

CLIMATE CHANGE AND DISASTER RISK REDUCTION

Research Synthesis Report

Final

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ABBREVIATIONS

ACSE	Adapting to Climate Change and Sustainable Energy
ADB	Asian Development Bank
APAN	Asia Pacific Adaptation Network
AUD	Australian Dollar
AusAID	Australian Agency for International Development
BoM	Bureau of Meteorology
BRSP	Building Resilience and Safety in the Pacific
CCA	Climate Change Adaptation
CCAP	Coastal Community Adaptation Project
CCCPIR	Coping with Climate Change in the Pacific Islands Region (project)
COSPPac	Climate and Oceans Support Program in the Pacific (project)
CROP	Council of Regional Organisations in the Pacific
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSO	Civil Society Organisation
DCCEE	Department of Climate Change and Energy Efficiency
DFAT	Department of Foreign Affairs and Trade (Australia)
DPCC	Development Partners for Climate Change
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EDF	European Development Fund
EU	European Union
FFA	Forum Fisheries Agency
FINPAC	Finnish Pacific (project)
FRDP	Framework for Resilient Development in the Pacific
FSM	Federated States of Micronesia
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Fund
GFDRR	Global Facility for Disaster Risk and Recovery
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GCCA	Global Climate Change Alliance
ICCAI	International Climate Change Adaptation Initiative
iCLIM	Pacific Climate Change Information Management
ICRC	International Committee of the Red Cross
ICT	Information and Communication Technologies
IFRC	International Federation of Red Cross and Red Crescent Societies
ISACC	Institutional Strengthening for Adaptation to Climate Change
ISDR	International System for Disaster Reduction
LDC	Least Developed Country

LLEE	Live and Learn Environmental Education
MDG	Millennium Development Goal
MFAT	Ministry of Foreign Affairs and Trade (New Zealand)
NAPA	National Adaptation Programme of Action
NDMO	National Disaster Management Office
NGO	Non-governmental Organisation
PACC	Pacific Adaptation to Climate Change (project)
PACCSAP	Pacific Australia Climate Change Science Adaptation Planning (project)
PCRAFI	Pacific Catastrophe Risk Assessment and Financing Initiative
PCRIP	Pacific Catastrophe Risk Insurance Pilot
PDNA	Post Disaster Needs Assessment
PICT	Pacific Island Countries and Territories
PIFS	Pacific Islands Forum Secretariat
PNG	Papua New Guinea
PPA	Pacific Power Association
PREP	Pacific Resilience Programme
PRIF	Pacific Region Infrastructure Facility
PRP	Pacific Resilience Partnership
PRRP	Pacific Risk Resilience Programme
PSE	Pacific Solutions Exchange
PSIS	Pacific Small Island State
PV	Photovoltaic
RMI	Republic of the Marshall Islands
RTSM	Regional Technical Support Mechanism
SDGs	Sustainable Development Goals
SIDS	Small Island Developing State
SME	Small and Medium Enterprises
SPC	Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
TVET	Technical and Vocational Education and Training
UN	United Nations
UNESCAP	United Nations Economic and Social Commission for Asia Pacific
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 of Coordination and Humanitarian Affairs
USAID	United States Agency for International Development
USD	United States Dollar
USP	The University of the South Pacific
WASH	Water Sanitation and Hygiene

EXECUTIVE SUMMARY

The research aimed to answer three questions:

1. Within a development context, what are the relevant needs and priorities associated with climate change and disaster risk reduction that the Ministry of Foreign Affairs and Trade (MFAT) needs to consider?
2. What are the current donor and development programme responses to these needs and priorities?
3. Where are the strategic opportunities of greatest potential for MFAT to add value through its targeted and mainstream programming?

This report synthesises the research findings. The full research findings are contained in three Working Papers. This synthesis is organised by the three research questions, enabling readers to navigate to the question(s) of most interest and to review the corresponding Working Paper for further detail.

The research is based on desk-based reviews of over 1,300 documents, and evidence gathered through interviews and consultations with approximately 110 stakeholders. It has a focus on the Pacific Islands region.

Findings

As context for the findings, the research notes a recent shift in focus towards resilient development, whereby risk and resilience are treated as an integral part of development in a “development first” approach. A development first approach can incorporate both targeted assistance to strengthen resilience (i.e. investing in specific and practical disaster risk reduction (DRR) and climate change adaptation (CCA) initiatives), as well as mainstreamed risk reduction programming (i.e. DRR and CCA measures are an integral part of all relevant development investments).

What are the relevant needs and priorities associated with climate change and disaster risk reduction that MFAT needs to consider?

Changes to climate and natural disasters of relevance to the Pacific region can be summarised as:

Past Changes	Anticipated Future Changes
<ul style="list-style-type: none">• Persistent warming trend	<ul style="list-style-type: none">• Increase in extreme high temperatures• Increase in extreme rainfall events
<ul style="list-style-type: none">• Sea levels have risen in most parts of the tropical south Pacific	<ul style="list-style-type: none">• Average sea-level rise of 79cm to 2 metres by 2100
<ul style="list-style-type: none">• Increased ocean acidification in the tropical Pacific• Increased frequency of coral bleaching	<ul style="list-style-type: none">• Decline in coral calcification rate of 10% by 2050• Coral bleaching for almost all reefs by 2050

Past Changes	Anticipated Future Changes
<ul style="list-style-type: none"> No consensus in trends on frequency or intensity of tropical cyclones 	<ul style="list-style-type: none"> More intense tropical cyclones Expansion in cyclone belt (pole-ward and equator-ward) Increase in significant wave height in tropical south Pacific
<ul style="list-style-type: none"> Increased exposure and vulnerability to natural disasters 	<ul style="list-style-type: none"> Increase in severe sea flood and erosion risks in low lying coastal areas and atoll islands Degradation of fresh groundwater and land resources

Of these changes, sea-level rise and expansion in the area where cyclones occur, are probably the most important foreseeable consequences of climate change in the Pacific. These changes will manifest as severe sea flood and erosion risks for low-lying coastal areas and atoll islands; the resulting wave over-wash of seawater will degrade fresh groundwater and land resources, leading to the inundation and eventual submergence of entire atolls and coastal areas on high islands. Severe coastal erosion and salt contamination of soils and groundwater would be precursors to the more extreme consequences of sea-level rise. These changes suggest the need for urgent and transformative CCA and DRR responses, involving more than extrapolation of measures designed for less challenging consequences.

To manage the risks that these changes pose to achieving and maintaining development outcomes, donors and development partners, including MFAT, need to consider needs and priorities within the following areas:

- **Addressing underlying issues**, including the need to strengthen national and local governance structures, and to address existing determinants of vulnerability such as severe overcrowding, proliferation of informal housing and unplanned settlement, inadequate water supply, poor sanitation and solid waste disposal.
- **Strengthening capacity**, including capacity for effective CCA and DRR within national and local institutions and individuals, and through increasing engagement with the private sector, and strengthening regional coordination and cooperation.
- **Building a stronger evidence base**, including through increasing understanding of the process and longer term implications of changes in the habitability of atolls and islands, and strengthening the creation, sharing and use of knowledge gained from past CCA and DRR experiences.
- **Improving the use of climate and disaster finance**, including through increasing access to finance and improving the prioritisation of CCA and DRR investment opportunities.
- **Increasing the effectiveness of investments**, including through ensuring all products, processes and partnerships are risk-informed, and ensuring humanitarian responses meet the needs of vulnerable groups.

What are the current donor and development programme responses to these needs and priorities?

There has been an increase in the number of donor and development programme responses to climate change and disaster risk, and an improvement in approaches. Development partners are implementing significant, and mainly successful, responses to many of the identified needs and priorities. However, gaps and opportunities exist in relation to: localising adaptation and DRM, addressing the underlying determinants of vulnerability, increasing the involvement of the private sector in resilient development, increasing atoll and island habitability in the longer term, and supporting resilient development through strengthening underlying governance structures.

The lessons and success factors from current donor and development programme responses include:

- The importance of using and building on existing mechanisms.
- Strong governance and institutional mechanisms are critical.
- The importance of investing time and resources to develop and sustain partnerships and coordination mechanisms.
- The urgency of building the capacity of local NGOs and other actors to support resilient development.
- The importance of promoting gender and social inclusion as a core part of resilience.
- The need to underpin prioritisation and decision-making processes with sound social and economic analysis, robust science, and transparent and inclusive processes.
- The importance of investing in information and knowledge management.
- The benefits of linking climate change finance, public financial management and aid effectiveness debates.
- The need to include climate change and resilience considerations in policy and planning, as well as in aid coordination and tracking mechanisms.
- The importance of integrating resilience principles throughout programming.
- Strengthening the evidence base to understand the implications of climate change for development requires long-term predictable funding for climate change science and observations.
- The importance of using existing long-term partnerships as the basis for capacity building initiatives.
- The need to engage stakeholders beyond climate change and DRR.

Where are the strategic opportunities of greatest potential for MFAT to add value through its targeted and mainstream programming?

The strategic opportunities of greatest potential for MFAT to add value through its development programming are:

- Moving to a development first approach by ensuring internal policies and procedures consider climate change and disaster risks, and the underlying causes of these risks, explicitly and in an integral way throughout policy and project cycles.

- Investing in strengthening local government and community leadership and governance.
- Demonstrating how existing support contributes to resilient development outcomes.
- Investing in improving national coordination capacity, and in supporting information and knowledge management systems
- Strengthening the links between building resilience and addressing food, water, energy, gender and human rights needs.
- Increasing the use of existing good practice in approaches to ecosystem-based adaptation, environmental impact assessment, building codes, land use planning and protected areas.

A common feature of the identified needs, priorities and strategic opportunities is that they are all nuanced by national and local circumstances. This contributes to the need to localise resilient development programming. Coordination and cooperation are also important in facilitating benefits of synergies and economies of scale, while reducing inefficiencies. The Framework for Resilient Development in the Pacific (FRDP) advocates for localisation, cooperation and coordination. MFAT is highly regarded in the region for its work at a local level, and its ability to mobilise cooperation and coordination among countries and development partners. There is a strategic opportunity to apply New Zealand's leadership and expertise in the region to support the implementation of the FRDP, through the Pacific Resilience Partnership, and in doing so give effect to many of the needs, priorities and opportunities identified in this research.

1. BACKGROUND AND INTRODUCTION

Research on the implications of climate change and disaster risk to development is a priority for New Zealand's Ministry of Foreign Affairs and Trade (MFAT). To address this priority, MFAT commissioned research framed by the following objectives (MFAT 2016):

1. Undertake a contextual review of existing responses to climate change and disaster risk reduction (DRR) and identify strategic areas and policy options for MFAT's development programming that are likely to produce the best value-add or benefit.
2. Identify specific, practical responses to climate change and DRR through MFAT's targeted support and mainstream programming, with a focus on Kiribati and Tuvalu.

Research and analysis related to the above objectives is timely given the endorsement of the Framework for Resilient Development in the Pacific (2017–2030) (FRDP) by Pacific Leaders in 2016. The Framework provides high-level strategic guidance on how to enhance resilience to climate change and disasters, in ways that contribute to and are embedded in sustainable development.

Both “integration” and “mainstreaming” are fundamental to achieving climate and disaster resilient development. While these terms are often used interchangeably, they have distinct meanings. This is consistent with the FRDP. Its first principle is to “integrate climate change and disaster risk management (DRM) (where possible), and mainstream [it] into development planning”. In this context, “integration” means managing climate and disaster risks in combination, rather than separately, while “mainstreaming” means addressing climate and disaster risks as an integral part of development planning and decision-making.

The research reported here was conducted by an independent team. This report synthesises the findings of the research related to the first objective above¹. This component of the research was framed around three questions:

1. Within a development context, what are the relevant **needs and priorities** associated with climate change and disaster risk reduction that MFAT needs to consider?
2. What are the current donor and development programme **responses** to these needs and priorities?
3. Where are the **strategic opportunities** of greatest potential for MFAT to add value through its targeted and mainstream programming?

The evidence base for the findings presented here is contained in three Working Papers (Figure 1), which align with the three research questions. The evidence base is not repeated here – only the findings of the research are summarised in this Synthesis Report. This summary of findings is organised by the three research questions, enabling readers to navigate to the question(s) of most interest and to review the corresponding Working Paper for further detail. There is further value to be gained by looking across the body of evidence, identifying common themes, opportunities and priorities; however, this is not the focus of this Synthesis Report.

¹ The research team developed a decision support tool and applied this to identify practical responses to climate change and DRR in Kiribati and Tuvalu (research objective two). However, MFAT does not consider the method operationally viable, and the tool is not reported on in this synthesis.

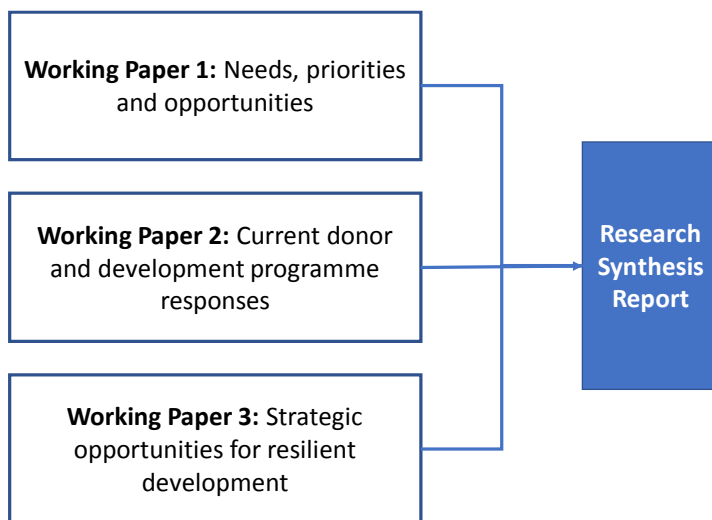


Figure 1: The research outputs

Working Paper 1 provides a detailed analysis of environment and development trajectories in the Pacific. It also identifies key strategic issues based on an analysis of needs and priorities associated with climate change and DRR, and key messages for MFAT arising from these strategic issues. It focuses less on identifying practical needs and actions associated with climate change and DRR.

Working Paper 2 provides a detailed analysis of current development partner responses to the strategic issues identified in Working Paper 1, and an assessment of the effectiveness of these responses drawing from formal reviews and evaluations. It organises this analysis first by development partner, and then by strategic issue. The paper also identifies the lessons learned from the research and analysis.

Working Paper 3 identifies strategic opportunities of greatest potential for MFAT to add value through its development programming. It draws on the analyses in the previous two Working Papers, as well as consideration of MFAT's and New Zealand's comparative advantage.

2. METHODOLOGY

The research used desk-based and consultative methods to gather, analyse and apply evidence to meet the research objectives. Specific methods for collecting information included desk-based reviews, face-to-face interviews, and virtual consultations using telephone, email and Skype. The research team interviewed approximately 110 stakeholders and reviewed over 1,300 documents.

The interviews and reviews focused on gaining a comprehensive and detailed understanding of:

- Climate change/DRR needs and priorities in a development context.
- The aims of country partners.
- Current responses by donors and development programmes.
- New Zealand's comparative advantage.
- MFAT's current commitments and strategic opportunities.
- Cross-cutting issues relating to climate change/DRR, including gender, disadvantaged groups, human rights and environment.

The evidence was analysed in ways that ensured robust responses to the research questions. This involved triangulation of the evidence obtained from different sources to identify and resolve any inconsistencies, and the identification of practical responses covering CCA and DRR in a development context. Any remaining inconsistencies and uncertainties in the evidence and associated findings were identified, and these are documented in the relevant Working Paper.

The research had a Pacific focus, but also built on MFAT's global experience and expertise. In addition to a focus on Pacific regional issues, needs and initiatives, including those delivered by other donors and regional agencies, the research also considered issues, needs and initiatives specific to Kiribati and Tuvalu to align with the second research objective. The research included both country and partner mapping.

3. RESEARCH FINDINGS

This section synthesises the research findings. It begins with a discussion on investment approaches in climate change and DRR, and then sections 3.2 to 3.4 present the findings for the three research questions.

3.1. Investment Approaches: From Risk First to Development First

The research found limitations in the conventional “risk first” approach, where management of climate and disaster risks is an add on, or even a separate goal, requiring a new or parallel set of processes (UNDP 2016). The risk first approach has also resulted in a mismatch between risk projections and data on the one hand, and policy, planning and management timeframes on the other. In addition, information has often not been sector specific, policy-relevant or actionable (USAID 2014). Even when priorities have been identified, they tend to have been lost when mainstreamed into national development planning and budgetary processes. Consequently, risk management interventions often do not emerge as a priority.

In response to such concerns, there is growing demand for the treatment of risk as an integral part of development, and a “development first” approach is gaining traction (USAID 2014, Hay & Pratt 2013, UNDP 2016). Importantly, the Framework for Resilient Development in the Pacific (2017–2030), calls for a development first approach. As members of the Pacific Islands Forum, Australia and New Zealand have signed this Framework and have thus agreed, on a voluntary basis, to incorporate climate and disaster resilient development considerations in all relevant programming as part of commitments to increasing the resilience of development outcomes in the Pacific Islands region.

When taking a development first approach, the desired development outcomes are identified first, and then assessed to determine how climate and disaster risks may affect their achievement. Management of significant risks is undertaken as an integral part of existing development processes. This change in approach means that identifying and prioritising investments will relate to an overarching goal of resilient development, where the two goals of sustainable development and building resilience are achieved through a joint approach (Figure 2).

A development first approach can incorporate both targeted assistance to strengthen resilience (i.e. investing in specific and practical risk reduction and adaptation initiatives) as well as mainstreamed risk reduction programming (i.e. DRR & CCA measures are an integral part of all development investments).

The research identified three complementary categories of investment related to managing both climate and disaster risks to achieving and maintaining development outcomes. These are distinguished in terms of the extent to which the resulting risk management activities are mainstreamed into development planning and processes, and the time horizon and magnitude of the risks being managed. The three investment categories are elaborated in sections 3.1.1 to 3.1.3.

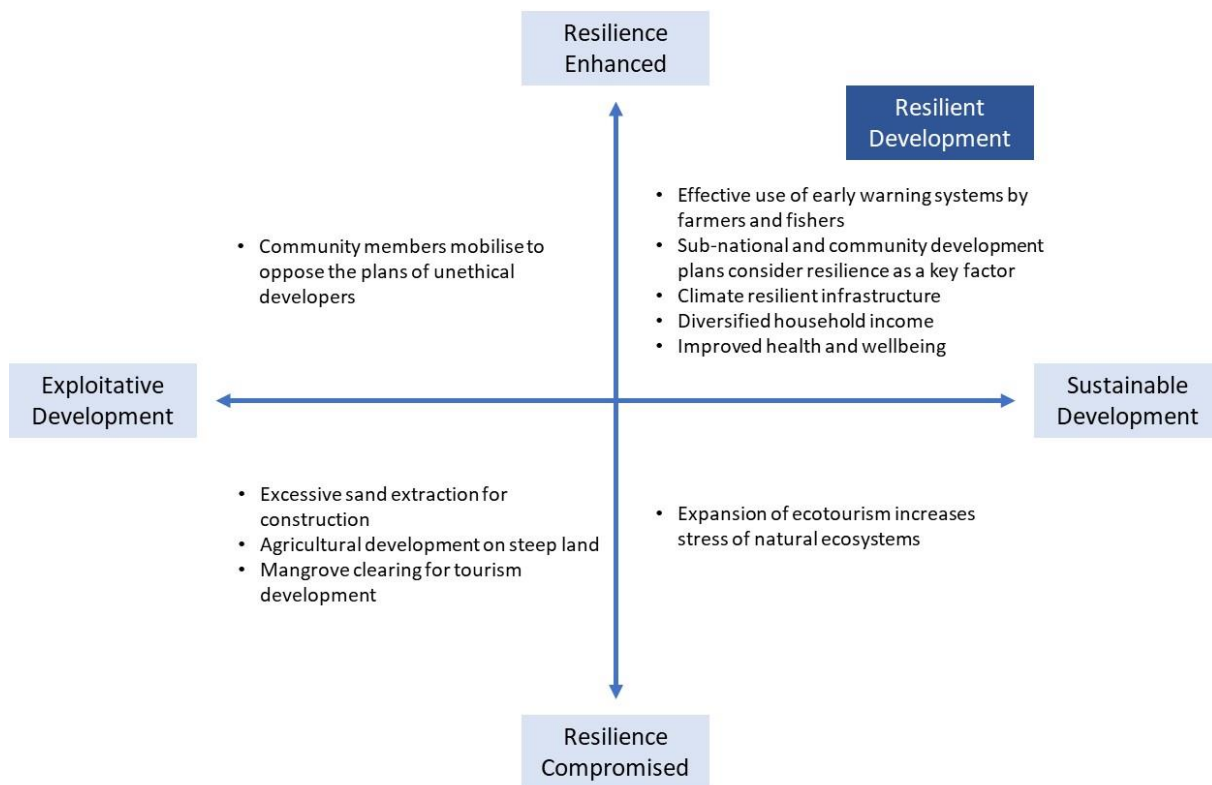


Figure 2: Resilient development is achieved by addressing the joint goals of sustainable development and building resilience. Examples of achieving, or not achieving, resilient development are shown

3.1.1. Make Resilient Development the Common Goal Across Development

To increase the resilience of development outcomes, it is important to identify, evaluate, select, implement and adjust initiatives in ways that reduce climate vulnerabilities and thereby improve development outcomes. Actions must ensure progress toward development goals at the same time as reducing climate and disaster risks to acceptable levels (USAID 2014).

A development first approach ensures that traditional development goals and strategies, and targeted and mainstreamed DRR and CCA strategies and programmes, are an integral part of development planning and processes or, as a minimum, there is a clear line of sight between them. Ideally, if a development first approach to development planning is adopted from the start, a country will have development goals and strategies with considerations of climate and disaster risks fully mainstreamed into development processes. The focus of planning and decision-making would be on resilient development as a common goal across development, climate change and DRM, as opposed to development and risk management goals being pursued in parallel (IIED 2014).

3.1.2. Target Support to Climate Change Adaptation and Disaster Risk Management as Required

In some situations, it is more appropriate to invest in specific and practical DRM and adaptation initiatives. An obvious example is humanitarian assistance, including disaster relief and recovery operations. Other examples of targeted support are:

- Investing in natural hazard and climate early warning systems.

- Improving the availability and quality of information on climate, risks and natural hazards, and their impacts.
- Education and training initiatives that enhance the knowledge and skills of individuals with respect to managing climate and disaster risks.

Importantly, targeted support must still be consistent with partner country priorities, as well as being planned and implemented in line with aid coordination policies and with development processes.

3.1.3. Invest in Transformational Resilient Development in Response to Extreme Scenarios

Current CCA and DRM initiatives are incremental in nature. They involve an extension of existing actions and behaviours in ways that are designed to avoid the disruption of a system and thereby ensure the continuation of the system’s function and benefits into the future. Such actions are consistent with “adaptation as resilience”, and hence with the wider notion of resilient development as described in 3.1.1, above.

However, adaptation to address a more extreme scenario, such as the now reasonably plausible scenario of a 2 metre rise in global mean sea-level this century (Manley et al. 2016a), must involve more than extrapolation of measures designed for less challenging conditions. Managing such extreme risks into the longer term requires a continuous and transformative process, rather than one that is intermittent and incremental. In transformational resilient development, coping with increasingly unprecedented risks and higher vulnerabilities requires reallocation of resources, technology innovations, and/or new governance structures that facilitate integrated and transformational approaches to climate and disaster risk management and development. It also involves challenging and confronting established systems of managing climate and disaster risks and the outcomes that result, by tackling the economic, socio-political and cultural roots of vulnerability.

3.2. Needs and Priorities Associated with Climate Change and Disaster Risk Reduction

Working Paper 1 (Manley et al. 2016a) contains a comprehensive situational analysis, including an assessment of environment and development trajectories in the Pacific (as Annex 1 to Working Paper 1). This provides the foundation for identifying the needs and priorities related to CCA and DRR for MFAT to consider. This section summarises these findings. References for the data presented in this section are contained in Working Paper 1 (Manley et al. 2016a).

3.2.1. Levels of Risk, Vulnerability and Capacity to Cope and Adapt

Environmental, economic and social changes are of great concern to PICTs. Past changes in climate and natural hazard events are summarised in Box A. Between 1900 and 2015 the Pacific Islands region experienced 325 natural disasters, directly affecting 7 million people, 9,200 deaths, ½ million homeless, and total damage of USD4 billion.

Box A

Natural Disasters and Changes in Climate – Past

- There has been a persistent warming trend of 0.18°C per decade since 1961, with most of the warmest years on record in the last two decades; since 1951 the frequency of warm days and nights has increased more than three-fold.
- Changes in observed annual total and extreme rainfall data over the period 1961–2011 are spatially heterogeneous and largely not statistically significant.
- Sea-levels in most parts of the tropical south Pacific have risen, with some rates as high as four times the global average of 3.4mm/year.
- No consensus on trends in the observed frequency or intensity of tropical cyclones in the Pacific.
- Decrease in the pH of the tropical Pacific Ocean by 0.06 pH units since the beginning of the industrial era, with the current rate of decrease being ~0.02 pH units per decade.
- Rate of ocean warming in coral reef areas of the Pacific has increased from ~0.02°C/decade over the past century to 0.24°C/decade over 1985 to 2012.
- Within the last three decades the frequency of bleaching stress has increased three-fold.
- Proportion of reefs in which ocean chemistry will allow coral reefs to grow has decreased from 98% (ca. 1780) to 38% (ca. 2006), due to ocean acidification.
- Since the 1970s there have been significant increases in the number of disasters related to meteorological, climatological and particularly hydrological hazards – this is largely due to increased exposure and vulnerability, rather than an increase in intensity or frequency of natural hazard events.
- Relative to population size, Pacific Island countries have a high proportion of people displaced by natural hazard events, with the proportion being especially high for Tuvalu, Vanuatu, the Federated States of Micronesia, and Kiribati.

The economic vulnerability of PICTs declined between 1990 and 2013, but remains considerably higher than the average for 127 countries for which data are available. The environmental vulnerability of all PICTs is higher than the average for all Least Developed Countries, and is likely to be increasing.

Development challenges abound in the Pacific. Despite enormous efforts and commitment, only two of the 14 PICTs (Cook Islands and Niue) achieved all seven Millennium Development Goals (MDGs). Three countries (Kiribati, Papua New Guinea and Solomon Islands) did not achieve any. Significantly, performance was poorest for MDG 1 (to eradicate extreme poverty and hunger); the MDG judged to be the most adversely affected by climate change and disasters. The nine PICTs for which data are available show little change in their Human Development Index since the early 2000s, in marked contrast to the improvements achieved before that time.

Hard won development gains are at serious risk. Vanuatu ranked top for the World Risk Index, Tonga 2nd, Solomon Islands 6th and Papua New Guinea (PNG) 10th. Vanuatu is ranked 5th in the 2015 Climate Risk Index.

Significantly, both the World Risk Index and the Climate Risk Index suggest that the Pacific Island atoll nations of Kiribati, the Republic of Marshall Islands (RMI) and Tuvalu have relatively low levels of risk. This is despite their highest point of elevation being only a few metres above sea-level. The main reason is that these atoll nations are outside the main tropical cyclone belt and seismic zones. Such countries are more affected by slow onset events, such as saline intrusion and coastal erosion. Rapid onset disasters are more frequent in areas of the tropical Pacific where high volcanic islands are more common.

When disasters do occur, the losses for small states are proportionately very high, sometimes amounting to as much as half of, or even the entire, gross domestic product (GDP). Cyclone Heta, which devastated Niue in 2004, generated immediate losses of more than five times the value of GDP. In comparison, although Hurricane Katrina was hugely expensive, damage losses were less than 1% of the GDP of the United States of America. Figure 3 shows annual average economic losses suffered by PICTs as a result of damage caused by tropical cyclones, earthquakes and tsunami.

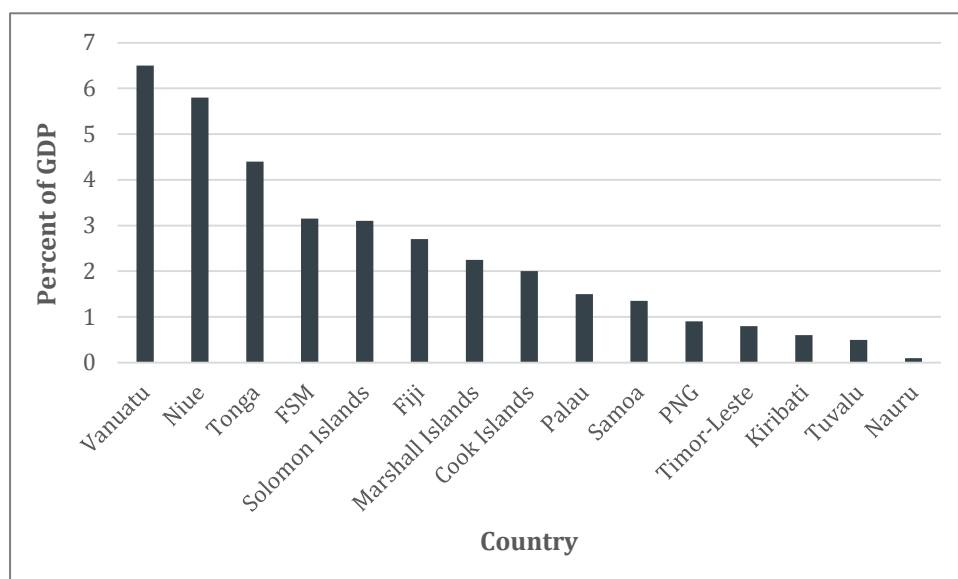


Figure 3: Average annual economic losses due to tropical cyclones, earthquakes and tsunami (Source: World Bank 2013)

In terms of coping capacity (capacity to reduce negative consequences), of the seven PICTs for which data are available and assessed, the World Risk Index suggests capacities are relatively low. This reflects relatively low levels of capacity in governance, disaster preparedness, early warning systems, medical services and insurance. In contrast, adaptive capacity (capacity for long-term strategies for societal change in relation to education, gender equity, state of the environment, ecosystem protection, and investment in health services) is assessed as being relatively high, with a few instances of notable changes (positive and negative) in adaptive capacity over time.

3.2.2. Adaptation Financing and Costs

Adaptation aid to PICTs totalled about USD705 million between 2010 and 2014 (Betzold 2016). Part of this aid will need to be paid back, as the total includes both grants and loans. Funding levels steadily declined from a high of USD242 million in 2011 to USD124 million in 2014. Of the USD705 million, around USD461 million (65%) targeted adaptation as a significant purpose, while USD243 million (35%) went to projects where adaptation was the principal purpose. Adaptation financing is distributed unevenly among PICTs, on both a per capita basis and in percentage of overall development aid. Regional programmes in Oceania received over one quarter of all adaptation finance to the Pacific, largely for principal adaptation projects.

Overall, adaptation aid to PICTs is less than what is needed for the region to effectively cope with and adjust to climate change. Continuation of the roughly USD141 million of adaptation finance currently disbursed to the Pacific per year is very likely to be insufficient as adaptation costs for the Pacific region have been estimated at about USD447 million every year until 2050, for a worst-case scenario (ADB 2013, ADB 2016). Even with an extreme reduction in global greenhouse emissions, annual average costs would be about USD158 million until 2050.

3.2.3. Future Changes in Climate and Hazard Events

Box B describes anticipated future changes in climate and hazard events. While global average temperature reached 1°C above pre-industrial times in 2015, an increase of 1.5°C in global average temperature could be reached by the early 2030s. The 2°C target in the Paris Agreement could be reached by 2050, even if all current pledges under the Agreement are fully implemented. Reaching the 2°C target would mean an additional doubling in the number of extreme weather-related events globally. For the Pacific, this would result in ocean acidification preventing the growth of almost all reefs, with coral bleaching also being an annual event for these reefs.

Reaching the 2°C target would also mean sea-level rise of at least 79cm, and possibly 2 metres as a result of the further collapse of ice shelves, leading to the inundation and eventual submergence of entire atolls and coastal areas on high islands. Severe coastal erosion and salt contamination of soils and groundwater would be precursors to the more extreme consequences of sea-level rise. The atoll countries of Kiribati and Tuvalu face high levels of climate risk. No atoll group in the Pacific is likely to be habitable by the end of the century. Annex A includes an assessment of evidence on the implications of sea-level rise on atoll and island habitability.

Limiting warming to 1.5°C would preserve at least 10% of the world's coral reefs, as opposed to higher levels of warming that will cause their virtual disappearance (Climate Analytics and UNDP 2016). A plethora of exotic pests and diseases would initially degrade the wellbeing and productivity of people as well as food production systems, and may eventually result in widespread epidemics and fatalities. Communities and countries would be burdened by increased floods and seasonal droughts.

Box B

Changing Climates - Future

- Extreme high temperatures that currently occur once every 20 years on average are projected to increase by up to 2.0–4.0°C by 2090, under the very high emissions scenario.
- Some months are likely to be dryer and some wetter, with annual precipitation remaining about the same but with greater differences in rainfall between wet and dry months and more intense rainfall in the wettest periods of the year; Kiribati is a notable exception – average annual rainfall is likely to increase by 20–25% compared to historical rainfall data.
- Extreme rainfall events that have occurred once every 20 years on average are projected to occur once every 7–10 years by 2090 (very low emissions scenario) and every 4–6 years by 2090 (very high emissions scenario).
- Risks of more severe drought in 2050 are small in most countries; but under a high emissions scenario extended periods of little or no rain are likely, especially for the Solomon Islands and Tuvalu, and to a lesser extent Fiji, Palau and RMI.
- El Niño and La Niña events will continue to occur in the future, but there is little agreement whether they will change in intensity or frequency; at least one recent study suggests that through the 21st Century El Niño events will double in frequency and become more intense.
- Global average sea-level rise will be about 79cm if global temperatures increase by 2°C by 2100, and by nearly 1 metre with 4°C warming, with significant regional variations in the Pacific; collapse of ice shelves could lead to sea-level increasing by up to 2 metres by 2100.
- Based on the 'business-as-usual' emissions scenario, the pH of the tropical Pacific is projected to decrease by a further 0.15 units; dramatic decreases in aragonite saturation are also projected to occur, suggesting that by mid-century the entire tropical Pacific region will have shifted to sub-optimal conditions, and a decline in coral calcification rate of about 10%.
- By 2050 ocean warming will cause annual coral bleaching for almost all reefs.
- More intense tropical cyclones and associated intense rainfall are likely.
- Cyclones could occur pole-ward of the current cyclone belt; if El Niño-like events become more frequent or more intense – as suggested by some climate models – cyclones could occur both closer to the equator and pole-ward of the current zone; such an expansion may well be the most important foreseeable influence of a warming planet on cyclone behaviour.
- Significant wave heights are likely to increase in the tropical south Pacific, while decreases are projected for the trade wind region of the north Pacific and in the regions of the mid-latitude westerlies.
- Projected increases in sea-level, superimposed on extreme sea-level events (e.g. swell waves generated by intense low pressure weather systems at higher latitudes, storm surges, El Niño-Southern Oscillation) will manifest as severe sea flood and erosion risks for low-lying coastal areas and atoll islands; the resulting wave over-wash of seawater will degrade fresh groundwater and land resources.
- A comparison of current and future tropical cyclone losses for 14 PICTS showed the increase in average annual loss of above-ground assets to be relatively small, but the end-of-century increases for many individual countries are considerably larger; changes in loss are greater for buildings than for other infrastructure and crops, with wind being the main contributor to building loss, while flooding mainly contributes to infrastructure loss.

As a result of equator- and pole-ward expansion of the tropical cyclone belt, countries which now suffer only the indirect consequences of cyclones (e.g. large ocean swells) risk being devastated by the direct effects of more intense cyclones. However, there will be continuing uncertainty in the magnitude, frequency and duration of El Niño and La Niña events, and hence uncertainty in the occurrence of the significant weather and climate anomalies with which they are associated.

3.2.4. Major needs and priorities

The research identified needs and priorities associated with several thematic areas, and potential opportunities for MFAT and/or other development partners. These are summarised below.

- **Support resilient development** – building resilience requires strengthening underlying governance structures at national, sector, sub-national and local levels, as well as engaging with a range of actors. MFAT is well placed to support PICTs in this regard, and is already assisting many countries in the region in the areas of governance and public financial management.
- **Ensure investments are risk informed** – all products, processes and partnerships need to be risk-informed, and this information needs to be effectively communicated to end users. This requires ensuring individuals whose principal expertise and responsibilities are at the sector level, work with people who are actively involved, and have specialist expertise, in climate and DRM. It also requires strengthening ICT as a means of ensuring that useful information and relevant knowledge is accessible to decision makers at national, sub-national and local levels.
- **Localise adaptation and disaster risk management** – local governments are critical stakeholders in supporting resilience building and coordination of disaster response and recovery. More investment is needed to support the institutional strengthening of the various actors in the chain, so that local governments can play their role in identifying communities in need as well as strengthening their own processes to be better able to respond to these needs. MFAT is well placed to respond to these needs and opportunities, having previously supported governance and leadership initiatives within local governments. Support needs to be sustained over the timeframe necessary to generate long-lasting changes in processes, and to institutionalise partnerships.
- **Address the underlying determinants of vulnerability** – such determinants – including socio-economic status, poverty, overcrowding, poor sanitation and solid waste disposal, access and control over resources, and information and the ability to contribute to decision making – influence adaptive capacity. Development partners, including MFAT, need to make formal links between programmes and activities related to CCA and DRR, and wider work to address the underlying determinants of vulnerability. Staff working with partner organisations on poverty alleviation, livelihood and enterprise development, and gender and human rights issues are likely to have a sound understanding of the social context within which risk reduction and resilience programmes are taking place, and could identify entry points for such programmes. Funding to support the capacity of NGOs that work at the community level to address these issues is an important part of an overall strategy to support increased resilience

and reduce climate and disaster risk. Gender and social inclusion training for all development staff is also recommended.

- **Strengthen individual and institutional capacities** – managing the impacts of climate change and disasters will require extensive skills and capacities across the whole of society. For example, appropriate skills within policy makers, agricultural extension officers, road maintenance workers, plumbers, fishers and farmers. Fundamental capacity constraints that need to be addressed include: weaknesses in the enabling environment for CCA and DRR at national, sub-national, and sector levels; difficult and limited access to adaptation financing; and limited human and institutional capacities that hamper the effective use of available financing.
- **Further engage the private sector in resilient development** – the potential for the private sector to contribute to resilient development in the Pacific is largely unrealised. The private sector in New Zealand has considerable experience with CCA, business continuity planning, and other aspects of disaster preparedness, response and recovery. Utilising this experience to strengthen skills and knowledge among private sector operators in the region, including through public-private partnerships, could significantly expand the number of actors engaged in supporting resilient development, including CCA and DRR. MFAT is well placed to promote private sector engagement including through the Private Sector Window, which facilitates connections for New Zealand companies interested in investing in the Pacific, and through its support for business mentoring.
- **Increase understanding of the longer term habitability of atolls and islands** – changes in habitability occur as a result of the interplay between atmospheric, oceanic, social and economic conditions over the long-term. While a focus on resilience tends to favour responses that consider only the short-term, a longer term perspective is critical when considering strategic responses, such as international migration as an adaptation option for countries facing severe declines in habitability. As noted, an analysis of evidence on the implications of sea-level rise on atoll and island habitability in the longer term is included in Annex A. The drivers of declining habitability include increasing population density, economic vulnerability, and incidence of pests and disease.
- **Increase access to climate and disaster finance** – available finance for building resilience is limited and difficult to access. A complicating factor in the Pacific is the number of funding agencies involved in implementing CCA projects. There is an opportunity to support efforts to assemble and review existing information on the objectives, eligibility requirements, selection criteria, and type of projects most likely to be funded by the various sources of climate finance. This information needs to be targeted, kept up-to-date, and made available to relevant government officials and others in PICTs. There is also a need to complete climate change finance and related assessments for FSM, Palau, Kiribati, Solomon Islands, and PNG. These and all other PICTs need to develop plans that clearly prioritise the actions that their governments, the private sector, civil society, and the country's development partners need to take in order to ensure each country has adequate capacity to access and manage climate finance efficiently and effectively. For the PICTs that wish to seek National Implementing Entity accreditation, their national plans should also prioritise the assistance they need to complete the steps to being "climate ready" and to secure accreditation.

- **Ensure effective use of climate and disaster finance** – the multitude of financing options necessitates strong coordination mechanisms at the national level to avoid duplication of effort and to ensure funding is disseminated efficiently. Support in this area requires a country-by-country approach. MFAT has increased efforts over recent years to improve coordination with other development partners (e.g. with the European Union (EU)), and is in a strong position to drive coordination and seek opportunities for joint programming with other development partners, including identifying areas of mutual interest and potential synergies, and identifying duplication that should be avoided.
- **Improve prioritisation of resilient development investment opportunities** – given constrained resources, prioritising the large number of opportunities to strengthen resilience is an essential part of the resilient development process. Support for the process of vulnerability assessment, and prioritisation and selection of adaptation and other risk reduction options, will become an increasingly important area as plans, frameworks and strategies are strengthened, and efforts to secure finance through national budgets and external finance intensify.
- **Strengthen knowledge creation, sharing and use** – there is a need to learn from the increased number of initiatives to support CCA and DRR. Development partners have a key role to play in helping to support the recognition of learning – including learning from mistakes – as a vital part of CCA, DRM and development processes. Joint learning exercises should be conducted with national level partners to maximise their usefulness.
- **Increase the effectiveness of humanitarian actions** – while most humanitarian actors pledge to target vulnerable persons in times of crisis, few are putting in place specific mechanisms and procedures to effectively reach, and take into account in their programmes, both the needs and potential contributions of vulnerable groups. Governments, working jointly with communities and humanitarian partners, need to better utilise traditional structures and community networks, and increase the effectiveness of communicating knowledge in both urban and rural communities. Given national governments have limited post-disaster follow-up capacity, it is critical that projects be community-led, and sustained mostly by local resources. There is also a need for humanitarian partners to work to strengthen community groups that amplify the voices of women, children, youth, older people and people with disabilities, and to systematically involve them in decision-making. Governments and humanitarian partners also need to invest in better analysis of social, economic and human vulnerability to natural hazards. This can draw from more regular and robust census data, economic modelling, and from information provided by local businesses and community groups. Improved data on vulnerability can be used to make both risk management and disaster response planning more targeted to local needs.
- **Strengthen coordination and cooperation** – given the magnitude of the capacity constraints PICTs experience, a regionally crafted coordinated response would provide the best opportunity to ensure individual countries and territories have the technical and administrative skills to meet climate change and disaster-related challenges in a timely, economical and sustainable manner. Partnerships can help ensure that actions are well coordinated and effective, with reduced duplication and waste. Regional cooperation also helps address many of the climate- and disaster-related challenges facing PICTs. It strengthens the ongoing national efforts to implement ambitious climate change actions. The EU's Regional Steering Committee for the Pacific is an example of a

mechanism that promotes regional coordination and cooperation. Pacific Leaders and their Ministers have made a series of political decisions in support of a range of climate change, DRR and development-related international, regional and multilateral agreements. Similarly, specific calls for improved coordination and cooperation have occurred following several disasters that have had multiple country and regional impacts.

3.3. Current Donor and Development Programme Responses

Working Paper 2 (Manley et al. 2016b) contains a comprehensive analysis of current responses to the climate change and DRM issues identified in Working Paper 1 (Manley et al., 2016a) and summarised above in section 3.2. This section summarises the comparative advantages and limitations of the main development partners' responses, and outlines the lessons and success factors identified from the analysis of responses. Annex B presents a summary of donor and development programme responses, and a summary of the effectiveness of these responses that draws on evaluation documents and stakeholder interviews.

This analysis, including in Annex B, is based on information gathered from development partners, including policies, strategies, project documents and evaluations. It is also based on current efforts by the Pacific Climate Change Portal and the Disaster Risk Reduction Projects Portal to map partner responses. This desk-based research was supplemented by interviews with practitioners working in areas that include development, CAA and DRR.

3.3.1. Comparative Advantages and Limitations of the Main Development Partners

The comparative advantages and limitations of the main development partners are summarised in the table below. In keeping with the acknowledged importance of regional coordination, the table indicates many opportunities for joint programming.

Development Partner	Comparative Advantage	Limitations
New Zealand	Flexible funding mechanisms. Expertise in disaster response and humanitarian assistance. Support for public financial management reform. Strong technical skills in renewable energy, agriculture and fisheries. Institutional strengthening at the local government level. Supporting the capacity development of NGOs. Network of Posts throughout the Pacific.	Partner agreement processes, such as joint programming, could be improved, as could the mainstreaming of resilience and social inclusion within MFAT processes.

Development Partner	Comparative Advantage	Limitations
Australia	Climate change science. Partnerships with the national meteorological offices. Support for public financial management reform. Gender mainstreaming. Targeted capacity building, especially strengthening individual and institutional capacities. Network of Posts throughout the Pacific.	Largest donor in the region so is often seen to be driving the development agenda – sometimes alone. Domestic politics have a strong influence on the aid agenda. Fluctuating aid volumes in recent years and changing priorities.
EU	Significant volume of funding available. Climate change and renewable energy high on political agenda, and likely to remain so. Climate change and gender mainstreamed within its programmes. Desire to move towards budget support. Willingness to partner with others, particularly New Zealand.	Small presence in the region. Bureaucratic procedures and lengthy approval processes.
Germany	Flexible funding mechanisms. Partnerships. Mainstreaming climate change and disaster risk into the education sector.	Competing with local delivery partners. Monitoring, evaluation and reporting processes weak.
Japan	Expertise in disaster risk management and insurance mechanisms.	Limited information available on programming and evaluations to help strengthen donor coordination.
SPC	Technical skills in agriculture, fisheries, water, sanitation, coastal zone management, climate change, disaster risk management and health. Strong relationships with government counterparts.	Weak financial management. Has struggled to mainstream climate change and disaster risk management and social inclusion effectively internally. Largest of the CROP agencies and sometimes reluctant to partner with others. Poor internal prioritisation mechanisms.
SPREP	Technical skills in environmental and biodiversity conservation, waste management. and coordination with meteorological services.	Strays into the mandate of others by implementing on the ground. Perfunctory monitoring and evaluation. Insufficient political priority given to its management of the Pacific Climate Change Portal.
PIFS	Access to the Leaders and to Forum Foreign and Economic Ministers. Convening power. High political profile. Lead role on climate change finance.	Limited capacity working on climate finance (though this will soon grow). Weak coordination mechanisms. Bureaucratic processes.

Development Partner	Comparative Advantage	Limitations
World Bank/ ADB	Public sector reform. Strengthened public financial management. Infrastructure development. Insurance. Ability to leverage large amounts of finance. Prominent DRR role (GFDRR).	Reluctance to partner with smaller players or replicate good practices started by others.
UN agencies	Able to support countries to access GEF (UNDP) and other funding sources. Multi-disciplinary. Able to access technical expertise from a large staff body globally. Influential. Learning and communications.	Competing with each other and with local delivery partners. Inadequate partnerships between UN agencies.
NGOs	Strong socially inclusive and community-oriented processes. Naturally take a development first approach. Good access to local government and communities.	Institutional capacities sometimes weak. Governments sometimes reluctant to partner.

3.3.2. Lessons and Success Factors from Donor and Development Programme Responses

Several lessons and success factors were identified from an analysis of donor and development programme responses to the needs and priorities associated with climate change and DRR. These are summarised below.

The importance of using and building on existing mechanisms

Understanding context is vital to being able to effect change. Greater use of existing institutional arrangements and partnerships can improve the effectiveness and sustainability of programmes. Similarly, embedded advisers and secondments to partner governments are opportunities and entry points for the consideration of risk across the development agenda.

Strong governance and institutional mechanisms are critical

Investing in governance mechanisms should be sustained where there is evidence of their usefulness. This particularly applies to local level governance mechanisms such as island councils and community governance structures. A predictable, long-term but modest funding commitment is needed to have meaningful impact.

The importance of investing time and resources to develop and sustain partnerships and coordination mechanisms

Considerable investment of time and other resources is required to develop and sustain the partnerships and coordination mechanisms that are critical to achieving outcomes and longer term results. The PRIF, the EU/New Zealand renewable energy partnership, and the Pacific Energy Summit and Conference are excellent examples. When strengthening partner coordination, care must be taken not to weaken country-ownership of coordination mechanisms.

The urgency of building the capacity of local NGOs and other actors to support resilient development

NGO partners with long established relationships with local governments and communities should be involved more widely in programme design and implementation. The use of regional institutions in implementing community-based initiatives is unlikely to be effective or efficient unless partners who are able to support the community once the project ends are also involved. Trusted local actors that understand the local context, including the underlying drivers of vulnerability, are a vital partner in providing targeted support and can help sustain interventions over the longer term. Building NGOs into project design, and investing in NGO capacity, is critical.

The importance of promoting gender and social inclusion as a core part of resilience

The FRDP includes three principles that are of relevance here: protect human rights; prioritise the needs and respect the rights of the most vulnerable and facilitate their effective participation in planning and implementation of all activities; and integrate gender considerations and advocate for and support equitable participation of men and women in the planning and implementation of all activities.

The need to underpin prioritisation and decision-making processes with sound social and economic analysis, robust science and transparent and inclusive processes

Strategic political decisions are taken at the top; but design and implementation decisions should be taken at the lowest possible level of public authority, closest to the population concerned, and with full consideration of robust evidence and involvement of all stakeholders. This includes information and evidence on criteria for prioritising climate and disaster resilient responses, including information on the economic losses incurred by climate change and natural hazard events. Flexibility and adaptive management are key requirements. Existing stand-alone, project-based approaches to adaptation planning largely fail to incorporate the adaptive planning that is required to accommodate the different timescales of climate change impacts.

The importance of investing in information and knowledge management

It is important to have ready access to fit-for-purpose knowledge on the causes, local impacts and responses to climate change, hazards and disasters, and to build capacity for local adaptation and other risk management measures. Understanding how users access information and knowledge, and their preferred format for receiving it, is critical to supporting the use of information and knowledge in decision-making. Traditional knowledge should be valued alongside scientific knowledge.

Linking climate change finance, public financial management and aid effectiveness agendas is desirable

There are strong links between these agendas. Bringing them together will help to ensure these reform agendas reinforce each other and avoid duplication and conflict.

The need to include climate change and resilience considerations in policy and planning, as well as in aid coordination and tracking mechanisms

Increased resilience of development outcomes can be achieved by the systematic inclusion of climate- and disaster-risk considerations in existing development planning and decision-making processes, in a development first approach. This involves working from within existing policy and aid management systems and adjusting them to take risk into account.

The importance of integrating resilience principles throughout programming

Development planning and processes should be adapted where needed, with support to ensure development practitioners understand the reasons why it is important to incorporate CCA and DRR planning to increase the resilience of development outcomes.

Strengthening the evidence base to understand the implications of climate change for development requires long-term predictable funding for climate change science and observations

Uncertainty regarding future funding for climate change science and observations can undermine the effectiveness of initial investments in strengthening national capacity, as well as relationships between information providers and end users. It is likely to be more effective to commit modest, predictable funding for longer time periods.

The importance of using existing long-term partnerships as the basis for capacity building initiatives

This can help to reduce the time needed to establish trusted relationships and maximise the effectiveness of initiatives. Coaching and mentoring can be as effective as formal training, but needs to be undertaken by trusted partners. Existing educational institutions, such as USP and local tertiary and TVET institutions, should be used to deliver formal capacity development where possible.

The need to engage stakeholders beyond climate change and DRR

Transforming the development agenda requires reaching new people and new partners, particularly planners and decision makers, sub-national governments and NGOs. When seeking to support resilient development outcomes in a specific sector, stakeholder analyses of the existing actors, governance structures and decision-makers are crucial for identifying the most appropriate entry point as well as champions that can influence change.

3.4. Strategic Opportunities of Greatest Potential for MFAT

When the preceding findings were taken together, the research identified strategic opportunities, including a set of prioritised opportunities described below that are more

directly relevant to MFAT. Working Paper 3 (Manley et al., 2016c) describes the methods used and provides further details of the strategic opportunities.

3.4.1. MFAT Walking the Talk: Moving to a Development First Approach

The adoption of the FRDP by Pacific Leaders in 2016 signals a commitment to address climate and disaster risks as part of all development processes.

Leading by example, there is an opportunity for MFAT to examine its own internal policies and procedures to ensure that climate change and disaster risks, and the underlying causes of these risks (including gender, social exclusion, poverty and disability) are considered explicitly and in an integral way throughout policy and project cycles, from the initial conception and design phase through to monitoring, evaluation, reporting and learning.

3.4.2. Invest in Strengthening Local Government Leadership and Governance

Achieving long-term resilient development at a community level requires strong local level governance systems that empower leaders to control their development planning processes while at the same time working effectively with both sub-national and national governments. To achieve this, the support provided by development partners must build on existing structures, systems and partnerships, and hence work from within rather than imposing external processes.

A tangible strategic opportunity is to build on the innovative work of the Pacific Risk and Resilience Programme. It is rolling out the development first approach, with a focus on enhancing governance mechanisms to help strengthen the resilience of Pacific Island communities to disasters and climate change related risk. Currently PRRP works with the governments and communities of Fiji, Solomon Islands, Tonga and Vanuatu. It is supported by DFAT and implemented through a partnership between the UNDP and Live & Learn Environmental Education (LLEE). MFAT could partner with the EU and LLEE to apply the learning from their roles in the PRRP. LLEE already has a presence in Kiribati, so it would be logical to demonstrate how strengthening local government leadership and governance in one or more of the outer islands of Kiribati can support achievement of resilient development outcomes.

3.4.3. Demonstrate How Existing Support Contributes to Resilient Development

Many aspects of MFAT's existing support to countries are highly relevant for resilient development, but these benefits are seldom recognised. Highlighting and strengthening the links between existing development assistance to strengthen national and sector planning processes and the resilient development agenda, provides excellent entry points for mainstreaming resilience considerations.

For example, MFAT support for public financial management reforms, particularly the existing trial of budget support to the Kiribati government, represents an important entry point for also strengthening readiness capacity to access finance for progressing the resilient development agenda. Work to improve aid coordination and the tracking of development assistance can also support monitoring of climate financial flows. Strengthening procurement procedures, and integrating risk considerations as part of that process, can ensure that contracted suppliers actively contribute to risk reduction. Strengthening the links between the overall budget process, the national development plan and the operational plans of ministries, and integrating

risk considerations as part of these processes, can ensure that risk reduction priorities identified in sector policies and plans translate into operational work plans.

3.4.4. Invest in National Coordination Capacity and in Supporting Information and Knowledge Management Systems

Investing in improved coordination and information management is a long-term process that requires adequate resourcing. Resilient development involves many players and informed decision-making. Effective coordination and information management are areas that require a significant amount of skilled capacity and are dependent on people and relationships. Technology solutions are rarely successful in removing barriers to sharing information. Technology may form part of the solution, but only as part of a wider approach that facilitates sharing of information, including by way of significant investments in nurturing partnerships, network strengthening and building trust.

MFAT could consider boosting coordination capacity in governments by supporting the placement of additional qualified individuals within the relevant agencies, such as in the Office of the Prime Minister of Tuvalu and Office of the President of Kiribati. One of their roles would be to improve systems for coordination with government and between it and civil society, the private sector and development partners. In addition, support for improved information and knowledge management systems would significantly reduce the time local officials spend retrieving information for consultants working on development projects. In developed countries, ready access to such information is taken for granted.

3.4.5. Strengthen the Links Between Building Resilience and Addressing Food, Water, Energy, Gender and Human Rights Needs

Both the FRDP and the Sustainable Development Goals (SDGs) recognise the interconnectedness of all facets of development. Yet, in many instances, development initiatives are still designed and implemented in silos. Insufficient time is given to understanding the relationships between the diversity of development needs, and to promoting a shared understanding and viable solutions. This is especially the case at a national level.

Creating opportunities for learning and reflection between and across areas of development practice is a vital part of achieving development outcomes that are more resilient. This may require changes in the way programmes are designed to ensure a broader range of stakeholders are consulted and can contribute their experience and expertise to the process. Institutionalising learning events, both locally and nationally, can also assist. The capacity of national and local government planners and existing coordination structures to drive this process can be strengthened by way of dedicated support for monitoring, evaluation and learning positions.

3.4.6. Increase the Use of Existing Good Practices

The FRDP identifies several good practices that need to become “standard practice” if tangible and widespread progress is to be made in ensuring development outcomes are resilient to climate, disaster and other risks. These include good practice in approaches to ecosystem-based adaptation, environmental impact assessment, building codes, land use planning and protected areas.

One example is taking a long-term approach to strengthen national and regional education and training curricula and programmes by including both conceptual and practical learning to use these approaches and tools. In the shorter term, support should be provided so that individuals with the relevant knowledge and skills can be seconded to work in relevant parts of government, at both national and sub-national levels. Their job descriptions should include a responsibility to strengthen systems that foster resilient development and to train local staff in the use of relevant approaches and tools, including ecosystem-based adaptation and environmental impact assessment.

4. DISCUSSION AND CONCLUSIONS

This section provides concluding comments and discusses the implications of the research findings for development.

Sea-level rise of 79cm to 2 metres by 2100, and possible equator- and pole-ward expansion of the area where cyclones occur, are probably the most important foreseeable consequences of climate change in the Pacific. These changes will manifest as severe sea flood and erosion risks for low-lying coastal areas and atoll islands; the resulting wave over-wash of seawater will degrade fresh groundwater and land resources, leading to the inundation and eventual submergence of entire atolls and coastal areas on high islands. Severe coastal erosion and salt contamination of soils and groundwater would be precursors to the more extreme consequences of sea-level rise. Responding to such increasingly unprecedented risks and higher vulnerabilities requires urgent and effective CCA and DRR interventions.

Over the last 20 years, as climate became an increasingly important issue for the Pacific Islands region, there was an increase in the number of donor and development programme responses supporting countries to address its impact. Largely in parallel, initiatives related to DRR became better organised and informed, more future focused, proactive and inclusive. However, many projects took a hazard-specific approach, assessing the specific nature of the hazard (e.g. the risk of drought) in a particular place and sector, rather than focusing on strengthening the resilience of the whole system. This led to fragmented approaches, missed opportunities for doing things more effectively, and duplication of effort. Key success factors for effective mainstreaming of climate and DRM initiatives were not given sufficient attention; with a focus on development partners to 'get money out the door'. Sustainability of outcomes was not often prioritised.

With a realisation that development planning that failed to address climate and disaster risks was placing hard won development gains at risk, more recently, there has been considerable effort to increase both the integration and mainstreaming of CCA and DRR, with a view to improving both the effectiveness and efficiency of interventions. Similarly, there is an increased realisation that, in many instances, pre-existing issues of severe overcrowding, proliferation of informal housing and unplanned settlement, inadequate water supply, poor sanitation and waste disposal, pollution, and conflict over land ownership require immediate resolution if additional stresses related to climate change are to be managed effectively.

Efforts to mainstream and integrate CCA and DRR often assumed that the underlying development planning systems were robust. Increasing effort is now being made to strengthen these development planning, prioritisation, decision-making and budgetary processes, in parallel to mainstreaming CCA and DRR.

The analysis of current donor and development partner responses undertaken for this research, concluded that there have been successful contributions to addressing the following needs and priorities:

- Ensuring products, processes and partnerships are risk-informed.
- Increasing the effectiveness of humanitarian actions.
- Strengthening individual and institutional capacities.
- Increasing access to, and effective use of, climate and disaster finance.

- Prioritising resilient development investment opportunities.
- Strengthening knowledge creation, sharing and use.

However, gaps and opportunities exist in relation to localising adaptation and DRM, addressing the underlying determinants of vulnerability, increasing the involvement of the private sector in resilient development, increasing atoll and island habitability in the longer term, and supporting resilient development through strengthening underlying governance structures.

As one development partner, New Zealand's comparative strengths have been its:

- Flexible funding mechanisms.
- Expertise in disaster response and humanitarian assistance.
- Support for public financial management reform.
- Strong technical skills in renewable energy, agriculture and fisheries.
- Institutional strengthening at the local government level.
- Supporting the capacity development of NGOs.
- Strong presence in the Pacific.

Conversely, the main areas for improvement in New Zealand's responses relate to partner agreement processes, such as joint programming, and the mainstreaming of resilience and social inclusion within MFAT processes.

In reflecting on the needs and priorities associated with climate change and DRR, the current gaps in responses of donors and development partners, and New Zealand's comparative advantage, the research prioritised six strategic opportunities for MFAT:

- Examine internal policies and procedures to ensure that climate change and disaster risks, and the underlying causes of these risks, are considered explicitly and in an integral way.
- Further invest in strengthening local government and community leadership and governance.
- Demonstrate how existing support contributes to resilient development outcomes.
- Invest in national coordination capacity and in supporting information and knowledge management systems.
- Strengthen the links between building resilience and addressing food, water, energy, gender and human rights needs.
- Increase the use of existing good practices in approaches to ecosystem-based adaptation, environmental impact assessment, building codes, land use planning and protected areas.

In assessing current responses to needs and priorities associated with climate change and DRR, one of the lessons identified in this research is to use and build on existing mechanisms. The research has shown that it is important to localise efforts to increase the resilience of development outcomes, to cooperate to achieve economies of scale, and to coordinate to reduce

inefficiencies and increase benefits arising from the investment. The FDRP advocates for localisation, cooperation and coordination, and Pacific leaders agreed that the Pacific Resilience Partnership would be the basis for coordinating implementation of the FDRP. The Pacific Resilience Partnership is tasked with bringing together diverse stakeholder groups, and the communities of practice working on climate change, DRM and sustainable development.

MFAT is highly regarded in the region, especially for its constructive and pragmatic leadership. It has the ability to bring together stakeholder groups and key players who need to be catalysed into overcoming barriers and achieving the many mutual benefits that come from regional cooperation and coordination. There is an opportunity for MFAT to apply its leadership skills and reputation to achieve successful regional coordination and cooperation by way of the Pacific Resilience Partnership, and thereby give effect to many of the needs that have been identified through the current research.

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ANNEX A: INCREASED ATOLL AND ISLAND HABITABILITY IN THE LONGER TERM

Collectively, PICTs are small land masses surrounded and linked by large ocean masses. The drivers of declining habitability of both atolls and the coastal fringes of high islands often work in synergistic ways. This is often through increasing Western influence in the Pacific, and the concurrent degradation of local cultures.

The drivers include:

- **Increasing population density:** rapid increases in population in many urban and other coastal areas are placing increasing pressure on terrestrial and adjacent marine resources, including unsustainable intensification of land use such that it is becoming increasingly difficult for individuals and families to meet their basic needs and maintain their livelihoods; these trends also reduce historical and cultural connections to the environment and natural resources, as well as the ability to use subsistence and other traditional low impact practices, thereby exacerbating the pressures.
- **Increasing economic vulnerability:** agricultural and coastal marine activities are increasingly focused on income generation rather than local subsistence, resulting in higher exposure to both economic fluctuations and to weather and climate extremes and variability. Pacific families are also vulnerable to changes in the regional and global economies that adversely affect the ability of expatriate family members to maintain the level of remittances on which they depend to maintain their quality of life.
- **Exploitation of natural resources:** as noted above, the move away from subsistence lifestyles and farming towards commercial crops and extraction of marine resources, and the development of new infrastructure such as roads and wharves, decrease the productivity of the terrestrial and marine environments and make it increasingly difficult to sustain large populations without considerable amounts of external assistance.
- **Increasing incidence of pests and diseases:** even without climate change, Pacific populations and ecosystems are being exposed to a growing array of pests and diseases due to the high mobility of people and the increasing movement of goods by ships and aircraft. Pests and diseases cause serious declines in the productivity of people as well as terrestrial and marine ecosystems, threatening food security.
- **Climate variability and change:** PICTs are particularly susceptible to the variety of consequences of climate change; reasons include: (a) climate change acting as a threat multiplier by exacerbating the impacts of other environmental changes such as invasive pests and diseases, and water shortages; (b) the low elevation of most land masses in the Pacific, including the coastal areas of high islands where people and built assets are usually concentrated; (c) a high dependency on natural and managed ecosystems which are very sensitive to temperature extremes and extremes and variations in rainfall; and (d) the isolation and lower capacity for response and recovery after extreme events that all too often manifest as disasters.
- **Ocean acidification:** this impacts food webs, biodiversity, aquaculture and hence societies. Tropical coral reef loss will affect tourism, food security and shoreline protection. Pacific people who rely on the ocean's ecosystem services are especially vulnerable.

- **Waste:** the small land masses of PICTs combined with high population growth, increasing amounts of waste generated per capita, much of it often of an intractable nature, and increasing competition for land resources, has resulted in often overwhelming problems with waste disposal, including degradation of land and marine environments.
- **Chemical and biological contamination:** while few PICTs have much if any data on chemical and biological contamination of land, water (terrestrial and marine) and air resources, it is generally considered that these resources are being degraded, with adverse consequences for human health and wellbeing, and for the productivity of natural and managed ecosystems.

The cumulative, synergistic effects of these drivers are of special concern for those living on small islands, whether they be the islets of atolls or the coastal lowlands of high islands. In the short-term, the consequences for atoll and island habitability can likely be addressed by reducing the underlying causes of vulnerability. But such approaches tend to emphasise incremental change to reduce impacts, while achieving co-benefits through no-regret, low-regret and win-win strategies. There is increasing evidence of limits to the effectiveness of such incremental approaches, even when attention is given to flexibility and safety margins.

In the face of the possibly grave impacts arising from almost inconceivable changes in the climate in the foreseeable future, transformative changes in our perceptions and paradigms about the nature of climate change and adaptation responses will be necessary (see section 3.1.3). These will still acknowledge the continuing uncertainty about how all the drivers of changes in atoll and island habitability, not just the climate, will change over time.

The need for transformative changes is no better illustrated than by considering the implications of sea-level rise on atoll and island habitability in the longer term, if not sooner. There are three fundamental reasons.

First, there are large uncertainties in sea-level rise projections, with these increasing rapidly into the future, and with the extent of down-scaling from the global projections. The increasing uncertainty (indicated by 5–95% model ranges) in global mean sea-level rise projections over time is shown in the following table. Comparable measures of uncertainty in sea-level rise projections for individual PICTs (Australian Bureau of Meteorology and CSIRO 2014) are always higher, sometimes by a wide margin.

Projected change in global mean sea-level for the mid- and late 21st Century relative to the reference period of 1986–2005, with likely range indicated by 5–95% model ranges. Source: IPCC, 2014

		2046–2065		2081–2100	
	Scenario	Mean	<i>Likely range</i>	Mean	<i>Likely range</i>
Global mean sea-level rise (m)	RCP2.4	0.24	0.17 to 0.32	0.40	0.26 to 0.55
	RCP4.5	0.26	0.19 to 0.33	0.47	0.32 to 0.63
	RCP6.0	0.25	0.18 to 0.32	0.48	0.33 to 0.63
	RCP8.5	0.30	0.22 to 0.38	0.63	0.45 to 0.82

NOAA (2017) presents the findings of an assessment of the most up-to-date scientific literature on upper-end global mean sea-level projections, including recent observational and modelling literature related to the potential for rapid ice melt in Greenland and Antarctica. The projections and results presented in several peer-reviewed publications provided evidence to support a physically plausible sea-level rise in the range of 2.0 to 2.7 metres. Importantly, the findings suggest that recent results regarding Antarctic ice-sheet instability indicate that such outcomes may be more likely than previously thought.

The assessment concludes that probabilistic projections of global mean sea-level rise for 2100 are: Low (0.3 metres), Intermediate-Low (0.5 metres), Intermediate (1.0 metre), Intermediate-High (1.5 metres), High (2.0 metres), and Extreme (2.5 metres).

Secondly, since sea-levels in the Pacific are projected to rise faster than the global average, the large increases in sea-level that are projected pose an existential threat to many PICTs, even when considered in isolation from the other habitability drivers identified above. Well before the ocean permanently overtops low-lying islets, unconsolidated sediment cover will erode due to incessant wave action. Moreover, increasingly frequent wave-driven inundation events will result in both soil and groundwater being contaminated by salt, compromising their ability to support human life. In addition, flooding and erosion will also threaten coastal structures and property, harbour and airport operations, waste water systems, sandy beaches, coral reef ecosystems, and other social and economic resources. Impacts will vary with location, and depend on how natural sea-level variability combines with modest increases of mean sea-levels.

Thirdly, and as previously noted, the consequences of sea-level rise do not occur in isolation of the many detrimental effects the other drivers of change will have. The effects are cumulative, and often synergistic. For example, extensive reef systems can help dissipate wave energy, and in turn reduce wave run-up on land. But sea-level rise will in itself reduce the ability of coral reefs to provide protection against the devastating effects of strong waves associated with storms as well as tsunamis.

Importantly, the role of reefs in attenuating wave energy may be maintained only if coral reef growth can keep up with the change in sea-level. Estimates of vertical rates of coral reef growth are in the same order of magnitude as estimates of relative sea-level rise. But such rates of growth can only be achieved by healthy reef systems. Direct human pressures (e.g. pollution, siltation, blast and poison fishing methods, and physical damage by tourists) compromise reef systems, as do ocean acidification and high sea surface temperatures that result in coral bleaching.

Taken together, these three considerations suggest a reasonably plausible scenario that even relatively modest increases in sea-level could cause forced abandonment of islets and, eventually, entire atolls. There is little or even no chance that incremental changes designed to reduce the impacts of sea-level rise will avoid the consequences described above, even if the enormous funding required was forthcoming. However, transformative changes driven by a desire to avoid abandonment of entire atolls might well buy considerable time, and perhaps even at a relatively affordable price.

Historic and recent changes

While recent studies have observed increases in total land areas on some Pacific Islands over the past decades (e.g. Webb & Kench 2010; Yates et al. 2013), they have generally occurred on mobile reef-top islands. Such mobility of the shoreline is a natural process, and coasts have always been evolving. However, artificial structures on the shoreline, combined with sand beach

mining and other disturbances in the sediment transport, can significantly affect normal processes (IPCC 2014). Furthermore, land area is not the only indicator to be considered. Other recent studies have pointed to some modification of the morphology of the islands, including reductions in the overall elevation of the islands. This might prove to be highly problematic for both freshwater resources and protection against coastal flooding (World Bank 2016).

Climate change will exacerbate the existing impacts of population growth, loss of natural resources and ecosystem services and limited economic growth on livelihood opportunities and environmental productivity. Similarly, it is important to recall that the dramatic increase in impacts associated with extreme weather and climate events in the past several decades is largely due to increased exposure and vulnerability, rather to any increase in intensity or frequency of cyclone and other natural hazards.

Of particular concern are atoll islands, which rarely rise more than 2 metres above mean sea-level and are composed mostly of materials (sand and gravel) that are readily eroded by waves. For example, recent analysis shows that the urban area of Majuro Atoll (RMI) has expanded both toward the lagoon and onto the ocean-facing reef flat, largely as a result of widespread reclamation due to a mix of residential, commercial, and industrial activities. On the other hand, the lagoon shoreline of rural areas of the atoll are predominantly eroding, whereas the ocean-facing shore is largely accreting (McLean & Kench 2015).

Biribo & Woodroffe (2013) raise serious concerns for the future of South Tarawa (Kiribati) reef islands. Evidence shows that widespread erosion along the ocean and lagoon shorelines is primarily due to human activities and further encroachment onto the active beach will disrupt longshore sediment transport, increasing erosion and susceptibility of the reef islands to anticipated sea-level rise. Duvat et al. (2013) found that between 1969 and 2008 the built area of Eita-Bangantebure (South Tarawa) that is located less than 20 metres from a reference shoreline increased by a factor of 32.2. This has increased population exposure given that 77.4% of the land is less than 2 metres above sea-level. While 71.3% of the built area is currently not exposed, 17.1% shows medium to very high levels of exposure due to very low land elevation and shoreline recession. This highlights a maladaptive trajectory of change, similar to that reported for other atoll countries (Duvat et al. 2013). Moreover, the failure of coastal protection at some locations in South Tarawa highlights the seriousness of the problems raised by unsustainable land-use practices in Tarawa (Duvat 2013).

Projections

Nunn (2013) claims that, in many ways, the historical and modern Pacific way of life as we have known it will end within the next few decades. There will be fundamental irreversible changes in island geography, settlement patterns, subsistence systems, societies and economic development, forced by sea-level rise and other factors. Within the next 20–30 years it is likely that many coastal settlements will need to be relocated, partly or wholly. Around the middle of the 21st Century, traditional coastal livelihoods are likely to be difficult to sustain, so people in the region will need alternative food production systems.

The foundation for the preceding commentary is provided by several studies. A recent assessment, which is based on a very much worst case scenario of a 2 metre sea-level rise, suggests that as many as 2 million people might be displaced from their present locations in the Pacific Islands region during the 21st Century if no effective protection is put in place (Nicholls et al. 2011).

For Majuro (RMI), a 50cm rise in sea-level (which is less than the average projection for sea-level rise by 2080 for RMI under the worst RCP 8.5 scenario) may mean the disappearance of 80% of its land area (ADB 2013). The World Bank (2016) projects a more modest but still large loss of land in Tuvalu's Fongafale Island (Funafuti), based on a projected sea-level rise of 62cm by 2090. This is the projected average estimate according to the Australian Bureau of Meteorology and CSIRO (2014). Such a rise in sea-level will permanently flood approximately 6-10% of Fongafale's land area. Even with no increase in the magnitude of storm surges and king tides, a further 10-11% of land will be subject to occasional inundations. Overall, approximately 20% of the land area will be either permanently or temporarily flooded (World Bank 2016).

The more significant short-term risk for atoll nations and territories is the risk of storm surges and ocean swells, including distant-source ocean swells originating in the mid to high latitudes. Hoeke et al. (2013) describe a widespread inundation event in 2008 that displaced 63,000 people in PNG and Solomon Islands. That event was caused primarily by remotely generated swell waves, but the severity of flooding was exacerbated by anomalously high regional sea-levels, linked with El Niño-Southern Oscillation and ongoing sea-level rise.

The risk of such events is already very high, but the risk will increase further due to sea-level rise in combination with increased ocean surface temperatures, ocean acidification and unsustainable development causing the deterioration of coral reefs, mangroves and other coastal ecosystems. Projected increases in sea-level to the year 2100 (RCP4.5: 0.35 to 0.70 metres), superimposed on extreme sea-level events (e.g. swell waves, storm surges, El Niño-Southern Oscillation) manifest as severe sea-flood and erosion risks for low-lying coastal areas and atoll islands. There is also high confidence that wave over-wash of seawater will degrade fresh groundwater and land resources (IPCC 2014).

Overall, for the atoll countries sea-level rise can result in 15-20% direct loss of habitable land in this century alone, thereby significantly increasing population density, reducing the size of the fresh-water lens, and reducing the amount of land available for cultivation and further concentrating the risk exposure from storm surges (World Bank 2016).

Projections of 21st Century sea-level rise were used to estimate the years when particular atoll clusters in the Pacific region would effectively become uninhabitable (see following table). The reasoning was based on a comparison with the time when these islands likely became habitable, as marked by the emergence of dry coastal land suitable for human settlement.

Clearly some groups of atoll islands are more sensitive to sea-level rise than others. Those in the central Pacific and in the Caroline Islands, which are part of the FSM or RMI, appear to be the most exposed while those in the main group of RMI, Tokelau, and parts of French Polynesia (Tuamotu Archipelago) appear least exposed. Regardless, and despite the comparatively crude methods used, the table shows that no atoll group in the Pacific is likely to be habitable by the end of the century (Dickinson 2009; Nunn 2012).

It is important to emphasise that projections such as those which underpin the results presented in this table are characterised by high uncertainty and bold (yet scientifically derived) assumptions. While unforeseen interventions may enable populations to inhabit the atolls for longer than indicated in the table, it is also possible that islands will become practically uninhabitable long before the times shown. Contributing factors would include increased groundwater salinisation due to such events as wave overtopping and wash, and the shrinkage of the freshwater lens on which most atoll islanders still depend. For example, on Pukapuka Atoll (Cook Islands), storm surge over-wash in 2005 caused the freshwater lenses to

become immediately brackish. It took around 11 months to recover. During extreme high ‘king’ tides large areas of the low-lying inner part of Fongafale Island (Tuvalu) become inundated with brackish waters (World Bank 2016).

Years when selected clusters of Pacific atolls will have become uninhabitable. Note: The earliest date is based on a sea-level rise of approximately 1.0 metre by 2100, while the latest date is based on a sea-level rise of approximately 0.5 metres. Source: Nunn (2012), based on Dickinson (2009).

Atoll cluster	Earliest date ^(a)	Latest date
Western Caroline Islands	2050	2100
Central Caroline Islands	2060	2120
Eastern Caroline Islands	2050	2100
Marshall Islands	2080	2160
Kiribati-Tungaru chain	2070	2140
Tuvalu	2070	2140
Tokelau	2080	2160
Phoenix Islands	2070	2140
Northern Cook Islands	2050	2100
Line Islands (Kiritimati)	2050	2100
Northern Tuamotu Archipelago	2070	2140
Society Islands	2070	2140
Southern Tuamotu Archipelago	2080	2160
Gambier Archipelago	2070	2140
Cook-Austral chain	2050	2100

^(a) The earliest date would be half this time if using the 2.0 metre rise by 2100 scenario.

Because high islands have more land and freshwater resources than do low islands, they have more long-term options for responding to changes in sea-level, rainfall, and other climate variables. However, the amount of land on volcanic islands that is flat enough for large-scale settlement, development, and agriculture is limited. This results in high concentrations of population, infrastructure, and commercial development in the low-lying coastal areas of high islands. Moreover, land rights and land tenure issues are serious impediments to planned relocations and resettlement (Petz 2013). While communities on high islands and low (atoll) islands have somewhat similar short-term challenges associated with climate change, the former do have greater degrees of flexibility in how they can adapt (Keener et al. 2012).

It is now almost certain that large numbers of people (and infrastructure and activities) in the Pacific Islands region will need to move from the exposed locations they currently occupy to other locations that are less vulnerable. This will involve considerable expense and, in a world where land is often at a premium and communally owned, it will involve extensive negotiation.

But if re-location is carried out in advance, much of the expense and the inconvenience can be reduced (Nunn 2009 & 2010).

Specifically, with respect to Kiribati and Tuvalu, Curtain et al. (2016) report that only about 100 people migrate from Tuvalu and 200 people from Kiribati every year. The combination of restricted external labour market access, youthful populations and high fertility rates lead to official projections of the populations of the two countries increasing by 77-83% and 46-73% by 2050, respectively. The total fertility rates in Kiribati (3.9) and Tuvalu (3.7) are among the highest in the East Asia Pacific Region and well above the average for Oceania of 2.4 (Curtain et al. 2016).

Kiribati poses challenges of a different magnitude due to its larger resident population base, its more rapid population growth, its high urban population density, its severely degraded urban environment and its smaller overseas population.

With current emigration rates, population sizes of both Kiribati and Tuvalu will continue to increase rapidly – by 76 and 15%, respectively, by 2050 relative to 2015. Doubling net migration from Tuvalu gradually, from the 100 currently to 200 by 2030, results in a population decline of 25% by 2050. But even a large increase in net migration from Kiribati, from 200 currently up to 2,400 in 2040, still results in a population increase by 2050 of 23%.

The preceding projections highlight needs which must be anticipated, with responses put in place sooner, rather than later. There is an urgent need for effective and sustainable adaptation of livelihoods to prepare for future sea-level rise and other consequences of climate change for the Pacific Islands region. It is important to build on lessons learned from past failures, and exploit the successes. Lessons include the need for adaptive solutions that are environmentally and culturally appropriate, with appropriate decision makers being empowered to design and implement them.

Migration

It is possible, and likely probable, that one form of adaptation to climate change will involve migration. The possibility of migration as a response to climate change is noted by PICTs in the FRDP. Climate change induced migration may take two forms; voluntary migration and forced migration (Campbell & Warrick 2014).

Voluntary Migration. First, climate change induced migration may occur where livelihoods are constrained by climate change and some community or family member may migrate and seek work. This reduces the pressures on social networks and on reductions in productivity caused by climate change by decreasing the numbers dependent on local resources. It may also help to offset losses through remittances.

Much migration (including climate change migration) in the Pacific is rural to urban, but there is also considerable international migration. Demand for access to international migration might be expected to increase under scenarios of climate change. For example, Kiribati has already instigated a 'migration with dignity' policy (Government of Kiribati 2015).

Long-term migration opportunities for the Pacific currently come through three types of programmes: permanent skilled migration, visa lotteries, and open access. Of the atoll countries, RMI has access to the USA under its Compact of Free Association. Kiribati and Tuvalu have fewer options, but these have increased recently with the Recognised Seasonal Employer (temporary) and Pacific Access Category (permanent) schemes in New Zealand and the

Seasonal Worker Programme in Australia. There is likely to be increased demand for such options in coming decades. It will be difficult to determine the extent to which climate change is a driver of such migration since it is likely to also have economic and social (e.g. family reunification) influences.

A recent study (Curtain et al. 2016) reported that there are currently few Pacific Islanders migrating annually through temporary skilled migration schemes. From 2010 to 2015, only 2,905 temporary skilled visas were granted to migrants to Australia from the Pacific, less than 1% of total arrivals under this visa category over that period. Over the same period, a total of 11,777 New Zealand Essential Skills visas were awarded to Pacific migrants, or 9% of the total.

The ability to access external labour markets varies significantly across the Pacific. Overall, populations from the poorest Pacific Island countries have the fewest opportunities to emigrate. The total number of Pacific-born migrants living in OECD countries is now 420,000. Most of these (79%) come from high-mobility countries (Fiji, Samoa and Tonga), 15% from open access countries (FSM, RMI and Palau), only 5% from low-mobility countries (PNG, Solomon Islands and Vanuatu) and hardly any (1%) from the other atoll countries (Kiribati and Tuvalu).

Increased international migration for work offers critical opportunities for the Pacific. Given the unique development challenges faced by PICTs, there is now broad consensus that expanding labour mobility is vital for their future. Given the bulge in the youth population, unemployment is a pressing problem. Where these countries are unable to bring jobs to the people, the alternative is to bring the people to where the jobs are. For labour-sending countries, remittance flows can be important sources of income and consumption, as well as foreign exchange and investment, often in education and health. More broadly, migration opportunities increase the incentives families face to educate their children, and facilitate knowledge transfer.

Australia and New Zealand would also benefit from greater Pacific labour mobility. Both countries have deep interests in a stable and prosperous Pacific, interests which are advanced by increased Pacific labour mobility. Aid dependency in the region is high, and reliance on aid alone is an unbalanced strategy. By both improving employment prospects and by increasing remittance flows, labour mobility helps stabilise otherwise fragile states.

Moreover, in marked contrast to aid, migration offers self-selected individuals and their households the chance to change their economic and social circumstances; the funds generated go directly to households. Encouraging Pacific labour mobility is also important to Australia and New Zealand for domestic reasons. Advanced economies will require high rates of net migration in coming years to address major labour market shortfalls. These are often in sectors – such as construction, health care, and social assistance – where Pacific nationals, with some targeted training, would be well placed to fill the gaps. A strengthened Pacific labour mobility regime would help Australia, in particular, move beyond the current ad hoc and unsatisfactory arrangements for importing unskilled labour, via reliance on international students and backpackers in particular. Evidence suggests that Pacific workers do well in metropolitan settings.

Forced Migration. Forced migration is the second category of climate change induced migration. It is most likely to take place as community relocation. In the case of high islands, the possibility for within-country relocation exists. There are numerous examples of where this has taken place, with different levels of success. But there have been few, if any, successful examples of international community relocation. This is a process which, if it is to be successful, would need long-term planning at both the places of origin and the destination.

A key issue is land, and the relationship that the great majority of Pacific people have with it. In most PICTs land and people are inseparable (e.g. in some cases the same word is used for land and people). This relationship must not be overlooked in relocation processes. Forced migration will cause the relationship to be severely strained, if not severed. It will also be difficult for destination communities to provide land for relocated persons without considerable consultation and negotiation, for they will also be losing their links to the land to be used for relocated communities. Proactive planning for relocation, including addressing issues of cultural identity and sovereign rights, is likely to reduce the disruptive effects of such measures should they be required.

Climate change is already impacting migration patterns in Kiribati and Tuvalu (see table below). Current international migration is partially enabling adaptation in Tuvalu, but not in Nauru or Kiribati. Tuvalu has relatively high remittances and a stable population size due to international migration. The net out-migration in Nauru and Tuvalu has been able to keep population growth at 0.4% and 0.2%, respectively. In comparison, only 1.3% of people in Kiribati experienced an international migration trip in the last 10 years and the net out-migration is only around 100 people per year. The population growth rate in Kiribati is 1.8% per year as international migration in Kiribati is not enough to help stabilise the population size or result in a sizeable volume of remittances to support households that remain and must adapt to climate change impacts.

Climate Change and Migration in Nauru, Tuvalu, and Kiribati. Source: UNESCAP (undated).

	Kiribati	Tuvalu	Nauru
Population at last census	103,058	10,857	10,084
Population growth rate (%)	1.8	0.2	0.4
Population by 2055	175,560	13,246	
Rate of population increase to 2055 (%)	70	22	
Rate of international migration 2005-2015 (%)	1.3	15	10
Rate of internal migration 2005-2015 (%)	7.7	12	0
Ratio of international to internal migration	59.2	0.8	0.0
Wanted to migrate, but could not (%)	9	8	7
Rate of population increase in capitals (%)	72	25	
Households impacted by climate change (%)	94	97	74
Reasons for migration decisions – Work (%)	41		
Reasons for migration decisions – Climate Change (%)	23	8	
Reasons for migration decisions – Education (%)	19		
Migration a likely response to climate change (%)	>70	>70	>40
Increase in need to migrate internationally by 2055 (%)	35	100	
Increase in need to migrate internally by 2055 (%)	100	70	

Climate change is likely to drastically impact pressures to migrate, particularly in Kiribati and Tuvalu. More than 70% of households in Kiribati and Tuvalu, and 35% in Nauru felt that migration would be a likely response if droughts, sea-level rise or floods worsened. Men and women experience migration differently. Women are slightly more likely to migrate for education and men are more likely to migrate for work (UNESCAP, undated).

Many potential migrants do not have the means to migrate – only a quarter of households across Kiribati, Nauru, and Tuvalu believe that their households will have the financial means to migrate. Based on modelling and assuming a medium climate change scenario (RCP 6), by 2055 international migration trips for Kiribati and Tuvalu will increase by 35% and 100%, respectively.

Most migration due to climate change will be internal. Based on modelling and assuming a medium climate change scenario (RCP 6), by 2055 internal migration for Kiribati and Tuvalu will increase by 100% and 70%, respectively (UNESCAP, undated). Under this scenario by 2055 the population of Kiribati will be 175,560, representing a 70% increase, while for Tuvalu it will be 13,246, representing an increase of 22% (UNESCAP, undated).

The anticipated impacts of climate change have provided a new moral imperative for considering migration as an adaptation response. As highlighted above, the case is particularly strong for the low-lying atoll states and territories in the Pacific. Half of the populations of Kiribati and Tuvalu live on the atolls of Tarawa (Kiribati) and Funafuti (Tuvalu), in overcrowded urban areas on narrow strips of coral with limited access to water, and land to grow food. As a result of this overcrowding, atoll and reef island environments have become degraded. Climate change will make the situation worse.

Kiribati and Tuvalu are actively seeking greater access to temporary and long-term employment overseas, especially for their burgeoning young adult populations. Without migration channels specifically for them, it is highly unlikely that they will be able to increase their rates of outward migration. With weak agricultural sectors, they struggle to compete in the seasonal worker schemes. Their low skill profiles and extreme remoteness place them at a disadvantage in accessing the temporary and permanent skilled pathways. Current schemes are inadequate. New Zealand's Pacific Access Category reserves 75 slots each for the two countries. An analysis of migration flows from the Pacific through standard Australian migration programmes analysis shows that these visa categories are not delivering substantial flows to the Pacific (Sherrell 2016).

Given the open access arrangements between their own two countries, it would make sense for Australia and New Zealand to provide open access to Kiribati and Tuvalu together. The total size of the diaspora in Australia from the Kiribati and Tuvalu combined in 2011 was only 625 migrants. For New Zealand in 2013 it was 2,922 migrants (Curtain et al., 2016).

Open access would likely result in modest outflows. As noted above, surveys show that many households feel that migration will be a necessary strategy as a result of climate change; however, most lack the financial means to migrate. Assuming that real income remains static, it is estimated (Curtain et al. 2016) that only about 31,000 i-Kiribati and 2,200 Tuvaluans would have the financial means necessary to migrate. If these numbers were to migrate steadily over a 25 year time horizon, Australia and New Zealand would be looking at an additional average inflow of 1,300 i-Kiribati and Tuvaluans annually or the equivalent of 0.6 per cent of the annual permanent migration programme for those two receiving countries.

Curtain et al. (2016) propose a series of interventions and possible reform options extending to both labour-sending and receiving countries around the Pacific Rim. With these in place there is projected to be 120,000 more Pacific migrants abroad in 2040 in the medium growth scenario than business as usual, and another 120,000 in the high growth scenario, taking the total number to 750,000. Importantly, this would double per capita income growth for PNG and Solomon Islands, triple income growth for Vanuatu, and quintuple income growth for Kiribati.

The reforms generate an additional net 40,000 to 80,000 jobs and \$US5 to 10 billion of net income for the people of the Pacific by 2040, relative to business as usual. The income gain, measured in 2005 prices and in terms of the expected income increases net of opportunity costs, of both seasonal workers and temporary and long-term migrants is about 5-10 times the current value of Australia and New Zealand's aid to the Pacific (AUD1.2 billion) (Curtain et al. 2016).

ANNEX B: CURRENT DONOR AND DEVELOPMENT PROGRAMME RESPONSES

This section focuses on responses from external partners. It is important to note that the main stakeholders involved in responding to climate change and DRM are Pacific Island communities, local and national governments, civil society organisations, and private sector organisations. References for information presented in this annex are contained in Working Paper 2 (Manley et al. 2016b).

Government of New Zealand

The Government of New Zealand's Aid Programme Strategic Plan (2015-2019) targets resilience as a key pillar for development aid. In focusing on resilience, New Zealand supports specific and practical actions and is committed to integrating climate change and DRR principles across all its initiatives and working in partnership with other development partners where feasible.

Overall, the New Zealand Aid Programme is based on bilateral country programming and focuses on the Pacific, with close to 60% of the aid directed there. Agriculture and renewable energy are flagship programmes and represent an important opportunity to integrate the consideration of climate and disaster risks.

The Pacific Energy Summit, co-hosted by New Zealand and the EU in 2013, brought together a significant number of partners working on renewable energy. This led to practical outcomes of projects that could be supported. Over 50 of the 79 projects proposed in 2013 have been completed or are underway. This partnership on energy laid the groundwork for the 2016 Pacific Energy Summit and an expansion to also develop partnerships in climate change and agriculture. The existing partnership with the EU and New Zealand's leadership in convening energy stakeholders represent a significant opportunity to improve donor coordination in these key sectors. Building on lessons from evaluations of fisheries support in the past, partnerships in climate change and agriculture should be developed as holistic sector programmes with explicit links to regional support provided to SPC and SPREP.

Humanitarian assistance to the Pacific region is also a key pillar of MFAT's Aid Programme. For example, New Zealand provided NZD 4.7 million of immediate humanitarian assistance to Fiji following Tropical Cyclone Winston.

The New Zealand NGO Disaster Relief Forum is a coalition of New Zealand-based NGOs, including Christian World Service, Habitat for Humanity, Oxfam New Zealand, Rotary New Zealand, Salvation Army, Save the Children New Zealand, Tearfund, UNICEF New Zealand, and World Vision. It is mobilised at the time of a disaster, to provide immediate and coordinated humanitarian support.

Assessment of New Zealand's Responses

Formal evaluations of New Zealand's recent support to climate change and DRM programmes have not been undertaken. Based on consultations with partners, New Zealand is recognised as a valuable partner in the climate change and DRM space, and one that others (in particular DFAT, EU and Germany) are keen to develop stronger partnerships with.

MFAT's expertise in energy, agriculture and fisheries is well regarded by its partners. There are opportunities for further integrating resilience into existing MFAT programmes in these sectors. Support provided through the New Zealand Red Cross to the International Federation of the Red Cross and Red Crescent Societies (IFRC) is also recognised as playing a crucial role in IFRC's

ability to not only respond to disaster events, but to work increasingly on risk reduction, particularly in Kiribati and Tuvalu where it is starting a programme of institutional strengthening with the national societies.

Funding of experts to support institutional strengthening in the fisheries sector was recognised as critical as these positions support small island states such as Tuvalu to maximise their fisheries revenue. A study concluded that support provided to SPC and the Forum Fisheries Agency (FFA) for tuna management has assisted PICTs to increase revenues from licensing arrangements. Support provided to SPC for tuna stock assessments provides important information for the Parties to the Nauru Agreement upon which to base their total quota decisions.

Coastal fisheries, which are critical for food security, have been recognised as a key gap. This fishery is expected to be severely affected by climate change impacts. MFAT have announced a NZD5 million package of support for FFA and SPC, including work on coastal fisheries.

Some lessons have been learnt from New Zealand's humanitarian response to Tropical Cyclone Winston. A review of the response highlighted the importance of pre-positioned supplies, training and trust of local partners, opportunities to provide additional support to local government, and a review of emergency kits to better cater for the needs of people with disabilities.

New Zealand's investments in borrow pit rehabilitation in Tuvalu and land reclamation in Kiribati are considered to be prototypes of transformative change in resilient development to ensure habitability of atolls in the longer term.

Government of Australia

The Government of Australia, through DFAT, is one of the largest donors in the Pacific region. The funding support it provides for climate change and DRM, including fluctuations in that funding, has a significant impact on the ability of PICTs to manage climate and disaster risks effectively.

Over the period 2008-13, through its International Climate Change Adaptation Initiative (ICCAI), a significant portion of Australia's assistance was directed at increasing the knowledge and evidence base around climate impacts, and at supporting key programmes in utilising the improved knowledge for better planning and implementation. Termination of the ICCAI resulted in a significant reduction in climate change funding for the Pacific. Support for NGOs and community-based projects (AUD15 million) was provided through dedicated community-based adaptation grant funding, as well as a contribution to the Global Environment Facility (GEF) Small Grants Programme, implemented by the UNDP. This support targeted small-scale community-based CCA in Small Island Developing States (SIDS).

The Future Climate Leaders Programme provided support for climate change curriculum development and scholarships at the University of the South Pacific (USP). Top ups were provided to the Pacific Adaptation to Climate Change (PACC) programme, and support to the SPC (AUD9 million) and to the Secretariat of the Pacific Regional Environment Programme (SPREP) (AUD3 million) for CCA and related activities. Recognising the need to move beyond improving the evidence base, the Pacific Adaptation Strategy Assistance Programme and subsequently the Pacific Australia Climate Change Science and Adaptation Planning (PACCSAP) programme focused on developing knowledge products and applying them to enhance adaptation planning.

Several bilateral PACCSAP projects targeted water supply and sanitation services and/or enabled existing infrastructure programmes to incorporate climate risks (e.g. in Kiribati, Nauru, RMI, Samoa and Tuvalu) and economic infrastructure (e.g. roads in Solomon Islands and Vanuatu). Additional funds were also provided for the CCA components of existing infrastructure projects (e.g. Solomon Islands roads, and sanitation in Kiribati).

The Climate and Oceans Support Program in the Pacific (COSPPac) 2012 to 2017, and its precursor, the Pacific Islands Climate Prediction Project implemented through the Australian Bureau of Meteorology (BoM), have provided ongoing support to national meteorological offices. This includes sea-level monitoring and specialised seasonal forecasting products to help manage climate variability and tidal events. Products are tailored to governments, as well as to communities for assistance related to agriculture, water security and health.

As well as supporting the evidence base and planning for CCA in the region, Australia provides a significant volume of finance to PICTs for humanitarian preparedness and response.

Currently, Australia has a number of relatively discrete and small (by Australian standards) climate change programmes in the region. These include the Pacific Risk Resilience Programme (PRRP), the Pacific Climate Change Information Management (iCLIM) project, and the Climate Finance Readiness project. These are in addition to Australia's main bilateral programmes.

PRRP is working initially in four countries: Fiji, Solomon Islands, Tonga and Vanuatu. It promotes a shift in thinking around resilience building – recognising that at the heart of managing risk and change are people, institutions and decision-making processes. PRRP works across key sectors such as finance and planning, education and food security.

In recognition of the importance of the climate finance agenda, Australia has provided AUD1.5 million to Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) to work in partnership with the Pacific Financial Technical Assistance Centre and the Pacific Islands Forum Secretariat (PIFS). The aim is to enhance the links at the national level between the existing public financial management reform roadmaps and the efforts to enhance climate finance readiness. An initial scoping mission to the Solomon Islands took place in September 2016 to plan a forthcoming climate finance assessment and risk governance assessment.

Through Australian funding to the Global Facility for Disaster Reduction and Recovery (GFDRR), the Community Resilience to Climate and Disaster Risk in Solomon Islands project aims to increase the capacity of selected rural communities to manage natural hazards and climate change risks.

Australia provides support to several partners working on DRR in the Pacific. These include Australian agencies that serve the region, such as Geoscience Australia, BoM and the Commonwealth Scientific and Industrial Research Organisation (CSIRO), as well as NGOs such as the Red Cross, Habitat for Humanity, Save the Children, Oxfam, and CARE, and various United Nations agencies including the United Nations Office for Disaster Risk Reduction (UNISDR) and the UNDP.

Australia contributes to the GFDRR. This Facility has led efforts to improve risk information to inform national governments of the extent of assets at risk from extreme events and to support premium setting and advocacy for regional insurance schemes and national contingency finance. Australia also supports UNISDR in the Pacific, the United Nations Office of Coordination and Humanitarian Affairs (UNOCHA) and the United Nations Central Emergency Response Fund. Significant post-disaster support was provided by the Government of Australia to Vanuatu in

response to Tropical Cyclone Pam in 2015, and to Fiji in response to Tropical Cyclone Winston in 2016.

The Humanitarian Partnership Agreement is the primary mechanism for humanitarian funding for Australian NGOs. The Agreement brings together DFAT and six pre-selected Australian NGOs (Care, Caritas, Oxfam, Plan International, Save the Children and World Vision). Most recently the partnership was activated in response to Tropical Cyclone Winston. Australia is providing AUD28.8 million in humanitarian funding over four years (2015-19), under a partnership with Australian Red Cross. This is complemented by additional development funding. The International Committee of the Red Cross (ICRC) provides backstopping support to the national Red Cross societies in the region. Australia provided AUD25.27 million in core funding to the ICRC in 2015-16.

Australia has pledged AUD200 million to the Green Climate Fund (GCF). Australia is an active member, and co-chair, of the GCF Board and in October 2016 was appointed as the new Executive Director of the GCF Secretariat. Australia also contributes a significant amount of aid to the Asian Development Bank and the World Bank.

Australia is currently reviewing its climate change and resilience programme with a view to ensuring that its main bilateral and regional programmes are promoting resilience throughout the entire aid programme. The current support provided by Australia could therefore be deemed to be in a “holding phase” while the review is conducted and a proposed “climate change facility / support unit” is established. Establishment of such a facility implies a longer term commitment by Australia to a climate change programme in the Pacific. This should help to address the fluctuating levels of support over the past few years and provide longer term consistency. Close collaboration between DFAT and MFAT – including joint research and programming – is recommended to strengthen development partner coordination in this area.

Assessment of Australia’s Responses

The effectiveness of Government of Australia financed climate change and DRM programmes in the region has been negatively impacted by shifts in political support for climate change programmes. The ICCAI review concluded that a lack of clear guidance from the Government of Australia about the level of resources available to continue to support climate change and related work had left a significant gap in resources for climate change science and adaptation in the region. As noted above, the Australian Government is currently reviewing its climate change and resilience programme in the region.

The ICCAI programme strengthened the evidence base for climate change decision makers in the region, through significant investment in climate change science. Key outputs included the latest climate change projections for countries in the region. The partnership between the Australian BoM, the CSIRO and national meteorological services in the region strengthened capacities nationally, and resulted in strong national ownership of the products developed.

Support provided to SPC through the ICCAI facilitated use of the results of the Pacific Climate Change Support Programme to advance research on the impacts of climate change on fisheries, agriculture and water. This has expanded the knowledge base for planners on the likely impact of climate change and extreme events on these key sectors. On the other hand, engagement with planners and ultimate users of the PACCSAP results was weak, leading to low levels of ownership of the products. Although PACCSAP was an adaptation planning programme, the entry points were climate change focal points rather than central planners. Mainstreaming was expected to occur through the presence of national coordination bodies and processes, but

these were often weak. A better approach may have been to use specific thematic entry points, and the pre-existing governance structures within those sectors, to coordinate the project. These could include infrastructure development committees, agriculture policy units, and water resource management committees.

Overall management of PACCSAP by the Department of Climate Change and Energy Efficiency (DCCEE), rather than the Australian Agency for International Development (AusAID) and then DFAT, meant that the programme was not well aligned to the overall development planning processes of national governments. As a result, it lacked overall coherence, and suffered from a lack of coordination. Emphasis also tended to be on the use of sophisticated and often expensive tools, such as LiDAR, rather than on understanding the existing processes with which development planning decisions are taken, and subsequently determining which tools could help adjust those processes to take risk into account. Additional funding has been made available to CSIRO to help expand the use of tools and products developed by the PACCSAP programme.

The PACC and PACC+ project was funded in part by Australia. This SPREP-executed programme took a “risk-first” approach. It failed to develop sufficient ownership of the project by stakeholders beyond traditional climate change partners, and did not adequately engage sector experts in the programme design and implementation within the programme’s key sectors, namely agriculture, water and coastal zone management. This meant that interventions were not integral parts of national development and sector processes, often resulting in duplication of sector-level planning processes, rather than being integrated within them.

The COSSPac programme is noteworthy in representing a long-term commitment by Australia to sea-level and oceans monitoring in the region. The programme builds on sea and ocean monitoring that commenced in 1991 under the Government of Australia South Pacific Sea Level and Climate Monitoring project. The result is a relatively long data time series that provides evidence for climate change impact and adaptation assessments. This long-term funding support has created lasting institutional partnerships and has improved collaboration and clarified mandates between SPC and SPREP, and their support to countries. During 2016 most services provided through COSPPac were fully devolved to partners, with SPC and SPREP due to manage the programme from 2017.

The Pacific iCLIM programme, implemented by Griffith University in partnership with SPREP, through a Government Partnership for Development programme, aims to enhance the information available for decision makers. The decision to partner with SPREP, and have climate change focal points as the main institutional partners, has resulted in similar challenges to those faced by DCCEE and SPREP in reaching key decision makers and planners. Programme design and resourcing limit the flexibility with which national governments can be supported. Despite an iCLIM report identifying the lack of qualified information managers as a constraint to better information management and sharing, the programme has not been able to address this capacity constraint by funding in-country positions.

Building on lessons from these experiences, the PRRP represents a shift in programming strategy. PRRP uses risk governance and development planning processes as its entry point for identifying, jointly with national stakeholders, adjustments in processes and key positions that are required to change behaviour. Efforts to improve links between national, sub-national and local level planning have led to strengthened partnerships with key actors, including NGOs and private sector actors. However, the use of an “emergent design” approach – and the resulting lack of clarity about the programme objectives – has led to confusion.

While the PRRP appears to have built strong country ownership and champions for the approach, it has yet to fully demonstrate the changed processes resulting from this. At a recent meeting of the PRRP Board it was recognised that further work on sharing lessons from the approach, and working in partnership with other development programmes, would be necessary for strengthening and replicating the benefits of the approach.

From a disaster preparedness, response and recovery perspective, Australia's programming is guided by its Humanitarian Strategy and Humanitarian Policy. It is worth noting that expenditure on disaster response traditionally dwarfs investments in risk reduction and preparedness.

The European Union

To channel climate change support, the EU uses existing bilateral and multilateral delivery channels as well as reinforcing existing initiatives. EU engagement in the Pacific has increased significantly over the past decade. European Development Fund (EDF) programming for the 11th round is currently ongoing. Funds remaining from the regional EDF-10 allocation were assigned to climate change and sustainable energy through the Adapting to Climate Change and Sustainable Energy (ACSE) programme, implemented by GIZ to manage a financing facility as well as USP / SPC.

Funding is also programmed through the European Commission's Humanitarian Aid and Civil Protection Department. Their Asia-Pacific office is based in Bangkok which can limit regular communication with Pacific stakeholders.

For the period 2014-2020, the European Commission plans to increase to at least 20% the proportion of the EU development and aid budget related to climate action mainstreaming and the transition to a low-carbon and climate-resilient society. As part of this process the EU has committed to mainstreaming climate change across its whole development agenda.

The SPC implemented (and EU funded) Global Climate Change Alliance (SPC-GCCA) (2007-14) was established to strengthen cooperation with vulnerable countries, particularly Least Developed Countries (LDCs) and SIDS, and to support the implementation of adaptation actions on the ground. The follow on GCCA+ (2014-2020) has two pillars; a platform for dialogue and cooperation, and technical and financial support. Priorities of the GCCA+ technical and financial support are:

- Climate change mainstreaming and poverty reduction.
- Increasing resilience to climate-related stresses and shocks.
- Sector-based climate change adaptation and mitigation strategies.

In the Pacific, GCCA and GCCA+ have supported national and regional initiatives. Regional programmes include support to USP for climate change post-graduate curricula development, scholarships and applied research, and support to SPC and SPREP. These two organisations worked jointly to implement a project supporting nine SIDS with nationally developed proposals. Within this programme, climate finance readiness and support for improved information and knowledge management are also supported.

In relation to DRM, the EU supports the SPC implemented Building Resilience and Safety in the Pacific (SPC-BRSP) project. This supports national disaster management offices (NDMOs) and other key stakeholders to strengthen policy, legislative and operational aspects of DRM.

Assessment of the EU's Responses

The EU is a significant development partner in the region. When contributions from its member states are also taken into account, it represents the largest donor in the region after Australia.

Climate change is recognised as a key policy priority for the region, and for the EU. Political support for climate change has generally been more consistent among the EU and its member states relative to other key donors in the region, including Australia, New Zealand and the United States. To this end, the 2012 EU Communication, "Towards a renewed development partnership with the Pacific region", stressed the importance of integrating climate change within the broader development agenda and emphasised the need for improved management of funding as well as the promotion of low-carbon development.

The present round of regional support, as expressed through EDF-11 does not specify climate change or risk reduction as a priority per se, but rather incorporates it into the key outcome areas of regional economic integration, sustainable management of natural resources and improved governance.

By its own admission, the EU procedures are bureaucratic and burdensome. But in line with aid effectiveness commitments, the policy goal of the EU is to support countries to become eligible for budget support, including finance to strengthen resilient development outcomes. In Samoa, for example, GCCA funding was added to existing budget support provided to the water sector. CCA and DRR measures were added to that framework, reducing transaction costs and monitoring and reporting burdens for the country. This is also in line with promoting a development first approach as it enables resilience principles to be integrated within existing sectoral programming.

The EU has promoted collaboration with CROP agencies through active efforts to programme projects that include multiple CROP agency partners (e.g. ACSE TVET – USP/ SPC; GCCA-PSIS – SPREP/SPC). Additionally, the EU has changed its approach to how funds are disbursed through the EDF, requiring CROP agencies to submit large joint programmes of work rather than smaller competitive bids. These efforts have gone some way to enhance inter-CROP coordination and collaboration. But EU-supported projects have also contributed to confusion as to roles and responsibilities at the regional level. For example, the USP-GCCA project involved applied research at the community level. In practice this resulted in many community-based adaptation projects led by USP. A network of these communities was created (the Local Community-Based Climate Change Adaptation Network), partially modelled on the Fiji Locally Managed Marine Area Network. However, the Network does not seem well integrated into other efforts to support community-based adaptation, particularly those led by NGO partners such as Oxfam, Save the Children, and Live and Learn. This tends to generate confusion.

A recent evaluation of the GCCA-PSIS gave the project positive ratings across all evaluation criteria. The project resulted in high levels of ownership and staff retention at the country level. A solid understanding of the context, ensured by conducting research at the outset, and flexibility and adaptive management in programme implementation, contributed to the ability of the project to meet its objectives, despite delays in project design and procurement. The use of Ministries of Finance for channelling funding contributed to ownership, and built capacity to manage climate finance.

The EU is currently the only partner supporting the scholarship programme for the post-graduate climate change course at USP. Graduates of this programme tend to secure

employment within their governments or development agencies, working on climate change. As such, the course builds long-term capacity in the region.

The EU has a strong history of supporting the energy and fisheries sectors in the region. These are also crucial flagship sectors for MFAT. A strong and active partnership with New Zealand in the energy sector is highly valued by the EU and is seen as providing a foundation for further work.

Government of Germany

The German Government's financial commitments to the region have grown significantly over the last 8 years, from a relatively small discrete forestry project to a large portfolio of projects and programmes. Currently, Germany's main financial commitments in the region relate to the regional SPC/GIZ project Coping with Climate Change in the Pacific Islands Region (CCCPIR), management of the EU-GIZ Adapting to Climate Change and Sustainable Energy (ACSE), a regional REDD+ Programme, and a regional marine spatial planning and conservation programme (MACBIO).

In 2016, Germany also announced a EUR15 million contribution to the Trust Fund for the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI). The Fund was proposed in 2015 at the Forum Economic Ministers Meeting, to accompany the conversion of the Pacific Catastrophe Risk Insurance Pilot to an independent entity.

CCCPIR worked across 12 countries (2009-2015), and with several CROP agencies (SPC, SPREP, PIFS, USP). Originally due to conclude in 2015, it was extended, albeit with a reduced level of support and a reduction to six countries (PNG, Fiji, Vanuatu, Solomon Islands, Samoa and Kiribati). Support is tailored to country needs, resulting in a variety of interventions.

Key achievements of the programme include:

- Supporting the Fiji Government to leverage a USD3.8 million project from the Forest Carbon Partnership Facility.
- Supporting the Choiseul Provincial Government in the Solomon Islands to establish and implement the multi-partner Choiseul Integrated Climate Change Adaptation Programme.
- Supporting the Government of Kiribati and Abaiang Island Council to establish a multi-partner Whole-of-Island programme.
- Supporting various countries to strengthen their governance arrangements (Vanuatu's National Advisory Board, Kiribati's National Expert Group, Fiji's REDD+ working group) and policy frameworks (Nauru, Palau, Vanuatu, Kiribati, Tonga).

Community-level interventions include increasing diversity of cropping systems, coral replanting, promoting ecosystem-based approaches to fisheries management, and the installation of solar-power systems on small tourism bungalows. This diversity and flexibility in approaches and activities, based on partner requests, confirms that the programme has been very responsive to needs, but may lack coherence across the programme.

One component of the CCCPIR focuses on mainstreaming the management of climate change and disaster risks within primary and secondary schools. This component takes as its entry point the current stage of curriculum development of an education ministry/department, and

identifies how CCCPIR can best support the curriculum development process, and integrate climate change and DRM as part of existing curriculum reviews.

A regional component of the programme supported the development of The Pacific Gender and Climate Change Toolkit. This assists practitioners to integrate gender considerations in their programmes. The regional component also supported the development of, and provides ongoing support to, the Pacific Climate Change Portal hosted by SPREP.

GIZ also implements part of the EU-ACSE Programme (see EU section above). This programme acts as a small financing facility to which countries can submit initial concept notes and subsequent project design documents. Approved projects are being implemented across several sectors, including energy, water, agriculture, governance, and climate finance.

In addition to its ongoing CCCPIR and ACSE work, Germany also contributes to several multilateral funds. These include the GCF and the World Bank's Climate Investment Fund.

Assessment of Germany's Responses

Germany does not have a diplomatic presence in the region. This absence can generate confusion among partners and countries around the status of GIZ, which is a German Government owned implementation agency. In October 2016, GIZ was approved by the GCF Board as an Accredited Entity.

GIZ is recognised to contribute actively to developing partnerships with other development partners and implementation agencies and has led many multi-partner efforts. CCCPIR has supported a wide range of activities across the region relating to mainstreaming and implementation. A flexible programme design has enabled GIZ to respond quickly to gaps and opportunities as they arise, but this has also led to criticism that the programme lacks strategic direction.

Tools developed by CCCPIR have been used and institutionalised by CCCPIR's main partners. The tools include the Pacific Gender and Climate Change toolkit and the Integrated Vulnerability Assessment framework. In comparison, the CCCPIR evaluation found that the Pacific Climate Change Portal has failed to sufficiently engage users and generators of information in order to understand the barriers to sharing information. As such, it remains an underutilised resource despite its considerable potential for information sharing, underpinning of planning, etc. GIZ has contracted a seconded development worker to support the portal management team at SPREP.

Monitoring and evaluation processes of the Pacific projects delivered through GIZ are generally considered to be weak. Insufficient attention has been given to learning within the programme.

Government of the United States

In 2012 the United States re-emerged as a donor of importance in the Pacific, including in relation to climate change and DRM. Its initial support was channelled through two large contracted programmes – the USAID Adapt programme, which is managed by AECOM and based in Bangkok, and the Coastal Community Adaptation Project (CCAP), which is managed by DAI and hosted by USP. USAID Adapt focused on support to governments with climate finance readiness and proposal development, while CCAP focused at the community level, supporting communities to implement key infrastructure projects and disaster risk reduction measures.

In addition, a food security project was channelled through SPC, a water security project through SPREP and several grants provided to GIZ, UNOCHA and UNICEF. The Pacific-American

Climate Fund is a facility managed by Partners for Global Research and Development. The Fund supports civil society and NGOs with small grants. The Fund has contracted two cycles of funding, and is in the process of contracting a third.

The United States' disaster preparedness and humanitarian responses focus on the Northern Pacific. Much of this is channelled through the International Office of Migration and its large Northern Pacific programme, the United States' Peace Corps, and the IFRC which works with local Red Cross societies. Funding is also provided to the French Red Cross and to Care, for work in the Solomon Islands and Vanuatu.

In 2016, a large USD25 million programme (Climate READY) was tendered for contract by USAID. It focuses on climate-finance readiness and policy and institutional strengthening, and is expected to commence in 2017. A smaller USD5 million programme, Institutional Strengthening for Adaptation to Climate Change (ISACC), commenced in 2016. It also has a focus on institutional strengthening. ISACC is managed by SPC, in partnership with PIFS and SPREP.

Assessment of the United States' Responses

Since the United States has only recently re-engaged in the Pacific, few formal evaluations of its support have been conducted. However, the mid-term evaluation of the USAID Adapt programme highlighted several weaknesses in the approach. According to the review, being based in Bangkok restricted the programme's ability to meaningfully engage with partners in the Pacific. It largely focused on strengthening climate finance readiness and provided useful backstopping to PIFS. This included contracting public financial management specialists to support climate finance assessments, and supporting countries particularly around proposal development. The review concluded that a greater focus on capacity building as part of the terms of reference for project proposal specialists may have helped to enhance knowledge transfer and uptake.

Additionally, USAID used the Asia-Pacific Adaptation Network (APAN) as its main knowledge sharing and learning tool. However, APAN has limited visibility in the Pacific and, as such, the use of APAN as a platform for information and knowledge dissemination and as a forum for discussions largely duplicated existing Pacific-based knowledge sharing and learning efforts, such as the Pacific Climate Change Portal and the Pacific Solutions Exchange. The approach may, nevertheless, have facilitated some knowledge exchange between Asia and the Pacific.

Annual fora arranged by USAID Adapt on climate finance were well organised and helped to bring partners and countries together to discuss key issues. Nevertheless, their effectiveness was constrained by the absence of a longer term capacity building strategy for the events. The capacity building elements of the programme did not have a clear statement of purpose and set of programming that sufficiently served USAID Adapt Asia-Pacific's mission, created lasting capacity building and thought leadership, or took full advantage of project-generated experience. It also failed to build on and align with USAID Adapt Asia-Pacific's project preparation efforts. In the Pacific the project failed to find an institutional partner needed for sustainability.

The CCAP programme ambitiously aimed to work in hundreds of communities across the Pacific in its original design, but scaled this down considerably to focus on around 70 communities. This is still a large number of communities to support sustainably, given the importance of establishing trust, relationships and understanding the governance structures capable of sustaining interventions. The programme has supported a variety of coastal and climate-relevant infrastructure improvements across the region.

A stronger partnership between the USAID Adapt programme's capacity building elements and the CCAP programme could have supported both to address the national-local disconnects that have been identified as a key issue in the Pacific and to institutionalise capacity building elements of the programme.

Government of Japan

In its support to the Pacific, Japan places significant emphasis on disaster risk reduction, preparedness and renewable energy. Japan has been a long-time supporter of early warning systems in the region. It has also supported the Regional Specialised Meteorological Centre in Fiji, including flood warning systems. Japan is currently supporting Vanuatu to strengthen its tsunami warning systems, through a World Bank project.

Japan provided significant assistance to support the Pacific Catastrophe Risk Insurance Pilot. It funded the cost of all member premiums in Year 1, and the vast majority of member premiums thereafter. In 2014 Japan committed to building a climate change centre at SPREP. This will host a range of experts working on climate change who are keen to undertake joint research. Japan has also pledged the second highest amount, after the United States, to the GCF.

Assessment of Japan's Responses

Japan has a wealth of experience in managing disaster risk domestically, and has played an active part in sharing this experience with PICTs. The assistance provided tends to involve large flagship programmes, such as the Pacific Environment Community Fund, the Pacific Catastrophe Risk Insurance Pilot insurance premiums, and support for the Pacific Climate Change Centre at SPREP.

Japan is not particularly active in the donor coordination discussions in the region and is not often present at the Development Partners in Climate Change (DPCC) meetings.

Council of Regional Organisations in the Pacific

At present there are nine CROP agencies in the Pacific, representing something of a coordination challenge. In practice, and to varying degrees, all CROP agencies support the resilient development agenda and the implementation of the new FRDP. A review of the annual reports of these CROP agencies suggests that those agencies currently active in delivering responses to the various climate change and DRM needs and priorities are SPC, SPREP, PIFS, USP, FFA and PPA. Relevant aspects of their work will be summarised in the following sections.

The Pacific Community (SPC)

SPC is the region's oldest and largest Pacific regional organisation. It provides technical and scientific support to assist informed decision-making across its 22 PICTs members. Much of SPC's technical assistance across its various divisions relates to resilience in some way – be that supporting the diversification of crops, gender equality, improving rain water harvesting, or assessing forest cover change.

SPC manages Australian, New Zealand, EU, and USAID climate change projects. It is the main implementing partner of the SPC/GIZ Coping with Climate Change in the Pacific Islands Region Programme and the REDD+ Programme. SPC is called on to support the implementation of bilateral programmes where absorptive or technical capacity at the national level is weak. Recent examples are the support provided to the Government of Tuvalu to inform DFAT water

tank distribution on Funafuti, and support to the Government of Kiribati for a water project on Kiritimati Island.

Many of SPC's sector programmes also have strong elements of climate and DRM – for example, technical assistance in water security and coastal zone management involves consideration of climate change and disaster risks. The Energy Programme of the Economic Development Division provides technical and policy advice to member countries in a range of areas, including energy efficiency, appliance labelling legislation, renewable energy options, economic assessments, gender and energy. SPC's tuna stock assessments are regarded by stakeholders as being of a high standard, and are routinely subject to peer review. They show that stocks of two key tuna species are reaching sustainable limits. New Zealand's support for tuna tagging was considered instrumental in kick-starting this programme, which contributed to tuna stock assessments.

SPC carries the regional mandate to coordinate capacity building in DRM. In this context it led establishment of the Pacific Disaster Risk Management Platform and Pacific Disaster Risk Management Partnership. The latter is a network of national and international agencies supporting DRM. SPC manages the Pacific Disaster Net – a regional information and knowledge management hub. In collaboration with others, SPC coordinated preparation of the recently endorsed FRDP.

As part of its technical service to the region, SPC designs and/or implements numerous projects related to risk reduction, including the EU Building Safe and Resilient Pacific (BSRP) project and the World Bank-funded Pacific Resilience Programme (PREP).

In support of DRM and CCA, SPC provides technical backstopping for projects through data management (e.g. P-DaLo, Pacific Disaster Net, Pacific Risk Information System), technical expertise (e.g. GIS, wave modelling) as well as post disaster support (technical assessment, coordination, planning/management of post-disaster needs assessments, training and capacity building). SPC is not a humanitarian agency, but as part of the Pacific Humanitarian Team it does provide technical expertise and supports member countries in managing responses to disasters. As an example, SPC sits on the water and sanitation cluster and food security cluster for some countries. It also coordinates the Pacific Island Emergency Management Alliance. This brings together fire, police and disaster response stakeholders.

SPC is currently applying for GCF accreditation.

Assessment of SPC's Responses

SPC is well placed to offer technical support to countries given the commitment to mainstream management of climate and disaster risks across all its divisions. But efforts to mainstream CCA and DRR across the organisation have been challenging. Climate change related projects have had variable institutional support internally, as a result of the physically fragmented nature of the organisation and changes to the management structure of the organisation. The absence of joint programming by climate change personnel, by involving relevant technical divisions during the design stage, has meant that technical divisional staff have often not been available to support implementation.

Information about climate change activities within the organisation is scattered across multiple sections of the SPC website. Efforts to institutionalise climate change and DRM focal points across the organisation were unsuccessful, though discussions around challenges of working cross-sectorally may have fed into preparation of SPC's latest Strategic Plan. The Plan

emphasises climate change as an area where cross-divisional working will be promoted. Current efforts to promote collaboration are focusing less on changing institutional structures, and more on encouraging collaboration across them. Managers of various climate change and DRM projects now meet regularly to facilitate collaboration.

Two staff members with extensive experience in coordinating and conducting post-disaster needs assessments (PDNA) have recently left SPC so its capacity to provide PDNA support services has been diminished.

Secretariat of the Pacific Regional Environment Programme (SPREP)

SPREP was established in 1978 and has the overall lead on climate change in the region. Climate change emerged initially as an environmental concern. As the regional organisation with the mandate to coordinate capacity building in environmental management, SPREP also managed several early adaptation projects in the region, and supported countries to develop their first national communications to the United Nations Framework Convention on Climate Change (UNFCCC).

SPREP coordinates regional support to member countries in their negotiation efforts at the UNFCCC. It also manages the Pacific Climate Change Portal and hosts the Regional Technical Support Mechanism (RTSM) Secretariat. The RTSM is a service designed to facilitate access to technical assistance in the region.

SPREP is accredited to the Adaptation Fund and the GCF as a regional implementing entity.

SPREP has four main programmes:

- Climate change.
- Biodiversity and ecosystem management.
- Environmental monitoring and governance.
- Water management and pollution control.

SPREP's biodiversity programme promotes ecosystem-based adaptation and a German-funded programme (IKI) is working in Vanuatu, Solomon Islands and Fiji to strengthen capacity to value and promote ecosystem services as an adaptation option.

SPREP managed the regional PACC programme from 2009 to 2013. It has an institutional partnership with the World Meteorology Organisation and hosts the Pacific Meteorological Desk. SPREP is the focal institution for the implementation of the regional component of the Pilot Programme for Climate Resilience, through the Asian Development Bank (ADB).

SPREP has historically organised a biannual Climate Change Roundtable. It remains unclear what governance mechanism will replace the Roundtable following the adoption of the FRDP in 2016.

Assessment of SPREP's Responses

As the agency mandated to coordinate capacity building in climate change in the region, SPREP has struggled over the past few years to identify its niche in a world where "climate change is everyone's business". With its comparatively small size (approximately 100 staff for 26

members, compared to over 600 staff for SPC), and a heavy policy and planning bent, SPREP has limited technical expertise to implement projects at the sector level.

Much of the early climate change financing made available by donors related to implementation of adaptation and mitigation projects. As such, SPREP's decision to develop technical-type projects may have been driven partly from budgetary necessities. This support for project implementation left its own capacity stretched, including struggling to deliver on its coordination roles in relation to supporting UNFCCC processes, monitoring and evaluation of the Pacific Islands Framework for Action on Climate Change, and overall climate change coordination. This is a similar situation to that at the national level, where the value of strong governance and coordination arrangements is not necessarily appreciated or adequately resourced.

The PACC project was the first regional project to commit substantial resources to dealing with climate change impacts. Limited capacity for managing projects, both within SPREP and at the national level, resulted in significant delays to project implementation and a confusion of roles between SPREP (implementing partner) and UNDP (implementing agency). Demonstration activities were identified for each country. As noted above, PACC took a "risk-first" approach. It failed to develop sufficient ownership of the project by stakeholders beyond traditional climate change partners, and did not adequately engage sector experts in the programme design and implementation. Interventions were not integral parts of national development and sector processes, often resulting in duplication of sector-level planning processes, rather than being integrated within them.

Whilst the project had the stated intention of working with SPC to provide the technical services to countries in relation to food security, water security and coastal zone management, formal and financial arrangements with SPC were not put in place and much of this work was delivered via consultancy services rather than linking with SPC to recruit additional staff to provide this support. PACC was found to have supported implementation of key interventions at the community level, but with limited success in mainstreaming risk more broadly within government institutions. There was poor national ownership of the project in some countries, along with delays that will likely compromise the sustaining of project outcomes.

SPREP's responsibility for regional coordination, through the Pacific Meteorological Desk and the Pacific Meteorological Council, has resulted in stronger relationships between Meteorological Services, and improved coordination. The FINPAC project, a partnership between SPREP, SPC and the Red Cross, and funded by Finland, sought to develop specific tools and enhance the capability of Red Cross societies to provide advice to communities on identifying risk reduction measures. This has led to substantial collaboration between meteorological services and NGOs at the national level.

The Pacific Climate Change Portal is an initiative that all the Pacific's partners recognised to be important. However, its initial development failed to include sufficient engagement with users to better understand their information needs and with suppliers of information to understand how best to access information easily. Increased efforts within SPREP to support the small team that manage the portal would increase its usefulness.

A regional advisory board for the portal was established, with representatives from CROP agencies, including SPC. Development of the portal at a time when SPC had already established a major portal for DRM (Pacific Disaster Net), and when the Asia Pacific DRR project's portal was operational, has also led to some confusion on where users should go for information.

Significant effort was put into indexing all of the Pacific Disaster Net and Pacific Climate Change Portal content to enable a regional search, but competition between SPC, SPREP and USP was apparent in the reluctance of SPREP to build on an existing platform and instead create a new platform from scratch. Increased coordination and collaboration between SPREP and SPC would have avoided this outcome.

Pacific Islands Forum Secretariat (PIFS)

PIFS plays a crucial role in progressing Pacific Leaders' and Ministers' decisions from their annual fora. As key priorities for Pacific Island Leaders and Forum Economic Ministers, climate change and DRM have been regular agenda items. In its role as convenor of the Forum Economic Ministers Meeting and its work on economic governance, aid coordination and development effectiveness, PIFS leads on climate and disaster finance research, advice and coordination.

The Secretariat has a small number of staff working on these issues, reflecting its role as a facilitator and not an implementer. PIFS led preparation of the Pacific Climate Finance Assessment Framework, as well as publications outlining national experiences with different funding modalities. PIFS works closely with SPREP to provide support to countries on climate finance topics within UNFCCC processes. It has also worked closely with SPC to advance the topic of disaster risk financing, catastrophe insurance and regional risk management, and hosts the project management unit for the World-Bank Pacific Resilience Programme (PREP).

PIFS' small team is due to expand as a result of the commencement of several initiatives related to climate finance readiness and institutional strengthening. These include the USAID-funded ISACC project, the DFAT-GIZ climate finance project and the PREP.

PIFS was originally proposed as the secretariat for the Pacific Resilience Partnership – a possible successor to the Pacific Disaster Risk Management Partnership and the Pacific Climate Change Roundtable. PIFS will play a crucial role in progressing the operationalisation of the Pacific Resilience Partnership following the endorsement of the FRDP in 2016.

Assessment of PIFS' Responses

PIFS has played a crucial role in progressing discussions on climate and disaster finance, by ensuring these issues remain high on the political agenda at meetings of Leaders and of Forum Economic Ministers. The Pacific Climate Change Financing Assessment Framework was developed by PIFS, to provide a Pacific-specific tool to support national assessments of climate finance readiness. In practice, it has only been used twice (Nauru, RMI) in that form. Other climate finance and, more recently, risk governance assessments have been coordinated by UNDP, in partnership with PIFS. These have used an adapted version of the Climate Public Expenditure and Institutional Review, in Samoa, Vanuatu and Fiji. A scoping mission to the Solomon Islands was held in September 2016 to commence a similar assessment.

This informal partnership to support climate finance assessments, with PIFS and UNDP playing leading roles, is a useful mechanism for encouraging other partners to join these processes. Nevertheless, PIFS has generally been unable to keep up with the demand from countries for assessments. An expanded team at PIFS should be able to address this demand, but there will be coordination challenges with the variety of emerging initiatives working on this topic. PIFS is also well placed to bridge the communication and coordination divide between organisations supporting strengthened public financial management, development effectiveness, and disaster and climate finance with additional capacity.

The University of the South Pacific (USP)

USP is a regional organisation with the mandate to support higher learning across its member countries. USP is the premier provider of tertiary education in the Pacific region, providing training critical in climate change assessment, and risk reduction work, covering chemistry, mathematics, agriculture, biology and governance/policy. In addition, USP's Pacific Centre for Environment and Sustainable Development delivers work specific to the fields of DRM and CCA. As an example, it manages and delivers a post-graduate diploma course in climate change and DRM, with the expectation that graduates will join governments or relevant non-governmental or development agencies. The climate change and DRM diploma was developed initially with Australian assistance under its fast start finance, and scholarships were awarded through Australian and EU funding. The EU funding for these scholarships concluded in 2017, with no foreseeable funding available after that.

As part of the EU-GCCA project, USP supports applied research at the community level across 15 countries. USP contributes actively to regional processes, including the WARD, the Pacific Meteorological Council, the Climate Services Working Group, and the FDRP Technical Working group, among others.

Assessment of USP's Responses

USP's courses have played an important role in strengthening capacity in the region. Many USP alumni are playing active roles in strengthening resilience, by working at development agencies, regional institutions, NGOs and within national governments.

As an education and research institution, USP's applied community-based research often involves USP staff in project implementation. This can strengthen their research and training methods, but can also lead to confusion and tension with other agencies. Such tensions have been partly overcome by USP's willingness to partner with other institutions in course design and delivery of activities jointly with other partners.

USP's seminar series has contributed to wider knowledge sharing, as have its research activities.

Forum Fisheries Agency (FFA)

FFA provides expertise, technical assistance and other services to its members who make sovereign decisions about their tuna resources and participate in regional decision-making on tuna management through agencies such as the Western and Central Pacific Fisheries Commission. Historically, FFA's focus has been on fisheries management activities, though its involvement in development work has increased since around 2009.

FFA does not have a climate change programme as such. It mainstreams climate change adaptation through its work on the management and development of tuna fisheries. Specific climate change-related work includes:

- Supporting UNDP-funded work targeting the systematic inclusion of climate variability and change considerations to oceanic fisheries management decision- and policy-making.
- Executing Government of Japan funded work on CFCs in fisheries.

Assessment of FFA's Responses

FFA's support for tuna management measures, such as the preparation of Tuna Management Plans, has assisted the governments of PICTs to increase revenues from licensing arrangements. New Zealand's support for FFA has aided this process.

New Zealand's project-specific funding for the regional observer programme has assisted in training observers to collect data that may be used in both scientific research and compliance enforcement, with improvements to compliance data management currently being investigated.

Climate variability, especially changes in sea surface temperature during the El Niño–La Niña cycles, influences the migratory patterns of pelagic fish. Integrating this information into advisory support provided to countries may help with medium-term planning of revenue from fisheries-licences.

Pacific Power Association (PPA)

The PPA is an intergovernmental organisation which promotes the cooperation of Pacific Island power utilities in technical training, exchange of information, sharing of senior management and engineering expertise, and other activities of benefit to its members. PPA implements supply and demand side management activities to increase energy efficiency. The effect of these activities is to reduce greenhouse gas emissions while improving utility performance.

In terms of present activities, PPA has recently facilitated a regional power system loss study, the findings of which underpin the development of action plans to reduce energy losses. PPA also undertakes ongoing benchmarking to formulate performance improvement programmes and to enable power utilities to increase their sustainability.

PPA also promotes the use of renewable energy by ensuring that utilities are ready to take on increased generation capacity from renewable energy sources. This work involves regulatory, technical and policy changes in the utilities. Upcoming work includes renewable energy (solar and wind) resource mapping, and working with utilities to be more disaster resilient.

The World Bank

The World Bank re-engaged in the Pacific in the early 2000s, and has recently been scaling up its assistance. The Bank's portfolio is concentrated on infrastructure, communications, transport, fisheries, agriculture, energy and climate change and disaster resilience. Most of its assistance is provided via loans, but the Bank also has some key grant financing mechanisms.

Much of the Bank's lending is in the infrastructure sector and it plays a crucial role in mainstreaming disaster and climate resilience in the construction of new infrastructure. The Bank is also a contributing partner to the Pacific Region Infrastructure Facility (PRIF).

The Bank coordinates the Global Facility for Disaster Reduction and Recovery (GFDRR) activities in the Pacific and has supported several projects in recent years. This includes, the SPC-executed PCRAFI project which has targeted DRM and CCA in the Pacific, in partnership with the ADB, SPC, EU and others. Under the PCRAFI, the World Bank plays a number of roles, including funder and general oversight, as well as mediator between PICTs and the reinsurance market, as part of the Pacific Catastrophe Risk Insurance Pilot (PCRIP).

The PREP extends and complements the work of PCRAFI. As well as strengthening early warning/ preparedness, and targeting resilient investments, the project is intended to support disaster risk financing, including the provision of ongoing support to the PCRIP. This includes investigating options to extend it, updating the risk information that underpins it and

potentially considering opportunities to provide coverage for more hazards. The project will also support key regional organisations with a critical role in technical, policy and or information areas, including PIFS and SPC.

The PREP project is presently in its first phase, targeting Samoa and Tonga, although RMI and Vanuatu are also involved in the disaster risk financing component. Phase 2 of the project is under preparation and will extend participation to other countries. In addition to World Bank Grant funding, PREP has funding support from the Climate Investment Fund's Pilot Programme on Climate Resilience, the GFDRR and the GEF's Special Climate Change Fund. As part of these partnerships, Pacific countries are supported to better understand the risks they face and financing options for managing those risk effectively.

In partnership with the UNDP and EU, the World Bank also forms part of a global tripartite to support countries to deliver Post-Disaster Needs Assessments (PDNAs), strategically plan for recovery from a disaster event, and thereby facilitate access to finance (e.g. in Vanuatu post-Pam and Fiji post-Winston). The World Bank has supported several PDNAs in the region, the most recent being the RMI PDNA in relation to the 2015-2016 drought. Demand for PDNAs has been increasing, with eight having been completed since 2009.

The World Bank is accredited to the GCF and is currently working with Samoa on a proposal, and will be assessing opportunities to apply for GCF funding for existing planned programmes.

Assessment of the World Bank's Responses

The PCRAFI pilot has received high-level support from PICTs. During the second phase of the pilot, all countries contributed to the cost of premiums, with the exception of the Cook Islands which paid its premium in full. Pay-outs to the Government of Tonga (in recognition of Tropical Cyclone Ian) and the Government of Vanuatu (Tropical Cyclone Pam) were made within 2 weeks of those events. These payments were small in relation to the total funding needed to recover from the disaster. Importantly, the purpose of the pay-outs is to support the resumption of government, not recovery from the disaster per se. In this respect, the cash injection from the PCRIP can be extremely useful during an emergency. By way of comparison, the Solomon Islands terminated its participation in the scheme after two natural hazard events the country experienced did not trigger a pay-out.

PCRAFI has undertaken a large volume of work to inform disaster risk financing and insurance premiums. Whilst much of it is available online, some of the applications are not immediately accessible. If they were they could be used much more widely, as part of development planning processes.

With the commencement of the PREP, the opening of its new Suva office in 2016, and the decision by leaders to endorse the FRDP and the associated Pacific Resilience Partnership, the World Bank is likely to have a larger profile in the future in contributing to resilient development in the region. A previous absence of a large physical presence in the Pacific, made it difficult for the Bank to join informal coordination mechanisms (e.g. the DPCC).

Asian Development Bank (ADB)

ADB has scaled up its assistance in the Pacific over the last decade or more. The vast majority of its support goes into infrastructure construction – transport, energy, water and sanitation, and ICT.

ADB has increased its assistance to mainstream climate change adaptation and mitigation and DRM in its investments, and help for countries to access finance to cover the extra costs. This includes climate-proofing investments by building roads, bridges, ports and airports to stronger specifications, and strengthening country safeguards and DRM systems. ADB also supports countries to integrate climate and disaster resilience into national development planning processes.

ADB administers a multi-donor-supported regional programme – the PRIF. This facility supports a coordinated approach to infrastructure planning by six partners: Australia, the European Commission, the European Investment Bank, Japan, New Zealand and the World Bank.

ADB is a major renewable energy financier in the region and has pledged support to help achieve renewable energy targets supporting hydropower, wind and solar, as well as promoting biofuel opportunities along with energy efficiency and grid expansion measures. ADB also provides support to countries to strengthen public financial management systems, including building audit capacity in Nauru, Kiribati and Tuvalu. These initiatives can support improved management of, and access to, climate change and disaster finance.

ADB works to strengthen private sector development. The private sector will have an increasingly important role in supporting climate and disaster resilience. Private sector investment in low carbon, climate-resilient infrastructure and technologies will be required to support the transition to more resilient economies. Increased efforts are being made to engage the private sector and its representative bodies in partnerships to support resilient development. Ensuring these programmes integrate climate change and DRM considerations can support this transition.

The Pacific Private Sector Development Initiative, a regional technical assistance programme co-financed by Australia and New Zealand, works to strengthen the enabling environment. ADB also manages the Pacific Business Investment Facility, co-financed by Australia, to provide business support services to small and medium-sized enterprises.

In partnership with the World Bank, SPC and others, ADB is a key partner in the GFDRR's activities in the Pacific, and has supported PCRAFI since its establishment. As part of the Pilot Programme on Climate Resilience, ADB is supporting the Government of Tonga to establish a climate change trust fund to finance community-based CCA, mitigation and DRM actions.

ADB is accredited to the GCF and has assisted the Fiji Government to secure the first GCF project for the region. In terms of future GCF projects, ADB is working with Pacific governments to identify from its pipeline of 2017-2019 projects those that might be suitable for GCF funding. Where possible, the ADB is looking to combine projects into a programmatic approach for GCF funding.

Assessment of ADB's Responses

The PCRAFI project established two databases that provide the foundation for future assessments and planning:

- Regional historical hazard and loss database for major disasters which contains an earthquake catalogue and a tropical cyclone catalogue dating back hundreds of years.
- Regional exposure database which contains components for buildings and infrastructure, agriculture, and population.

The data are held in, and made publicly available through, the Pacific Risk Information System (available in an on-line portal). Based on the data generated, the project has enabled the generation of hazard models, which include earthquakes (both ground shaking and tsunamigenic) and tropical cyclones (wind, storm surge, and excess rainfall) that have been peer-reviewed by Geoscience Australia which described them as "high standard, thorough and representative of best practice."

The programme was driven by the need to develop disaster risk assessment tools and practical technical and financial applications to reduce and mitigate countries' vulnerability to natural disasters. In this respect, the programme targets the generation of tools to support ex-ante DRR measures (such as planning, emergency preparedness, CCA, disaster risk financing) and post-disaster support (such as rapid impact assessments).

A wealth of information exists within the data portal. It has been used to inform planning; for example, as part of the ADB "Strengthening Disaster and Climate Resilience in Urban Development in the Pacific", tools developed under PCRAFI were trialled in Fiji and Samoa.

A review of the project by the ADB noted that the planning tools developed under the project were straightforward to use, and relevant, and that there had been a high number of downloads of hazard maps from the PCRAFI web site. The project was deemed to be successful since the products were viewed as highly relevant and sustainable. However, it was also noted that the project was assessed as being less than efficient. Importantly at this point, it was noted that there were substantial delays in executing the project due to, for example, delays in recruiting SPC to execute the work. Contract signing took place around 25 months after project approval. This delay was largely attributed to a lack of familiarity with ADB recruitment processes and a lack of staff resources dedicated to the work.

An evaluation of ADB's support to 10 PICTs was conducted in 2014. It highlighted progress in increasing collaboration with other development partners including through the PRIF as a more collaborative approach to new initiatives as a result of a greater in-country presence. The evaluation also noted that the ADB has supported the scaling up of activities to promote CCA and DRR at both country and regional levels. As a result, there is a reasonably good appreciation among Pacific countries and development partners of the possibilities for adaptation and the measures necessary to adapt to climate and disaster risks.

United Nations Development Programme (UNDP)

UNDP activities in the region are guided by the 2013-2017 United Nations Development Assistance Framework in the Pacific. This was prepared in cooperation with 14 PICT governments and other development partners. UNDP's main areas of support to countries are in governance, inclusive growth and poverty reduction, gender equality, climate change, environment, and DRM.

UNDP has significant global and regional experience in managing and implementing projects in several sectors relevant for increasing climate and disaster resilience. As an implementing partner for the GEF, the Adaptation Fund and the GCF, UNDP has a large climate change and disaster resilience portfolio in the Pacific. Recently the GCF Board approved a USD36 million project for coastal infrastructure in Tuvalu, to be implemented by UNDP.

In addition to projects funded via these multilateral channels, UNDP also implements the AUD16 million Pacific Risk Resilience Programme. With UNDP support, the Tuvalu government has implemented two Least Developed Country Fund programmes – NAPA 1 (which was topped up

with Australian Government finance) and is part-way through NAPA 2, focusing on fisheries, DRR and local governance strengthening. Other projects include an Adaptation Fund project focusing on food security, Strongem Waka lo Community fo Kaikai, support for the Solomon Island Water Sector Adaptation Project, and a regional Ridge to Reef programme that will support national programmes.

UNDP forms part of the global tripartite arrangement for support in the delivery of post-disaster needs assessments. To this end, UNDP has supported several PDNAs in the region, the most recent being the RMI PDNA of the 2015-2016 drought. Together with UN Women, UNDP is implementing a Markets for Change programme, targeting women vendors and identifying infrastructure improvements required to ensure safe and resilient market places. This is one of a handful of programmes that actively involve multiple UN partners from the design stage.

UNDP also plays an active role in development partner coordination and provides a secretariat to the Development Partners in Climate Change (DPCC) and the Pacific Solution Exchange (PSE). The PSE is a query-based knowledge exchange and discussion forum that supports peer to peer knowledge sharing. UNDP also facilitates funding for national communications support from the UNFCCC Secretariat and manages the GEF-funded Small Grants Programme.

As an accredited entity to the GCF, and now the implementing partner for Tuvalu's project, UNDP's role in the Pacific is likely to expand further.

Assessment of UNDP's Responses

UNDP's broader mandate, including across governance and financial inclusion, provides the opportunity to draw on knowledge from these sectors and potentially reach new actors and audiences. For example, in Fiji UNDP organised a Parliamentary Speaker's panel discussion on climate finance, through collaboration between its governance and resilience programmes.

The support UNDP provides to national and regional projects has had mixed results. As detailed above, the PACC Terminal Evaluation highlighted some of the differences in approaches between SPREP and UNDP, and the potential mixed messages delivered to countries during implementation. The NAPA 1 project in Tuvalu faced significant logistical challenges, and staff turnover contributed to implementation delays. Lessons from NAPA 1 are feeding into NAPA 2, with coordination between stakeholders working in the sector line ministries and the project now being much improved from NAPA 1.

The PRRP is currently undergoing a mid-term review. Results from the review should provide clearer guidance to focus activities for the remaining years of the project. It should also have valuable lessons for other partners working to integrate resilience into their programming.

United Nations Children's Fund (UNICEF)

UNICEF's engagement in the resilience space is largely around children's rights, as well as water and sanitation issues.

UNICEF Pacific works with governments and humanitarian partners before, during and after disasters to ensure that quick and effective relief is provided to affected populations, particularly women, children and people with disabilities. Disaster preparedness and response planning and management are integrated into all programme components and link with Pacific NDMOs, UN and regional agencies under the umbrella of the Pacific Humanitarian Team. Specific focus areas for UNICEF humanitarian action include water, sanitation and hygiene (WASH); immunisation; nutrition; child protection; and education.

The study “Climate Change Impacts on Children in the Pacific” highlighted the importance of addressing climate change and DRR across all UNICEF programmes. A partnership has been established with the “350.org” to promote youth participation in the regional climate change debate and policy making.

UNICEF’s mandate for children and its strategic emphasis on WASH issues, particularly in schools, gives a clear focus for its work.

United Nations Office for Disaster Risk Reduction (UNISDR)

UNISDR was established in 1999 as a dedicated secretariat to facilitate the implementation of the International Strategy for Disaster Reduction (ISDR). As well as its headquarters in Geneva, the agency has regional and sub-regional offices, including a sub-regional office in Suva servicing the Pacific. The role of this office is to provide a focal point in the UN system for the coordination of DRM in the Pacific, including regional organisations and activities in the socio-economic and humanitarian fields. Specifically, the office targets coordination, campaigning, advocacy and information sharing.

Specific projects in the UNISDR regional office are relatively limited. Occasionally DRM projects are delivered through the office, but the main thrust of work is to link and coordinate the DRM work of key agencies in the Pacific. This has included co-hosting, with SPC, previous DRM Platforms and other fora. In particular, the ISDR-Pacific team plays significant roles in coordinating global reports on DRM and targeted DRM activities, as well as supporting the regionalisation of DRM approaches. In this content, UNISDR played a key role on the regional Technical Working Group dedicated to the preparation of the recently endorsed FRDP. Additionally, staff of the regional office may support technical activities such as contributing content to PDNAs, and engaging the private sector on business continuity planning.

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)

UNESCAP has a small office in Suva. From 2013 to 2016, and in partnership with the International Labour Organisation and UNDP, UNESCAP implemented an EU-funded project on climate change and migration in the Pacific. This project delivered valuable research findings on migration trends, climate change influences and the legislative environment. The reports form a good evidence base for future discussions of the issues nationally, regionally and globally.

UNESCAP plays a role in coordinating input from countries to be presented at meetings related to the SDGs and supports the roll out of indicators and alignment to national development plans. Its strength is in undertaking key analytical work of relevance to the implementation of activities designed to assist countries to achieve their SDGs.

Fiji is part of an Asia-Pacific wide project on mainstreaming disaster risk into sustainable development. In 2016 UNESCAP, in partnership with SPC, convened an agriculture and climate change expert group to exchange knowledge, information and good practices on resilient agriculture between Asia and the Pacific. This included capturing benefits of dialogues between the meteorology, water, and agriculture sectors. In Asia these have resulted in downscaling of climate risk data, specifically for the agriculture sector. Policy and technical recommendations are being produced in advance of a Pacific Agriculture Ministerial Conference in 2017.

International Federation of the Red Cross and Red Crescent Societies (IFRC)

The IFRC plays a critical role in disaster risk reduction and response in the region. As a backstopping mechanism to the national Red Cross societies, the IFRC acts quickly post-disaster to release pre-positioned supplies, to deliver initial and immediate response materials, and to mobilise funding support for the recovery effort. Partnerships with the Australian and New Zealand Red Cross organisations support resource mobilisation, allowing the IFRC office in Suva to play a coordination role. The Red Cross is represented on many of the Pacific Humanitarian Team clusters that work post a disaster. They rely on their volunteer network to be able to mobilise response efforts quickly.

The IFRC and its constituent societies are increasingly active in developing risk reduction programmes, and strengthening the governance and management of the national societies which play a critical role pre- and post-disaster. Not all people affected by an emergency experience it in the same way. The Red Cross Societies have a strong emphasis on ensuring that this diversity is recognised in response efforts. Recent guidance on this need includes Minimum Standard Commitments to Gender and Diversity in Emergency Programming.