engagement over a defined period. The support provided is based on national priorities and national development strategies. The SPC Strategic Plan 2016–2020 aims to improve multi-sectoral responses to climate change and disasters in the countries and territories of its member states.
- The SPREP Strategic Action Plan 2011–2015 includes climate change as a strategic priority with the goal of ensuring all members strengthen their capacity to respond to climate change through policy improvement, implementation of practical adaptation measures, enhancing ecosystem resilience to the impacts of climate change, and implementing initiatives aimed at achieving low-carbon development.

1.2 Lessons Learned

- In order to effectively mainstream disaster and climate change risk into development processes, deep-seated governance issues need to be tackled. Risk governance provides the enabling environment for risk informed development through people, mechanisms and processes.
- The challenge of coordinating the implementation as well as monitoring, evaluation and reporting of various interrelated frameworks at a national level can be overwhelming for some PIC governments.
- Robust and coordinated monitoring and evaluation are essential for measuring progress and recording lessons learned, which can then inform the future design of policies and initiatives. Support is important for PICs to build their capacity for monitoring, evaluation and reporting.
- Streamlined indicators at the national, regional and international level, and joint in-country missions for reporting can reduce the reporting burden on PICTs.
- Governance, coordination mechanisms, and policies, which integrate climate change and DRM, tend to streamline processes, reduce duplication, and make better use of resources. For example, JNAPs for climate change and DRM are useful tools for mainstreaming climate change and DRM within national and sectoral policies and plans.
- Coordination of implementation of national and regional frameworks requires dedicated time and resources, both capital and human. Resource coordination and planning, beyond convening annual meetings, are required. A dedicated person, coordination unit, or secretariat within national governments to coordinate the implementation of JNAPs can facilitate effective delivery of JNAP objectives.

2 Partnerships and cooperation

The PIFACC and RFA both stress the importance of coordinated partnerships to support PICTs in the implementation of the frameworks.

The PIFACC action plan includes 'Partnerships and Cooperation' as Theme 6. Partnerships and cooperation involve the engagement of all relevant stakeholders, including government, private sector, civil society and community-based institutions.

Although the RFA does not include a theme dedicated to partnerships and cooperation, the 'Implementation and follow-up' section advocates for partnerships and coordination activities. In particular, in relation to resource mobilisation, it encourages public and private partnerships to be developed to implement schemes that reduce risks, reduce insurance premiums, and expand insurance coverage, thereby increasing financing for post-disaster reconstruction and rehabilitation.

Table 3. Themes of RFA and PIFACC

RFA implementation and follow-up	PIFACC Theme 6 – Partnerships and cooperation
• The successful implementation of this Framework for Action is dependent on the ownership and combined efforts of governments and all other stakeholders working in partnership to ensure a multi-disciplinary, mutli-sectoral, integrated approach at regional, national and community levels.	6.1 Partnerships and organisational arrangements between government agencies, the private sector, civil society, the community and other stakeholders strengthened. 6.2 CROP agency partnerships coordinated, harmonised and strengthened to promote joint planning, implementation and delivery of country-focused outcomes. 6.3 Existing and emerging international partnerships for the Pacific Island region on climate change and related issues strengthened, effectively coordinated and harmonised to maximise benefits to PICTs. 6.4 Enhanced Pacific advocacy for further international reduction in greenhouse gases and to secure equitable levels of resources for adaptation.

2.1 Summary of progress under the RFA and the PIFACC

Partnerships have been established and have evolved to improve regional coordination of climate change and DRM activities. The convening of regional meetings has provided avenues for increased regionalism in efforts to address climate change and disaster risks. CROP agencies have established mechanisms to better coordinate and partner on climate change and DRM. Mechanisms for technical assistance in-country as well as at international forums have been established. In addition, some partnerships with the private sector have been fostered.

Examples of partnerships that have been established at the regional level include:

- The Pacific Climate Change Roundtable (PCCR), which was established in 2005, under the PIFACC, to monitor and evaluate the progress of its implementation. The PCCR is a regional biennial meeting and comprises five technical working groups responsible for monitoring the implementation of the thematic areas of the framework.
- The Pacific Platform for Disaster Risk Management (PPDRM) is a yearly regional meeting established in 2009 to provide an opportunity for exchange and sharing of experiences, regional priority setting, and information dissemination within the Pacific Island region DRM community. The PPDRM brings together representatives of National Disaster Management Offices (NDMOs), regional organisations, development partners and civil society organisations.
- The Pacific Meteorological Council facilitates and coordinates the scientific and technical programme and activities of the Pacific national meteorological services. It replaced the Regional Meteorological Services directors body to provide policy-relevant advice to SPREP on the needs and priorities of its member countries and territories in relation to meteorology and related fields. The PMC meets biennially and is guided by the Pacific Meteorological Strategy 2012–2021.
- The Pacific Resources and Environmental Economics Network (PREEN) is a network of professionals working together to promote and mainstream the use of economics in environmental management across the Pacific region. A focus of PREEN is to use natural resource and environmental economics data to support and/or underpin economic development and environmental conservation decisions in the Pacific. For example, the PREEN network has developed cost benefit analysis tools and accompanying training to DRM and climate change practitioners. PREEN has over 30 members spanning 18 organisations, including five regional organisations and ten countries.

- The Pacific Urban Forum convened by UN-HABITAT brings together Pacific Island nations, local governments, development partners, civil society and other practitioners to advance the Pacific Urban Agenda as a regional framework to guide urban decision-making. The outcomes of the 2015 Pacific Urban Forum highlighted urban challenges as a priority development issue for the Pacific region.
- The Development Partners for Climate Change (DPCC) is an informal mechanism formed in 2008 by Suva-based development partners to foster greater cooperation in climate change activities in the Pacific.
- The Regional Technical Support Mechanism (RTSM) was established under the Pilot Programme for Climate Resilience (PPCR), the Climate Investment Funds (CIF) and Strategic Climate Fund (SCF). It established a roster of experts across key areas related to climate change, such as adaptation, mitigation, climate science, capacity building, economics and knowledge management and information. Within the RTSM, a Rapid Response Fund (RRF) finances the deployment of experts for PICs on an as needed basis. The RTSM and RRF are initiatives of the CROP agencies, multilateral development banks, development partners, donors and PICs. To date, 55 experts have registered on the roster.

Partnerships between private and public sectors include the following examples:

- SPREP partnered with the Scientific Research Oganisation of Samoa (SROS) and renewable energy companies in Samoa to explore the use of biofuels through the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) programme (see Section 7 for more detail).
- SPC-GIZ partnered with the tourism industry in Fiji to work with hotels to reduce their greenhouse gas emissions through the SPC-GIZ Coping with Climate Change in the Pacific Island Region (CCCPIR) programme (see Section 5 for more detail).
- UNISDR partnered with the South Pacific Tourism Organisation to work with hotel providers in the Yasawa Islands in Fiji on preparedness and business continuity planning.
- Fiji Business Disaster Resilience Council was initiated in 2016 with support from United Nations to build networks and capacity in the business sector to strengthen disaster preparedness response and recovery; strengthen engagement of business with government, regional partners and NGOs; and to map out private sector capacity and resources that can be utilised in times of disaster.

Pacific advocacy for further international reduction in greenhouse gases and to secure equitable levels of resources for adaptation has been enhanced. For example, PICs have participated and taken leading roles in international climate change negotiations and UNFCCC processes in relation to climate change. Fourteen PICs have ratified the Paris Agreement and most have developed their Intended Nationally Determined Contributions to achieving the objectives of the UNFCCC Paris Agreement.

Support has been provided by CROP and UN agencies to build capacity among PICs to participate in international forums on climate change and DRM. For example, PICs have received support in the form of briefing materials and preparatory sessions in advance of the Convention of Parties (COP) meetings. Media and communications support has increased the exposure of Pacific Island issues and the number of climate change stories appearing in the media. In addition, a High Level Support Mechanism (HLSM) was established by SPREP for the purpose of preparing PICs for COP. The HLSM is designed to heighten the effectiveness of ministers and their climate change officials in the negotiation process.

The CROP agencies have improved their coordination and partnership through the Working Arm of the CEO Subcommittee on Climate Change and Disaster Resilient Development (WARD), which meets monthly with focal points from the different agencies to oversee the development and coordination of climate change and DRM actions.

2.2 Lessons Learned

- Strong regional coordination between CROP agencies allows for cross pollination, reduced duplication and better delivery of results in countries in accordance with their national priorities and needs.
- Strengthened partnerships for resilience across stakeholder groups including national and subnational governments as well as the private sector, civil society, regional partners, donors and communities provides opportunities for coordinated or network approaches.
- Partnerships and networks can assist in addressing the challenges posed by increased projects and funding mechanisms.
- Regional partnerships and meetings bring together communities of practice in the Pacific to improve collaboration, exchange of ideas and experience, priority setting and coordination of resources and actions.
- Stronger partnerships between governments, civil society and the private sector can strengthen effectiveness and efficiency of emergency response and recovery actions.

3 Improving understanding of climate change, hazards, vulnerability and risks

Theme 3 of the PIFACC, 'Improving our Understanding of Climate Change', identifies the development of scientific capacity as foundational to its implementation. Improving the quality, access and analysis of meteorological data is essential to understanding climate processes. Theme 3 of the RFA, 'Analysis and evaluation of hazards, vulnerabilities, and elements at risk', also recognises that effectively promoting a culture of resilience requires a greater understanding of the causes and effects of hazards and the physical, social, economic and environmental vulnerabilities to disasters.

Table 4. Themes of RFA and PIFACC

RFA Theme 3 – Analysis and evaluation of hazards, vulnerabilities and elements at risk	PIFACC Theme 3 – Improving our understanding of climate change
a. An integrated framework for disaster risk reduction planning developed and implemented in Pacific Island nations and communities. b. Estimates of disaster risk and vulnerability in place, which will enable informed decisions regarding the impact of disasters on physical infrastructure, and social, economic and environmental conditions in Pacific Island nations and communities. c. Data and statistical information on disaster occurrence and impacts available for the region. d. Implementation of a comprehensive scientific and technical regional database enabling spatial analysis of hazard-prone areas, and establishment of magnitude frequency relationships and loss functions.	3.1 Strengthened technical and institutional capacity to collect, store and analyse data used to detect climate change signals in the Pacific (current variability). 3.2 Strengthened technical and institutional capacity to apply analytical frameworks, models and tools to project future climate changes in the Pacific (future climate change). 3.3 Strengthened capacity to apply analytical frameworks, models and tools (appropriate to the Pacific) to assess national and regional climate change vulnerability (impacts/ vulnerability to current and projected climate changes).

3.1 Summary of Progress under the RFA and PIFACC

There has been strengthened collaboration in relation to regional scientific databases and local efforts underway for integrated frameworks on DRR planning. Services to collect data to predict climate change assists PICTs to understand make more risk-informed decisions. Efforts have been made towards the establishment of systems to predict, model and assess climate variability and exposure of infrastructure and assets, including environmental assets and natural disasters. These tools and systems have also been used to assist in substantiating the cost of disasters.

A number of databases and spatial analysis tools have been developed to assist in risk-informed decision-making. Web-based map servers were first introduced to PICs through the SOPAC-implemented, European Union-funded EDF 8 & 9 project, Reducing Vulnerabilities of Pacific ACP States, to make data and information more accessible to a range of stakeholders. The high cost of internet access and limited in-country capacity to maintain the servers saw most countries not utilising the technology. However, recent advances in technology and data hosting options have seen more countries using online portals to publish and share public data and information.

The following is a list of examples of data collection, management and analysis systems that can assist with improved understanding and analysis of climate change and natural hazards and risks:

- The Pacific Risk Information System (PacRIS) was established under the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI). It houses the most comprehensive regional database of baseline exposure (buildings, infrastructure and crops) and probabilistic risk assessment results for 15 countries. PacRIS also includes a regional historical hazard catalogue of earthquake and tropical cyclone events and a historical loss database for major disasters. It includes country-specific hazard models that simulate earthquakes, tsunamis and tropical cyclones. Risk maps showing the geographic distribution of potential losses for each PIC as well as other visualisation products of the risk assessments can be accessed through the open-source web-based platform. PacRIS enables proactive regional integration with the Open Data for Resilience Initiative that advocates the sharing and use of information for building resilience to natural hazards in a changing climate. PCRAFI is a joint initiative of SPC, the World Bank

and the Asian Development Bank with financial support from the Government of Japan and the Global Facility for Disaster Reduction and Recovery, and with technical support from AIR Worldwide, Institute of Geological and Nuclear Science of New Zealand, Geoscience Australia, Pacific Disaster Centre, Open Geo, and the Global Facility for Disaster Reduction and Recovery Labs.

- Disaster losses are also systematically collected on the Pacific Damage and Loss (PDaLo) information system, maintained and updated by SPC. PDaLo is supported by UNISDR and was developed using the DesInventar methodology to catalogue disaster related damage and loss in the region. It is an instrument that allows its users to visualise and analyse in space and time, hazards, damage and loss (reported nominal value for damage from an event), which have occurred since 1967, to support decision-making processes related to mitigation actions and risk management.
- The Pacific Islands Global Ocean Observation Systems (PI-GCOS) was established in 2000 due to a decline in observation systems for the Pacific region. The system is based on the premise of the Global Ocean Observation Systems, addressing the total climate system across a number of scientific disciplines including physical, chemical and biological properties, and atmospheric, oceanic, hydrologic, cryospheric and terrestrial processes. The PI-GCOS identifies observations across atmospheric, oceanographic and terrestrial processes, which are the priority needs for the region.
- The South Pacific Sea Level and Climate Monitoring Project (SPSLCMP) was developed in the early 1990s by the Government of Australia in response to PICs' concerns about the potential impact of human-induced global warming on climate and sea-level rise in the Pacific. The project features a network of permanent tide gauges, weather sensors, and land-monitoring stations located in 13 PICs, and information products including annual tide calendars for these and other locations. In 2011, this project was phased into the Climate and Oceans Support Program in the Pacific (COSPPac) supported by Australia.
- The Pacific Sea Level Monitoring (PSLM) project continues the 20-year South Pacific Sea Level and Climate Monitoring Project. The primary goal of the project is to provide a high-quality and reliable record of climate and sea level in the Pacific region. The project also provides information about the processes, scale and implications of sea-level rise and the variability of extreme events for Pacific communities. It makes sea-level data more readily available and usable to support management of coastal infrastructure and industries.
- The Pacific Hydrological Cycle Observing System (Pacific HYCOS) strengthened the capacity of PICs through providing hydrological equipment and capabilities to assess and monitor water resources in relation to flood and drought forecasting. This information is made available to meteorological service providers, national disaster managers and water resources managers. The project was funded by the European Union Water Facility, implemented by SOPAC (now SPC), which hosted the project regional centre with supervision and aid from the World Meteorological Organization and with linkages to the Fiji Meteorological Service and United Nations Educational, Scientific and Cultural Organization (UNESCO).
- Vanuatu, Solomon Islands and Papua New Guinea formed the Melanesian Volcanic Network (MVN) (see Section 6 for more details) to provide a mechanism to strengthen volcano monitoring and assessment of associated risks. It also provides technical and capacity support to national volcano observatories.
- SPC and GIZ have been working with Forestry and Agriculture Departments of PICs to map forestry and agricultural resources to build capacity to manage their responses to the challenges and opportunities posed by climate change. Temporal mapping of vegetation and forest cover using remote sensing techniques have begun with field verifications being undertaken by in-country teams.
- In the South Pacific, the Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project (SWFDDP) 2009–2013 was managed by representatives of nine participating PICs, and supported by the World Meteorological Organization (WMO), built in-country capacity in relation to severe weather forecasting and warning services, and emphasised the importance of liaising closely with those receiving the severe weather forecasts and warnings.

The following is a list of examples of initiatives at the national level in relation to strengthening capacity for analysis of climate change and disaster:

- Vanuatu and Solomon Islands national disaster management offices (NDMOs) have developed disaster loss databases using the DesInventar methodology.
- The Cook Islands Geo Portal Project is an online information centre for disaster risk response and management. It aims for collaboration and continual improvement of emergency response by public, government ministries and key stakeholders, to promote best practices before, during and after disasters. Developed by Emergency Management Cook Islands in partnership with the Government of New Zealand, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), UNDP and SPC.

3.2 Lessons Learned

- Scientific tools are essential to inform hazard, vulnerability and risk assessments as well as understanding of slow onset climate change impacts. In particular, data collection, analysis and communication should be enhanced and made public in relation to meteorological, hydrological, and seismological hazard and risk information.
- Avenues for national and sub-national agencies to link information to evidence-based planning and decision-making should be improved.
- Observation systems and geo-spatial databases involve long-term activities to ensure data is being collected and managed. As such, databases and information systems should be designed for sustainability long after funding for initial implementation. In such cases, the phased approach to project design can promote sustainability and incorporate changes in line with technological upgrades.
- Development of guidelines for the collection and determination of baseline data could be beneficial. Guidelines should include disaggregated data – e.g. sex and age – and information sources, particularly when working with communities or when analysing the impacts of disasters.
- It is important for national agencies, Bureau of Statistics, to share geospatial data and statistics including raw data with other ministries, especially central planning agencies.
- Collection of damage and loss data as well as updating and strengthening information systems is critical to support the display and analysis of climate and disaster impacts across different sectors. There are gaps in collection, monitoring and data access. This is often a result of limitations in funding.
- While there have been innovative developments for databases and progress made towards the type of data collected, issues remain in access, standardisation, and comprehensive collection.
- Data can be locked to a country or a system, therefore data sharing needs to be encouraged including through supporting systems of hardware and protocols.

4 Education, training and information and knowledge management

Building knowledge and capacity to address climate change and disasters is an essential element of both the RFA and PIFACC. Theme 2 of the RFA focuses on improving knowledge, information, public awareness and education, while Theme 4 of the PIFACC focuses on improving education, training and awareness. The RFA has five expected outcomes and the PIFACC has three expected outcomes with national and regional outputs and activities

Table 5. Themes of RFA and PIFACC

RFA Theme 2 – Knowledge, information, public awareness and education	PIFACC Theme 4 – Education, training and awareness
a. Better-informed and more resilient communities as a result of quality public awareness and education programmes. c. Sustainable, user-friendly information management networks in use at national and regional levels. d. Improved knowledge of social, economic and environmental impacts of disasters in Pacific Island nations and communities to monitor the effectiveness of DRR and disaster management measures. e. DRR and disaster management training programmes institutionalised at national and regional levels. f. Accredited and recognised qualifications in DRR and disaster management.	4.1 Increased awareness and understanding of climate change issues among communities and other stakeholders. 4.2 Strengthened capacity to monitor and assess environmental, social and economic risks and impacts of climate change. 4.3 Strengthened capacity to identify, design and implement effective adaptation and mitigation measures that integrate economic, scientific and traditional knowledge.

4.1 Summary of Progress under the RFA and PIFACC

Significant progress has been made in education, training and information and knowledge management in relation to climate change and DRM. Formal qualifications with academic institutions and vocational training have been established across the Pacific in both climate change and DRM. Training programmes have been delivered by multiple agencies and partnerships to build capacity. The Post Disaster Needs Assessment methodology and training has been developed and rolled out across the region, improving skills inpost-disaster recovery efforts. Public awareness and training has increased with many projects and programmes at the national and regional level. Regional information knowledge management systems and professional networks have been established and improved.

The following is a list of examples of formal qualifications that have been established at universities and through vocational training within the region to build knowledge and capacity in relation to climate change and DRM:

- The University of the South Pacific (USP) offers post-graduate Masters and PHD programmes in climate change that include DRM. In 2013, 62 students graduated with a post-graduate Diploma in Climate Change, and seven students were awarded a Master of Science in Climate Change. Climate ambassadors were trained in three sub-regional training workshops: one in Palau for Micronesian countries; one in Fiji for Melanesian countries; and one in the Cook Islands for the Polynesian countries. USP has established the Pacific Centre for Environment and Sustainable Development (PaCE-SD), that undertakes research and projects to adapt to the effects of climate change, and to improve sustainable development. As a way of mainstreaming climate change and sustainable development into the development process PaCE-SD also works with regional governments in an advisory capacity.
- The University of Papua New Guinea offers courses on DRR and climate change adaptation as well as hazards assessment within its curricula. The university hosts a Centre for Disaster Reduction established in 2002. In addition, the centre coordinates projects to advance its knowledge base through studies of past disasters for future learnings and the cause and effect of any contemporary disasters.
- In partnership with SPC, Fiji National University offers a full Post Graduate Certificate in Disaster Risk Management with four units focusing on DRM, DRR, emergency response management and recovery and evaluation.
- The Solomon Islands National University (formerly Solomon Islands Institute of Higher Education (SICHE)) has

offered 'Introduction to Disaster Management' training to nursing students since 2005. In 2012, training material on Initial Damage Assessment was added to the curriculum. The training material has since been used to train student nurses and student teachers in Malaita, Munda and Vanga.

- Regional technical and vocational training on resilience including climate change and DRM have gained accreditation through the European Union-funded, and SPC/USP implemented Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation (EU PacTVET) project. There are eight strands within the certificate that can be tailored to country contexts including: agriculture, energy infrastructure, fisheries, forestry, health, tourism, water resources, and coastal management. Through support from this project some countries have also developed national accreditation. In addition certificates in sustainable energy, renewable energy and energy planning have been developed.
- The Pacific Regional Federation for Resilience Professionals (PRFRP) was established by the EU PacTVET project in 2016. The Federation is an organisation for collective representation in industry and government providing an industry certification scheme for practitioners that sets the benchmark of quality for the profesionalisation of resilience (climate change adaptation and disaster risk management) sector. There is also a Resilience Industry Skills Advisory Committee (ISAC) to facilitate reviews and updates of education and training curriculum and practices in resilience.

The following is a list of examples of training programmes delivered to build capacity in climate change and DRM:

- The Pacific Disaster Risk Management Programme (PDRMP) (1995–2014) was based at SPC and supported by the Asia Foundation with funding provided by the United States Agency for International Development (USAID). It offered a suite of seven technical courses and one skills-based course on DRM to assist in the development of trainers.
- The Post Disaster Needs Assessments (PDNA) has been led by national governments with financial support, capacity development and methodology by the World Bank, the European Union and UNDP. Training for PDNA has been delivered by SPC with support from various funders. Training in Fiji and Samoa in 2014 was funded by the World Bank, and in Palau by the European Union through the EDF10 EU-SPC Building Safety and Resilience in the Pacific (BSRP). In 2015, training was undertaken in Samoa through the European Union through the SPC BSRP Project and the Government of New Zealand through the Samoan Tourism Authority.
- Workshops and simulation exercises have been delivered by UNOCHA and co-facilitated by humanitarian partners and the governments of Fiji, Vanuatu, Solomon Islands, Papua New Guinea, Federated States of Micronesia, Samoa and Tonga. In addition, regional training on education in emergencies was conducted in 2013 by UNOCHA.
- A collaboration between the Pacific Council of Churches and Brot fuer die Welt, implemented the Climate Change and Disaster Risk Assessment Project (CIDRA). This project was designed to build the capacity of its member churches to address climate change and disaster risks in Fiji, Solomon Islands, Vanuatu, Kiribati and Tuvalu.
- Geological Information Systems (GIS) trainings have been provided to NDMOs by SPC to enable the officers to develop applications relevant to their areas of work and responsibilities.

Significant education, training and awareness-raising has been delivered through programmes and projects across the Pacific, for example:

- Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) (see Section 7 for more detail) provided training support to national partners. For example, training of staff of the Niue Power Cooperation, the Nauru Utility Corporation and Tuvalu Electricity cooperation was provided on the technical operation and maintenance of a grid-connected solar PV system. Training on development of energy curricula was provided to Tonga primary schools, and IT training was provided for the Tuvalu Electricity Cooperation in order for information to be communicated to external parties.
- The European Commission-funded Education Sector Disaster Management for School Community Risk Reduction and Preparedness project of Save the Children trained a number of school disaster management champions across various levels of the education sector in Vanuatu and produced information, education and communication materials to be used in schools to build knowledge and capacity to address disaster risks.
- The Climate Adaptation, Disaster Risk Reduction and Education (CADRE) programme by the International Organization for Migration (IOM) aimed to build resilience of vulnerable communities to climate-induced natural hazards, by educating school students in Federated States of Micronesia and Marshall Islands on climate adaptation and DRR.
- US Peace Corps Small Project Assistance (SPA) for Adaptation developed and ran youth camps in Federated States of Micronesia in 2013, which promoted environmental awareness, knowledge and skills in climate change adaptation and DRR at the community level.

- The Pacific Islands Climate Education Partnership (PCEP) is a collaborative network of Pacific Island communities and friends responding to the impacts of climate change in the US-affiliated Pacific Islands. The partnership is a project of Pacific Resources for Education and Learning (PREL). The partnership educates students and citizens across the Pacific about the urgency of climate change impacts through modern science, and the importance of honouring indigenous cultures and environmental knowledge. The National Science Foundation-funded project started in 2011 and serves the Federated States of Micronesia, the Republic of the Marshall Islands and Palau.
- Many Strong Voices is a public awareness initiative borne at the climate change negotiations in Montreal in December 2005, out of a need for joint efforts to raise awareness about the effects of climate change in the Arctic and Small Island Developing States (SIDS) – two of the world's most vulnerable regions. Supported by SPREP, Many Strong Voices is a strong example of regional collaboration for education as it has worked to bring together over 20 organisations from the Arctic and SIDS to take collaborative and strategic actions on climate change mitigation and adaptation at the local, regional and international level.

A range of targeted climate change awareness materials and toolkits have been produced at a regional level for various audiences including children and journalists, for example:

- The Children Take Action children's storybook was produced by SPREP to raise awareness on climate change.
- The SPC/GIZ Coping with Climate Change in the Pacific Island Region (CCCPIR) programme (see Section 5 for more detail) collaborated with the Fiji Ministry of Education, Ministry of Foreign Affairs and the Ministry of iTaukei Affairs in the production of a series of children's storybooks written in the Fijian vernacular on climate change, food security and greenhouse gas emissions.
- The Pacific Climate Crab, a four-minute film to explain climate science, was produced in collaboration between Australian Bureau of Meteorology, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Government of Vanuatu, Australian and Vanuatu Red Cross, and Red Cross/Red Crescent Climate Centre with funding from the Government of Australia.
- The Pacific Media Climate Change Toolkit was produced by SPREP with funding from the Government of Australia. It assists journalists in the region to report on climate change and environmental issues through a series of factsheets and a training manual.

The following are examples of information and knowledge management developments that build awareness and capacity in relation to climate change and DRM across the region:

- The Pacific Disaster Net (PDN) provides a portal for DRM information in the Pacific, serving the purpose of providing archived and up-to-date information. PDN is managed by SPC and connects 1820 subscribers (as of 2014) through a mailing list that sends out a weekly digest of material recently added to the portal. The portal has an established mailing list of stakeholders in the Pacific.
- The Pacific Climate Change Portal provides a platform for readily accessible and coordinated climate change related information and tools from regional and national institutions in the Pacific region. It also serves as a platform for governments of the Pacific to share information. The portal, administered by SPREP, provides country profiles, a directory of experts, climate updates, multi-media files, e-resources, and links to forums such as the Pacific Solutions Exchange. The portal has an associated mailing list – the Pacific Climate Change Information Network.
- The Pacific Solutions Exchange Programme (PSEP) is a programme that facilitates knowledge, resource and experience sharing within the climate change and development community via email across the Pacific. The forum is moderated by the UNDP Multi-Country Office Fiji and is funded by the Government of Australia (AusAID).
- In 2014, SPREP and Griffith University embarked on the Pacific Climate Change Information Management project (iCLIM), funded by the Government of Australia, with the goal of enabling better climate change resilience and adaptation planning in the Pacific region by improving the ability of regional bodies and governments to discover, store, access and utilise climate change information and data.
- The USP EU-GCCA Knowledge Centre, a product of USP's European Union-funded Global Climate Change Alliance (EU-GCCA) Project, holds information on climate science, impacts on climate change and variability, integration of traditional knowledge, lessons learned by communities on past adaptation projects, as well as information on best adaptation practices. The online centre catalogues all student theses in climate change and associated data sets for download in order to provide access to the growing body of research in the Pacific.
- South-South Cooperation between Pacific and Caribbean SIDS on Climate Change Adaptation and Disaster Risk

Management facilitated by UNDP with implementation support from SPC, SPREP and USP, concluded in 2013, having provided a platform for practitioners to share knowledge on technology and skills to build capacity to find suitable solutions and to replicate best practices for addressing the various threats posed by climate change and disasters.

- The STAR Network provides the opportunity for countries and scientists to exchange information, research and experiences in relation to DRM in a regional conference. Following the 2009 tsunami, a special session of the 2009 STAR focused on sharing the scientific and technical findings of personnel involved in the post disaster assessment.

4.2 Lessons Learned

- Disaster management training is most effective when coordinated and led by the national governments, tailored to the local context, and linked to and in support of existing or planned work activities.
- DRM training is highly valued for the development of practical skills, the opportunity to bring together participants from a variety of organisations and the creation of an environment in which to forge effective working relationships that can be called upon in an emergency.
- Capacity building through formal education and on-the-job training is vital for ensuring sustainability of good practice.
- Community-level training is most effective when it is compatible with and linked to local and/or national government policy and processes.
- While one-off training courses have value, greater benefit is achieved through a sustained programme of training that supports development over time.
- Formal courses at regional academic institutions, coupled with the provision of scholarships has enabled access to academic teachings for officials of national agencies particularly those that hold decision-making positions within governments.
- Investment in curriculum development and teacher education has proven to be an effective approach for the introduction of climate change and DRM into school curricula.
- Integration of climate change and DRM into education curriculum at the school level can assist children and youth to act as positive agents of change in their community to build resilience to climate change and disasters.
- While progress has been made in raising general public awareness of climate change and DRM, there is scope for targeted and more detailed awareness-raising on specific topics such as clean development mechanisms.
- The media can be a positive agent for increasing public awareness if they are equipped with accurate and specific information and an understanding of how to communicate information on climate change and DRM.
- Vernacular glossaries of climate change and DRM terminology have been very effective in efforts to raise awareness among those unfamiliar with climate change and DRM issues.
- Existing information portals and geospatial databases have the potential to inform programme design and implementation.
- Knowledge management guidelines could assist with consistent documentation of lessons learned from disaster events, climate change and DRM projects.

5 Implementing tangible adaptation measures and the reduction of underlying risk factors

The first theme of the PIFACC focuses on implementation of best practice adaptation and risk reduction measures with expected outcomes of improved access, management and dissemination of climate change financing from regional to national and down to community levels. Theme 6 of the RFA focuses on the reduction of underlying risk factors through the integration of risk reduction measures in resource use policies in major infrastructure and projects, and in national and sectoral planning. This includes risk assessment codes of practice across key sectors, as well as taking steps to address underlying risk factors such as poverty and population trends.

Table 6. Themes of RFA and PIFACC

RFA Theme 6 – Reduction of underlying risk factors	PIFACC Theme 1 – Implementing tangible, on-the-ground adaptation measures
a. Active steps are taken to address underlying risk factors such as poverty and population trends that negatively impact on community resilience. b. Adoption of risk assessment codes of practice and design standards by key sectors such as private sector, health, transport, communication, construction and agriculture for improving their resilience. c. DRR measures for major infrastructure; industries and projects are covered by planning processes. d. Resource-use policies and practices incorporate risk-reduction measures.	1.1 Enhanced resilience to the adverse effects of climate change through the implementation of best practice adaptation and risk reduction measures. 1.2 Improved access to equitable amounts of climate change financing at regional, national and community levels. 1.3 Improved management and dissemination of equitable amounts of climate change financing at regional, national and community levels.

5.1 Summary of Progress under the RFA and PIFACC

There has been significant increase in the scientific understanding and assessment of risk and vulnerabilities, as well as in the number of projects, programmes and initiatives being implemented at the local, national and regional level. It has been recognized that community-based approaches are important mechanisms to build local capacity and ownership of processes to address climate change and disaster risks.

There has been an increased harmonisation of policies and activities related to climate change adaptation and DRR as they have the shared aim of reducing vulnerability to hazards, particularly hydrological and meteorological hazards.

The following is a list of examples of regional studies to improve on-the-ground adaptation and reduction of underlying risk factors:

- Regional research into the relationship between natural disasters and poverty was supported by the Global Facility for Disaster Reduction and Recovery (GFDRR). In 2009, Fiji was used as a case study to: develop and pilot a method to empirically assess the relationships between disaster and poverty in the Pacific; identify policy implications; and provide recommendations for data collection and management.
- A study undertaken by the University of New South Wales investigating approaches to integrate DRR and climate change adaptation at the community level in the Pacific. The study found that inconsistent governance and legislative frameworks, terminology and funding mechanisms created barriers for integration.
- The Pacific Climate Change Science Programme (PCCSP) funded by the Government of Australia has provided information on past and future climate trends. The PCCSP works across five key areas – including risk reduction – by understanding current and future climate related hazards and climate change impacts.
- The Pacific-Australia Climate Change Science and Adaptation Planning Programme (PACCSAP) and PCRAFI (see Section 3) improve regional risk information on future tropical cyclone wind hazard changes. The PACCSAP is designed to support PICs to develop capacity to monitor and adapt to their changing natural environment and enhance resilience to the impact of climate change through the inclusion of climate science and risk information in development planning.

- The Science and Technology Research Partnership for Sustainable Development (SATREPS) Project (2013–2018) is a collaboration between the Japan Science and Technology Agency (JST) and the Japan International Cooperation Agency (JICA) that works towards sustainable management of coral reefs and island ecosystems responding to the threat of climate change. This includes studies on biodiversity, ocean acidification, sea level rises, economic evaluation of ecosystems, and sustainable management of ecosystems in watershed areas.

Examples of risk assessment codes of practice and design standards are summarised below:

- The Pacific Region Infrastructure Facility (PRIF) is a multi-partner infrastructure coordination and financing mechanism. PRIF provides a framework for better engagement of countries and development partners to facilitate more effective use of available funding and delivery of better infrastructure services. PRIF builds on successful activities in the Pacific to help address gaps in existing infrastructure (water, energy, transport, ICT and urban development), and is developing innovative approaches to the problems of delivering infrastructure services in the Pacific.
- The South Pacific Engineers Association assists countries in strengthening the application and enforcement of engineering standards and building codes to help reduce disaster risks. To date, engineering standards and building codes have been developed in Fiji, Samoa, Vanuatu, Papua New Guinea and Niue. The Samoa National Building Code was reviewed to take into account best seismic information. The Fiji Building Code was reviewed in 2011 with the support of the Fiji Engineers Association.
- The Reducing Vulnerability of School Children to Earthquakes in Fiji Schools Project retrofitted six schools in Fiji to be compliant with the Fiji National Building code as well as with the seismic standards of New Zealand. The project is an initiative of the United Nations Centre for Regional Development (UNCRD) for the Fiji NDMO and supported by SOPAC (now SPC), the Centre for Appropriate Technology and Development (CATD), Fiji Public Works Department, Fiji Institute of Technology (now Fiji National University), the Fiji Institute of Engineers, and the Fiji Council of Social Services.

The following is a list of examples of programmes at the regional level aimed at enhanced resilience through adaptation and risk reduction measures:

- The European Union ACP-EU Natural Disaster Facility has provided funding support since 2009 for a number of projects including funding to eight PICs in two areas: the provision of safe drinking water and the establishment of emergency communications and/or emergency operation centres for targeted countries. Issues of accessing safe drinking water were improved in Tonga, Tuvalu, Nauru, Federated States of Micronesia and the Republic of the Marshall Islands. Rainwater tanks were supplied to Tuvalu and training for the rainwater catchment systems was provided to recipient communities. Water tank storage capacity was improved for Nauru through the rebuilding of the structure housing six ferrocement tanks. In the Republic of the Marshall Islands, 250 rainwater catchments were installed in Ebeye, 350 rainwater catchments in Majuro and 173 rainwater tanks in the outer islands.
- The Supporting Disaster Risk Reduction in Pacific Overseas Countries and Territories, funded by the European Union ACP-EU Natural Disaster Facility EDF9 and implemented by SOPAC (now the Geoscience division of SPC), provided technical assistance to French territories to improve water security, water safety planning, and inundation mapping and modeling in order to reduce disaster risks.
- The Pacific Hydrological Cycle Observing System (Pacific HYCOS) (see Section 3 for more detail) provided equipment, instruments, site installations and training to enable monitoring and assessment of pilot river basins and aquifers, including flood forecasting capability and drought forecasting.
- The Implementing Sustainable Water Resources and Wastewater Management in Pacific Island countries (GEF Pacific IWRM) Project, delivered by SPC and funded by the Global Environment Facility (GEF), improved water resource, wastewater management and water use efficiency in PICs. For example, flow meters were fitted on all abstraction bores in the Mataki'eua Well-field in Tonga and technical support was provided in the form of data analysis and compilation of groundwater data and information.
- The establishment of a mechanism for rapid seedling production and distribution in times of disasters was undertaken by the Samoa Infrastructure and Asset Management (SIAM) Project in 2010. The project aimed to reduce Samoa's coastal vulnerability and strengthen institutional and community response capability, land-use planning and disaster management frameworks. Coastal infrastructure management plans, which considered climate change and DRM, were produced out of this project. The World Bank-funded initiative was led locally by the Planning and Urban Management Agency and the National Disaster Management Office (NDMO) of the Ministry of Natural Resources and Environment (MNRE) of the Government of Samoa.

- The ACP-EU/SPC Building Safety and Resilience in the Pacific (BSRP) project funded by the European Union and implemented by SPC was initiated in 2013 for 15 Pacific ACP states. The project works with countries to strengthen their capacity to address existing and emerging challenges with regard to the risks posed by natural hazards and related disasters, while maximising synergies between DRR and climate change adaptation.
- The third phase of the Pacific Catastrophe Risk Insurance Pilot programme was carried out from 1 November 2014–31 October 2015, following a decision of the Forum Economic Ministers Meeting. The success of the initiative was demonstrated in the rapid response payout of USD 1.27 million to Tonga within two weeks of Tropical Cyclone Ian hitting the Ha'apai group of islands. The pilot is implemented by SPC, the World Bank and the Asian Development Bank, with financial support from the Government of Japan, the Global Facility for Disaster Reduction and Recovery, and the ACP-EU Natural Disaster Risk Reduction Programme.
- In 2008 the Government of Australia, GEF and UNDP-funded Pacific Adaptation to Climate Change (PACC) project was initiated and implemented by SPREP. The project's overall goal was to reduce vulnerability and to increase adaptive capacity to the adverse effects of climate change in key development sectors identified by the beneficiary PICs – namely, coastal zone management, food security and food production, and water resources management. For example, a coastal calculator to assist with designing the harbour to adapt to the expected impacts of climate change was developed and implemented in the Cook Islands.
- The SPC/GIZ Coping with Climate Change in the Pacific Island Region (CCCPIR) initiated in 2009, aimed to strengthen the capacities of 12 PICs to cope with the current and anticipated impacts of climate change and to enhance the capacity of regional organisations, addressing adaptation in two of its five components. The project was commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) with support from GIZ. The project supported regional organisations including SPC, SPREP and the Melanesian Spearhead Group (MSG) in improving their information packages, advisory services and training opportunities on the topic of climate change. It advised the governments of the island states on developing policies and strategies to prepare key sectors of the economy for anticipated climate-related events.
- The Pacific-Australia Climate Change Science and Adaptation Planning Programme (PACCSAP) was managed by the Government of Australia through AusAID and jointly delivered by the Australian Bureau of Meteorology and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) from 2009 until the end of 2011. The programme worked with PICs to improve climate change projections and adaptation planning activities. Building on the success of the PCCSP, the Australian Bureau of Meteorology and CSIRO are continuing to work towards improving understanding of the current and future climate of 15 partner countries in the Pacific.
- The Global Climate Change Alliance: Pacific Small Island State (GCCA: PSIS) project was funded by the European Union and implemented by SPC and SPREP with the overall objective of supporting the governments of nine Pacific small island states in their efforts to tackle the adverse effects of climate change. The purpose of the project was to promote long-term strategies and approaches to adaptation planning, and pave the way for more effective and coordinated aid delivery on climate change at the national and regional level.
- The USP EU-Global Climate Change Alliance (USP EU-GCCA) Project was implemented in 15 Pacific ACP countries with the objective of training national and regional experts on climate change and adaptation as well as the development and implementation of sustainable strategies for community adaptation to climate change. The project resulted in outcomes such as a best practice tool kit, which was developed and disseminated to assist with climate change adaptation projects at the community level.
- The Pacific Risk Resilience Programme (PRRP) of UNDP funded by the Australian Government focuses on strengthening governance mechanisms for risk governance across government functions, including budgeting, planning and financing for the countries of Fiji, Solomon Islands, Tonga and Vanuatu. The project has resulted in, for example, the strengthening of the strategic function of the Vanuatu National Advisory Board and support for the formulation of an integrated climate change and DRR policy for Vanuatu.
- The Enhanced Climate Change Resilience of Food Production Systems in Pacific Island Countries and Territories was fundedthrough USAID, and implemented by SPC in Fiji, Kiribati, Samoa, Solomon Islands and Vanuatu. SPC partnered with the national and provincial governments, regional agencies, development partners and non-government agencies. The project supported updating vegetation and land-cover maps and working with local communities to implement appropriate adaptation measures to build resilience to climate change. For example, to address the growing problem of saltwater intrusion and unpredictable seasons, climate ready staple crops were introduced, with monitoring and prevention of crop pests and diseases.
- Also funded by USAID, the Coastal Community Adaptation Project (C-CAP), implemented by DAI, aims to build the resilience of vulnerable coastal communities in the Pacific region to withstand more intense and frequent weather events and ecosystem degradation in the short–term, and sea-level rise in the long-term.

- International Climate Change Adaptation Initiative (ICCAI) is part of the Pacific Adaptation Strategy Assistance Programme of the Government of Australia that aims to: enhance the capacity of the partner countries to assess key vulnerabilities and risks; formulate their adaptation strategies and plans; and consider adaptation in decision-making. A major output of this programme is country-led vulnerability assessments and adaptive strategies informed by best practice methods and improved knowledge.
- The Mangrove Ecosystems for Climate Change Adaptation and Livelihoods (MESCAL) Project by International Union for Conservation of Nature (IUCN) looked at improving community livelihoods through targeted sustainable management and harvesting of mangrove resources, and increased resilience to climate change. The MESCAL project was funded by the governments of Italy and Austria and is implemented in five PICs – namely, Fiji, Samoa, Solomon Islands, Tonga and Vanuatu.
- Plan International Australia implemented the Child Centered Climate Change Adaptation (4CA) programme under the Humanitarian Partnership Agreement between the Government of Australia (Australian Aid) and Plan International Australia. Implemented in six countries in the Pacific region, the programme had an overall goal of achieving safe and resilient communities in which children and young people contribute to managing and reducing the risks associated with changes in the climate. For example, in Papua New Guinea, children and youth trained under 4CA collaborated with village leaders to resubmit a proposal with clearer demonstration of risks for construction of a seawall, which was then funded by local government.
- The development of the National Sustainable Land Management Project funded by GEF and coordinated by UNDP, provided support to PICs for sustainable land management technologies to minimise land degradation problems and support rural communities in the three key sectors of sustainable management (environment, social services and economy). Through this project, Palau has developed community plans contributing to climate change planning and policy framework development.
- The Water Sector Improvement Programme in Palau was funded by the Asian Development Bank and implemented by the Government of Palau. The project was designed to address regulatory, management, and technical and pricing problems that currently result in high water losses and undermine cost-recovery in the states of Airai and Koror. The programme, 2011 - 2015, supported the merging of the Palau Water & Sewerage Corporation (PWSC) with Palau Public Utilities (PPU), and provided training and technical assistance in areas such as leak detection.
- The Micronesia Challenge is a sub-regional conservation initiative, enhancing community resilience by using traditional knowledge and ecosystem strategies to conserve vulnerable coastal land resources by 2020. It has the goal of conserving at least 30 per cent of near-shore resources and 20 per cent of terrestrial resources. The Micronesia Challenge is a collaboration between the Micronesians in Island Conservation Network (MIC), Pacific Islands Managed and Protected Areas Community (PIMPAC), Locally Managed Marine Areas Network (LMMA) – Micronesia Node, and the Micronesia Challenge Young Champions campaign.

Funding for actions to address climate change are available bilaterally between governments, through development partners and multilateral climate change funds such as the Green Climate Fund, the Adaptation Fund, the Global Environment Facility and Climate Investment Funds (CIFs) implemented by the multilateral development banks. The Green Climate Fund was established by parties to the UNFCCC Conference of Parties (COP) in 2010 as a mechanism to assist developing countries in adaptation and mitigation practices to counter climate change. A number of agencies, for example UNDP, SPREP and IUCN have become accredited to receive funds from the Green Climate Fund in the region. Support is provided to PICs by UNDP, SPREP, IUCN, SPC, GIZ and PIFS to effectively access and manage international climate change funding.

The following is a list of example initiatives that have built capacity in relation to climate change financing at regional, national and community levels:

- The Climate Public Expenditure and Institutional Review (CPEIR) framework was developed by the Capacity Development for Development Effectiveness Facility for Asia and Pacific (CDDE). This framework was used by Samoa in 2012, supported by UNDP, to assess country policies, institutions and the management of public finances as they relate to climate change.
- The Pacific Climate Change Finance Assessment Framework (PCCFAF) was developed by PIFS with support by the Government of Australia and contribution by AusAID, UNDP, SPREP; SPC, Eurpoean Union and EcoSTEPS in response to the need to approach climate change financing in an informed way, commensurate with the specific circumstances and challenges of PICs. The framework was used for assessment of the ability to access and manage climate change resources across six interrelated dimensions and the potential of the country to utilise various modalities to assist in these efforts. The framework was used for climate finance assessments in Nauru in 2013 as a pilot and then in the Republic of Marshall Islands in 2014 with support from SPREP, SPC, GIZ, European Union, USAID, Japan and AusAID.

- The Institutional Strengthening in Pacific Island Countries to Adapt to Climate Change (ISACC) is a regional project funded by USAID and implemented by SPC, SPREP and PIFS to strengthen the national institutional capacity of PICS to effectively plan, coordinate and respond to the adverse impacts of climate change and to access climate financing. The ISACC project is undertaking climate finance assessments to identify gaps and opportunities in country capacity to absorb and manage climate change funding.
- The Climate Finance Readiness in the Pacific programme is implemented by GIZ and PIFS, in close collaboration with SPC and the Pacific Financial Technical Assistance Centre (PFTAC). The project is funded by the Government of Australia (DFAT) and is working to enhance access to climate change finance through support to public finance management reforms as well as project proposals available that meet environmental and social safeguards and are used to support increased access to climate change finance.

5.2 Lessons Learned

- Funding mechanisms have recognised the need for regional projects to articulate national priorities and allow for PICTs to lead project design. Having a strategic action plan that identifies national priorities, removes the burden of duplication by regional programmes and ensures that programming services are targeting national priorities. JNAPs can assist with identifying national priorities for climate change and DRM.
- Continued advocacy is beneficial in terms of raising awareness of the economic, social and environmental benefits of integrating actions to address climate change and disasters into national development plans and for the need for strengthened enforcement of codes of practice or lower risk land-use practices.
- Forming practical partnerships, while time-consuming, are an effective way of maximising the human resources available at the national level in the Pacific Islands, especially noting the high number of similar projects and activities in the region.
- Many projects demonstrate the ecosystem benefits and cost benefits of strengthening the links between climate change adaptation technology and climate change mitigation actions.
- Short-term training courses on project and financial management, accredited by a tertiary educational institution, will help build much needed capacity in areas such as procurement, monitoring and evaluation for project and programme implementation.
- Development partners should work with existing in-country mechanisms such as conducting climate and disaster impact assessments through existing traditional structures.
- Selection of communities for the implementation of climate change and DRM projects should be based on an assessment of vulnerabilities and needs.
- Regional programmes can add value to national initiatives in that they promote the exchange of ideas, practices, and lessons learned across the different countries and subregions. Regional approaches are especially appropriate when addressing climate change and disaster risks as they are cross-boundary in nature.

6 Effective, integrated and people-focused early warning systems

The RFA recognises that for disaster preparedness to be effective, it is essential to have well-functioning early warning systems for all hazards that incorporate traditional knowledge and are linked to the global network. Early warning systems should deliver accurate and understandable information in a timely manner.

Table 7. Themes of RFA and PIFACC
RFA Theme 5 – Effective, integrated and people-focused early warning systems
• Robust, effective national and regional monitoring and early warning systems established and strengthened for all hazards incorporating traditional knowledge and appropriate technology and tools. • Community, national and regional warning systems integrated into the global network supporting early warning and vice-versa to improve safety and security to disasters. • Effective communication and awareness-raising in place as part of these community-focused early warning systems.

6.1 Summary of Progress under the RFA

Work is ongoing to build capacities of PICTs to effectively protect their communities from natural hazards. National agencies responsible for hazard forecasting and warning have worked closely with regional organisations and partners to strengthen institutional capacities.

Early warning systems remain largely hazard specific, using technical language without effective information on potential impact. Improvements can be made in translating the technical information into user friendly language that guides actions for the community.

While support to national meteorological services, national tsunami warning centres and National Disaster Management Offices (NDMOs) has strengthened the collaboration between these key agencies, further investments are needed to ensure that warning messages are made and reach the 'last mile' and communicate to recipients how they should react.

Efforts are underway to merge traditional warning signs used by communities with the current terminology used for warnings.

Examples of regional frameworks that aim to strengthen early warning systems include:

- The Pacific DRM Partnership Regional Early Warning Strategy (REWS) 2008 which identifies key intervention areas for development partners and governments to strengthen end-to-end early warnings.
- The Pacific Islands Meteorological Strategy 2012–2021 which embraces the multi-hazard approach and has provisions for all-hazards early warning systems to be strengthened, coordinated and supported by both national agencies and regional organisations.

Examples of actions that have strengthened early warning systems at the regional level include:

- The Finnish – Pacific (FINPAC) Project housed at SPREP since 2013 and funded by the Government of Finland designed to provide national meteorological services with the capacity and tools to deliver and communicate timely weather and climate services. The project supports communities to strengthen their ability to use and apply meteorological data and information to develop appropriate plans to address climate change and disaster risks. It is being implemented by a range of partners including the Pacific Meteorological Desk Partnership, the Pacific Meteorological Council, the Government of Finland, the Finnish Meteorological Institute, the World Meteorological Organization, the International Federation of the Red Cross and Red Crescent Societies, the University of the South Pacific and the Australian Bureau of Meteorology.
- The Pacific Tsunami Warning and Mitigation System (PTWS), managed by UNESCO-Intergovernmental Oceanographic Commission (IOC), is based in Hawaii and provides warning services for PICTs. The PTWC has shifted into an advisory role, providing tsunami threat messages, wave forecasts and threat maps. All PICTs have assumed full responsibility for national tsunami threat assessment and providing warning to communities at risk. Training on new and enhanced PTWC products and other national capacity building efforts are ongoing. In 2004, tsunami capacity assessments were conducted for 14 PICs to determine their capacity to manage tsunami events and risks. The assessments also

served as a guide for donors and development partners on areas that required targeted improvements for PICs. As part of the tsunami capacity assessments, an inventory of geospatial data was undertaken for Tuvalu, Fiji, Solomon Islands, Kiribati, Niue and Tonga for inundation and sea-level change modeling. The understanding of tsunami and other inundation risks has further progressed with the availability of better tsunami inundation models using high resolution bathymetric and topographic data to model tsunami risks especially for parts of Tonga.

- The Melanesian Volcano Network was created to establish a subregional facility that supports capacity development in volcanic monitoring and warning. This includes provision of equipment to conduct monitoring during times of significant volcanic activity to better inform emergency planning and responses, and to raise public awareness. The members of the network are Papua New Guinea, Solomon Islands and Vanuatu, with collaboration having extended to New Caledonia. The Melanesian Volcano Network also supported the development of a warning system for volcanic eruption in Ambae Island in Vanuatu through collaboration with international volcanologists, local government officials and community representatives. A warning and evacuation plan was made, and committees were formed to maintain awareness of eruption hazards.
- The Emergency Managers Weather Information Network (EMWIN) and RANET (Radio Internet) System, has been supported by SPC and SPREP and is largely used for early warning by disaster managers in the region. EMWIN is an inter-regional network with services available for use by countries of the Pacific and Caribbean regions. It has a suite of data access methods, which make available a live stream of weather and other critical emergency information to the emergency management community in the Pacific. In 2011, the National Ocean and Atmospheric Administration (NOAA) announced that given a change in the satellite system used for EMWIN, all existing EMWIN users needed to have new equipment (receiver, PC and software) installed to be able to receive the EMWIN direct broadcast after the changeover date of 14 December 2011. The system upgrade took place in November 2011, and was supported by SPC, SPREP and the World Meteorological Organization.
- UNESCO-IOC established a programme officer for tsunami warnings and DRR at SPC to provide technical advice and support to PICTs to strengthen their capacities in early warning and response systems. Through this support, the majority of countries in the region have established and/or strengthened their national tsunami response plans, standard operating procedures (SOPs) and warning capabilities. Regular Pacific wave exercises have been conducted (2011, 2013, 2015) to involve as many countries as possible to test the effectiveness of the PTWS at regional and country levels, including the delivery of warning/advice, understanding and use of recently implemented new and enhanced PTWC products and response measures.
- The Oceania Regional Seismic NETwork (ORSNET) is a regional seismic monitoring network that includes national seismic observatories of the island countries in the Southwest Pacific, with a focus on improving national tsunami early warning systems and to improve the understanding and knowledge on earthquake and tsunami hazards. Support from the French Pacific Fund enabled the establishment of the ORSNET server in New Caledonia. The initiative has since been endorsed as the technical solution for seismic data sharing between Southwest Pacific countries and is being coordinated by the Vanuatu Meteorology and Geo-hazards Department. The ORSNET has improved automatic detection time for seismic activity of magnitude 3 and higher. It also has an automated alerting system through SMS, email and a website. This network also improves the reactivity of the national seismic observatories for early tsunami warning.
- The Regional Meteorological Services Centre in Nadi, the Australian Government Bureau of Meteorology and the Meteorological Services of New Zealand have been linked at the global level through the World Meteorological Organization to provide services to designated regions in the Pacific.
- The seismic observation networks in Fiji and Tonga have been upgraded through support from JICA, including the improved capacity development of staff to analyse seismic observation data.
- Early warning systems and communications for Papua New Guinea and the Federated States of Micronesia have been strengthened through the European Union-funded Disaster Risk Reduction in Eight Pacific ACP States project (B-Envelope). Support included installation of seismic stations at the Port Moresby Geophysical Observatory, data logging rain gauges with the National Weather Services (NWS), and radio services to improve communication within and between provincial disaster committees.

The following is a list of examples of actions that have raised awareness and improved communications in relation to early warning systems:

- A community-based and people-centered early warning system that incorporates traditional knowledge was implemented in Tuvalu and Solomon Islands through the Foundations of the People of the South Pacific (FSPI), Increasing Community Resilience to Natural Disasters through the Use of Traditional Coping Strategies project. The strategies focused on land-use practices, strengthening of homes using traditional knotting, food preservation techniques, water use practices in dry areas, and community-based DRR and disaster management plans/safer village plans.

- The International Federation of the Red Cross and Red Crescent Societies (IFRC) has conducted capacity building and disaster preparedness trainings at the community level to enhance preparedness and response capabilities of these target communities. The IFRC promotes a low cost, low tech approach to community-based DRR. The approach provides for community-based early warning systems installation and trainings, the establishment of community DRR committees, and disaster plans and training on evacuation procedures. Communities can then provide outreach services in regards to first aid and disaster preparedness.
- The National Council of Churches Australia and Act for Peace have partnered with national disaster management offices to develop community disaster plans, community structures to respond to emergencies, as well as the facilitation of simulation exercises.
- Adventist Development and Relief Agency (ADRA) New Zealand has partnered with six other New Zealand organisations and over 20 local organisations in Tonga, Fiji and Vanuatu to update plans and to participate in simulation exercises (SimEx) in each country through the Enhancing Emergency Preparedness and Disaster Risk Reduction Strategies in Fiji, Tonga and Vanuatu project. This will test the training and the readiness of national operation centres and communities to deal with disasters.
- The Implementing Sustainable Water Resources and Wastewater Management in Pacific Island Countries (GEF Pacific IWRM Project) was funded by GEF and implemented by SPC. The project worked to improve flood preparedness and integrate land and water management planning within the Nadi Basin using an integrated flood risk management approach. Monitoring of rainfall and hydrological events by Fiji Meteorological Services has been improved with the installation of an additional six rain gauges and six river level stations. Collectively these gauges provide improved data to inform flood warnings to Nadi Town.

6.2 Lessons Learned

- Economic shocks, such as the impact of financial crisis, can dramatically impact on finances for early warnings systems. It is key to factor potential shocks into planning for early warning systems.
- Inter-governmental collaborations can build capacities in all areas of early warnings systems and communication of warnings to communities.
- Increased resources can improve monitoring of seismic activity and capacity development of human resources.
- Best practice for community-based early warning systems is to include all hazards in the designed and to engage all members of the community. Further investment is required to ensure that early warning systems are multi-hazard and supported by trained forecasters, meteorologists and other specialists. Support systems, such as the standard operating procedures for warning and response need to be incorporated. Ensure that warnings are made; interpreted and communicated in a manner that is easily understandable; accessible to communities; and guide action.
- Technical language used in early warnings can limit the ability of communities to understand and act appropriately to warnings. Simple language with clear directions about action and impact is more effective.
- Limited capacity and difficulties in retention of trained forecasters and meteorologists at the country level create challenges. For example, many countries do not have the capacity to observe rainfall to be able to link with surface run-off and forecast flooding or predict and plan for droughts.
- Improve capacity to forecast long-wave events, particularly events that originate outside the region; but create impacts inside the region.
- Limitations in accessibility of hazard maps, such as landslide susceptibility maps, reduce the ability of disaster managers and planners to make informed decisions.

7 Mitigation of global greenhouse gas emissions

Theme 5 of the PIFACC provides guidance for PICTs to continue to promote measures to reduce greenhouse gas emissions through cost-effective renewable energy technologies ensuring safe, secure, clean, efficient and affordable energy. Guidance is also provided to engage in carbon market mechanisms and Clean Development Mechanism (CDM) initiatives.

Table 8. Themes of RFA and PIFACC
PIFACC Theme 5 – Mitigation of global greenhouse gas emissions
5.1 Increased access to safe, secure, clean, efficient and affordable energy supplies.
5.2 Enhanced ability to engage in carbon market mechanisms including REDD+ as measures to reduce greenhouse gas emissions.
5.3 Cost-effective renewable energy technologies available and local resources sustainably managed.
5.4 Clean Development Mechanism initiatives developed and implemented, where appropriate.

7.1 Summary of Progress under the PIFACC

Although the contribution of PICTs to total global greenhouse gas emissions is insignificant compared to the rest of the international community, action is being taken to transition to renewable energy in a cost-effective manner. This not only supports increased access to energy services, but also improves national energy security and energy independence as countries are less affected by price fluctuations, costs and availability of imported fossil fuel. Many PICTs have developed strategies and strong goals to move towards clean renewable energy resources. A considerable number of projects and programmes have been undertaken in the region to support PICTs in their endeavors.

REDD+ has developed in the region with pilot programmes that provide an important avenue for protecting valuable natural assets while also contributing to global greenhouse gas reduction targets. Investigations are underway as to the opportunities under the CDM.

Since 2005, there has been significant work undertaken and investment made in support of energy development for the Pacific. Several PICs have reviewed their energy policies and developed energy roadmaps, for example:

- Nauru Energy Roadmap: 2014–2020
- Solomon Island National Energy Policy 2007
- Republic of the Marshall Islands National Energy Policy and Energy Action Plan 2009
- Tuvalu National Energy Policy 2009
- Fiji National Energy Policy 2006

A number of high-level forums and consultations were convened to address issues of enhanced energy access and security. In 2011 and 2014, the Pacific Ministers of Energy and Transport met to discuss and agree on key energy priorities and actions for the Pacific. As a result of the meeting, the 2014 Denarau Communiqué was endorsed by ministers. In 2013, the Government of New Zealand and the European Union collaborated on the Pacific Energy Summit, to bring attention to the benefits of investing in renewable energy and energy efficiency. The summit was a forum for countries, development partners, regional organisations and the private sector to showcase innovative projects, services and technology in the energy sector.

The Pacific Regional Data Repository for Sustainable Energy for All (SE4ALL) is a web-based one-stop shop portal and database management system intended to support Pacific governments and their development partners working in the energy sector. It is facilitated by a partnership between UNESCAP, Government of Australia, Government of Tonga, PIC energy offices, power utilities, petroleum companies, statistics offices, development partners, CROP agencies, civil society, the private sector, national pricing authorities and consumer groups. The portal maintains a list of current and completed energy projects that are either driven regionally through multilateral agreements or bilaterally at the national level.

The following is a list of examples of regional projects and programmes that seek to enhance availability and affordability of renewable energy:

- The SIDsDOCKs is an initiative among member countries of the Alliance of Small Island States (AOSIS) to provide SIDS with a collective institutional mechanism to assist them to transform their national energy sectors into catalysts for sustainable economic development and help generate financial resources to address adaptation to climate change.
- The Pacific Islands Energy Policy and Strategic Action Planning (PIESAP) lead by SOPAC (now SPC) and UNDP and funded by the Government of Denmark, was a project aimed at establishing national energy policies, plans and mechanisms that would influence national efforts toward achieving reliable, affordable, and environmentally sound energy for sustainable development of the 14 Pacific ACP countries. The project concluded in 2008 and set the groundwork for renewable energy technologies to be considered by national governments. Under the PIESAP, Tonga produced a renewable energy policy while other PICTs produced, drafted or held consultations on national energy policies.
- The Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) commenced in 2007 and was implemented by UNDP and funded by GEF. It initially focused on mainstreaming renewable energy into traditional PICT energy policies and plans as well as raising the profile of renewable energy. As funding became available, the project extended to include clean development mechanism initiatives and energy efficiency. The project resulted in outcomes such as feasibility studies for wind and solar power supply in Samoa as well as education on energy efficiency in schools and installation of solar systems.
- The Pacific Environment Community (PEC) Fund has implemented practical Pacific-tailored approaches to combating the effects of climate change. Managed by PIFS, the PEC Fund helps Forum Island countries tackle climate change issues with a focus on the provision of solar power generation systems and sea water desalination plants, or a combination of both. In 2009, the PEC fund installed 1000 solar home systems and four water desalination plants in the rural areas of Fiji.The North Pacific ACP Renewable Energy and Energy Efficiency Project (North-Rep) was implemented by SPC and funded by the European Union in the Federated States of Micronesia, Palau, and the Republic of the Marshall Islands. Some key results of the project include the installation of 1500 solar photovoltaic (PV) stand-alone systems as well as micro grids for small island communities. It also supported the revitalisation of the Nanpil Hydropower Plant in Pohnpei, Federated States of Micronesia, which has contributed an additional of 1.2 MW of renewable energy to the national energy production reserves. As a result, the Federated States of Micronesia is moving towards its policy target of having 30 per cent of its energy supplied by renewable energy.
- The Government of the United States of America, through USAID, and in partnership with Arizona State University (ASU) and USP, implemented the Vocational Training and Education for Clean Energy (VOCTEC) project to provide training and capacity building for grid connected and off-grid solar PV for the Federated States of Micronesia, Fiji, Kiribati, the Republic of the Marshall Islands, Palau, Samoa, Solomon Islands, Tonga and Vanuatu.
- The Palau Sustainable Economic Development for Renewable Energy Application (SEDREA) (2008–2013) was funded by GEF, and implemented by UNDP. It increased access to financing for renewable energy projects and establishment and implementation of regulatory frameworks that are supportive of renewable energy.
- The Solar Energy for Outer Islands Project in Kiribati was funded by the European Union. The aim, as supported by the Kiribati ministries, was to reduce social vulnerabilities experienced in Kiribati. The initiative provided for electrification of outer islands in order to improve the standard of living and to reduce the rate of migration to the capital. The initiative saw the installation of 1806 solar home systems on 18 islands.
- Tokelau has become the first country in the world to have all electricity supply from 100 per cent renewable energy. Tokelau's Renewable Energy Project (TREP) was driven by the community with funding from the Government of Tokelau, Government of New Zealand, Government of France and UNDP. The project resulted in the installation of solar panels and has strengthened the relationship between communities and government.
- The Fiji Renewable Energy Power Project, funded by UNDP, aims to remove barriers to the widespread and cost-effective grid-based renewable energy supply via commercially viable renewable energy technologies. The project will also look at mainstreaming environmental sustainability and sustainable energy in regional and national policies, planning frameworks and programmes.

The following is a list of examples of actions to improve energy efficiency at the regional level:

- Promoting Energy Efficiency in the Pacific (PEEP) 2007–2014 aimed to reduce the energy intensity of the economies of five Pacific developing countries to: enhance energy security; make energy services more affordable to end-users; and reduce greenhouse gas emissions. The PEEP focused on identifying a pipeline of specific energy efficiency

projects for funding or co-financing by the Asian Development Bank, GEF, the Government of Australia, and the Government of Japan. The project resulted in outcomes such as development of an energy use database to provide access to information on electricity consumption and energy efficiency indicators at national and end-use sector levels.

- The Government of Australia-funded Pacific Appliance Labelling and Standards (PALS) programme was developed and implemented in 2012 by SPC. As a result of the programme, a number of PICs have approved the drafting of national legislation and regulations that ensure that major electricity-consuming appliances such as refrigerators, freezers, air conditioners and lights, meet a minimum level of legally enforceable performance standards and that energy rating labels are affixed to these products to inform consumers.

The following is a list of examples in which progress in relation to REDD+ measures has been made:

- The Pacific Islands Regional Policy Framework for REDD+ 2013 was developed with the support of the SPC and GIZ regional project, Climate Protection through Forest Conservation in Pacific Island Countries. The framework is designed to provide policy options to guide REDD+ programme development at regional and national levels, and to provide a rationale for financial support for the sustainable management and use of forest and tree resources.
- National initiatives in relation to REDD+ have taken place in Fiji with support by the GIZ's CCCPIR programme supported the development of the Fiji national REDD+ website, in Papua New Guinea supported by Live and Learn and Solomon Islands supported by UNDP.
- Established in 2009, the Coping with Climate Change in the Pacific Island Region (CCCPIR) programme (see Section 5) supported PICTs in relation to policy work for REDD+, land use, forestry and ecosystems-based approaches to climate change. The CCCPIR programme specifically focused on climate change and tourism, where the intention was to forge public-private partnerships to promote adaptation to climate change and to reduce greenhouse gasses used in the tourism sector. CCCPIR has partnered with Fiji, Samoa and Vanuatu.

Below are examples of actions related to Clean Development Mechanism initiatives:

- Papua New Guinea, Vanuatu and Fiji have each established a designated national authority, a prerequisite to the CDM programme.
- Vanuatu undertook activities including the development of project notes, three national CDM capacity building workshops, and the development of a booklet outlining CDM opportunities in Vanuatu. The country also participated at the World Carbon Expo in Cologne, Germany.
- A regional workshop was held in Samoa in 2012 on CDM, to look at moving forward on the preliminary set-up phase for Fiji, Samoa, Vanuatu, Solomon Islands and Tonga.

7.2 Lessons Learned

- Strategies and actions to reduce greenhouse gas emissions should be informed by evidence-based assessments of vulnerability of communities, and feasibility of mitigation and sequestration opportunities.
- Assessment of the socio-economic implications of energy should be incorporated into energy project planning, with the aim of achieving energy security for communities in the region.
- It is important to ensure that transition to renewable energy sources is accompanied by training for local technicians to ensure sustainability of the equipment and systems as well as funding sources for maintenance.
- REDD+ projects in the region present an opportunity to protect natural resources and minimise greenhouse gas emissions. Continued efforts should address challenges of free, prior and informed consent and how to meaningfully engage community members. There may be opportunities to link small projects together to minimise transaction costs.

8 Planning for effective preparedness, response and recovery

Planning for effective preparedness, response and recovery is Theme 4 of the RFA. The theme acknowledges that while not all natural hazards can be avoided, there is considerable scope for reducing their devastating impacts on vulnerable communities by strengthening DRM for more coordinated, effective and efficient preparedness, response and recovery activities.

Table 9. Themes of RFA and PIFACC	
RFA Theme 4 – Planning for effective preparedness, response and recovery	
a.	Disaster preparedness, and the capacity for effective and timely response and recovery, strengthened in all Pacific Island nations and communities.
b.	Funds and resources made available to achieve an effective model of disaster management.
c.	Emergency communication systems established and operating effectively.
d.	Public awareness programmes addressing all known hazards.
e.	Emergency response organisations and systems strengthened, including at the regional level.

8.1 Summary of Progress under the RFA

Although the governance arrangements change between PICTs, the National Disaster Management Office (NDMO) or its equivalent at the national level is often the ministry responsible for disaster preparedness, response and recovery efforts. Most NDMOs were established in the 1990s and have bolstered their capacity to undertake disaster preparedness and response activities. Disaster management in the Pacific has been strengthened over the years by a range of preparedness actions, response actors, and innovative recovery measures often leading to broader development outcomes.

The objective of 'all hazards' and 'whole-of-government' approaches to disaster management have emerged with increased interoperability between relief response agencies, civil society, and government emergency responders such as the NDMO, fire services, ambulances and police.

The Pacific Humanitarian Team (PHT) was established through the Pacific Framework for Humanitarian Assistance in 2008 to support coordination of response to disasters or emergency situations through the Cluster Approach, and is coordinated by UNOCHA. The PHT responds to humanitarian needs of the Pacific, through eight clusters: Water, Sanitation and Hygiene; Shelter; Logistics; Protection; Early Recovery; Education; Health and Nutrition; and Food Security. These clusters are led by different agencies that provide humanitarian assistance globally. In countries where the cluster approach has been recognised, the lead role is taken by the government ministry responsible for the sector and is supported by the global cluster lead agency. Efforts of the UNOCHA Cluster Approach in countries have resulted in more coordination and resources available to assist countries. In some circumstances, the increased response in relation to disasters has overwhelmed national systems, particularly those with smaller agencies. The last few years have seen a strengthening and focus on protection issues as well as cross-cutting issues such as a stronger focus on persons with disabilities, children, gender and the participation of relevant line ministries in these sectors.

The PHT has undertaken actions to clarify roles and responsibilities and coordination amongst partners prior to, and during, humanitarian responses. In particular, the Pacific Humanitarian Team Position Statement 2014–2020 and the Emergency Response and Preparedness Plan (EPREP). While the position statement guides the vision and goals of the PHT until 2020, the EPREP defines the coordination mechanisms of the PHT and the relevant government institutions for emergency preparedness and response. Furthermore, it outlines the mechanisms through which members can link to government structures to ensure the most effective and efficient means of coordination and information sharing during an emergency.

The Post Disaster Needs Assessments (PDNA) have been led by national government with financial, capacity development and methodology support by the World Bank, the European Union and the United Nations Development Group.

Post-disaster technical assessments have been undertaken to collect data on damage through on-the-ground surveys, satellite image data and recently with assistance from drones. The data collected is important for PDNAs, improved understanding of hazards, and for medium and long-term management response to risks.

Emergency response simulation exercises have been conducted across the Pacific to increase community preparedness to disasters. For example, with funding from the Government of New Zealand, simulation programmes have been delivered throughout 2013–2014 in Fiji, Tonga and Vanuatu, by the Adventist Development and Relief Agency New Zealand (ADRA NZ), Caritas, Christian World Service, Oxfam, Rotary, Tear Fund, and UNICEF. The simulations have resulted in opportunities to identify successes and gaps in disaster preparedness and response that can be used to create improvements across the countries.

In the following instances, capacity has been strengthened in preparedness, response and recovery:

- The Pacific Islands Emergency Management Alliance (PIEMA) established in 2014, is an alliance between the NDMOs, fire and emergency services through the Pacific Islands Fire Services Association, the Australasian Fire and Emergency Services Authorities Council (AFAC) and the Pacific Islands chiefs of Police, to strengthen emergency preparedness and response capacity of the Pacific Islands. PIEMA is funded by the European Union and implemented by SPC through the EDF 10 EU-ACP Building Safety and Resilience in the Pacific project. The PIEMA project has worked closely with NDMOs to develop mobile emergency operation centres and to strengthen tactical communications systems. Twining arrangements between the fire services of the Australian Fire Authorities Council and national fire services of the Pacific Islands Fire Services Association have built capacity throughout the region from 2004 onward.
- As previously mentioned in Section 6, IFRC is piloting a 'low-cost, low-tech' approach towards capacity building. The approach incorporates risk reduction and preparedness activities that are simple to understand and execute, and are targeted towards children or the elderly.
- The Cash-for-Work programme funded by UNDP supports PICTs in their rebuilding efforts during the response and recovery phase. In collaboration with local authorities, community members are employed to clear, recover and recycle waste. Cash-for-Work provides needed cash and tools to help restore their livelihoods. The programme has been introduced in affected areas across the Pacific, such as Fiji following the floods of 2012, Tonga in response to Tropical Cyclone Ian in 2014, and Vanuatu in response to Tropical Cyclone Pam in 2015.
- The Pacific Enhanced Humanitarian Response Initiative (PEHRI) funded by the Government of Australia supported activities such as:
    - The National Council of Churches of Australia/Act for Peace work with the National Council of Churches in Fiji, Solomon Islands, Tonga and Vanuatu to establish community disaster management committees, training, and to develop community disaster plans.
    - Communities in Vanuatu to identify traditional and modern coping mechanisms for reducing risk with support by CARE Australia.
    - Solomon Islands NDMO and four non-government organisations to improve resilience of communitieswhile at the same time focusing on the protection of women and children, with support from AUSTCARE.
    - NDMO to clearly define the role of the Catholic Church in national DRM arrangements of Fiji, Kiribati, Samoa and Vanuatu and to develop disaster management plans for the Catholic Church in these locations with support from Caritas Australia.
    - Pre-positioning of emergency supplies and reviewing of DRM arrangements in Fiji, Kiribati, Samoa, Solomon Islands and Vanuatu with support from UNICEF.
- The Pacific Disability Forum and the Fiji Disabled Peoples Federation (FDPF) developed the Fiji Disability Inclusive Community Based Disaster Risk Management Toolkit as part of the Disability Inclusiveness in Disaster Risk Reduction Management, funded by the Government of Australia from 2011–2013.

The following is a list of examples in which emergency operations centres and their communications systems have been strengthened:

- Early warning communication equipment in Papua New Guinea was strengthened through the establishment of flood monitoring equipment for the Department of Environment and Conservation by SPC through the European Union-funded EU-ACP Natural Disaster Facility. At the Port Moresby Geophysical Observatory, ten seismic stations were installed to monitor seismic activity, and five automatic weather stations and 20 data logging rain gauges were supplied.
- Strengthening of emergency operations centres and communications in Fiji, Tuvalu, Kiribati, Tonga and Palau through the European Union-funded EDF10 Building Safety and Resilience in the Pacific project implemented by SPC. For example, in Palau, a training room and accommodation facilities were built, and communication systems were installed.
- Emergency radio communications were provided for the Royal Papua New Guinea Constabulary for use in ten of their policy outposts in the remote areas of the Morobe Province.
- The Samoan Radio Network was established in 2013 due to lessons learned from the 2009 Tsunami. The network was developed by the Samoan Government (NDMO, Fire and Police) in partnership with the Government of New Zealand, SPC, and the Samoan Red Cross to have different radio channels for different agencies with the ability to cross each other's channels.

Examples of public awareness campaigns include:

- The International Day for DRR and World Humanitarian Day that continue to be key events in the Pacific where programmes and targeted activities are designed to raise public awareness of disasters.
- The Fiji Ministry of Health, UNICEF and the Fiji NDMO collaborated on the 'Get Ready' Campaign funded by UNICEF and the Government of Australia. This campaign was designed with ten simple messages on what an individual could do to prepare for disasters. The messaging is available online, via posters and through an application that can be downloaded on Android smartphones.

8.2 Lessons Learned

- It is acknowledged that there can be considerable stress on national systems during emergency events to meet the needs of affected communities. The need for continued strengthening of national capacity particularly in relation to coordination and logistics is recognised. Training can build effective collaboration between the NDMO's coordination role and the cluster system.
- Coordinated post disaster assessments can reduce burden, enable the sharing of information and data, and quicken relief responses. As such, coordinated post disaster assessments among clusters and with national response systems are encouraged.
- There is a need for further revision of governance arrangements to account for additional focus on DRR, noting the requirement for multi-sector responses.
- Acknowledge and build on traditional knowledge and existing community coping mechanisms to empower communities and local actors in their disaster response. Response to disasters should not disempower or substitute community efforts to cope and recover.
- There is a key role of civil society organisations as a bridge between local communities and governments, especially when it comes to communicating the kind of humanitarian assistance required post-disaster.
- Engaging with the private sector can provide opportunities and partnerships for improved and innovative disaster preparedness, response and recovery.
- Financing for disaster response should move towards supporting all elements of DRR, crisis response, and recovery.

Glossary

Adaptation:

Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. [Source: IPCC AR4, WGII.]

Climate change

Any change in climate over time, including in climate variability and extremes, whether due to natural variability or as a result of human activity. This also includes changes in climate variability and extremes. [Source: Adapted from IPCC AR4, WGII.]This definition aligns with that used by the Intergovernmental Panel on Climate Change (IPCC).

A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods [UNFCCC 1992].

Disaster

A serious disruption of the functioning of a community or a society, involving widespread human, material, economic or environmental losses and impacts, and exceeding the ability of the affected community or society to cope, using its own resources. Disasters may be slow or rapid onset, and widespread (e.g. where dispersed populations are exposed to repeated or persistent hazard conditions of low or moderate intensity) or concentrated (e.g. where large concentrations of people and economic activities are exposed to intense hazard events, such as strong earthquakes, active volcanoes, heavy floods, tsunamis or major storms, which can lead to potentially catastrophic disaster impacts involving high mortality and asset loss). [Source: based on UNISDR 2009.]

Disaster management

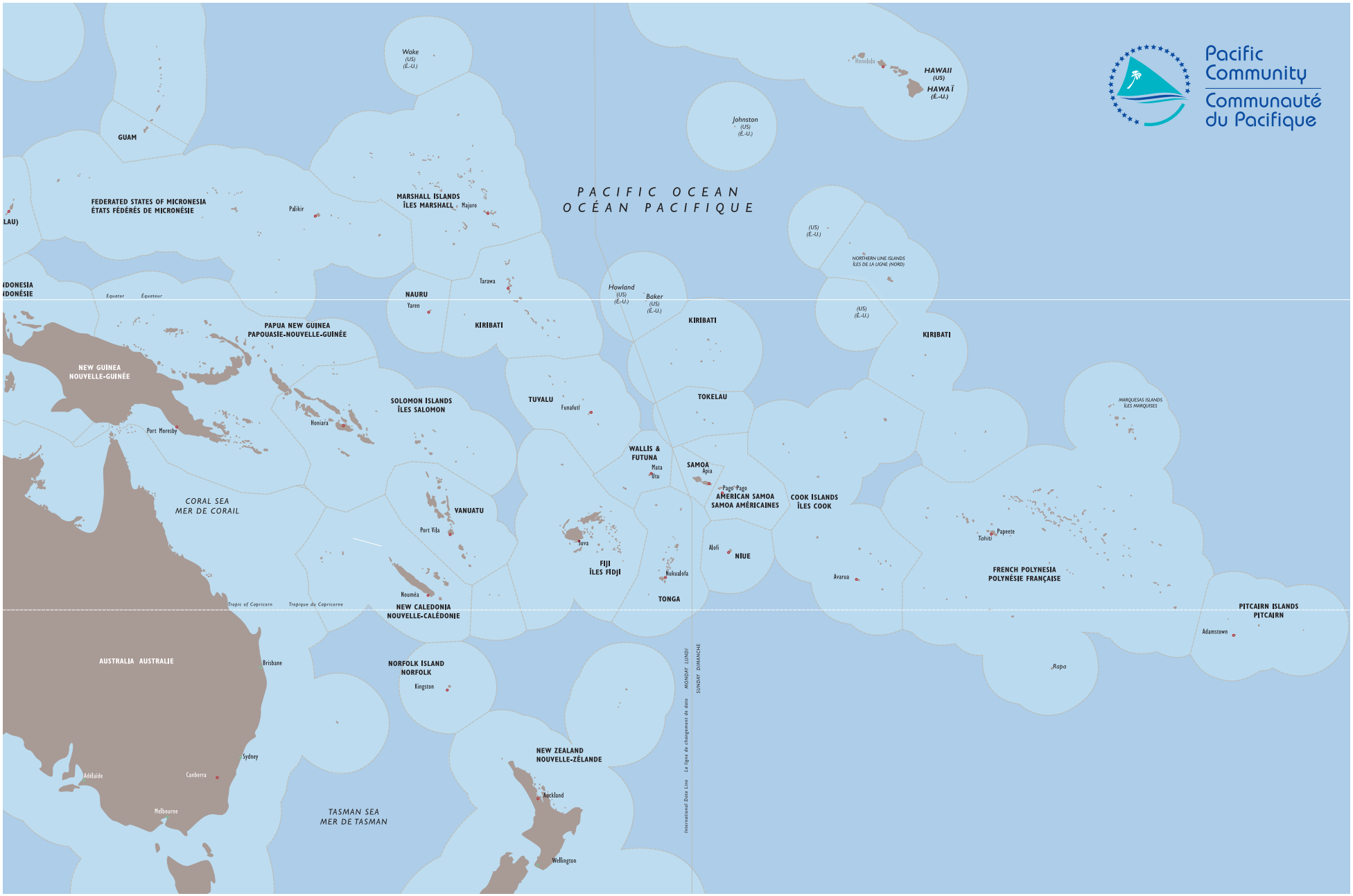
The organisation and management of resources and responsibilities for dealing with all aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters. [Source: adapted from IFRC.]

Disaster risk management

The systematic process of using policies, plans, organisations, and operational skills, capacities and actions to lessen the adverse impacts of hazards, as well as the possibility of a disaster. [Source: adapted from UNISDR 2009]

Disaster risk reduction

A systematic approach to identifying, assessing and planning and implementing actions to reduce the risk of a disaster. [Source: adapted from UNISDR 2009.]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