

**Research and Analysis on
Climate Change and Disaster Risk Reduction**

Working Paper 1

**Needs, Priorities and Opportunities
Related to Climate Change Adaptation and Disaster Risk Reduction
in the Pacific Islands Region**

Final

**Marita Manley
John E. Hay
Padma Lal
Catherine Bennett
Joanne Chong
John Campbell
and
Will Thorp**

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Executive Summary

The implications of climate change and disasters for development is strategically important for New Zealand's Ministry of Foreign Affairs and Trade. To inform its work in this area, the Ministry commissioned research that involved:

1. Undertaking a contextual review of existing responses covering climate change adaptation and disaster risk reduction, and a strategic review that identifies areas and policy options for the Ministry's development programming that are likely to produce the best value-add or benefit; and
2. Identifying specific, practical responses to climate change adaptation and disaster risk reduction that can be delivered through the Ministry's targeted support and mainstream programming, with a focus on Kiribati and Tuvalu.

The current working paper, the first of three to report the findings of the contextual and strategic reviews described above, provides a comprehensive response to the following research question:

Within a development context, what are the relevant needs and priorities associated with climate change and disaster risk reduction that MFAT needs to consider?

The paper is based on a review of academic and practitioner research, briefs, reports and evaluations of interventions, articles and grey literature. This desk-based research was supplemented by interviews with development, adaptation and disaster risk reduction practitioners.

Most of the research findings are not new, though here they are backed up by more substantive research using current information. However, there is new evidence that suggests a possible sea-level rise of 2m by the end of this century, as well as a possible north- and south-ward expansion of the area where cyclones occur in the Pacific. These may well be the most important foreseeable consequences of a warming planet.

Without effective management of the drivers of vulnerability, it is very likely that the consequences of changes in weather, climate and marine conditions, including both rapid and slow onset extreme events, will become more serious in the near future. It is critical that the focus be on proactive efforts to reduce these consequences, rather than on further efforts to improve post-disaster responses. This will require longer-term investment in improving equitable access to information, livelihood opportunities and strengthened governance systems and a holistic approach to supporting resilient development.

The research and analysis identified the following success factors for successful management of climate and disaster risks, and for increasing the resilience of development outcomes.

Risk management mainstreamed in development plans and processes

Incorporate relevant elements of climate and disaster risk management when strengthening policies and the underlying governance structures and public financial management systems at national, sector, sub-national and local levels. This can be facilitated by engaging with a diverse range of actors.

Risk-informed products, processes and partnerships available and used

All investments, including agriculture, fisheries, health, education, energy, transport, information and communication technologies and the informal sector, should be risk-informed. Individuals whose principal expertise and responsibilities are at the sector level should collaborate with people who are actively involved, and have specialist expertise, in climate and disaster risk management.

Adaptation and disaster risk management localised, as appropriate

Strengthen linkages between central government, local government and communities, settlements and households. This relates to the flow of information, funding and human resources, including in relation to addressing the urgent and substantial need for further support for resilient development at sub-national and sector levels. Specific actions must be informed by bottom-up development planning that makes full use of knowledge and expertise of climate and disaster risk management at sub-national levels.

Underlying determinants of vulnerability are addressed

Reduce vulnerabilities, and enhance the resilience of development outcomes, by giving greater recognition to the influence of socio-economic status, poverty, power, access and control over resources and information, and the ability to contribute to decision making as well as to follow up activities.

Individual and institutional capacities are well developed

Strengthen the ability of local educational institutions to develop and deliver technical and vocational education and training courses to build capacity in managing climate and disaster risks, and ensure increased and effective use is made of existing and new opportunities.

Private sector playing a significant role in resilient development

Support the potential for the private sector to be a key player in increasing the resilience of development, including as a source of financial support. Currently the potential of the private sector to contribute to climate and disaster resilient development, including through adaptation and disaster risk reduction, is largely unrealised, but examples of good practice are increasing in number.

Longer term habitability of atoll and islands is considered

Given sea-level rise and related projections, there is a need to manage for today as well as for the inevitable. This requires increased understanding of the processes and longer-term implications of changes in atoll and island habitability as a result of the interplay between atmospheric, oceanic, social and economic conditions over the longer term. A longer-term perspective is critical when considering strategic responses, such as international migration as an adaptation option for countries with severe loss of habitability.

Increased access to, and effective use of climate and disaster finance

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 and disaster finance. Ensure this information is targeted, kept up to date, and widely accessible. Strengthen the links between planning and budgetary processes, and between priorities, plans and public financial management. Also ensure strong national leadership around national policies, priorities and work plans.

Resilient development investment opportunities planned and prioritised

Develop, disseminate and ensure the widespread and effective use of robust and user-friendly processes for the identification, prioritisation, selection and implementation of adaptation and other risk reduction interventions.

Knowledge management and learning well established

Strengthen knowledge creation, sharing and use, including early warning systems and improved monitoring, reporting, transparency and learning.

Humanitarian actions for disaster prevention, response and recovery are effective

Improve preparedness to manage and recover from disasters, including responding to humanitarian emergencies

Strong coordination and cooperation

Guided by the Framework for Resilient Development in the Pacific, and in line with recent recommendations by Forum Leaders and Foreign and Finance Ministers, all development partners, the private sector and civil society should work with Pacific countries and territories through active participation in the new Pacific Resilience Partnership under the Framework.

Specific opportunities related to these needs and priorities are further elaborated by way of key messages and considerations for the Ministry of Foreign Affairs and Trade.

The next step is to take these evidence-based needs, priorities and opportunities and identify strategic priorities for the Ministry of Foreign Affairs and Trade. This is the subject of following two working papers. These identify strategic priorities at the regional generally, as well as for the Ministry's programming related to Kiribati and Tuvalu, specifically.

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List of Abbreviations

ADB	Asian Development Bank
CCA	climate change adaptation
CCPIR	Climate Change in the Pacific Islands Region (project)
COSPac	Climate and Oceans Support Program in the Pacific (project)
CROP	Council of Regional Organisations in the Pacific
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DFAT	Department of Foreign Affairs and Trade (Australia)
DRM	disaster risk management
DRR	disaster risk reduction
ENSO	El Niño-Southern Oscillation
FINPAC	Finnish Pacific (project)
FRDP	Framework for Resilient Development in the Pacific
FSM	Federated States of Micronesia
GDP	gross domestic product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICT	information and communication technologies
IFRC	International Federation of Red Cross and Red Crescent Societies
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IT	information technologies
MCA	multi-criteria analysis
MDG	Millennium Development Goals
MFAT	Ministry of Foreign Affairs and Trade (New Zealand)
NAP	National Adaptation Plan
NCCAC	National Climate Change Advisory Committee
NDC	Nationally Determined Contribution
NDMO	National Disaster Management Office
NGO	non-governmental organisation
PACCSAP	Pacific Australia Climate Change Science Adaptation Planning (project)
PCRAFI	Pacific Catastrophe Risk Assessment and Financing Initiative
PIC	Pacific island country
PICT	Pacific island countries and territories
PNG	Papua New Guinea
PRP	Pacific Resilience Partnership
RCP	Representative Concentration Pathway
RMI	Republic of the Marshall Islands
RON	Republic of Nauru
SDG	Sustainable Development Goals
SME	small and medium enterprises
SPC	Pacific Community
SPCZ	South Pacific Convergence Zone
SPREP	Secretariat of the Pacific Community
TC	tropical cyclone
TVET	technical and vocational education and training
UNFCCC	United Nations Framework Convention on Climate Change

USD	United States Dollar
USP	The University of the South Pacific
VNR	Voluntary National Review
WPM	West Pacific Monsoon

1. Introduction and Overview

Research on the implications of climate change and disaster risk to development is a strategic priority for the International Development Group of New Zealand's Ministry of Foreign Affairs and Trade (MFAT). The Group commissioned research that addressed this priority by:

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

The contextual and strategic research included both country and partner mapping. This focused on Pacific regional issues, needs, initiatives and opportunities, including those delivered by other donors and regional agencies, as well as those specific to Kiribati and Tuvalu.

The current working paper, the first of three to report the findings of the contextual and strategic reviews described above, provides a comprehensive response to the following research question:

Within a development context, what are the relevant needs and priorities associated with climate change and disaster risk reduction that MFAT needs to consider?

The second paper assesses the current responses of donors, development partners and countries themselves to these needs, priorities and opportunities. Based on the findings presented in these two papers, the third paper identifies strategic areas and policy options for MFAT's development programming that are likely to produce the best value-add or benefit.

The desk-based research considered a large number of formal and informal documents. Most related to Pacific islands countries and territories and the region as a whole, but some provided a much wider perspective. This information was supplemented by interviewing over 80 development, CCA and disaster risk management (DRM) practitioners, in person in Wellington and Suva and via Skype.

Over the past 20 years a great deal of research findings and related information have been produced in order to better understand the underlying science, the impacts and resulting needs and priorities associated with climate change and disaster impacts in the Pacific, and in Tuvalu and Kiribati specifically. As agreed with MFAT, this report does not go into extensive detail about these specific needs and priorities. They are well documented and provide guidance on "what to do" – for example, to roll out and strengthen early warning systems, support

climate-resilient agriculture, and build infrastructure capable of withstanding future impacts. They will be referenced at appropriate places in this report since they provide useful sources of information to help guide interventions by national stakeholders, as well as for partners working to support them at national, sectoral and local levels. However, this report provides guidance around key strategic considerations that should be on MFAT's radar, with a focus more on the "how to do".

In recent years the focus of both CCA and DRR has shifted from targeted interventions to those based on a broader understanding of the people, mechanisms and processes (UNDP, 2016a) required to ensure that development across societies and economies is resilient to climate and disaster risks and that development itself does not exacerbate these risks (Hay and Pratt, 2013a; Hay and Pratt, 2013b). As an agency supporting development, MFAT has the opportunity to contribute extensively to these efforts by ensuring that resilience¹ is mainstreamed in all its programmed areas of assistance.

Therefore, the current research also considered needs and experiences in supporting climate and disaster resilient development², not only through targeted CCA and DRM interventions, but also through initiatives that mainstream risk considerations across the development agenda. The findings provide further useful insights for MFAT.

¹ The ability of a system, community or society exposed to hazards, and/or climate change, to resist, absorb, accommodate and recover from the consequences of a hazard event or of climate change in a timely and efficient manner. This includes through the preservation and restoration of its essential basic structures and functions. [Source: FRDP]

² Economic and social development and environmental management that accounts for the actual and potential consequences of natural hazards and of the adverse conditions caused by climate change, through disaster risk management, climate change adaptation and low carbon development. Disaster risk management, which includes both disaster risk reduction and disaster management, has many synergies with adaptation to climate change. [Source: FRDP]

2. Taking Stock

2.1 Environment and Development Trajectories for the Pacific

The following is a summary of the detailed analysis presented in Annex 1. This includes additional references that support the findings presented below.

Environmental, economic and social changes are of great concern to Pacific island countries and territories (PICTs). Past and anticipated 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 USD 4 billion.

Box A

Changes in Climates and Natural Disasters – Past

- There has been a persistent mean annual warming trend of 0.18°C 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 the presence of 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 units per decade;
- Rate of 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 recent decades;
- 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 - largely due to increased exposure and vulnerability, rather than an increase in intensity or frequency of natural hazard events; and
- Relative to population size, Pacific island countries have high numbers of people displaced by natural hazard events, with the numbers being especially high for Tuvalu, Vanuatu, the Federated States of Micronesia (FSM) and Kiribati.

The economic vulnerability of Pacific island countries (PICs) declined marginally between 1990 and 2013, but remains considerably higher than the average for 127 countries for which data are available. The environmental vulnerability of all

PICs 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 PICs achieved all seven Millennium Development Goals. Three PICs did not achieve any. The nine PICs 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 intrusions and coastal erosion. Rapid onset disasters are more frequent occurrences 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. Cyclone Heta, which devastated Niue in 2004, generated immediate losses that exceeded the 2003 value of the Gross Domestic Product by over five times. In comparison, although Hurricane Katrina was hugely expensive, damage losses were less than 1 % of the gross domestic product of the United States of America.

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 Paris agreement are fully implemented.

Reaching the 2°C target will 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.

It would also mean sea-level rise of at least 80 cm, and possibly 2 m as a result of the further collapse of ice shelves, leading to the inundation and eventual submergence of not only entire atolls but also 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.

Box B

Changeable 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;
- Generally, some months are likely to be dryer and some wetter, with the 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 the historical rainfall data;
- Extreme rainfall events that have occurred once every 20 years on average are projected to occur once every seven to ten years by 2090 (very low emissions scenario) and every four to six 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 these events 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 79 cm if global temperatures increase by 2°C by 2100, and nearly 1 metre with 4°C warming, with significant regional variations in the Pacific; further 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 poleward 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 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; and
- A comparison of current and future tropical cyclone losses for 14 PICs showed the increase in ground up average annual loss 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.

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 all cause their virtual disappearance (Climate Analytics and UNDP, 2016). A plethora of exotic pests and diseases would initially degrade the well being and productivity of people as well as their food production systems, and may eventually result in widespread epidemics and fatalities. Communities and countries would be further burdened by increased floods and seasonal droughts.

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.

But there will be continuing uncertainty in the magnitude, frequency and duration of El Niño and La Niña events, and hence in the occurrence of the significant weather and climate anomalies with which they are associated.

2.2 Addressing Climate and Disaster Risks in the Pacific

As climate change has become an increasingly important issue for the Pacific islands region over the last twenty years or so, there has been an increase in the number of development partner projects supporting countries to address current impacts and those that are anticipated in the future (SPC, 2016a). Largely in parallel, initiatives related to DRM became better organised and informed, more future focussed, proactive and inclusive (Applied Geoscience and Technology Division, 2013).

Initially, climate change impact assessments and adaptation initiatives (e.g. such as those described in National Adaptation Programmes of Action) were largely divorced from activities and interventions in the DRM area (e.g. actions related to the Hyogo Framework for Action). Projects were managed by different people – both at the national government and implementing partner level, financial flows went to different parts of the government and different organisations, and very little joint programming took place (UNISDR and UNDP, 2012). The result was that many projects took a hazard-specific approach, assessing the specific nature of the hazard (e.g. the risk of drought) in one particular place and within one particular sector, rather than focussing on strengthening the resilience of the whole system. This led to fragmented approaches at the regional and national level, as well as to missed opportunities to increase the effectiveness of interventions (e.g. UNDP, 2015a). It also resulted in a fragmented donor landscape, with many examples of duplication of effort.

Early DRR and CCA efforts were also not well integrated into the broader development context. Climate change practitioners designed and began implementing food security and water security projects, often with good intentions to work collaboratively with those already leading the work in these sectors (UNDP, 2015b; SPC, 2016a; GIZ, 2015). Sometimes efforts were made to ensure the activities were owned by those working within these sectors, as is

increasingly the case. But often the fast start finance, and the resulting drive of development partners to “get money out of the door”, meant that key success factors for effective mainstreaming were not given sufficient attention (Oxfam, 2012). These success factors include taking time to understand the sector level context, including socio-cultural aspects and gender dynamics, analysing stakeholder capacity and processes, identifying key champions within the system, working with them to understand entry points within existing systems, and supporting them to drive these changes.

Since there was pressure to disburse fast start finance expeditiously, sustainability of outcomes was not often prioritised (ADB, 2013c). Research has also revealed the importance of communications and relationships as a key determinant of adaptive capacity in the Pacific, including both formal and informal mechanisms playing a key role (Gero et al., 2013).

With few exceptions (e.g. Kiribati, Tuvalu, Tokelau and RMI), PICTs face challenges that are not only more immediate than those associated with climate change, but also potentially more damaging to national development in the longer term. These include population growth, loss of natural resources and ecosystem services owing to exhaustion or unsustainable exploitation, and limited opportunities for sustainable economic growth owing to the distance to markets. None of these challenges can be considered in isolation from that posed by future climate change; indeed climate change will only exacerbate most such challenges by reducing livelihood opportunities and environmental productivity in many parts of the region (Nunn, 2012).

Integration and mainstreaming³. Over the past five to ten years, considerable effort has been made to address these two considerations, with a view to improving the effectiveness on the ground of similar work streams and to ensure that there is a coherent approach to managing all types of risks jointly (SPREP, 2013; Hay and Pratt, 2013b; SPC, 2013; SPC, 2016a; and SPREP and UNDP, 2013).

A significant body of evidence and research was also produced that made the case for mainstreaming (e.g. SPREP and UNDP, 2013). Collectively these showed that business as usual development planning which fails to address risks will reduce economic growth and have significant costs (World Bank, 2012).

Multilateral banks, regional organisations, United Nations (UN) agencies and non-governmental organisations (NGOs) have supported practitioners with guidance on mainstreaming climate and disaster risks within the core

³ While these two terms are often used interchangeably, in this report they have distinct meanings. So too in the new Framework for Resilient Development in the Pacific. Its first principle is to “integrate climate change and disaster risk management (where possible) and mainstream 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 a normal part of development planning and decision-making”

development context (e.g. Pacific Disaster Risk Management Partnership Network, 2009; SPREP and UNDP, 2013). These efforts often assumed that the underlying development planning context was robust and the mainstreaming of climate and, sometimes, DRM required the review of existing frameworks and identifying entry points in which risk reduction could be incorporated. Guidance documents and manuals also tended to focus on the case for mainstreaming, by identifying entry points, rather than on tools that could be used to assist decision-makers (e.g. SPREP and UNDP, 2013).

A shift to focussing on resilient development. More recently there has been a shift by national governments and partners in focus to ensuring that risk is embedded within the development planning processes itself. Treatment of risk and resilience as an integral part of development, in a “development first” approach, is rapidly gaining traction. It is an underpinning principle of the recently approved Framework for Resilient Development in the Pacific (FRDP).

This approach incorporates considerations of risks, shocks and stresses into existing development processes, acknowledging that climate and disaster risks have a two-way relationship with development – while risks can increase vulnerability and undermine development, well-designed development initiatives can also reduce vulnerability. The outcome of a “development first” approach is often described as “resilient development”, where the joint goals of developing sustainably and building resilience are achieved through a common approach. Importantly, while a “development first” approach might be construed as being limited to mainstreaming CCA and DRR measures across development investments – i.e. “mainstream programming” - it can also incorporate targeted support that involves investing in specific and practical DRR and CCA initiatives, so long as they are considered in a wider “development first” context.

Several countries, in recognition of climate change as a broader development issue, have recently transferred responsibility for leading on climate change to central government ministries – for example, the Ministry of Economy in Fiji and the Office of the Prime Minister in Tuvalu. Strengthened coordination mechanisms nationally, such as the Vanuatu National Advisory Board, are engaging a wider range of government departments, NGOs and the private sector in mainstreaming climate change and disaster risks. While targeted risk reduction measures can strengthen resilience, transformative change is only possible by taking a “development first” approach rather than a “risk first” approach to mainstreaming (UNDP, 2016a). This approach recognises that “risk is largely rooted in flawed development”, and the consideration of risks as part of that process presents a practical opportunity to address some of the underlying drivers of risk and vulnerability (UNDP, 2016a).

In summary, there is increasing consensus regionally and globally that risk considerations need to be “grounded in development” and considered “inherent in the very definition of development” (SPC et al., 2016; World Bank, 2012b; Aysan and Lavell, 2014).

Resilient development – some tensions. A “risk first” approach involves the identification and prioritisation of climate and disaster risks through the lens of risk, with any resulting interventions being undertaken separately, and treated as ‘add ons’. Climate and disaster risk management and strengthening resilience are thus seen as additionalities, requiring new or parallel sets of processes.

A “development-first” approach requires more engagement with a broader set of stakeholders and it takes more time. For example, the most effective way to integrate and mainstream climate change and disaster risks and resilience in the education sector is to do so from “within” the education sector, as part of curriculum review processes. This means waiting for the opportunity of an existing review process, which often does not fit with a “project” life cycle.

Many practitioners are reluctant to engage more broadly – at regional, national and sub-national level. Most financing for adaptation and disaster risk reduction is via short-term projects, which limits the ability of practitioners to engage in long term change processes.

Recent research undertaken in the United Kingdom revealed a similar evolution to that occurring in the Pacific, with the discourse of adaptation giving way to resilience (Kythreotisa and Bristow, 2016). Furthermore, a specific notion of resilience – resilience as preparedness and responsiveness to crises – has developed particular appeal, although interpretations of resilience do vary.

As Kythreotisa and Bristow note, the notion of resilience is acknowledged to be something of a buzzword and invariably fuzzy. But its breadth of meaning and interpretation is largely perceived to be distinctly advantageous. In general, resilience is widely regarded as having significant potential to encourage cross-sectoral dialogue and mobilize a sense of urgency in the importance of being crisis-ready (e.g. Action Aid, 2016; Kythreotisa and Bristow, 2016; Lovell et al., 2016; Boudreau, 2013).

While resilience has clear value as a concept in mobilizing and coordinating policy actions, Kythreotisa and Bristow (2016) also identified a ‘resilience trap’. In the Pacific this manifests as a tendency to focus on short-term strategies, giving precedence to responses to extreme events in the short term, rather than focus on longer-term and potentially more transformative approaches to managing climate and disaster risks.

An early version of the recently approved FRDP provided evidence, and highlighted the need, for transformational changes in the management of climate and disaster risks, including taking a longer-term perspective. Significantly, text regarding transformational changes is absent in the approved version, as is a fourth goal “Adaptive Management of New and Emerging Issues”. The goal recognised the need for PICTs to develop the capacity to address emerging and new challenges, including surprises. The benefit of having such capabilities is evident in the way PICTs and their development partners are currently grappling with longer-term issues such as ocean acidification, migration, forced

displacement and other forms of loss and damage, as well as with the prospect of geoengineering responses to climate change.

The “resilience trap” is consistent with the general human tendency to have a preoccupation with short-term gain and a lack of interest in what might happen a year or a decade hence. Such “short-termism” helps explain why long-term strategies for climate-change adaptation are unlikely to be successful in the modern Pacific Islands and why various manifestations of climate change are regarded as climate variability, despite often overwhelming evidence to the contrary (Nunn, 2012).

From a development perspective, mainstreaming risk reduction measures such that they become part and parcel of the way we plan, prioritise and allocate budgets is a logical approach. As noted in a recent UNDP report: “The initial findings are demonstrating that a focus on strengthening priority risk governance building blocks “from within” a country’s development agenda, is supporting more systematic and institutionalised mainstreaming of risks into development planning and budgeting” (UNDP, 2016a). A more recent update is provided in PRRP (2016).

Perversely, the more mainstreamed or institutionalised the risk reduction and adaptation actions become, the less visible they are. From a social justice perspective, developing countries that have done little to contribute to climate change believe that developed countries should provide them with assistance to adapt. Tracking commitments for financing adaptation, and assessing their additionality, are more difficult when risk management measures are successfully mainstreamed. As risks are dealt with within the system – rather than being an additional added on activity – it becomes harder to “see” the management of climate and disaster risks. And for negotiators trying to make the case for the vulnerability of small island states, and hence the allocation of new and additional finance to deal with managing climate change impacts, having these activities visible helps to make that case (Lebel et al., 2009).

Similarly, there are some tensions between advocates of targeted risk reduction measures and of mainstreaming approaches as the most effective way to manage climate and disaster risks. For example, many climate change and disaster risk practitioners do not consider it to be their role to engage in discussions around the promotion of gender equality or strengthening government procurement policies – yet both have a strong link to underlying climate and disaster risk vulnerability as well as to the ability to invest resources effectively when managing risks.

For example, the strengthening of early warning systems as a targeted risk reduction measure is something that few people would dispute as being necessary for climate and disaster risk reduction. In contrast, providing funding for a planned school curriculum review, including the opportunity to include learning about climate and disaster risks, has often been harder to justify from an adaptation and disaster risk reduction finance perspective. Such activities are often viewed as “core development work”. If insufficient resources exist to

support efforts to undertake such initiatives, climate and disaster risk financing must be flexible enough to address these broader issues, or there is a possibility investments in those sectors will be rendered ineffective. Coordination with other sources of funding, and joint programming of activities, are therefore imperative.

Efforts to implement joint programming. Governments in the region are increasingly demanding that development partners work collectively to address national and sub-national climate change adaptation and disaster risk reduction needs (pers. comm. UNDP).

The Government of Vanuatu established the National Advisory Board for Climate Change and Disaster Risk Reduction to ensure that all projects undertaking CCA and DRR activities are well coordinated, that opportunities for joint activities are maximised, and that transport, administration and related costs are minimised. This has led to improved coordination with NGOs, through the Vanuatu Climate Adaptation Network. Some of the co-benefits of enhanced collaboration have been the sharing of resources, improved opportunities for peer to peer learning, and a coordinated and therefore more influential voice in the dialogue with the government (Oxfam, 2015). The National Advisory Board has also provided a structured approach to ensuring that key line ministries, such as the Department of Local Authority and the Department of Women's Affairs, have a strong voice in decision making related to CCA and DRR (pers. comm. GIZ).

Following discussions with several development partners the Kiribati Government established the Kiribati National Expert Group for climate change and disaster risk management, and subsequently initiated a 'Whole of Island' approach to addressing climate and disaster risks across multiple sectors. This takes as its starting point the Island Development Plan (pers. comm. GIZ) and works across all development sectors to identify entry points for strengthening resilience to climate change and disaster risks. The approach has been trailed on Abaiang, an outer island in Kiribati. An integrated vulnerability assessment, based on a sustainable livelihoods framework (GIZ, 2015), was conducted with a multi-disciplinary team (Jupiter et al., 2013; SPC, 2015a). This involved technical experts from a range of development sectors. It was used to highlight key vulnerabilities and risks. The results of the assessment were used to facilitate discussions on development and adaptation priorities, with a view to mainstreaming them into the Island Development Plan. An evaluation will be undertaken prior to the possible application of the approach in other atolls (pers. comm. GIZ and USP).

The Kiribati Government has shown strong ownership of the 'Whole of Island' approach and is seeking additional development partner finance to replicate it in other islands. During interviews for this research several partners, including the University of the South Pacific, the International Federation of the Red Cross (IFRC), the Pacific Community (SPC), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), and Australia's Department of Foreign Affairs and Trade (DFAT), expressed the view that the 'Whole of Island' approach should be evaluated in order to assess the possibility of driving more development partner

coordination to support the Government of Kiribati to upscale CCA and DRR work to include other outer islands.

In Tonga, a process of bottom-up community development planning, supported by expertise from the national government and led by the Ministry of Internal Affairs, is mainstreaming climate change and disaster risk considerations as part of these community level plans. In Fiji, the Western Divisional Office has established partnerships with tourism operators in the private sector to support implementation of risk reduction initiatives in the Yasawa group of islands (UNDP, 2016b).

In line with the shift towards integration at the national level, the Pacific Region decided to pursue an integrated regional strategy – the Framework for Resilient Development in the Pacific (FRDP). The FRDP was finalised after significant consultation in the region. The guidance within it represent the latest available consolidated source of priority actions. The shift away from separate regional frameworks that align separately to the UN Framework Convention on Climate Change (UNFCCC) and to the Sendai Framework for Disaster Risk Reduction has not been universally supported. In 2015 the Tuvalu government raised a number of concerns regarding the draft FRDP text, arguing that it was too heavily influenced by the disaster risk management community and that the text did not sufficiently deal with issues such as loss and damage. As noted above, the FRDP has since been approved by Forum Leaders.

2.3 Where to from here?

Relative to a decade ago, we know considerably more about resilient development, and CCA and DRR experiences and priorities, including approaches to integration and mainstreaming. This applies to working at national and sub-national levels, including in key sectors such as agriculture, water, health, energy, infrastructure and education. Mainstreaming “no regrets” options in these sectors has started in many countries, but is arguably not yet part of regular planning and budgeting processes at the sector level (pers. comm. UNDP). There are also lessons still being learned about the early efforts on integrating CCA and DRR, particularly regarding the sustainability of outcomes at different scales and in different contexts. While some evaluation and reflection has occurred (e.g. SPREP, 2013; UNDP, 2015b), more is needed to understand how best to both integrate and mainstream CCA and DRR, for lasting and effective reductions in risks to development.

In addition to supporting countries to take a ‘development-first’ approach to mainstreaming CCA and DRR within their national development planning and policies, sector policies, plans and budgets, it is vital that development partners themselves effectively integrate risk considerations into their sector-based support to countries. This can reinforce efforts at the country level to embed risk considerations across all sectors.

3. Success Factors for Managing Climate and Disaster Risks in the Context of Resilient Development

This section focuses less on practical needs and actions, and more on key success factors that have been identified during the research. Desk based research, and interviews with key stakeholders, identified several success factors for successful management of climate and disaster risks, and for increasing the resilience of development outcomes. These are:

1. Risk management mainstreamed in development plans and processes
2. Risk-informed products, processes and partnerships available and used
3. Adaptation and disaster risk management localised, as appropriate
4. Underlying determinants of vulnerability addressed
5. Individual and institutional capacities well developed
6. Private sector playing a significant role in resilient development
7. Longer term habitability of atoll and islands considered
8. Increased access to, and effective use of climate and disaster finance
9. Resilient development investment opportunities planned and prioritised
10. Knowledge management and learning well established
11. Humanitarian actions for disaster prevention, response and recovery are effective
12. Strong coordination and cooperation

Each of these is elaborated below.

3.1. Risk management mainstreamed in development plans and processes

Recently coordinated audits of climate change adaptation and disaster risk reduction strategies and management for ten PICTs (PASAI, 2015; Kelly, 2015) concluded that they are not well placed to respond effectively to the threats and challenges arising from climate change. The audits covered governance arrangements, vulnerability assessments and strategy development, coordination between responsible agencies, project-level governance, coordination management, financing and human resource capacity constraints, as well as monitoring and reporting.

The audits revealed that the necessary cross-sectoral management of climate changes risks through mainstreaming government responses across vulnerable sectors is not yet taking place. Programme-level governance arrangements to support adaptation programs and projects funded by development partners, including sound management and project monitoring, have not been developed (PASAI, 2015; Kelly, 2015).

The foregoing findings are of great concern given that the case for ensuring that climate and disaster risks are taken into account throughout the development planning, prioritisation and budgeting process has been clearly made (e.g. World

Bank 2012b). This required changes in individual and organisational behaviour and governance systems, to ensure that knowledge on how to better manage risks is translated into actions that lead to more resilient development outcomes.

A transformative approach to mainstreaming. It is important to entrench responsibility for climate and disaster risk governance within the core institutions responsible for development planning and budgeting at national, sector and sub-national levels. This will go a long way towards ensuring that the development process itself actively contributes to reducing vulnerabilities and increasing resilience. Such a transformation also requires strong partnerships, and coordination between agencies that have the relevant skills, capacity and knowledge required to implement risk management initiatives within government, civil society and the private sector.

The resulting “development first” approach recognises that the underlying development planning processes and mechanisms are likely to be weak and that addressing resilience requires strengthening these processes and mechanisms directly (McNaught, forthcoming). Often termed ‘risk governance’, recent examples of approaches include addressing climate and disaster risks in the national development planning process (e.g. Te Kaakega III in Tuvalu) as well as at sector policy and planning levels (SPREP, 2014), strengthening key decision support tools to take risk into account, recruitment of additional staff responsible for risk governance and placing them in key line ministries, and partnership agreements between the private sector and divisional administrators (UNDP, 2016a). This is consistent with priority activities identified in the FRDP.

Importantly, such actions do not reduce the need for climate change and DRM agencies. Rather, they refocus and better define the roles of these agencies as coordinators, evaluators, creators and communicators of knowledge and learning, facilitators of partnerships, and as disaster managers. They need to work closely with planning agencies as well as with sector agencies.

For example, one role of National Disaster Management Offices (NDMOs) is to manage disaster preparedness and response. But they still have an important role to play in supporting resilient development processes. For instance, NDMO staff have a wealth of relevant knowledge that comes from experience in managing disasters. This includes knowledge of the risk factors that contribute to better or worse outcomes on the ground. This knowledge can inform risk reduction efforts in other sectors, including through strengthened partnerships and coordination efforts. Staff in the NDMOs understand that it is not their role to lead these wider partnership and coordination efforts. But the value they can add to resilient development processes is often not recognised. Leadership and coordination must be provided by institutions responsible for planning and budgeting, while drawing on a wide range of actors. Unfortunately, the modestly resourced NDMOs are often overlooked by planners.

Success factors and challenges. Lessons from approaches to mainstream other issues into national development planning (e.g. gender, youth) provide

important insights into some of the building blocks for risk governance (UNDP, 2016a). There is increasing evidence that the following factors are crucial in transforming the management of climate change and disaster risks to support resilient development:

- Actors and champions – supporting resilient development requires key actors to lead and drive the process, relevant skills and knowledge and strong communication process to transfer knowledge and skills;
- Mechanisms and partnerships – legal and policy framework and institutional arrangements must be conducive to managing risk; partnerships and coordination mechanisms are required to support the inclusion of a wide range of stakeholders as part of the process;
- Risk informed processes and products – key processes such as monitoring and evaluation, learning and knowledge creation, communication and the development of risk informed products (such as assessments, briefs, templates) are required to support the development process (UNDP 2016a).

A number of countries are changing their internal mechanisms and processes to better reflect that climate change and DRM are core development issues. For example, Samoa's Climate Resilience Investment Coordination Unit was fully mainstreamed in the Ministry of Finance, with absorption of staff and an allocation in the Ministry's budget. Its function is to ensure that all national and sector level planning mechanisms take risk into account.

Fiji's Climate Change Division moved from Foreign Affairs to the Ministry of Economy. Resources are being allocated by the Fiji Government to further strengthen the Division. At the sector level, following Cyclone Pam, the Vanuatu Government created a Risk and Resilience Unit within the Ministry of Agriculture. This was to strengthen the consideration of risk and resilience within the Ministry's programmes more broadly, and not just as a reactive response to an individual event. In Tonga, the Ministry of Internal Affairs has taken the lead to institutionalise a bottom-up approach to risk-informed community development planning.

As part of such processes, tensions often emerge. Government agencies that have historically led on climate change and DRM find the scope of their responsibilities changed, to better reflect their role as knowledge providers, coordinators, facilitators and responders. This organisational change is not an easy process. In Tonga, gradual acceptance of the role of the Ministry of Finance in leading on climate finance issues means that the Ministry of Climate Change is now able to better focus on technical issues and the creation of knowledge and learning to inform development planning and budgeting processes (pers. comm. SPC). In Tuvalu, the shift of responsibility for climate change and DRM to the Office of the Prime Minister will involve the Department of Environment refocussing on its core mandate of environmental protection and management – a crucial aspect of resilient development in Tuvalu, but only one aspect.

These and other changes have challenged existing power dynamics within institutions, particularly where there are resource implications. Managing these

changes to minimise conflict, and support constructive and empowering partnerships, requires change management skills that are often lacking amongst government officials. The case studies below further highlight some of the challenges with the processes of integration and mainstreaming, from an organisational change perspective.

The Pacific Community (SPC)⁴

In 2013 SPC hired a Senior Climate Change Adviser to drive the process of mainstreaming climate change across the organisation. As part of the process, a staff training programme was developed, and a group of climate change focal points across all divisions was established. Several meetings of the climate change and DRM focal points were held in order to identify the key barriers to mainstreaming. Many of these barriers were not climate change and DRM specific. Rather, they reflected weaknesses in the underlying governance structures within the organisation. These included an organisational culture that did not support information and knowledge sharing, inadequate resources to support knowledge creation, learning and sharing (staff, IT systems), programming that was largely based on a silo approach to development, institutional structures that hindered cross-divisional collaboration (e.g. added bureaucracy associated with joint country missions), weak monitoring and evaluation systems and insufficient political will to transform existing systems and processes.

Part of this learning was used internally to feed into a parallel process of adjusting the way in which SPC developed its programmes internally, by designing them to take better account of issues such as climate and disaster risks as well as other cross-cutting considerations. Tensions within the senior leadership team, among other issues, have contributed to slower than expected progress.

Red Cross – Solomon Islands⁵

An analysis of mainstreaming processes within the International Federation of the Red Cross was undertaken in order to identify factors that supported the process internally and encouraged adoption of adjusted practices.

A global project – Preparedness for Climate Change – was assessed by way of a literature review and analysis of 33 country experiences. The aim was to identify some of the challenges associated with mainstreaming.

The Solomon Islands was assessed in depth as a case study, including analysis of activities that were completed, document analysis, interviews and participant observations. This research also drew from literature that examined success factors from other areas, such as gender mainstreaming.

⁴ Summarised from SPC CCDRM focal point meeting reports 2013-15.

⁵ McNaught (Forthcoming)

Three clear factors emerged as being necessary for successful mainstreaming, and adoption of strengthened processes:

- **Investment in organisational capacity vital to mainstreaming** - strong organisational systems are necessary to be able to support the mainstreaming of any issue; to mainstream something means to change the way that the organisation currently functions; in order to be able to build resilience to extreme events an organisation needs to be adaptable – and to be adaptable means to be well functioning; if underlying governance structures are weak, building resilience requires addressing these shortcomings directly;
- **Ability to connect with government and with communities** - this requires investing in the capacity of the organisation and its staff, in order to be able to facilitate processes at community level and to have good community engagement skills; facilitating change at sub-national level requires skills and trust-building with communities; inadequate investment in these skills jeopardises the successful roll out of projects, especially if they do not take into account issues such as community ownership, the underlying socio-political context and existing power dynamics; at best these can produce interventions which are not owned fully by the community and, at worse, can act to undermine existing resilience structures;
- **Mainstreaming need not be costly** - the resources required for mainstreaming are not large, but it does require a sustained ongoing effort and political will at the highest level of the organisation; there is also a need to ensure that all communities and stakeholders are also driving the process from the bottom up; all too often project-based funding is less than five years – and yet a committed, sustained and consistent approach is needed to have traction and produce meaningful change.

Key Messages for MFAT: Risk management mainstreamed in development plans and processes

Building resilience requires strengthening the underlying governance structures at national, sector, sub-national and local levels, as well as engaging with a diverse range of actors. MFAT is well placed to support PICTs in this regard. It is already providing assistance to many countries in the region in the areas of governance and public financial management, including specific sector-level governance support.

MFAT might wish to:

- Assess opportunities across the aid programme to take a stronger “development first” approach to integrating and mainstreaming the management of climate and disaster risks, particularly as part of support for strengthened public financial management systems and within key sectors (agriculture, fisheries, energy, transport, information and communications technologies (ICT) health, education and the informal sector). A practical example could involve adjusting the terms of reference for all procurement

processes (e.g. of ICT infrastructure) to require contractors to describe what measures they will adopt to reduce risk and increase resilience, and track this as part of payments and progress reports;

- Identify opportunities to adjust terms of reference of national and sector adviser positions that MFAT supports, in order to incorporate elements of climate and DRM, where appropriate;
- Require resilience programmes to conduct stakeholder, governance and institutional analyses as part of their initial activities, in order to develop a thorough understanding of the political and institutional contexts of the work; these analyses should involve collaboration with organisations already engaged in this space; and
- Ensure that programmes focussed on resilience have sufficient time to engage meaningfully in strengthening underlying governance structures, by providing longer-term support to programmes and projects.

3.2. Risk-informed products, processes and partnerships available and used

Supporting resilient development involves bridging the work done by agencies that have climate change and disaster risk information and management as their core focus (e.g. meteorological offices, NDMOs), and key development actors as well as communities. Understanding the nature and implications of the risks is a crucial first step. Adequate resources need to continue to be made available to support improved understanding of climate and disaster risks, and effective engagement of communities and civil society, including the private sector.

Climate services and DRM programmes such as the Pacific Climate Change Science Programme⁶, the Climate and Oceans Support Program in the Pacific (COSpac)⁷ and Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI)⁸, as well as knowledge products and tools developed by the Australian Bureau of Meteorology, the National Oceanic and Atmospheric Administration, the National Institute for Water and Atmosphere, the World Bank, the Asian Development Bank (ADB), SPC, the Secretariat of the Pacific Regional Environment Programme (SPREP), NDMOs and others, are vitally important to improving the evidence and information base of the type of climate change and disaster risks the Pacific region faces now, and will face in the future.

Significantly, it is also important to not only have relevant and robust information provided by rigorous science, including modelling and assessments, but to also communicate this information to end users in ways that are both targeted and user-friendly. Despite efforts to address this need, most science-based information is still largely unintelligible to sub-national officials as well as to the heads of villages and households. There have been important efforts in this

⁶ <http://www.pacificclimatechangescience.org/>

⁷ Climate and Oceans Support Program in the Pacific - <http://cosppac.bom.gov.au/>

⁸ Pacific Catastrophe Risk Assessment and Financing Initiative <http://pcrafi.sopac.org/>

regard, such as the climate crab animation developed as part of Pacific- Australia Climate Change Science Adaptation Planning (PACCSAP) programme, and children's story books developed by SPC/GIZ Coping with Climate Change in the Pacific Islands Region (CCCPiR). The current work that the Finnish-Pacific (FINPAC) project is undertaking to support meteorological services to develop more user-friendly products is another excellent example.

More effort is needed to engage NGOs and sub-national actors in communicating messages effectively. Moreover, translating technical information and knowledge into strengthened processes and systems requires a sound understanding of current processes and systems, as well as of the needs of users in the relevant sector or community.

For example, within the agriculture sector, transferring the improved information available on climate change impacts and possible responses to the agriculture sector requires a good understanding of how extension officers currently provide advice to farmers. This includes understanding: (i) the process by which a change in the current agriculture sector plan affects information and advice given to farmers; (ii) who extension officers interact with and how; (iii) the nature of the advice farmers are currently requesting and acting upon; (iv) how farmers currently access information about weather and climate; and (v) how, and if, the farmers use the information. This level of reflection does not take place very often when planning how to influence current processes and systems (pers. comm. McNaught).

Case Study: Making early warnings accessible

The International Federation of the Red Cross provides technical backstopping support to national Red Cross societies, to support their internal governance structures. A key part of this assistance is the management of volunteers who play a vital role in communicating early warnings, assessments and coordinating response efforts.

As part of FINPAC⁹, the Red Cross in Tuvalu partnered with the Tuvalu Meteorological Office and SPREP to strengthen the early warning messages issued to the outer islands by the Tuvalu Meteorological Office. Focus group discussions between the Meteorological Office and community leaders and members helped to define what types of messages worked best to alert community members to a potential threat event. In evaluating the process, the Red Cross indicated that it was the first time that the Meteorological Office had conducted focus groups with their end users. Simply starting the dialogue, and strengthening the relationship, should lead to improved understanding of user needs.

A significant amount of work has been undertaken to better understand the barriers to documenting, sharing and use of information, and identify the enabling factors necessary to improve information and knowledge management

⁹ <https://www.sprep.org/finpac/>

within the context of climate change and DRM (Griffith University and SPREP, 2016a; Griffith University and SPREP, 2016b). These include underlying legislation, policies, procedures and standards, technology, capacity and adequate resourcing. However, availability of information and knowledge management systems in themselves do not necessarily lead to risk-informed decision-making.

In order to enable the inclusion of climate and disaster risk information in decision making more broadly, there is a need to recognise that it is people and organisations that will use this information and knowledge. The following crucial enablers were identified: (i) collaboration; (ii) increasing accessibility of climate information; (iii) improvement in the underlying science; (iv) institutional reform; and (v), identifying windows of opportunity for building trust and mutual understanding.

Key determinants of adaptive capacity include social networks, access to information via robust and effective communication networks, access to land and resources, and income levels. For many of these areas there are strong links between the main development-related activities MFAT supports – such as enhancing transport links between outer islands and the capital, improving ICT infrastructure and systems – and long-term resilience building. For example, the support to Tuvalu to complete the in-filling of the borrow pits has had a noticeable improvement in the quality of the environment and, over the longer term, access to available land for Funafuti residents (pers. comm. USP).

Key Messages for MFAT: Risk-informed products, processes and partnerships available and used

Within key sector programmes – such as those focussing on agriculture, fisheries, energy, transport, health, education, the informal sector and ICT – MFAT can increase efforts to ensure this work is risk-informed and that key counterparts, such as planners within the agriculture and fisheries ministries, are engaging with those actors who are involved in climate and DRM. ICTs are important for ensuring that useful information and relevant knowledge are adequately collated and stored. However, technology solutions are rarely the sole answer in making information accessible to decision makers that need it in their work at national, sub-national or local level. Understanding how people currently access information (e.g. via the radio, social media) must be considered. Transforming existing decision making processes requires the involvement of a diverse range of stakeholders who have expertise in a range of areas relating to the underlying causes of vulnerability.

MFAT may wish to:

- Extend existing support to enhance knowledge generation and learning through CCA and DRM focussed initiatives; this includes support for improved climate change and meteorological science, skills and knowledge for risk assessment and early warning systems and expanding partnerships between these service providers and end-users;

- Strengthen inclusive development processes by supporting NGOs involved in climate change and DRM, and NGOs focussed on addressing the underlying causes of vulnerability (e.g. income generation and gender equity);
- Across key investment priorities (agriculture, fisheries, energy, transport, health, education, the informal sector and ICT) identify key entry points for reflecting resilient development principles and practices, including through supporting recruitment of additional staff with resilient development expertise by key ministries and within the Terms of Reference of policy and technical advisers supported by MFAT; and
- Within MFAT support for strengthening energy, transport and ICT identify opportunities for reducing risks and vulnerabilities, and in increasing resilience. For example, as part of the support provided for ICT sector, strengthen partnerships between ICT providers, the generators of information and community leaders and decision makers to improve the understanding of community needs and maximise the benefits of new technology to support risk reduction.

3.3 Adaptation and disaster risk management localised, as appropriate

There is an ongoing disconnect between central government, local government and communities, settlements and households (UNDP 2016a). For example, much of the learning and discussions occurring at regional and national level trickle down to sub-national and community levels, but only very slowly. National government officials have received significant amounts of training over the past decade as part of climate change and DRM programmes, but very few programmes focus specifically on capacity development for sub-national actors (e.g. provincial and district offices, Island Councils). These communication and capacity disconnects exist between capitals (urban) and local governments (urban), and local government and interior areas (rural) and outer islands (rural) communities. Inadequate resourcing, poor communication, unreliable transport links and weak governance structures all play a role in perpetuating this disconnect, thus hampering the support for bottom-up development planning that makes full use of CCA and DRM expertise and knowledge.

Rural and/or remote communities often have greater levels of food security and more secure housing (both traditional and modern) when compared to most urban settlements (Campbell, 2014). They are more likely to have a subsistence element to their livelihoods, which reflects fewer commercial opportunities, as well as the need to have a subsistence livelihood to fall back on when market opportunities are not available. In contrast, those living in urban settlements may have lower levels of food security and less secure shelter, but may have better access to information and medical services.

The link between local level government structures (such as Island Councils, Provincial Governments, State governments) and the national government is often weak, partly as a result of inadequate resourcing and poor communication and practices. Many PICTs have decentralised forms of government, but local

governments do not always have the resources to fulfil their mandates. Extension officers may only visit remote communities once or twice a year (pers. comm. Village Headman, Fiji). Frequently there is confusion on the part of line ministries as to the role of ministries that are responsible for local government (Government of Tonga and UNDP, 2015). Integrating CCA and other risk reduction measures into local development processes is therefore often ad hoc and heavily dependent on external resources from development partners.

And yet, in terms of the overall resilience of communities in the region, the local government structures are vital. When a disaster strikes, local level governments are relied upon to coordinate response efforts. With appropriate support, they can also be important actors to integrate risks into local development planning processes.

Despite the increased volume of development assistance compared to a decade ago now flowing to national governments in the region (ADB, 2013a; ADB, 2013b; Barnard et al., 2014), there remains ongoing and general frustration that not enough of this funding is reaching vulnerable communities. It is there that the need is greatest and they are recognised as the first responders. Such communities should be seen as a potential resource and source of information, not simply passive victims of events.

There is little systematic knowledge concerning the performance of non-state and sub-national efforts. Chan et al. (2016) found that resilience actions have yet to produce specific outputs. In comparison, energy and industry actions perform above average. While many actions target low-income and lower-middle-income economies, the implementation gap in these countries remains greater. More effort is necessary to mobilize and implement actions that benefit the world's most vulnerable people (Chan et al. (2016).

Many NGO-led programmes have focussed efforts on the local level, and the decision-making structures within it. As a result, they have developed a wealth of learning on resilience, adaptive capacity and inclusivity (Oxfam, 2015). However, all too few resilience strengthening projects and programmes directly target this sub-national level as their core stakeholders.

Crucially, there is insufficient effort to strengthen the local government system itself. While many CCA and disaster risk management programmes have supported "Community Adaptation Plans", "Disaster Action Plans", "Climate Change and Water Security Adaptation Plans" and the like, this is insufficient in addressing gaps and weaknesses in the underlying local governance structures. For example, if communities do not use formal plans currently, development of another plan is unlikely to strengthen their resilience.

Moreover, all too often these efforts make assumptions about the way in which decisions are made locally, with inadequate analysis of current decision making processes and governance structures. Many of these interventions are therefore stand-alone and implementation of priorities identified in the plan is not supported and/or evaluated. There is a need to strengthen local planning and

governance mechanisms and mainstream risk reduction and resilience as part of these efforts. There are examples of good practice (e.g. Live and Learn Environmental Education, 2010; TNC, 2016). These need to be replicated and scaled up.

Projects often experience high costs and delays when delivering activities in the more remote areas, such as outer islands. This is especially so for small countries and territories with limited local capacity, capability and small private sectors. When detailed budgets (based on quotes) and timelines are not available, a general “rule of thumb” is to multiply the overall cost and time for outer island projects by two (compared to capital islands). Where quotes for goods and services have been obtained, it is still prudent to include a large contingency (up to 20%) for capital works projects in outer islands. This contingency factors in the high risks and uncertainties associated with capital works projects, including the unreliable and costly transport to these remote islands (PREA, 2016).

Several attempts have been made to strengthen the links among different levels of government (e.g. Government of Kiribati, SPREP, SPC and GIZ, 2014; UNDP, 2016a), but with mixed success. Producing change in this space requires long-term engagement. For example, a previous NZ-funded governance programme in Fiji working with iTaukei Affairs to strengthen the reporting of village headmen to their Provincial Offices started to gain traction, such that the information could be used by all central line ministries and NGOs to better target support, including risk reduction measures. But these gains were lost when funding ended abruptly with a change in government and in the aid programme priorities (pers. comm. FSPI).

In Tonga, an institutional analysis as part of a Climate Finance and Risk Governance Assessment revealed that there was no formal mechanism through which the National Emergency Management Office or the Ministry of Internal Affairs could integrate village emergency plans into overall village or district development plans (Government of Tonga and UNDP, 2015). A recent addition to the staff of the Ministry of Internal Affairs is now supporting risk-informed community-based development planning. This should lead to more informed and better coordinated service delivery by central government ministries (UNDP, 2016b).

Non-state actors are also critically important in bridging the disconnect. They should be involved from the outset of any project or programme, and recognised as important partners in service delivery to rural and remote communities. A coordinated network of NGOs and private sector operators, working with local government, can significantly improve local government outreach.

Enhancing coordination between government, NGOs and the private sector can support identification of efficiency improvements and cost-sharing initiatives. For example, the Oxfam-led NGO network in Vanuatu – Vanuatu Climate Adaptation Network – identified opportunities for NGOs to coordinate the delivery of their supplies to various outer islands, and strengthened relationships and trust between government and NGO partners. These enhanced coordination

mechanisms and relationships proved critical to also coordinating response efforts post cyclone Pam (Oxfam, 2015).

Key Messages for MFAT: Adaptation and disaster risk management localised, as appropriate

Local governments are critical, though sometimes overlooked, stakeholders in supporting resilience building and coordination of disaster response and recovery. More investment is needed in supporting 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 internal processes to be better able to respond to these needs. Lessons from Vanuatu suggest that the involvement of the provincial governments can give local communities a greater voice and more opportunity to express their needs (UNICEF and UNDP, 2015). Experiences in Vanuatu, Tonga (UNDP, 2016b), Kiribati (Government of Kiribati, SPC, SPREP and GIZ, 2014) and Tuvalu (ADB, 2008) suggest that strengthening the knowledge and skills and leadership of local government and island councils has the ability to produce transformative change.

MFAT has previously supported governance and leadership initiatives within local governments (e.g. support in Tuvalu for the UNDP-led governance programme), but these efforts have not been sustained over the timeframe necessary to generate long-lasting changes in processes as well as institutionalisation of partnerships. Building and strengthening relationships of trust among government actors, NGOs and the private sector is also critical, as is supporting actors across these different spaces. MFAT is well placed to respond to these needs and opportunities.

MFAT may wish to:

- Give added recognition to the fact that governance and leadership at the local level is critical for resilient development;
- (Re-)Engage in actively strengthening local government as key stakeholders in resilient development;
- Utilise existing mechanisms of MFAT support provided to NGOs and private sector networks to actively engage them in supporting resilient development; for example, support provided to Tuvalu through the Red Cross should build on previous work conducted to strengthen local government systems;
- Institutionalise climate change and disaster risk management training for partners working to strengthen local government systems; and
- Support and strengthen local NGOs and integrate them into programme designs as a key partner in localising implementation.

3.4 Underlying determinants of vulnerability addressed

As discussed above, many early climate change adaptation and disaster risk reduction projects focussed on hazard-specific and/or sector-specific

interventions. Moreover, early discussions of vulnerability focussed on the environmental drivers of vulnerability – changes in climate, sea-level and ecosystems – with little recognition of social factors that can enhance, but can also reduce risk (Barnett and Campbell, 2010).

Significant progress has been made in recent years to recognise that managing climate and disaster risks, including by building resilience, necessitates addressing the underlying determinants of vulnerability. These include socio-economic status, poverty, power, access and control over resources and information and the ability to contribute to decision-making processes. Collectively these influence adaptive capacity. Analyses of factors that contribute to adaptive capacity now regularly include the effectiveness and inclusivity of local governance and decision making institutions and processes (ODI, 2010; Warrick et al., 2016). An increasing body of research is highlighting the importance of analysing and taking into account the political and cultural context within which responses to climate change and disaster risks are undertaken (Adger et al., 2013).

Progress has also been made to ensure that humanitarian actors consider the diverse needs of affected communities post-disaster, though each disaster event reveals that significant gaps remain (SPC, 2016b).

Conducting a social or gender analysis is now recognised as a minimum requirement to ensure that interventions at least do not exacerbate and reinforce existing inequalities and vulnerabilities through a lack of understanding about the dynamics of the particular context. Unequal distribution of resources and power imbalances are both the root cause of poverty and also impact on a person's capacity to adapt (CARE, 2015).

When identifying how to operationalise socially inclusive and gender-responsive programming a key factor is the capacity and awareness of staff within the organisation, as well as in any organisations involved in delivery. Institutionalisation of staff and partner training programmes can enhance the skills and knowledge of staff responsible for making the connections between climate change and disaster risk management programming. Institutionalising these themes as part of monitoring and evaluation frameworks can also support gender-responsive and socially inclusive programming (SPC, 2016a).

Interventions that address key determinants of vulnerability can lead to significant co-benefits. For example, a key underlying risk relates to socio-economic status. Few formal links exist between partner-supported interventions focussing on enterprise development, agriculture and fisheries development, environmental protection and those supporting increased resilience. This is a significant missed opportunity. Similarly, support to strengthen governance and leadership, and to address gender, human rights and disability issues, have significant links to building resilience. These links should be exploited fully to maximise the return on investment of all interventions.

In many instances the pre-existing issues of severe overcrowding, proliferation of informal housing and unplanned settlement, inadequate water supply, poor sanitation and solid waste disposal, pollution, and conflict over land ownership require immediate resolution if the additional stresses related to climate change are to be managed effectively (Storey and Hunter, 2010).

Natural resources are vital livelihood assets and ecosystem health underpins many of the other determinants of resilience such as food security and water security. In many parts of the Pacific natural resources are under pressure. Climate change will exacerbate these challenges. This is another key area where the development process itself can undermine resilience. Over-fishing, the clearance of mangroves, aggregate mining, deforestation and a failure to enforce current environmental protection legislation are significant challenges to protecting and preserving the environment and ecosystem services it provides.

Supporting national and sub-national governments, NGOs and communities to sustain and protect natural resources in the face of competing interests is critical. Typically, ecosystem-based approaches to adaptation are not mainstreamed into the broader development agenda. In Lami town in Fiji, the local council provided consent to a developer to clear an area of mangroves despite a recent study (SPREP, 2014) confirming their economic value in offering shoreline protection for the town.

Key Messages for MFAT: Underlying determinants of vulnerability addressed

Within MFAT, formal links should be made between programmes and activities related to CCA and DRR, and work to address the underlying determinants of vulnerability. MFAT staff working with partner organisations on environmental protection, poverty alleviation, livelihood and enterprise development, and gender and human rights are likely to have a good understanding of the social context within which risk reduction and resilience programmes are taking place, and could identify entry points.

Social change is a long-term process and maximising these links requires long-term engagement as well as predictability of funding for organisations working on poverty alleviation, livelihood development, governance, gender equality and human rights. Programme 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.

Compulsory gender and social inclusion training for staff across the whole Aid Programme, and across all partners involved in implementation, is also recommended. The use of champions, and the creation of learning spaces within the organisation, can help to strengthen capacity (DFID, 2006). Use of gender-indicators can help to ensure that gender is taken into account in programme design, implementation, monitoring and evaluation (GIZ, 2015).

MFAT may wish to:

- Give increased recognition to the fact that vulnerability is multi-faceted and that gender inequality, social, cultural and economic power and access to resources and information are crucial determinants of vulnerability;
- Involve staff responsible for environmental protection, poverty alleviation, livelihood and enterprise development, gender and human rights in climate change and disaster risk management programming;
- Institutionalise and enforce mandatory gender and social inclusion training for staff and partners; and
- Use strengthened gender-markers and indicators as part of monitoring and evaluation frameworks to ensure progress against these issues is tracked

3.5 Individual and institutional capacities well developed

Coping with climate and weather extremes is part of life in the Pacific. Historically, Pacific populations have a wealth of traditional and local knowledge to respond to environmental challenges and changes. These local and traditional knowledge and skills are increasingly being recognised as vital resources for adaptation (Fletcher et al., 2013). Traditional coping strategies are consistently being applied as part of response to disasters and climate change.

In this respect, research has revealed five common strategies employed in PICTs: (i) recognition of traditional methods; (ii) faith and religious beliefs; (iii) traditional governance and leadership; (iv) family and community involvement; and (v) agriculture and food security. Pacific Islanders have developed highly sophisticated techniques of gardening and fishing which have proved successful for many centuries in sustaining food security and livelihoods.

Networks and relationships, often called social capital, are core to Pacific traditional society. These networks must be the basis for any efforts to support strengthening capacities locally. This is evident from the success of community-based resource management work in the last decade. It has utilised such skills and personal networks (USP, 2011). The adaptive capacity of the disaster response system is enhanced by the presence of strong informal communication and relationships that operate beyond formally established mechanisms. In addition, appropriate participation of traditional leaders and faith-based organisations in disaster planning and response have been shown to increase the effectiveness of the disaster response system (Gero et al., 2013).

Nevertheless, at both national and sub-national levels there remains a well-recognised shortage of people and time to support implementation of risk reduction initiatives (SPC, 2015b; UNDP, 2015b; Applied Geoscience and Technology Division, 2013). Recent audits of climate change adaptation and disaster risk reduction strategies and management in ten PICTs (PASAI, 2015;

Kelly, 2015) identified technical and administrative skills that need to be developed. These include:

- technical and research skills to carry out high quality climate vulnerability and risk assessments and to develop relevant plans and policy responses;
- administrative capabilities such as submission writing to secure available adaptation funding; and
- capacity to soundly project manage on-the-ground funded adaptation measures, monitor results and acquit grants.

The lack of people with the necessary skills is in part a result of small populations, and therefore limited numbers of people relative to the challenges being addressed. Formal capacity development opportunities within PICTs may also be limited, and international opportunities for training are therefore an important part of strengthening national capacities. But it is also the case that competent staff within national governments are often overseas attending meetings and training workshops. Therefore, all too often they are not in-country to fulfil their roles and commitments (Richardson, 2009).

Extending the reach of these training opportunities beyond national governments to sub-national governments and NGOs is important, so long as disruptions are minimised. Strengthening in-country capacity through formal educational institutions such as The University of the South Pacific (USP) should be used where possible. Overseas trips often represent an opportunity to supplement low staff salaries, thus creating an incentive for travel. Salary top ups – with equivalent additional responsibility - have not been tested significantly, but have been used in a number of instances. They can provide staff with additional motivation and reward for driving change locally and the SPC Development of Sustainable Agriculture in the Pacific (DSAP) project used them as part of the recruiting of graduate research assistants.

Placing appropriately trained and experienced staff within ministries is recognised as an important part of building capacity, including through mentoring, coaching and capacity supplementation where necessary. To maximise the effectiveness of this approach, recruitment and management should be government-led, and use national government systems, wherever possible. Demonstrating the value of these additional staff can support their absorption into government systems (UNDP, 2016a).

Building the capacity of staff in line ministries should be included in activity designs so that it is an integral part of project implementation. Staff are more likely to own the project results if they have been associated with the initiative since inception, as well as carrying on with these activities when the project ends (UNDP, 2015b).

Transferring project funds – including for staff salaries - directly to national budgets increases national ownership of project activities and staff. It also enhances collaboration between the Ministry of Finance and line agencies, allows

for improved accountability and transparency, and creates employment for local staff (SPC, 2015b). This is also in line with aid effectiveness principles.

Gero et al. (2013) have also highlighted that in “small Pacific island bureaucracies, responsibility and capacity often rests with individuals rather than organisations”. Building institutional capacities that support the strengthening of internal processes and decision-making tools is critical to ensuring that skills and knowledge acquired by individual staff members are shared, and used to enhance organisational performance.

Where skills shortages exist, using locally-available recognised technical and vocational education and training (TVET) programmes is preferable to ad-hoc training (pers. comm. USP). Accredited courses have the benefit of the content being standardised. In addition, working towards a formal qualification that can be added to an individual’s curriculum vitae is often an excellent motivator. Similarly, where capacity supplementation is deemed necessary, greater effort must be made to ensure that the process of recruitment and performance management of embedded staff is national government-led.

The EU-PacTVET Project (Hemstock et al., 2016) recommended that climate change programmes such as disaster risk management and project management be offered regionally, mainly at USP. Such initiatives to develop and deliver training and certification programmes, including those designed to enhance the capacity of the private sector, can build on the University’s internationally-recognized accredited programmes and courses and targeted vocational and continuing training and education. These include specialised courses and programmes in climate change and public administration, such as programme and project management (Hemstock et al., 2016).

Key Messages for MFAT: Individual and institutional capacities well developed

Managing the upcoming and ongoing impacts of climate change and disasters will require extensive skills and capacities across the whole of society. This includes, but is not limited to policy makers, agricultural extension officers, road maintenance workers, plumbers, fishers and farmers. It is important that this training is targeted to where it is needed most, and that effort be put into the prioritisation process.

MFAT may wish to:

- Support the strengthening and use of existing locally available TVET courses to deliver training, and ensure that local educational institutions are supported as part of the process;
- Invest in the availability of, and support, in-country training and mentoring
- Strongly avoid resorting to the use of ad-hoc regional workshops and training initiatives;
- Utilise existing institutional and capacity needs analyses to inform decisions regarding support to be provided;

- Further support the placement of appropriately experienced staff, and/or provide staff salary top-ups, to supplement capacity locally to support the mainstreaming of climate and disaster risk management into national government systems, while ensuring that national governments drive this process; and
- Further support the building of institutional/organisational capacity, alongside individual capacity.

3.6 Private sector playing a significant role in resilient development

Climate change can affect businesses and their value chain in many ways, directly and through indirect or systemic impacts. Business risks from climate change include:

- Increasing water scarcity and changes in the availability of natural resources;
- Physical impacts of extreme weather events and sea-level rise on utilities and infrastructure;
- Energy or commodity price volatility;
- Changing demand for consumer and intermediary goods and services;
- Health issues affecting workers and consumers (e.g., due to heat waves or the expansion of infectious diseases);
- Regulatory uncertainty as governments prepare to cope with climate impacts (e.g., new water regulations and changes to zoning laws due to expanding flood zones); and
- Reputational consequences for companies that are seen as failing to support their community in case of a disaster (Caring for Climate, 2015).

As highlighted in the FRDP, the private sector is a key partner in supporting the transition to a low-carbon climate and disaster resilient world. Significant finance to support this transition is likely to come from the private sector (Climate Change Support Team of the UN Secretary General, 2015). Private sector organisations have a significant role to play, not just in shifting investment to lower-carbon technologies and energy systems, and in supporting resilient infrastructure development, but also in contributing to policy and legislation. Efforts to engage the private sector to date in policy development processes have often been ad-hoc. National-level private sector associations should be engaged wherever possible, to provide inputs to policy development processes (pers. comm. PIPSO).

It is in the interest of businesses to strengthen their climate resilience to protect core operations, reduce liabilities and avoid damage to the bottom line. Businesses that are able to develop or extend existing products and services to help others adapt can significantly increase revenues. Moreover, companies that address community vulnerabilities in their CCA strategies can make important contributions to local community resilience. This “responsible” corporate adaptation, focused on creating shared value and enhancing community

livelihoods, is the most robust approach to reducing climate risks and capitalizing on business opportunities.

The private sector is small in many PICTs. When providing assistance for CCA and DRM it is all too easy for small and medium enterprises (SMEs) to be crowded out. Sourcing materials locally, and supporting the private sector to strengthen their own systems to do so, helps sustain the availability of materials and capacity required for the longer-term. This can be particularly apparent in disaster response. Donors can support local SMEs by buying local products rather than importing from outside. Doing so supports the local economy and begins the path to recovery sooner.

There is a shortage of well-trained individuals in the private sector who have the skills necessary to design, manage and carry out on-the-ground climate change adaptation and risk reduction interventions. But the increased involvement of the private sector and professional associations, such as the South Pacific Engineers Association, has been a promising development in recent years. More effort is needed to increase engagement of the private sector in CCA. Given the lack of awareness across the Pacific, and particularly at the community level, regarding basic building principles that can limit damage from natural hazards, many homes have suffered major damage due to non-compliance with such building principles (Hay and Pratt, 2013b).

Significant climate change finance is being provided to PICTs through a range of bilateral development partners and multilateral institutions to fund CCA, though only a relatively small amount is presently directed to the private sector.

In Fiji, a Connecting Business Initiative to better involve the private sector in CCA and DRM is linking key national and local government agencies with private sector representatives that have significant outreach across the country. The Initiative is designed to support the increased need for coordination, not only in Fiji but regionally across the Pacific. It is a global multi-stakeholder initiative led by the United Nations Office for the Coordination of Humanitarian Affairs, United Nations Office for Disaster Risk Reduction and the United Nations Development Programme.

Whilst in Fiji a strong focus is on strengthening networks between the private sector and other partners, as well as on business continuity planning to support businesses to return to full operations quickly post-disaster, the network could also play a more active role in supporting local and national governments to reach communities and conduct initial damage assessments. TC Winston highlighted the important support that businesses can offer to help maximise relief and recovery efforts (Shelter Cluster Fiji, 2016).

The recent launch of the Fiji Business Resilience Council is another concrete step towards meaningfully engaging the private sector in the Fiji Government's disaster emergency preparedness, response and recovery activities. The Council will assist businesses to coordinate with Government in disaster response and recovery, and improve their business continuity and preparedness.

The humanitarian community has already formed innovative partnerships in a number of business sectors, including telecommunications, finance (e.g. cash transfers) and logistics. Although private sector actors have great interest and capacity to develop partnerships with the international community and national authorities, there is a pressing need to increase incentives, reduce barriers to effective engagement, and explore new models to improve information sharing and data management, as well as to find incentives for the private sector to partner with public sector agents. Engagement of the private sector should be continuous throughout the process of preparedness, response and recovery.

There is a need to strengthen communication and share best practices between the public and private sectors. Both the private and public sectors need to better understand the various command and control structures of the other, as well as the different resources available to promote a better coordinated response. There is also a need to build trust and understanding the various party's motivations, as well as to engage in continuous dialogue among NGOs, private sector and local governments.

The focus of effort should be increasingly shifted to preparedness, the implementation of sustainable approaches, and leveraging support. Emergency preparedness should be part of a company's internal corporate enterprise risk management models. Tax incentives are seen as a possible enticement for private companies to partner with the public sector and engage in disaster response. Removal of barriers and custom taxes for emergency response materials are an important means to support the private sector's recovery efforts. Similarly, the provision of credit following a disaster can also help to speed the recovery by allowing suppliers to access quickly additional materials. Moreover, functioning rule of law is an incentive for companies to engage in emergency preparedness, response and recovery (UNOCHA, 2015).

Consultation with the private sector in advance of the World Humanitarian Summit highlighted that the private sector has moved from a purely corporate social responsibility focus to integrating disaster preparedness and response into core business functions. Consultations identified several challenges and needs, including: (i) a need to create a platform for information sharing across actors involved in humanitarian response; (ii) the need for tools for improving mutual understanding; (iii) building trust between the public and private sector; (iv) integrating private sector experiences into lessons learned in future emergency responses; (v) increasing the use of quantitative measures in decision-making processes; (vi) agreeing on a set of principles for collaboration; (vii) improved systems for matching the needs and resources of both the public and the private sectors; and (viii) significantly improved linking of business partnerships in disaster risk reduction, response and recovery (UNOCHA, 2015).

Key Messages for MFAT: Private sector playing a significant role in resilient development

MFAT supports several private sector initiatives in the region, for example the Private Sector Window, which facilitates connections for New Zealand companies interested in investing in the Pacific. Support for business mentoring is also provided. The private sector in New Zealand has considerable experience with CCA, business continuity planning and other aspects of disaster preparedness, response and recovery. Utilising these existing mechanisms to strengthen skills and knowledge among private sector operators in the region, including public-private partnerships, could expand considerably the number of actors engaged in supporting resilient development, including CCA and DRM. Efforts to promote increased trade between New Zealand and the Pacific could be undermined by a failure to adequately address climate and disaster risks as part of that process.

MFAT may wish to consider:

- Ensuring that private sector support programmes – including export promotion work – integrate climate and disaster risk management throughout their activities;
- Identifying further opportunities to support private sector networks to contribute to resilient development, including strengthening their partnerships with government;
- Identifying opportunities to strengthen partnerships between NZ businesses and their counterparts in the Pacific, with regard to increasing the resilience of development efforts;
- Working with partners, including the private sector, to conduct evaluations of the effectiveness of disaster preparedness initiatives, and to run simulations based on past data and trends to assess different opt-in models for the private sector to engage in preparedness;
- Create leadership programmes and train private sector employees on CCA, DRR and disaster preparedness; and
- Use local business in sourcing materials wherever possible as part of disaster preparedness and response.

3.7 Longer term habitability of atoll and islands considered

The following is a summary of the more detailed information presented in Annex 2.

Climate change offers an additional set of issues that go beyond conventional notions of sustainability for atoll and island communities. Atoll and island habitability is not simply a function of sea-level rise, but may also be affected by increased temperatures (including impacts on food security - plants, reefs, lagoons and ocean resources - and people's health) and water resource degradation. The loss of habitability is, and will continue to be, the ultimate driver of forced relocation, including movement of entire communities and

villages. Successful adaption therefore requires interventions that protect the habitability of islands, particularly on atolls.

A recent assessment, which is based on a very much worst case scenario of a 2m sea-level rise, suggests that as many as two 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). 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.

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. 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).

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).

Sea-level rise will be about 80 cm if global temperatures increase by 2°C. Further collapse of ice shelves could lead to sea level increasing by up to 2 metres by 2100 (NOAA, 2017). By 2050 coral bleaching will likely be an annual event for almost all reefs and ocean acidification will prevent the growth of almost all reefs. Annual coastal protection costs could be as high as USD 300 million for Fiji and for the Solomon Islands. Increased temperatures and higher risk of seasonal droughts are likely to decrease crop productivity and negatively affect livestock. Investment in increased water storage, rainwater harvesting, desalination facilities and other alternative water resources will be critical, especially on islands with limited amounts of land suitable for reservoirs. No atoll group in the Pacific is likely to be habitable by the end of the century (World Bank, 2016; FEU-US, 2016; Dickinson, 2009; Nunn, 2012).

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.

It is possible, if not 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. The atoll countries of Kiribati and Tuvalu face high levels of climate risk but have low to moderate levels of labour mobility. International migration offers the potential for a 'triple win', delivering gains for migrants, sending countries, and receiving countries.

Key Messages for MFAT: Longer term habitability of atoll and islands considered

Owing to the high costs of adapting on small islands, it has been suggested that there will be a need for migration. Relocation and displacement are frequently cited as outcomes of sea-level rise, salinization, and land loss on such islands. Importantly, climate stress is occurring at the same time as the growth in rural to urban migration. The latter is leading to squatter settlements that strain urban infrastructure – notably sewerage, waste management, transport, and electricity. Urban squatters on small islands often live in highly exposed locations, lacking basic amenities, leaving them highly vulnerable to climate risks. However, a lack of research in this area makes it difficult to draw clear conclusions on the impact of climate change on the growing number of urban migrants in small islands.

While high islands have more land and freshwater resources than do low islands, the amount of land on volcanic islands that is flat enough for large-scale settlement, development, and agriculture is limited. Land rights and land tenure issues are also serious impediments to planned relocations and resettlement.

Without improved access to a comprehensive climate risk management strategy that includes options for mobility, a significant proportion of people from Nauru, Kiribati, and Tuvalu and other small islands in the Pacific could be "trapped" by worsening environmental conditions, declining local well-being and few opportunities to either migrate or generate the income necessary for adapting.

In reality, financial and legal barriers are expected to inhibit significant levels of international environmentally-induced migration in the Pacific. Moreover, resettlement, migration and related adaptation strategies should be regarded as options of "last resort" on at risk islands, as they may actually discourage viable adaptation initiatives, by fostering overdependence on external support. For this and other reasons, research into the possible un-inhabitability of islands has to be undertaken with sensitivity in order to avoid short-term risks (i.e., to avoid depopulation and ultimately island abandonment) associated with a loss of confidence in an island's future.

But importantly, well-managed migration can increase the adaptive capacity to cope with climate change. Migration can increase: i) resilience to crises; ii) capacity to cope with future impacts of climate change; and iii) diversification opportunities for an economy based on multiple sources of revenue. However, if migration is to be adaptive, careful policy planning and well-placed policy interventions are required.

MFAT may wish to consider:

- Supporting studies that increase understanding of the policy implications of changes in habitability of atolls and other small islands (including high islands), considering much more than just coastal erosion and inundation;
- The role of climate change as a migration driver and how this might be reflected in policy. In order to better understand the impact of climate change on migration there is an urgent need for robust methods to identify and measure the effects of the drivers of migration on both migration and resettlement;
- The utility of current New Zealand migration policy in the context of climate change, and the immigration policy implications of increased flows of climate change induced migrants;
- Supporting studies that lead to identification of climate change 'hot spots' where climate induced migration is likely to be most significant (e.g. atolls, delta areas, some urban locations; coastal lowlands of high islands);
- Supporting studies that investigate the costs of climate-induced migration for those who leave their homes; this work may be influenced by, and contribute to the outcomes of the Warsaw International Mechanism for Loss and Damage which is considering the economic and non-economic costs of climate change induced and forced migration; and
- Establishing procedures/processes for international community relocation including: a) facilitating discussion across the region, including amongst development partners with close ties with PICTS; b) cooperating with PICTs that may be either the origins of, or destinations of, relocated communities; c) identification of likely source and destination areas (likely to be contested or controversial); d) facilitate dialogue between countries (origins and destinations of relocated persons) and between communities (relocated persons and hosts); and e) supporting further research into community relocation in the Pacific context; given that there are Tuvaluans from Vaitupu resettled in Kioa and I-Kiribati in Rabi, these would be useful sites for identification of positive and negative aspects of such relocation.

3.8 Increased access to, and effective use of climate and disaster finance

This section is presented in two parts.

A. Securing finance for climate change adaptation and disaster risk management

Building resilience at individual, institutional, and private sector levels is essential to achieve sustainable development in Small Island Developing States, but available financing for this purpose is limited and difficult to access (OECD and World Bank, 2016). A complicating factor in the Pacific is the number of funding agencies involved in implementing climate change adaptation projects. This increases the need for robust systems and processes to be in place at all levels of government, including at the level of individual project implementation (Kelly, 2015).

Pacific Leaders have called for simplified access to financial resources to support climate change action and resilience, particularly for small island developing states. They also noted the need for full and equal participation of women in climate financing discussions and decisions.

The current landscape of climate change and disaster risk financing is complex. Donors have a responsibility to reduce this complexity wherever possible, by committing longer term funding, moving towards the provision of budget support rather than projects and in supporting the establishment and use of national trust funds where relevant.

Atteridge and Canales (2017) report that, for the Pacific, the vast majority of climate finance (86%) is being delivered as project-based support. Direct budget support is rare. In terms of sectoral distribution, the largest share of funding has supported work to create an “enabling environment”. As project finance is likely to be a continued feature of the climate change landscape for many years, PICs will need support to strengthen their ability to navigate climate change and disaster risk management funding sources, proposal development, and meeting fiduciary requirements of different partners.

Documentation on the various funds that PICs can access to support climate adaptation is abundant. The challenge, however, is having full and ready access to this information such that it allows the relevant government officials to make informed decisions, and act on them in a timely manner, commensurate with the financial, human and other resources available to them. The options and modalities of the various funds PICs can in principle access have been assessed (PIFS, 2012; PIFS, 2015a). Some of these modalities are being implemented or explored in the region, and can provide practical examples for others.

There is a need to assemble and review existing information on the objectives, eligibility requirements, selection criteria, and type of projects most likely to be funded. This information needs to be targeted, kept up to date, and made available to relevant government officials and others in PICs, including via the Climate Change Portal pacificclimatechange.net and through various awareness-raising initiatives. Secondly, there is a need for targeted opportunities for relevant officials to learn to use available information in a practical sense. This can include more active mentoring when consultants are used to support project

proposal development. Capacity building opportunities and elements of this support should be made explicit and including within the Terms of Reference for consultants.

Climate finance, or risk-governance assessments have been completed in several countries (Samoa, Vanuatu, Fiji, Nauru, RMI, Tonga) and have provided useful recommendations for adjusting institutions, processes and strengthening capacities for accessing climate finance.

There is also a need to complete climate change finance and related assessments for FSM, Palau, Kiribati, Tuvalu, Solomon Islands, and PNG, with a focus on their current and potential ability to access and manage climate change resources. The assessments should consider the six dimensions of climate change financing: funding sources, policies and plans, institutions, public financial management and expenditure, human capacity, and development effectiveness. Increased effort should be made to link these assessments to existing support that is provided for strengthened public financial management.

Identifying actions that 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 is a first-step. For the PICs that wish to seek National Implementing Entity accreditation, their national plans should also define the assistance they need in order to complete the steps to being 'climate ready' and secure accreditation.

Some progress has been made to address the historical imbalance between financial flows for mitigation interventions and those for adaptation. The balance provisions in the Paris Agreement, as well as the commitment of the Green Climate Fund to equitable disbursement, will help further. At the Fund's Board Meeting in 2014 it was agreed that the Fund would balance its allocation between adaptation and mitigation. Moreover, nearly half of the adaptation pool is expected to be allocated to Least Developed Countries, Small Island Developing States and African states.

However, climate financing remains a complicated landscape of bilateral, multilateral funds, grants, budget support, loans, insurance instruments etc. The existence of two international frameworks (UNFCCC and Sendai Framework for Disaster Risk Reduction) also perpetuates the complication, as various funding sources are directly linked to these global frameworks (e.g. National Adaptation Programmes of Action, National Action Plans and the Global Facility for Disaster Reduction and Recovery). All this is in addition to the multitude of bilateral and multilateral funding sources for the various sectors of the economy (e.g. infrastructure, energy, health, education) that are relevant for resilient development.

Allocating resources to improve the resilience of water and sanitation systems, for example, requires combining internal resources for water supply and sewage system construction and maintenance, with those from traditional development

partner support for infrastructure, including the Pacific Regional Infrastructure Facility, with additional finance or loans that may be available (e.g. from the Green Climate Fund, via the World Bank or the ADB) to make these systems more resilient. The timeframes, disbursement, procurement and reporting requirements associated with these different funding opportunities are often poorly harmonised. Robust public financial management systems are therefore required to support the coordination and management of these internal and external resources.

The existence of prioritised national planning frameworks that describe the actions that need to be taken - and ideally provide costings for them - has often been identified as a prerequisite for funding. This has led to many donors supporting country efforts to develop climate change policies, strategies and joint national climate change and disaster risk management plans.

Experience in the region with National Adaptation Programmes of Action helped to cement the expectation that a costed list of priorities would translate into resources. This was because the Pacific's Least Developed Countries that were supported to develop the Programmes (Samoa, Kiribati, Solomon Islands, Tuvalu, Vanuatu) received significant resources from the Least Developed Country Fund, for projects based on priorities identified in the Programmes of Action.

One of Nauru's main motivations for developing a Joint National Action Plan – RON Adapt - was to develop a Programme of Action style document. They had seen it work well as a resource mobilization tool (pers. comm. Nauru government official). However, by then most of the funds to implement the Programmes of Action were already committed. Hence development of RON Adapt did not drive the creation of new funding opportunities, per se. Rather, it supported the decision making process on how best to use the available funding. This points to a weakness in underlying national monitoring and evaluation of policies, plans and projects.

Few development partner projects have systematically supported the strengthening of national monitoring and evaluation systems. The Pacific component of the Pilot Programme for Climate Resilience, implemented by SPREP, has attempted to do this in Tuvalu. It has supported the government to develop guidelines on national monitoring and evaluation processes (SPREP, 2016a). The Tuvalu government has recently created a position within the Office of the Prime Minister to strengthen implementation of these processes.

Insufficient analysis has been conducted to evaluate whether the existence of a costed plan supports internal and external budgetary allocations. However, it is clear that a multitude of individual and organisational skills and capacities are needed for countries to be able to access and manage resources effectively (UNDP, 2012, PIFS 2013, UNDP, 2015a) These skills include being able to develop sound policies and plans and prioritise actions (see Section 3.10), turn priority actions into project concept notes, implement public financial management reforms, negotiate effectively with development partners, and

integrate climate change and disaster risk management priorities into development planning, partner dialogues and roundtables.

Increasingly, climate finance workshops¹⁰ (USAID Adapt, 2013) are providing opportunities for countries to directly discuss their climate change priorities with development partners in a structured way. But a risk arises when taking this approach if the underlying planning and coordination structures are weak. This can allow a subset of actors attending such key meetings to take the opportunity to drive the discussions with partners. Priorities and concept note ideas may therefore not have been developed in a participatory way (pers. comm. GIZ). Linking the identification of priorities to existing policies and plans is an effective way to reinforce their importance.

It is not unusual for donor-funded programmes to under spend in the region. Given limited absorptive capacity at the national government level, the involvement of a wider range of actors (NGOs, private sector) in the development and implementation of national priorities is vital.

The role of National Adaptation Plans and Nationally Determined Contributions in securing finance and supporting implementation. Post-Paris, the move to the development of National Adaptation Plans and the formalisation of Nationally Determined Contributions presents both opportunities and risks for countries and their development partners (GIZ, 2016). A common refrain by countries and partners is that too much attention has been given to the planning process, with insufficient attention being paid to implementation. Yet another resource intensive planning exercise could prove to be a distraction from implementation if not well managed. The National Adaptation Plan (NAP) guidelines (LDC Expert Group, 2012) allow countries to start their planning process based on national circumstances. But if resources are made available to support the development of NAPs there is considerable scope for duplication of work that has already been undertaken.

On the other hand, such processes can raise the profile and visibility of relevant priorities and can help to secure funding to address them. It is important to connect the National Adaptation Plan development process to the existing national development planning frameworks and /or climate change and disaster risk management policies and plans. There is also not strong evidence to suggest that the existence of a plan in and of itself supports greater access to finance.

Financing disaster risk management. The vast majority of disaster financing is spent on response and recovery. There is a wealth of evidence that makes the case for increased finance for DRR and for disaster preparedness in order to reduce the overall impact of events and the overall damages and losses incurred (Clarke and Dercon, 2016). Most countries also have emergency or contingency budget lines that are used to finance post-disaster responses that are still

¹⁰ e.g. the USAID-Adapt-PIFS-SPREP Climate Finance workshop (2014) and GCF workshops (2015, 2016) held specific bilateral country sessions.

needed. The management of these national funds could be strengthened to ensure they are fit for purpose, including the harmonisation of different post-disaster funds and insurance payouts, and strengthening processes for disbursement (Government of Tonga and UNDP, 2015).

Public Financial Management and Governance. Strengthening national public financial management systems, as well as aid coordination, is an important way to improve a country's ability to access and manage climate change and disaster risk reduction finance. The Cook Islands, which is well advanced with its public financial management reforms and aid coordination systems, was also the first Pacific Island Country to access direct readiness support (GCF, 2016). Climate change ministries and divisions, NDMOs and line ministries are increasingly recognising the importance of improving public financial management systems, and ensuring that finance be channelled through national ministries of finance where it can be tracked and reported (GIZ, 2015).

A review of the recently completed Climate Public Expenditure and Institutional Reviews highlighted that most additional climate finance is currently being disbursed outside the national budget process. This is partly because funds are more visible and it is easier to demonstrate their additionality. But such a situation undermines efforts to integrate climate change considerations into national planning and budgeting systems (UNDP, 2015a). Strengthening the links between existing public financial management roadmaps and reforms, aid coordination platforms and climate change finance, will support a coherent government and partner response to climate change.

Other financial instruments. Insurance instruments are being trialled in the Pacific – modelled on experiences from the Caribbean. Current payouts are small relative to financing needs post-disaster, but are designed to provide an immediate injection of funding based on a parametric trigger to support government operations in the aftermath of an event (GFDRR, 2015). The insurance currently covers only the damage from cyclones and earthquakes. However, the modelling is being revamped to include climate change parameters.

There are also opportunities for leveraging private sector finance through the appropriate enabling environment, for example tax concessions on donations post-disaster. Making credit more easily available can also assist the private sector to recover as quickly as possible, post-disaster. In Fiji, following TC Winston, hardware supply stores and infrastructure suppliers emptied their stocks within a few weeks and could not restock immediately. This was because many of the initial purchases were provided on credit, requiring companies to secure loans to bring in more stock (pers. comm. Midlink). Six months of hardware supplies are still inadequate to meet the reconstruction needs.

Key Messages for MFAT: Increased access to, and effective use of climate and disaster finance

There is a need 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 PICs, through various awareness-raising initiatives and targeted opportunities for relevant officials to learn to use the available information hands-on. Several new climate-finance readiness programmes in the region are commencing in 2016/2017 and it is anticipated that this will be a key priority for them.

There is also a need to complete climate change finance and related assessments for FSM, Palau, Kiribati, Solomon Islands, Tuvalu and PNG, with a focus on their current and potential ability to access and manage climate change resources. These and all other PICs need to develop plans that identify 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 PICs that wish to seek National Implementing Entity accreditation, their national plans should also define the assistance they need in order to complete the steps to being 'climate ready' and secure accreditation. Again, the dedicated climate-finance readiness programmes are likely to provide support in this space.

In line with the aid effectiveness agenda, MFAT should continue to increase the use of the national budgets as a critical way to support governments to prioritise and allocate resources at the national level.

MFAT may wish to consider:

- Where this is not already being undertaken, supporting work 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, and support targeted opportunities for relevant officials to learn to use this information hands-on;
- Where this is not already being undertaken, supporting relevant PICs to develop plans that identify 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 those PICs that wish to seek National Implementing Entity accreditation, ensure their national plans also define the assistance they require in order to complete the steps to being 'climate ready' and secure accreditation;
- Using the findings of individual country-level Climate Public Expenditure and Institutional Reviews, Climate Finance Assessments and Risk Governance Assessments to inform identification of specific support that could be provided to countries;

- Working with relevant regional organisations as well as with countries to improve the link between planning and budgetary processes, in addition to strengthening public financial management systems, to move from project to programmatic funding, and to encourage outcome- versus input-based budgeting processes;
- Increasing the use of national recruitment and procurement systems and budgets to channel climate and disaster funding to countries;
- Utilising MFAT support provided to strengthening public financial management processes to include strengthening climate and disaster finance processes and institutional arrangements; and
- Support mechanisms that provide credit to the private sector post-disaster.

B. Ensuring effective and efficient use of funding

The multitude of financing options necessitates strong coordination mechanisms at the national level so that duplication of effort is avoided.

This requires the strengthening of financial processes to ensure that funding received by the Ministry of Finance can be disseminated quickly. Delays in transferring funds to the implementing line ministries have historically led to calls from line ministries to bypass their own Ministry of Finance and channel project funding direct to them. Increased engagement by Ministries of Finance and Planning in climate and disaster finance processes are supporting a more coherent national approach to climate and disaster financing that is integrated with development financing more broadly.

Countries are developing their aid policies and strengthening their internal coordination processes through specific governance bodies such as the Vanuatu National Advisory Board (see above), and improved aid coordination processes. Increasingly governments are driving development partner coordination and actively directing partner resources (pers. comm. UNDP). The Kiribati National Expert Group and the Tuvalu National Advisory Council on Climate Change (NACCC) are relatively newly revamped institutional arrangements and currently rely on strong individuals to lead those coordination mechanisms. In both countries aid coordination systems are weak and efforts to strengthen aid coordination mechanisms in Tuvalu, including the development of an aid coordination database management system, were largely unsuccessful (pers. comm. GIZ).

Existing mechanisms for development partner coordination, such as the Suva-based Development Partners for Climate Change, tend to be information sharing forums and informal, rather than opportunities for exploring proactively opportunities for joint programming. The absence of strong coordination mechanisms leads to many examples of duplication of effort as governments, rationally, approach several partners with the same suggested interventions and priorities in the hope of receiving support from at least one partner. Strong leadership is required within countries, to champion establishment and implementation of clearly defined policies, priorities, plans and programmes.

Climate change and disaster risk management have not yet been fully mainstreamed into existing government-partner coordination systems, such as donor roundtables that meet in the context of national development planning processes. Such processes represent an opportunity to mainstream risk reduction measures into all development activities, nationally and sub-nationally, in a “development first” approach. Allocating time to discuss these priorities during existing donor roundtables is more efficient than creating standalone climate change and disaster risk financing discussions that take place outside of these processes.

A number of examples of government-led development partner coordination and joint programming exist – such as the Choiseul Integrated Climate Change Adaptation Programme and the ‘Whole of Island’ approach in Kiribati – but detailed evaluations of these efforts have not yet taken place. The ‘Whole of Island’ approach, which has been trialled in Abaiang and is driven by the Kiribati National Expert Group, seems to have gained traction internally and appears to have strong national government ownership (pers. comm. SPC). The Government is supporting the roll out of this approach to other islands. It could usefully be evaluated as a mechanism for increased development partner coordination and alignment to local level development planning processes.

Key Messages for MFAT: Increased access to, and effective use of climate and disaster finance

Enhanced coordination of activities and strengthened delivery mechanisms at the national, sub-national and local level must be nationally-led. Support in this area requires a tailored country-by-country approach. MFAT has increased efforts over recent years to improve coordination with other development partners (e.g. with the European Union) and is in a unique position to drive further coordination, including through the present research project. This could include the proposed joint dialogue with Australia’s DFAT. That Department is currently undertaking a study with similar objectives and intended outcomes.

MFAT should identify and evaluate additional opportunities for joint programming with other development partners, including identification of areas of mutual interest and potential synergies, as well as possible duplication that should be avoided.

MFAT may wish to consider:

- Encouraging and supporting countries to drive coordination efforts from within, by using a tailored country by country approach;
- Identifying opportunities to strengthen partnerships and joint programming with other partners – particularly as Australia’s DFAT is currently reviewing its resilience programme; and
- Establishing, desirably with other donors and development partners, a regional technical support mechanism (for resilient development), building on experience with the Pacific Regional Infrastructure Facility, and learning

from limitations with the effectiveness of the Regional Technical Support Mechanism.

3.9 Resilient development investment opportunities planned and prioritised

A wealth of national, sub-national and local level planning exercises have identified many actions that should be taken to improve resilience. Given constrained resources, prioritising the large number of potential opportunities to strengthen resilience is an essential part of the resilient development process. Prioritisation results should inform both national level budget submissions and proposals for external finance.

However, identification of key priorities should only ever be seen as an initial step in the project preparation and management process. Within monitoring and evaluation frameworks, development partner indicators often refer to “number of plans developed” and “number of policies endorsed”, for example. The drive to quantify indicators, and thus to be able to measure progress, means that indicators often fail to capture meaningful change. The evaluation of the SPC-GIZ CCCPIR programme noted that, despite the programme results model having indicators which referred to implementation of policies and plans, little evidence had been documented on the progress of implementation (SPC, 2015a).

Processes used to prioritise interventions are often weak. Most governments have project proposal templates which ask proponents to provide details of the rationale, costs and benefits of the programme. Ministries of Finance regularly complain that insufficient useful information is provided to them by line ministries to facilitate the decision making process (PIFS et al., 2014). Uncertainty regarding the degree of climate change impacts likely to be experienced, and their precise timing, complicates the decision-making landscape.

Cost-benefit analysis is the traditional tool used as part of government decision-making and development partner processes to support a greater understanding of the costs and benefits of an intervention. Efforts to strengthen skills to conduct and manage cost benefit processes (Buncle, 2013) have been fragmented. They have not been integrated into nationally and regionally available training programmes in order to enhance their sustainability.

Cost benefit analysis is more applicable for routine large-scale investment decisions (e.g. see Hay, 2014), and even then should only be used as an aid to the decision-making process. In such cases efforts should be made to support national level capacity development as part of the process of conducting a cost benefit analysis.

The more unusual and less routine the decision-making context the more difficult and challenging the use of cost benefit analysis tends to be. In many cases a full cost benefit analysis will not be possible or even desirable. However,

a simplified qualitative cost benefit analysis framework can be applied as part of a rapid assessment. It will often identify factors (costs and benefits) that may otherwise have been overlooked (pers. comm. SPREP).

Multi-criteria analysis (MCA) is less time-intensive than cost benefit analysis and is often used as part of various prioritisation exercises. The development of national infrastructure investment strategies supported by the Pacific Regional Infrastructure Facility used multi-criteria analysis extensively. The Coastal Community Adaptation Project (USAID, 2014) developed an infrastructure prioritisation index to support the identification and prioritisation of climate-resilient infrastructure.

Other tools, such as Real Options Analysis and Portfolio Analysis, can be used to account for uncertainty. As yet they have not been widely applied in the region. In recognising the importance of the social and political context within which adaptation and risk reduction takes place, adaptive management techniques and social network analysis have also been identified as key decision-support tools. (Watkiss et al., 2013).

At the local level, integrated vulnerability assessments have been used to identify priority actions, for example, the integrated vulnerability assessment used as part of the 'Whole of Island' approach (Government of Kiribati/SPC/SPREP/GIZ 2014). Most development partners have their own guidelines for conducting vulnerability assessments (e.g. CARE International, 2009; IFRC, 2012). Combining the results from these assessments for use as part of prioritisation exercises can be challenging when seeking an overview of vulnerability for a community or other locality.

The Department of Local Authorities in Vanuatu has led a process to develop their own guidelines for conducting vulnerability assessments and is requiring that partners use these guidelines when gathering information as part of community level assessments. This should give local governments in Vanuatu a greater ability to produce comparative analyses of needs across different communities.

Increased involvement of statistics departments in supporting the collection and management of data and information collected as part of vulnerability assessments can facilitate their utilisation across all government ministries as part of their own programming. This can also strengthen links to relevant information held by statistics departments and gathered, for example, as part of national censuses and household income and expenditure surveys.

Many of the approaches discussed above often fail to adequately capture the contribution of ecosystems and the natural environment to resilience. The case for investing in ecosystem and nature-based approaches to climate change adaptation and disaster risk reduction has been made (IIED, 2016). Healthy coral reefs provide storm surge protection and reduce the damage associated with extreme events (Ferrario et al., 2014). Healthy forests support the retention of soil, reduce soil nutrient loss and improve downstream water quality and

agricultural productivity. The economic case for reforestation and improved land use planning as an important adaptation strategy has been identified through individual case studies (Brown et al., 2014) and should be expanded to assess national level contributions of ecosystem services to resilience.

Environmental degradation in the region is increasing (SPREP, 2012). Efforts to promote resilient development must recognise the need to increase resources to maintain and enhance the ecosystem services that nature provides (pers. comm. IUCN). Failure to account for the importance of nature-based solutions will lead to missed opportunities to promote cost-effective resilient development.

Key Messages for MFAT: Resilient development investment opportunities planned and prioritised

Increased support for the process of prioritisation and selection of adaption and other risk reduction options is required. This 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. Decision support tools such as those reviewed above, and provided as a result of the current research (Hay et al., 2016a), are essential to avoid ineffective use of resources, and even maladaptation¹¹ They also help to increase the inclusivity of the prioritisation process. In the consideration of adaptation and risk reduction options, nature-based solutions should be given more prominence.

MFAT may wish to consider:

- Supporting capacity building for utilising decision-support tools, through existing programmes, as well as evidence-based decision-making processes and increasing technical knowledge about the full spectrum of CCA and DRR responses, and not just physical structures and the like;
- Involving national and sub-national stakeholders fully in exercises to prioritise adaptation and other risk reduction investments in order to promote capacity development as well as deliver effective resilient development outcomes – this should be reflected in all Terms of Reference for technical expertise procured through MFAT; and
- Increasing support for nature conservation and ecosystem based approaches as cost-effective adaptation and risk reduction measures.

3.10 Knowledge management and learning well established

Over the past two decades there has been an increase in the number of initiatives to support climate change adaptation, disaster risk reduction and resilient development. Learning from these experiences is of vital importance in achieving resilient development in the future. Improvements in information technology

¹¹ Actions that may lead to increased risk of adverse climate-related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future. [Source: FRDP]

and information sharing platforms has increased the volume of data and other information available to support decision makers, programme managers, policy makers and other stakeholders.

Making this information and knowledge accessible and useful for stakeholders requires a comprehensive understanding of the underlying processes through which information is accessed and used. It has often been assumed that making information available would translate into increased use of such information to inform decision-making. Information has to not only be produced, but it must be discoverable (people have to know it exists), accessible (people have to be able to access it) and usable (it must be in a format that decision-makers can easily use) (Griffith University and SPREP, 2016a; Griffith University and SPREP, 2016b). Insufficient understanding of the role of information and knowledge managers and brokers (UNISDR, 2013) has often led to inadequate investment in information and knowledge management systems that support knowledge sharing and uptake.

Tools used in market research must increasingly be used to better understand user needs and evaluate client satisfaction with current approaches to information dissemination. This includes increasing efforts to understand how individuals, organisations and networks learn, and how information and knowledge is used to change behaviours and adjust processes and systems.

Supporting national and local actors to document their own learning must become an increasing focus of projects. Lessons learned products are often produced through one-off workshops, and written up as reports. Learning and sharing should be seen as integral and continual processes, and planned from the outset to identify the best media through which knowledge and learning should be shared with target users. Monitoring, evaluation and learning frameworks should help to support these nationally-led processes.

Many projects employ communications staff, but their focus is often on donor visibility rather than promoting knowledge creation and sharing with end users. Formal evaluations of projects are seen as meeting requirements, rather than embraced as opportunities to learn about what works and what doesn't.

The in-built incentives within evaluations often don't support their use as learning exercises. Project staff and evaluators are encouraged to demonstrate results and evidence. Future funding may often be tied to the results of evaluations, further reducing their value as learning exercises. The Global Climate Change Adaptation project implemented by the Pacific Community (PREA, 2016) used the opportunity provided by their evaluation to share preliminary results of the evaluation with relevant stakeholders as part of a roadshow. The project team used videos to disseminate project information and lessons learnt relevant to the Pacific context, with videos being screened on the Pacific Way programme greatly extending the reach of the project. The national and regional lessons learnt workshops, and the lessons learnt roadshows were a useful means to disseminate project successes and lessons to key national and regional stakeholders, including regional organisations and other development

partners (PREA, 2016). Such efforts to ensure evaluation results are made accessible should be built into all CCA and DRR projects.

Links between CCA and DRR projects and formal academic research processes and institutions are often weak. Increased participation of students in projects would support the learning process.

Currently, considerable learning is happening within research groups and through research projects. Learning is thus occurring – but to maximise the uptake of this learning, the process of learning needs to be inclusive. National and local decision makers must be involved in participatory action-based research to ensure that knowledge and learning is retained by key actors.

Key Messages for MFAT: Knowledge management and learning well established

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 the climate change adaptation, disaster risk management and development processes. Learning exercises should be conducted jointly with national level partners, in order to maximise their usefulness.

MFAT may wish to consider:

- Undertaking user needs exercises internally within MFAT, involving both posts and countries; these should be undertaken to understand how and in what format stakeholders working in key sector-based programmes need and use climate and disaster risk information and knowledge;
- That learning should be recognised as a core development process and embedded within projects and programmes from the outset;
- That evaluation processes should be recognised as valuable learning opportunities;
- Appropriate incentives for those conducting evaluations, so that lessons can also be learnt from less successful interventions and programmes;
- Innovative ways of sharing information and knowledge, with these being supported as appropriate; and
- Sharing and discussing the results of the current research with countries and other donors and development partners, in order to maximise its usefulness.

3.11 Humanitarian actions for disaster prevention, response and recovery are effective

Responses to Tropical Cyclone (TC) Pam revealed lessons about how the structures of local communities and governments could be overwhelmed by an international system that, despite best intentions, does not adapt itself to provide effective support in local contexts. TC Pam also highlighted ongoing capacity constraints in local NDMOs. Addressing these gaps requires sustained support from international and regional organisations. Long-term relationships of trust

and cooperation between partners were highlighted as critical for effective response.

Global consultations related to the recent World Humanitarian Summit highlighted both needs and opportunities to improve disaster response, including by:

- shifting away from providing hand-outs and moving towards empowering affected people and engaging them in decision-making, with a special focus on the empowerment of women and the support of small and medium enterprises, including making sure they are resilient;
- improving cash transfers after a crisis, thereby giving affected people greater choice;
- ensuring the banking sector recovers quickly after a disaster;
- keeping people safe from violence and abuse;
- cooperating with the private sector in conflict-related and protracted emergencies;
- building trust and reliability; and
- addressing the growing gap between needs and resources (UNOCHA, 2015).

Regional consultations in the Pacific, in advance of the World Humanitarian Summit, resulted in several key issues being identified, including:

- **Placing affected people at the centre of humanitarian action** – there are many examples in the Pacific islands region where responses have failed to account for the specific local requirements;
- **Recognise local needs** - recognise the unique needs of communities and individuals, including children, older people and people with disabilities; a lack of information on specific needs means that all too often responses ended up being “one-size fits all”;
- **Build on Strengths** – communities, civil society groups and governments are the first responders in disasters, and remain when any surge of additional assistance wanes; new technology has provided the opportunity to enhance the involvement of remote communities in response and recovery;
- **Responding to displacement** – forced displacement and voluntary and planned relocation are already taking place in the Pacific Islands region, particularly in the context of disasters and the effects of climate change, but also related to inter-community conflicts and violence; customary and ancestral land rights are key to helping people move to new locations peacefully and sustainably;
- **Collaborating for resilience** – existing agreements, including the FRDP and the Sendai Framework for Disaster Risk Reduction, provide opportunities for collaboration, although further work is needed at the national level to implement these agreements; communities, and particularly women, must be empowered to support resilience building; more needs to be done to safeguard vulnerable groups;
- **Financing for preparedness, response and early recovery** – there is overwhelming evidence that funding is skewed towards disaster response, rather than preparedness and risk reduction, despite a recognition that

investing in preparedness and risk reduction pay dividends; this was demonstrated by the experience of Vanuatu in the wake of TC Pam;

- **Improving reporting** – reporting all sources and destinations of financing for disaster preparedness and response will help to increase accountability to affected people and also assist aid providers to better target their funding;
- **Partnering with the private sector** – small and medium-sized enterprises are of immense importance in the Pacific; preparedness through business continuity planning, particularly for those businesses that provide essential services, is critical to the effectiveness of a disaster response; there is a need to develop protocols for engagement between governments, civil society and the private sector;
- **Increasing community involvement in disaster preparedness and response** by organising regular disaster simulation exercises at the local level. These simulations can be used to clarify roles and responsibilities and explain what to expect in the event of a major disaster; simulations can also help to identify critical gaps in the community that could be addressed through better training, pre-positioning of supplies and equipment or building infrastructure, such as multipurpose emergency shelters;
- **Using faith-based organisations** – it is important to make full use of these strong existing networks as they are a critical part of a response, especially in instances of low capacity of local government; but in some cases they are not perceived to provide aid impartially, predominantly supporting their own communities. If governments and humanitarian organizations are to work through local organisations, they have to commit to respecting key humanitarian principles and standards, particularly around the impartial distribution of aid; and
- **Data and other information** – there is a need for more and relevant data and other information, including disaggregated data and the results of using scientific and economic models to support Pacific humanitarian action and decision making (WHS, 2015).

All too often, those that are marginalised in society, as a result of their social status, the tenure of their land, or their gender, struggle to access the necessary humanitarian support post-disaster. Persons with disabilities often do not have adequate access to basic assistance such as water, shelter, food or health. In addition, the specific services persons with disabilities may need, such as rehabilitation, assistive devices, access to social workers or interpreters are often not available to persons with disabilities, further impeding their access to mainstream assistance.

Women, children and persons with disabilities are more vulnerable in times of crisis. Often these persons are not properly taken into account in humanitarian response. Evacuation centres may not be safe and secure spaces for women and children. Some of the main barriers preventing persons with disabilities from obtaining aid in crisis contexts are linked to the lack of accessible information on those services, and the difficulty in accessing the services themselves, including lack of physical or financial access, lack of staff trained in disability, or distance from the services.

While efforts are being made to address these issues, there are still significant challenges in making such assistance truly inclusive, because of such constraints as insufficient consultation of persons with disabilities, lack of technical expertise on disability, and financial obstacles. Support post TC Winston for women's safe spaces was recognised as important in addressing women's specific needs as part of the response.

While most humanitarian actors pledge to target vulnerable persons in time of crisis, few of them are putting in place specific mechanisms and procedures to effectively reach, and take into account, persons with disabilities in their programs. Addressing these challenges is a human rights imperative. It is also simply about effective implementation of principled humanitarian aid. This ambition requires changes in policies and practices within the humanitarian community as a whole (Handicap International Federation, 2015).

Key Messages for MFAT: Humanitarian actions for disaster prevention, response and recovery are effective

National governments, working jointly with communities and humanitarian partners, need to strengthen their engagement with traditional structures and community networks, to more effectively communicate knowledge in both urban and rural communities. With only limited post-disaster follow-up capacity available from central governments, it is critical that projects involve sub-national governments, NGOs and faith based organisation networks. Simulation exercises can help increase understanding of informal response structures, clarify responsibilities in the event that national or international support is required and address critical gaps. It is important for central governments to provide stable, long-term support, even if that support is modest. Several projects in PNG had initially shown progress, but faded away without local buy-in when external support was shifted to a new project.

There is 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 need to work with local governments and NGOs 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, or information from local businesses or community groups.

Improved data on vulnerability can be used to make both risk management and disaster response planning more targeted to local needs. Governments and their development partners should collaborate to raise awareness about DRR and preparedness in communities, building on traditional approaches. This could be done by including DRR in education curricula at all levels, as well as by working with faith-based groups, private businesses and other parts of the community.

Governments and their humanitarian partners need to strengthen two-way communication with communities, not only to provide accountability, but so they

can provide feedback as well as communicating their own humanitarian needs to responders. Humanitarian partners should place protection at the centre of all activities, with particular attention to vulnerable members of the community including women's safety, dignity and security, before, during and in the wake of crises.

MFAT may wish to:

- Make greater efforts to ensure its approaches are fit for context and scale of disasters and build on existing national and sub-national governance structures;
- Work together with other development and humanitarian partners in advance of a crisis, to ensure assistance is harmonised and delivered with appropriate restraint and in support of national and local coordination mechanisms, and does not add to their burden during crises;
- Mainstream displaced persons' special protection needs, including those related to gender, age and disability, into humanitarian programming;
- Work with Governments and other international partners to strengthen national, provincial and local capacities, and support communities to be better prepared for displacement, including DRR measures against adverse effects in host communities;
- Invest in the implementation of FRDP and Sendai Framework, and ensure that communities, and women in particular, are involved from the start in the design and implementation of initiatives to achieve FRDP and Sendai outcomes;
- Work with Governments to establish and adopt national benchmarks for investment in all phases of the disaster risk cycle;
- Initiate multi-year predictable funding for national disaster management offices and local organisations – particularly women's organisations – to build greater capacity to plan for and respond to disasters; and
- Identify and exploit opportunities to strengthen partnerships between New Zealand businesses and their counterparts in the Pacific, with regard to planning for, responding to, and recovering from disasters.

3.12 Strong coordination and cooperation

Taking action to address climate change and improve disaster resilience are key priorities for the Pacific islands region. Pacific Leaders have stressed that climate change is the greatest threat facing the region. In 2015, Forum Leaders identified climate change as one of five regional priorities under the Framework for Pacific Regionalism. In 2016 Leaders emphasised the importance of immediate, significant and coordinated practical action to address climate change and disaster risk management.

Regional cooperation helps address many of the climate challenges facing PICTs, and enhance the ongoing national effort to implement ambitious climate change actions. Regional cooperation has a role in increasing technical cooperation, ensuring progress to achieve SDGs is resilient, and helping raise climate

ambitions by tapping into sub-national networks including urban areas, the private sector and civil society (UNESCAP, 2016).

The EU's Regional Steering Committee for the Pacific provides an appropriate example of a mechanism that promotes regional coordination and cooperation. The Committee brings together high-level representatives from 15 PICs, regional organisations and overseas countries and territories. It is co-chaired by the EU and PIFS. The Committee provides strategic guidance to ensure that the Euro 166 million allocated under the European Development Fund 11 cycle responds effectively to the challenges faced by the people of the Pacific, with an emphasis on coherence of regional support with national programmes. It also provides an opportunity for open and frank discussions between all stakeholders on opportunities as well as issues and challenges with regard to Pacific's regional programmes under the European Development Fund. Examples of the consortia established under the Committee are:

- Regional Economic Integration (Trade Integration & Private Sector), led by PIFS and SPC);
- Fisheries and Marine Coastal Ecosystem led by FFA;
- Waste Management led by SPREP;
- Public Financial Management, Data and Statistics led by PIFS; and
- Human Rights, Gender and Civil Society Engagement led by SPC.

Pacific Leaders and their Ministers have made a series of political decisions in support of a range of climate change, disaster reduction and development-related international, regional and multilateral agreements. Similarly, specific calls for improved coordination and cooperation have occurred following several disasters resulting from natural hazard and climate change related risk events that have had multiple country and regional impacts.

These and related initiatives align with regional efforts to achieve cross-cutting commitments. The needs identified include improved coordination and cooperation in climate change and disaster risk management, improving access to adequate global climate change and disaster financing instruments, and supporting regional and international agreements for climate change, disaster risk management and overall sustainable development.

In their most recent meetings¹², Forum Foreign Ministers have identified opportunities for supportive regional responses to strengthen national leadership to manage climate change and natural hazards. Their discussions are consistent with the Framework for Pacific Regionalism, including the need to shape the regional political agenda through a greater focus on topics that require genuine regional action and integration.

In their July 2015 meeting Ministers of Foreign Affairs reaffirmed the need to continue and enhance collaboration on disaster management arrangements

¹² Sydney, Australia, 10 July, 2015 and Suva, Fiji, 12 August, 2016.

including telecommunications, transportation and early warning systems as well as expand measures that would promote faster and better coordinated responses to events in the region.

There is an increasing need for strengthening cooperation and coordination among the Council of the Regional Organisations in the Pacific (CROP) agencies and development partners, to ensure a common purpose in planning, funding and implementation in support of achieving regional and national outcomes that are resilient and sustainable (PIFS, 2016). To date there has been insufficient guidance on the governance and institutional frameworks needed to ensure CROP and other agencies and partner organisations cooperate and collaborate to support countries and territories in their efforts to increase the resilience of development outcomes.

This guidance on frameworks, and how supporting initiatives could be undertaken in a coordinated way, is now formalised in the Framework for Resilient Development in the Pacific (FRDP). In September, 2016 the Framework was endorsed by Pacific Leaders. They recognised its potential to support coordination and action on a number of key issues related to climate change and disaster risk management.

The FRDP is a voluntary, non-political framework. As such, it does not replace the role of existing regional political statements or declarations on climate change and disaster risk management. Thus Leaders agreed that the Pohnpei Statement: Strengthening Pacific Resilience to Climate Change and Disaster Risk would complement the FRDP. That Statement incorporates several principles related to coordination and cooperation, including:

- Recognition that in addition to national governments and development partners, effective action will also come from the private sector, technical and educational institutions, and civil society;
- Coordinated implementation of the FRDP will involve working across local, national, regional and international agencies to ensure a more resilient Pacific;
- Disaster response and early recovery should be nationally-led and supported by regional and international efforts;
- Recognition that, in line with the Framework for Pacific Regionalism, effective action to build resilience will require greater coordination and collaboration; and
- Acknowledgement that the CROP will continue to provide valuable coordination, policy advice, applied scientific and technical expertise, capacity supplementation and capacity building support for action on climate change and disaster risk management.

The FRDP is a regional policy and practice framework for the coordination and high level guidance for actions to build resilience to climate change and disasters within the context of sustainable development. Importantly, it provides opportunities for implementation of the Paris Agreement, Sendai Framework for DRR, and other multilateral meeting outcomes.

Through its key pillars of 'Strengthened Integrated Risk Reduction and Adaptation to Enhance Climate change and Disaster Resilience', 'Low Carbon Development', and 'Strengthened Disaster Preparedness, Response and Recovery' the FRDP also provides opportunities for dealing with emerging issues such as: loss and damage; the displacement of persons; improving disaster risk management coordination; and the ongoing challenge of obtaining sufficient funding for climate change and disaster risk management.

In the Pohnpei Statement, Leaders also called on all development partners, the private sector and civil society to join with PICTs to support the principles and the implementation of the Statement through high-level participation in a new Pacific Resilience Partnership (PRP). They tasked the Forum Secretariat to convene a Working Group, including Members, CROP agencies, and relevant stakeholders, to elaborate on the PRP process by December 2016, to implement the FRDP.

Partnerships can ensure that actions are well coordinated and effective, with reduced duplication and waste (PIFS, 2015c). Partnerships are vital for effectiveness and sustainability whether amongst development partners, with other governments, international organisations, within various national departments, local and provincial government, civil society organisations, the private sector, NGOs, the community and all the way to the individual.

Through better coordination and partnerships the capacity constraints in PICTs can be reduced through a combination of long-term capacity development and supplementation approaches. More targeted support for capacity could be guided more effectively by PICTs clearly defining roles and responsibilities and identifying gaps in institutional and human capacity at country level.

The PRP will bring together the disaster risk management and climate change communities of practice, along with central and CROP agencies and other partners (for example, private sector stakeholders, humanitarian and development partners, sectoral partners) to better coordinate and streamline regionally supported assistance. The PRP will therefore include a broad range of stakeholders with common interests but also with some distinct needs and capacities such as preparedness, early warning capability, engineering skills, emergency management expertise, procurement capability, and risk reduction.

The PRP could be supported as part of the implementation of the FRDP. In practical terms it could be guided by a Steering Committee that will provide strategic guidance and support and oversee an administrative Support Unit that could provide practical and ongoing support for this initiative, including technical monitoring and evaluation of the FRDP. There would also be an opportunity to link with related climate and disaster risk initiatives for capacity support through the Regional Technical Support Mechanism, the Pacific Humanitarian Team and the Pacific Islands Emergency Management Alliance.

The PRP should develop governance and institutional mechanisms designed to strengthen cooperation and coordination for the effective implementation of regional support to national climate change and disaster risk management initiatives for resilient development. It should bring together all relevant actors to build cooperation, improve collaboration and harmonise systems that support nationally-led resilience building and strengthening. The PRP could provide a mechanism for accessing the pool of Pacific-based experts to assist with activities such as nationally-led planning and response efforts, damage and loss assessments, procurement and support and advice on donor coordination and funds management.

There is also a need to increase collaboration between governments and the private sector. This includes strengthening the sector's capacity to enable effective engagement in, and participation throughout, the risk management cycle, including supporting rapid recovery process of markets, quickly re-establishing telecommunications and assisting in the provision of food and logistics.

Given the magnitude of the capacity constraints PICTs continue to experience (PASAI, 2015; Kelly, 2015), a regionally crafted coordinated response would provide the best opportunity to ensure individual countries and territories have the necessary technical and administrative skills to meet current and future climate change challenges in a timely, economical and sustainable manner. The priority is for capacity building projects that seek to develop skills in climate change adaptation planning and project implementation.

Key Messages for MFAT: Strong coordination and cooperation

Actions to improve coordination and cooperation at the regional level should be guided by the FRDP and include establishment and operation of the PRP. Initiatives should be in line with recent recommendations by Forum Leaders and Foreign and Finance Ministers – these called for greater coordination and collaboration, including all development partners, the private sector and civil society joining with PICTs through high-level participation in the new PRP.

MFAT may wish to consider:

- Contributing to the Working Group convened by the Forum Secretariat and tasked to elaborate on the Pacific Resilience Partnership process;
- Building on the success of the renewable energy roadmap process by supporting preparation of national resilient development investment roadmaps covering such themes as atoll water security, coastal protection, coastal fisheries, oceanic fisheries, longer-term atoll and island habitability, and sustainable transport; and
- facilitating a regionally crafted coordinated response for capacity building that develops skills in climate change adaptation planning and project implementation.

4. Summary and Conclusions

This report provides a comprehensive response to the following research question:

Within a development context, what are the relevant needs and priorities associated with climate change and disaster risk reduction that MFAT needs to consider?

The research and analysis identified 12 success factors for effective management of climate and disaster risks, and for increasing the resilience of development outcomes. Urgent, comprehensive, collective and sustained actions are needed to ensure that every PICT will soon be appropriately close to achieving such results. Addressing the underlying determinants of vulnerability and improving the effectiveness of humanitarian actions are also seen as priorities. The imperative for such actions is highlighted by the recent and projected environment and development trajectories for the Pacific, as documented in the present report.

The 12 success factors cover a wide range. All are encompassed by the need to focus on resilient development, by taking a “development first” approach rather than the more conventional “risk first” approach. Such a transition needs to be underpinned by the production and use of risk-informed products and services, as well as greater emphasis on localising adaptation and disaster risk management.

Ready access to adequate climate and disaster finance is a major challenge, as is the ability to use such resources in an effective manner. This will be helped by giving more attention to prioritising resilient development and related investments as well as to increasing the involvement of the private sector.

Substantive progress will be possible only if individuals have the requisite knowledge and skills. Education and training institutions must build such capacity where gaps exist. Institutional arrangements and capacities must be capable of supporting and sustaining efforts that focus on resilient development. Collectively, this will require more attention being given to knowledge creation, management and learning.

The capacity constraints faced by PICTs can be reduced through better coordination and more productive partnerships. This can be by way of a combination of long-term capacity development and supplementation approaches. Partnerships can also help ensure actions are well coordinated and effective, with reduced duplication and greater sustainability.

As well as managing the immediately foreseeable risks to development gains, more strategic thinking and approaches are required to address the challenges atolls and low-lying areas of higher islands will face in the coming decades. Responses should focus on managing for today as well as for the inevitable.

The next step is to consider the efforts other development partners are making to address these evidence-based needs and priorities. This collective understanding will then be used to identify strategic priorities for MFAT to consider, for the regional generally, as well as for the Ministry's programming related to Kiribati and Tuvalu, specifically.

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Annex 1

Environment and Development Trajectories for the Pacific

Trends in Observed Weather and Climate. A recent assessment provides details of observed regional-scale trends in air temperature, rainfall, tropical cyclones and other variables over the past 30–60 years (Australian Bureau of Meteorology and CSIRO, 2014). Station-based observations show a persistent mean annual warming trend of 0.18°C 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 - once rare extremes, that used to occur approximately 20 days in a year, are now occurring much more frequently, between 45–80 days in a year. There have been significant decreases in cool days and nights.

Trends in observed annual total and extreme rainfall vary according the period analysed (McGree et al. 2013). The Interdecadal Pacific Oscillation switched to a negative phase from about 1999, largely reversing earlier rainfall changes. Thus changes in observed data over the period 1961–2011 are spatially heterogeneous and largely not statistically significant. This contrasts with changes from 1961 until around the time of the switch. These showed a general decrease at locations to the southwest of the South Pacific Convergence Zone (SPCZ) and a general increase to the northeast of the SPCZ, with the largest trends east of 160°W. On the other hand, trend analyses for 1981–2011 show wetter conditions in the West Pacific Monsoon (WPM) region and southwest of the mean SPCZ position. In the tropical North Pacific it has become wetter west of 160°E, with the Intertropical Convergence Zone (ITCZ)/WPM expanding northwards west of 140°E. Northeast of the SPCZ and in the central tropical Pacific east of about 160°E it has become drier.

Trends in the number of rain days are generally similar to those of total rainfall, with more (less) days typically associated with more (less) total rainfall. Similarly, past changes in extreme rainfall have tended to be consistent with those of total rainfall. There is a strong relationship between the El Niño–Southern Oscillation (ENSO) and total rainfall as well as for some extreme indices (McGree et al. 2013).

Sea surface temperatures have trended upwards, while the significant year-to-year variability is largely due to the ENSO. Sea levels have risen, with the Pacific Ocean experiencing rates up to four times the global average of 3.4mm/year (Figure 1). The large rates of sea level rise in the western tropical Pacific and of sea level fall in the eastern Pacific over the period 1993–2010 correspond to an increase in the strength of the trade winds in the central and eastern tropical Pacific over the same period (IPCC, 2013).

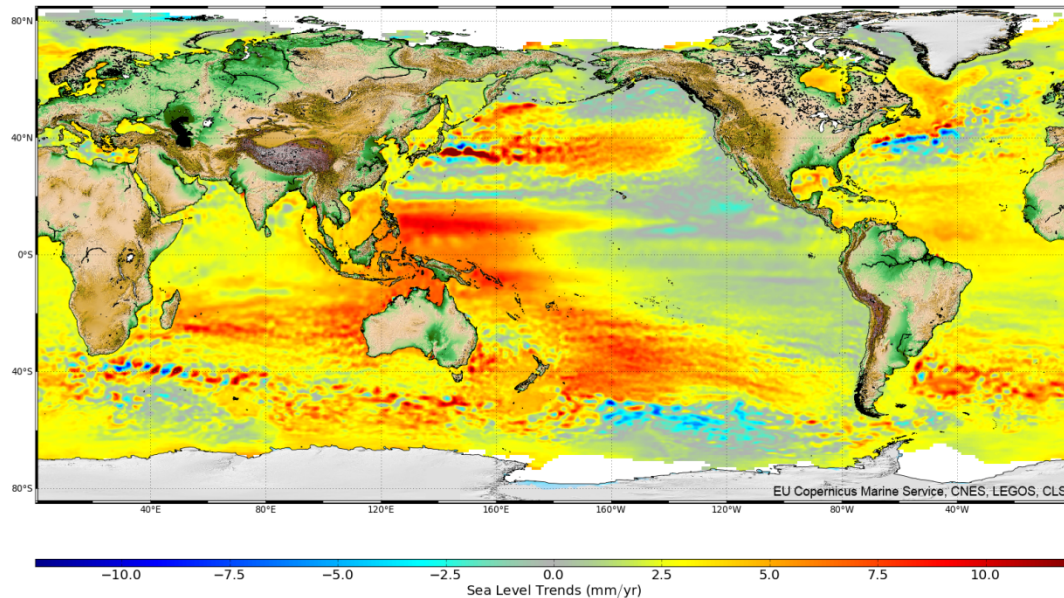


Figure 1. Regional patterns of observed sea level (in mm/year) from 1993 to 2015 (Source: EU Copernicus Marine Service, CLS, Cnes, Legos <http://www.aviso.altimetry.fr/en/data/products/ocean-indicators-products/mean-sea-level.html>).

There is evidence that in the Pacific Islands Region extreme high sea level events are increasing at a greater rate than mean sea level (Hay, 2014) as a result of a trend in the combined effects of king tides, storm surge and associated wind wave setup. On the other hand, there is no consensus on the presence of trends in the frequency or intensity of tropical cyclones in the Pacific as the reliable observational record is of insufficient length (World Bank, 2016). An updated analysis of cyclone track data for the South Pacific through to the 2010–11 season shows a slight decrease in the total number of cyclones, with little change in the number of the most intense (Australian Bureau of Meteorology and CSIRO, 2014).

Increased emissions of greenhouse gases have decreased the pH of the tropical Pacific Ocean by 0.06 pH units since the beginning of the industrial era (in the early 19th Century). The current rate of decrease is ~ 0.02 units per decade (Johnson et al., 2016). The rate of warming in coral reef areas has increased from $\sim 0.02^{\circ}\text{C}/\text{decade}$ over the past century to $0.24^{\circ}\text{C}/\text{decade}$ over recent decades (1985–2012) (Table 1). Over this period reefs were exposed to prolonged, high temperatures that caused bleaching once every six years. However, within the last three decades the frequency of bleaching stress has increased three-fold. The 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 and continues to drop (Heron et al., 2016).

Table 1

Trends in annual temperature averaged across coral reef regions of the Pacific
(Source: Heron, 2016)

Coral Reef Region	Annual temperature trend (°C/decade)		
	1880-2007	1950-2009	1985-2012
Western Pacific	0.04	0.07	0.08
Central Pacific	0.04	0.09	0.24
Eastern Pacific	0.02	0.09	0.24

Climate Projections for the Pacific. Providing credible climate change projections is problematic, and especially so for the many smaller islands of the Pacific. All projections are based on highly uncertain assumptions of future socio-economic and technological development. Thus confidence levels decrease into the future, due to uncertainties in future rates of greenhouse gas and aerosol emissions, their build up in the atmosphere, and on the resulting radiative forcing.

Projections described below are presented for four scenarios of greenhouse gases and aerosol emissions now used by the Intergovernmental Panel on Climate Change (IPCC, 2013). Called Representative Concentration Pathways (RCPs), these are RCP2.6 (very low emissions), RCP4.5 (low emissions), RCP6 (medium emissions) and RCP8.5 (very high emissions).

Global greenhouse gas emissions are currently on a trajectory that approximately matches that of RCP8.5.

Many islands in the Pacific are much smaller than the spatial resolution of the global circulation models that generate the large-scale climate projections. There may be considerable deviation at smaller scales due to island topography and other local features. A technique known as dynamical downscaling can be used to provide more spatial detail in the climate projections, but this does not guarantee increased reliability in representing the future climate. Such down-scaled projections still refer to an average change over the broad geographic region encompassing a landmass of interest and the surrounding ocean (Australian Bureau of Meteorology and CSIRO, 2014).

Australian Bureau of Meteorology and CSIRO (2014) also notes that average temperatures will likely increase by around +0.5–1.0°C, regardless of the emissions scenario. By 2090 temperatures could increase by +2.0–4.0°C under a very high emissions scenario. There will be more extremely hot days and warm nights - extreme 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.

Most GCM-based projections show increases in WPM rainfall, mostly over the wet season. They also project increases in rainfall within the ITCZ, particularly in the June to August season. The area of the ITCZ is projected to expand as rainfall

increases on the equatorward side of the ITCZ. Changes in SPCZ rainfall are uncertain as they are sensitive to sea-surface temperatures not well simulated by many models. The average position of the SPCZ is not expected to change significantly, although the years when it moves north and merges with the ITCZ will become more frequent (Australian Bureau of Meteorology and CSIRO, 2014).

More generally, average annual rainfall will increase slightly, but there is likely to be significant variation in changes in the monthly precipitation – some months are likely to be dryer and some wetter, with the 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 the historical rainfall data (1948 to 2008). However, there is considerable difference amongst climate models, making it uncertain as to the extent of change that might occur in the populated areas of Tarawa (World Bank, 2016).

Extreme rainfall events that occurred once every 20 years on average during 1986–2005 are projected to occur once every seven to ten years by 2090 under a very low emissions scenario, and every four to six years by 2090 under a very high emissions scenario (Australian Bureau of Meteorology and CSIRO, 2014). Most of the Pacific Islands Region will experience an increased probability and severity of flooding, due to increased rainfall during high rainfall events (World Bank, 2016).

Under a medium climate change scenario (RCP6), the risks of more severe drought in 2050 are small in most countries. Fiji, RMI, Palau, FSM, Vanuatu and Solomon Islands may experience a small reduction in some of the 1 in 50 year and 1 in 20 year low rainfall values, Changes in drought frequency are likely to be much more significant should more extreme climate change take place, especially for the Solomon Islands and Tuvalu and to a lesser extent Fiji, Palau and RMI. There is a small but significant chance that global warming may lead to extended periods of little or no rain, particularly in Solomon Islands and Tuvalu (World Bank, 2016).

El Niño and La Niña events will continue to occur in the future, but there is little agreement between the climate models on whether these events will change in intensity or frequency (Australian Bureau of Meteorology and CSIRO, 2014). Cai et al. (2014) suggest that through the 21st Century El Niño events will double in frequency and become more intense.

For each of the four emissions scenarios there are regional variations in projected sea-level changes for 2081–2100 relative to 1986–2005 (Australian Bureau of Meteorology and CSIRO, 2014). An example for the low emissions scenario is shown in Figure 2. The amount of regional sea-level rise is of course largest for the RCP8.5 and smallest for the RCP2.6 emissions scenario, with RCP4.5 and RCP6.0 being in between, and similar (Figure 3).

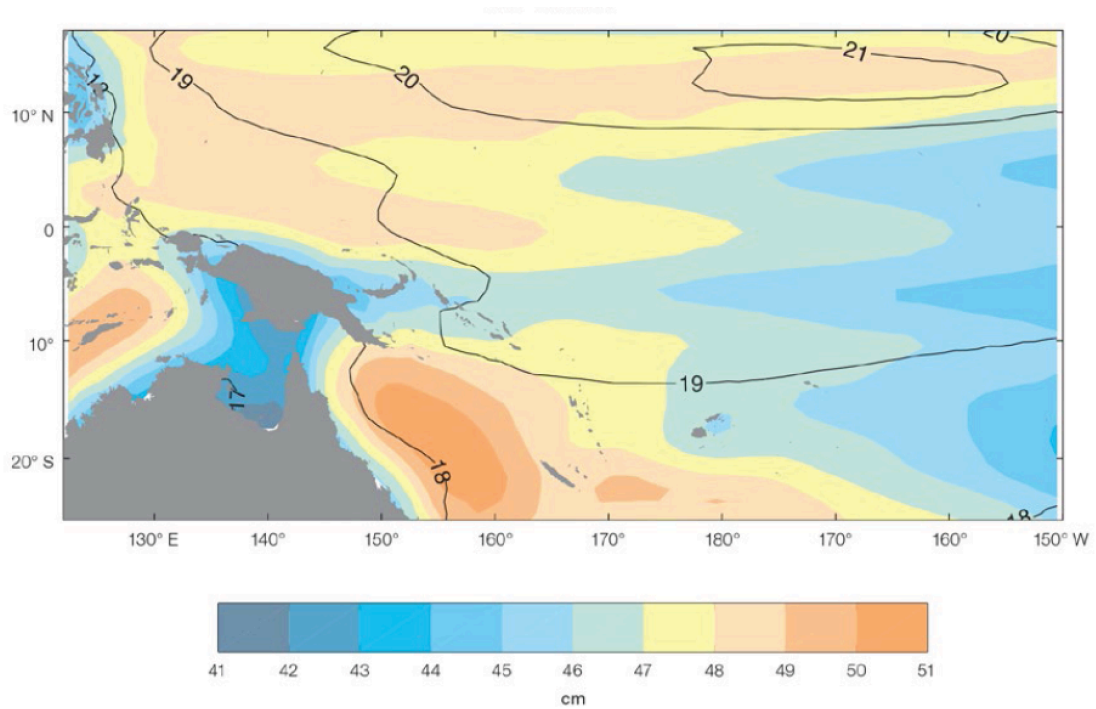


Figure 2. The regional distribution of projected sea-level rise for the period 2081–2100 relative to 1986–2005, for emissions scenario RCP4.5. The uncertainty is indicated by the contours (in centimetres). (Source: Australian Bureau of Meteorology and CSIRO, 2014).

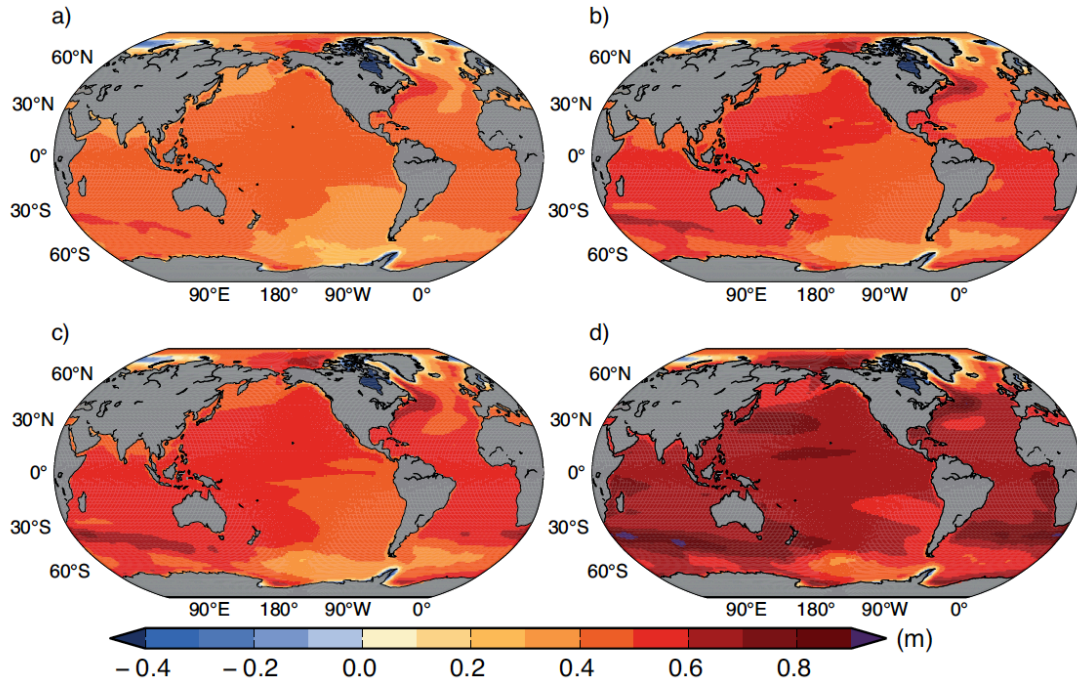


Figure 3. Ensemble mean regional relative sea level change (metres) evaluated from 21 CMIP5 models for the RCP scenarios (a) 2.6, (b) 4.5, (c) 6.0 and (d) 8.5 between 1986–2005 and 2081–2100. (Source: IPCC, 2013).

The further collapse of ice shelves, as observed on the Antarctic Peninsula, could lead to a larger 21st century rise of up to several tenths of a metre. Global average sea-level rise will be about 79 cm above average levels between 1980 and 1999 if global temperatures increase by 2°C by 2100, and by nearly 1 metre with 4°C warming (World Bank, 2012a). Many semi-empirical model projections of sea-level rise are up to about twice as high as process-based model projections, but there is no consensus in the scientific community about their reliability and there is thus low confidence in such projections (IPCC, 2014).

NOAA (2017) presents the findings of an assessment of the most up-to-date scientific literature on scientifically supported 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 m. 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 (0.3m), Intermediate-Low (0.5m), Intermediate (1.0m), Intermediate-High (1.5m), High (2.0m) and Extreme (2.5m).

Future changes in ocean pH and aragonite saturation will largely depend on the atmospheric concentration of CO₂. Based on the RCP8.5 'business-as-usual' scenario, the pH of the tropical Pacific (averaged between 15°S to 15°N and 120°E to 280°E) is projected to decrease by a further 0.15 units from the historical 1986–2005 period into the 2040–2060 period. Moreover, dramatic changes in aragonite saturation are also projected to occur (Figure 4).

These projections suggest that by mid-century the entire tropical Pacific region will have shifted to sub-optimal conditions, with aragonite saturation levels between 3 and 3.5. This represents a drop of approximately 0.6 in the tropical region, corresponding to a decline in coral calcification rate of about 10% (Johnston et al., 2016).

Saturation levels greater than 4 are considered optimal for coral calcification, while levels less than 3.5 compromise the ability of a healthy reef system to continue reef-building. Saturation levels less than 3 are considered extremely marginal for growth of corals, with no major reef systems currently found at locations with these levels (Johnston et al., 2016).

It is likely that sea surface temperatures in the Pacific Islands Region will increase faster along the Equator and at a slower rate further pole ward (Collins et al., 2010). Ocean warming will cause annual coral bleaching for almost all reefs by 2050 (Heron et al., 2016).

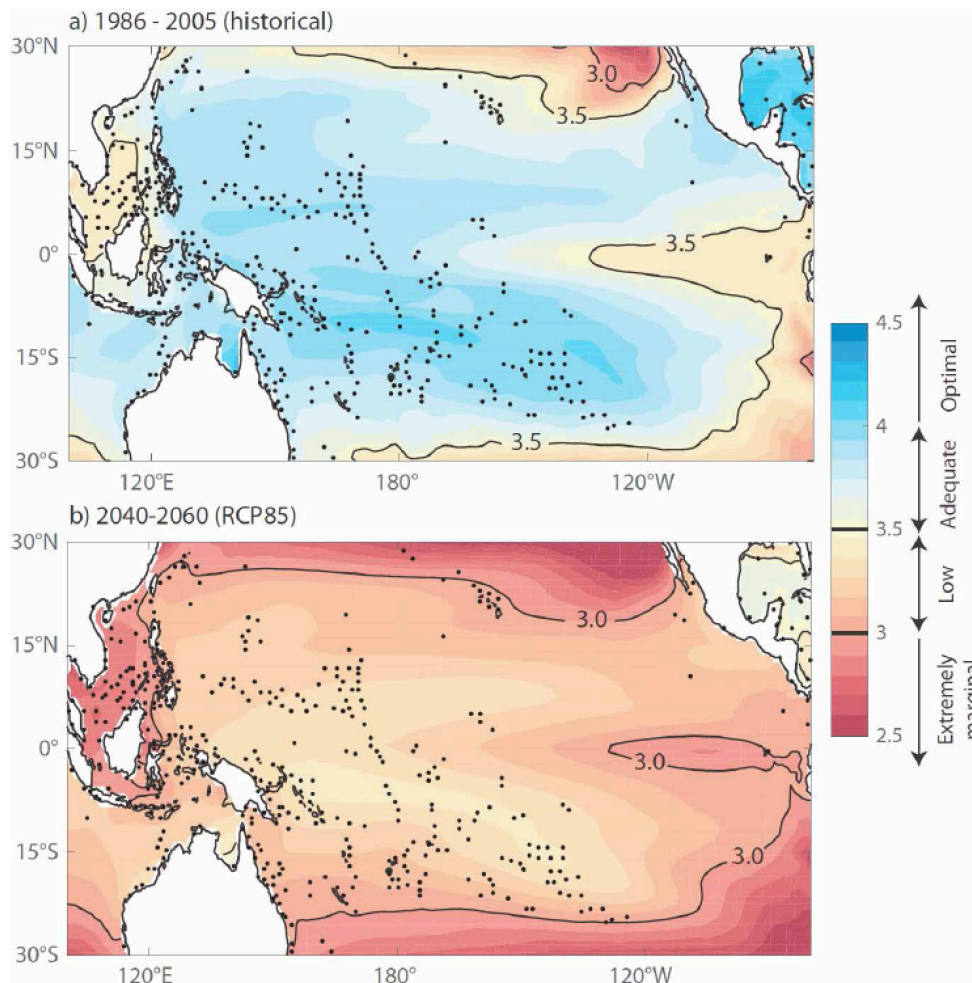


Figure 4. Aragonite saturation state for the periods (a) 1986–2005 and (b) 2040–2060 (based on RCP8.5 simulations). Contour lines of 3 and 3.5 are superimposed. Black dots indicate location of coral reefs. (Source: Johnston et al., 2016).

There are likely to be more intense tropical cyclones and associated intense rainfall in the Pacific. As the Pacific Ocean warms, cyclones could occur poleward of the current “typhoon/hurricane belt” and be more damaging. El Niño events are associated with an equator-ward shift in cyclone tracks. If El Niño like events become more frequent or more intense – as suggested by some climate models – this could result in cyclones occurring both closer to the equator and pole-ward of the current zone. This expansion in where cyclones occur in the Pacific may well be the most important foreseeable influence of a warming planet on cyclone behaviour (World Bank, 2016).

Generally, the intensity of tropical cyclones is likely to increase by 3–5 percent per 1°C rise in sea surface temperature. This forms the basis of distributing changes in cyclone intensity as expressed by the projected 1 in100 years wind speed for 2050 under historical climate, low and high-emission scenarios (Table 2).

Table 2

Estimated increases in cyclone wind intensity up to 2050
for selected Pacific Island Countries
Source: World Bank, (2016)

Country	Likely wind speed with mean return period of 100 years (Kmph sustained over 1 min)		
	Historical climate	Low emission scenario	High emission scenario
Fiji	157	162	168
FSM	154	160	166
Marshall Islands	142	149	155
Tonga	152	158	165
Vanuatu	182	190	197
Samoa	152	158	165

Significant wave heights are likely to increase in the tropical South Pacific as a result of a projected strengthening of austral winter easterly trade winds. Decreases in significant wave height are projected for the trade wind region of the North Pacific and in the regions of mid-latitude westerlies (IPCC, 2013).

Observed Frequency of Natural Disasters and Estimates for the Future.

Figure 5 presents the number of natural disasters per year that are recorded in the EM-DAT database for the Pacific Islands Region. Since the 1970s there have been significant increases in the number of disasters related to meteorological, climatological and hydrological hazards, with the greatest increase for the last. On the other hand, the number of disasters related to geophysical hazards has been relatively constant over time. However, the World Bank (2016) highlights the incomplete nature of the record, even for floods occurring since 2000.

The World Bank (2016) also notes that the dramatic increase in impacts associated with tropical cyclones in the past several decades globally is largely due to increased exposure and vulnerability, rather than an increase in intensity or frequency of cyclone and other hazards.

Table 3 shows the consequences of the more 325 natural disasters that occurred in the Pacific Islands region between 1900 and 2015. The majority of disasters are caused by severe storms, including tropical cyclones.

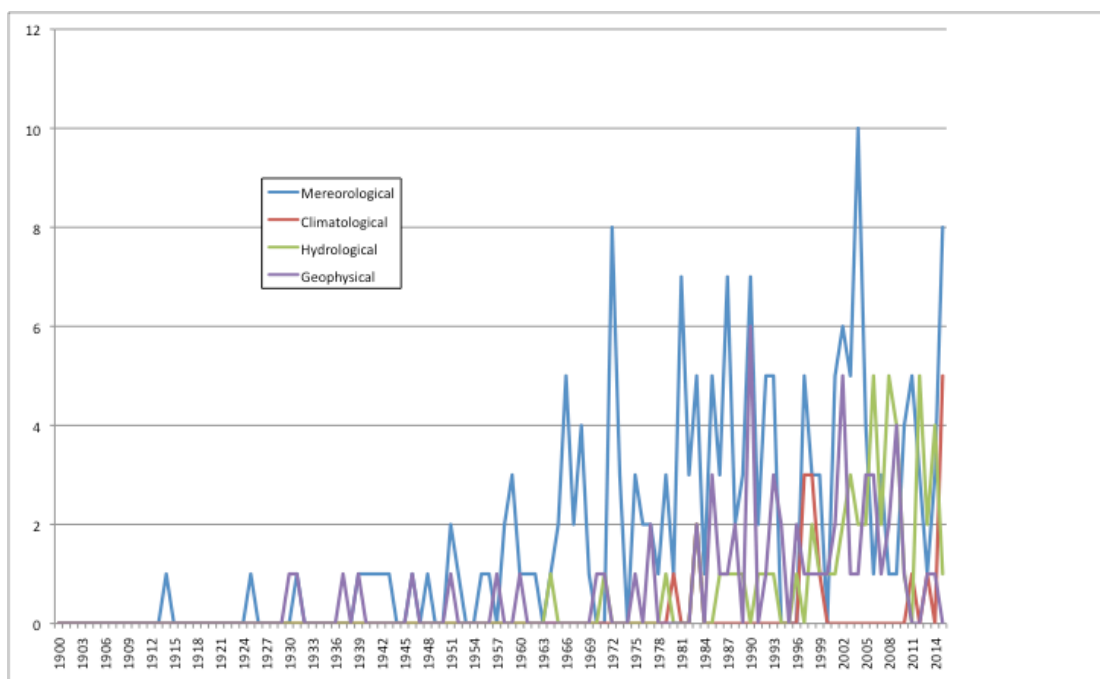


Figure 5. Number of disasters in the Pacific Islands Region, by disaster group. (Source: EM-DAT: The OFDA/CRED International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium)

Table 3

Consequences of the Natural Disasters in the Pacific Islands Region 1900 – 2015
(Source: EM-DAT: The OFDA/CRED International Disaster Database
www.emdat.be Université catholique de Louvain Brussels Belgium)

Hazard Type	Occurrences	Total deaths	Affected	Injured	Homeless	Total affected	Total damage ('000 USD)
Climatological	17	84	3,030,019			3,030,019	121,650
Geophysical	65	6,549	278,881	1,499	65,400	345,780	375,615
Hydrological	56	730	838,790	56	118,085	956,931	346,375
Meteorological	187	1,841	2,359,464	2,659	239,291	2,601,414	3,249,760
Total	325	9,204	6,507,154	4,214	422,776	6,934,144	4,093,400

Of the 20 countries with the highest average annual disaster losses scaled by gross domestic product (GDP), 8 are Pacific island countries: Vanuatu, Niue, Tonga, the Federated States of Micronesia, the Solomon Islands, Fiji, the Marshall Islands, and the Cook Islands (Figure 6).

Considering new disaster-induced displacement of people relative to population size highlights the significant impact of natural hazard events on PICTs, including Tuvalu, Vanuatu, Micronesia and Kiribati (Figure 6). They face disproportionately high disaster risk because their mostly lowlying, coastal populations tend to be exposed to a range of hazards, particularly cyclones, floods, landslides, earthquakes and tsunamis. The devastation wrought on Vanuatu by tropical cyclone Pam, a category five storm, in March 2015 provides a clear case in point (IDMC, 2016).

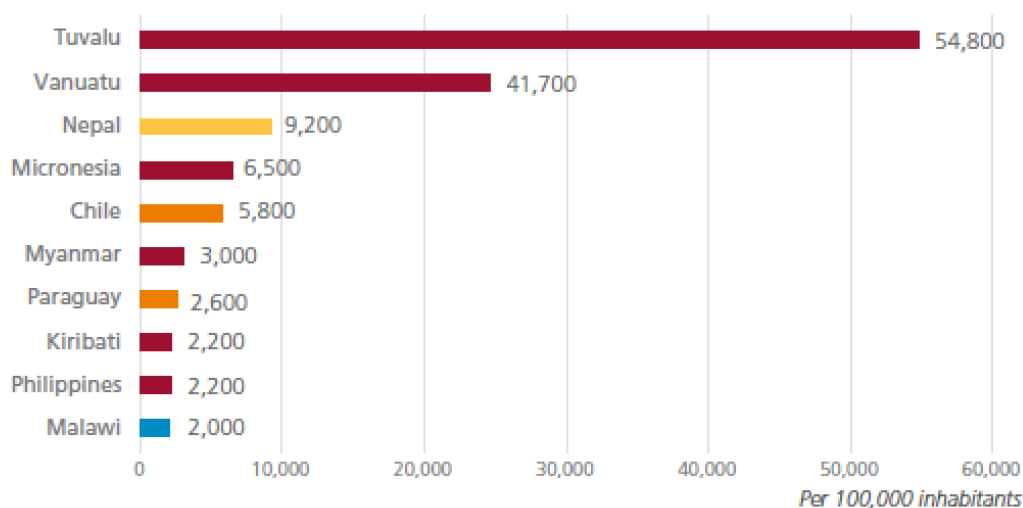


Figure 6. Countries with most new displacements associated with disasters in 2015 (relative to population). (Source: IDMC, 2016).

Drought risk was amplified in 2015/2016 by the effects of the El Niño weather phenomenon on rainfall patterns, which brought drier-than-normal conditions to many regions of the world, including parts of the Pacific. Lack of rainfall had a severe impact on agriculture and food security, particularly in parts of Fiji, PNG, the Solomon Islands and Vanuatu. RMI was the first country to declare a state of emergency in early February 2016 as a result of a severe shortage of fresh water on many atolls, caused by persistent drought (IDMC, 2016).

The World Risk Index consists of four components: exposure to natural hazards; susceptibility as a function of public infrastructure, housing conditions, nutrition and general economic framework; coping capacities; and adaptive capacities to future natural events and climate change. Although the index is focussed on suddenly occurring hazards like earthquakes and floods, it also includes chronic hazards such as droughts and sea-level rise.

Vanuatu and Tonga have the highest scores, and two other Pacific Island Countries (out of only seven assessed) are in the top 15 of 173 countries measured (Table 4).

Table 5 shows that of the of the six Pacific Island Countries for which the World Risk Index was calculated in both 2011 and 2016, half experienced an increase in the index (PNG, Tonga and Vanuatu), while half experienced a decrease (Fiji, Kiribati and Solomon Islands).

Table 4

The Top 15 Countries in the 2016 World Risk Index
(Source: Bündnis Entwicklung Hilft and United Nations University – EHS, 2016)

Country	Risk (‰)	Rank
Vanuatu	36.28	1.
Tonga	29.33	2.
Philippines	26.70	3.
Guatemala	19.88	4.
Bangladesh	19.17	5.
Solomon Islands	19.14	6.
Brunei Darussalam	17.00	7.
Costa Rica	17.00	8.
Cambodia	16.58	9.
Papua New Guinea	16.43	10.
El Salvador	16.05	11.
Timor-Leste	15.69	12.
Mauritius	15.53	13.
Nicaragua	14.62	14.
Guinea-Bissau	13.56	15.

Table 5

World Risk Index for 2011 and 2016
(Source: Bündnis Entwicklung Hilft and United Nations University – EHS, 2016)

Country	World Risk Index	
	2011	2016
Fiji	13.57	13.15
Kiribati	1.88	1.78
Papua New Guinea	15.45	16.43
Solomon Islands	23.51	19.14
Tonga	29.08	29.33
Vanuatu	32.00	36.28

The Global Climate Risk Index analyses the quantified impacts of extreme weather events (meteorological events such as tropical storms, winter storms, severe weather, hail, tornados, local storms; hydrological events such as storm surges, river floods, flash floods, mass movement (landslide); climatological events such as freezing, wildfires, droughts) in terms of fatalities and economic losses, based on data for 183 countries in the Munich Re NatCatSERVICE. Worldwide, it is one of the most reliable and complete data in this regard. The Index examines both absolute and relative impacts to create an average ranking of countries in four indicating categories, with a stronger emphasis on the relative indicators. The four indicating categories are (i) number of deaths; (ii) number of deaths per 100 000 inhabitants; (iii) sum of losses in US\$ in purchasing power parity; and (iv) losses per unit of GDP.

Some quite different patterns emerge using the Climate Risk Index (Germanwatch, 2016) (Table 6). For example, for the period 1995-2014 Vanuatu is ranked at 114, out of 183 countries. But the ranking drops to 29 for 2014 only, presumably because of the consequences of Cyclone Lusi.

Table 6

Climate Risk Index Data for Selected Pacific Island Countries
(Source: Germanwatch, 2016)

Country	Climate Risk Index (1995-2014)	Rank	Climate Risk Index (2014)	Rank
Fiji	45.67	26	75.83	84
Kiribati	112.50	128	117.67	138
Marshall Is	112.17	127	73.00	79
Micronesia	71.83	67	117.67	138
Palau	167.17	176	117.67	138
Papua New Guinea	63.50	55	75.00	81
Samoa	78.33	80	70.00	74
Solomon Is	74.83	73	20.67	12
Tonga	56.83	43	28.83	130
Tuvalu	115.50	132	117.67	138
Vanuatu	103.83	114	41.33	29

Significantly, both the World Risk Index and the Climate Risk Index suggest that the Pacific Island atoll nations of Kiribati, Marshall Islands 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 reason for the difference becomes apparent when comparing the component values for the World Risk Index (Table 6). This shows the benefits of the atoll nations being outside the tropical cyclone belt.

Of the 20 countries with the highest average annual disaster losses scaled by gross domestic product, 8 are Pacific island countries: Vanuatu, Niue, Tonga, the Federated States of Micronesia, the Solomon Islands, Fiji, the Marshall Islands, and the Cook Islands (Figure 7).

Table 7

Component Scores of the Global Risk Index for 2016, for Vanuatu and Kiribati
(Source: Bündnis Entwicklung Hilft and United Nations University – EHS, 2016)

Country	Risk Index Rank	Exposure (%)	Vulnerability (%)	Susceptibility (%)	Coping Capacity (%)	Adaptive Capacity (%)
Vanuatu	1	63.66	56.99	34.90	81.16	54.90
Kiribati	164	3.05	58.50	42.25	83.69	49.56

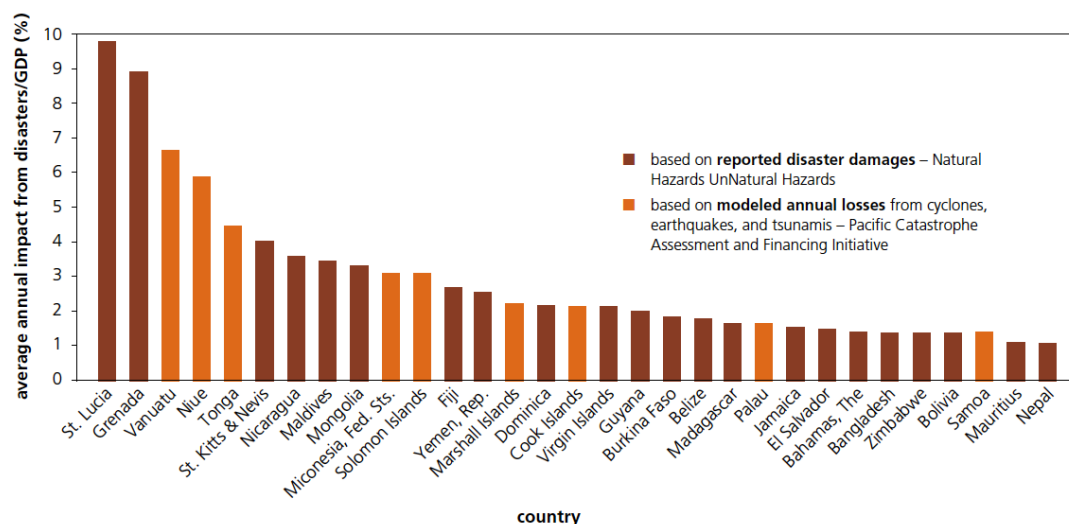


Figure 7. Average annual impacts from disasters as a percentage of GDP. (source: World Bank, 2012b).

Figure 8 shows annual average economic losses suffered by Pacific island countries as a result of damage caused by tropical cyclones, earthquakes, and tsunami.

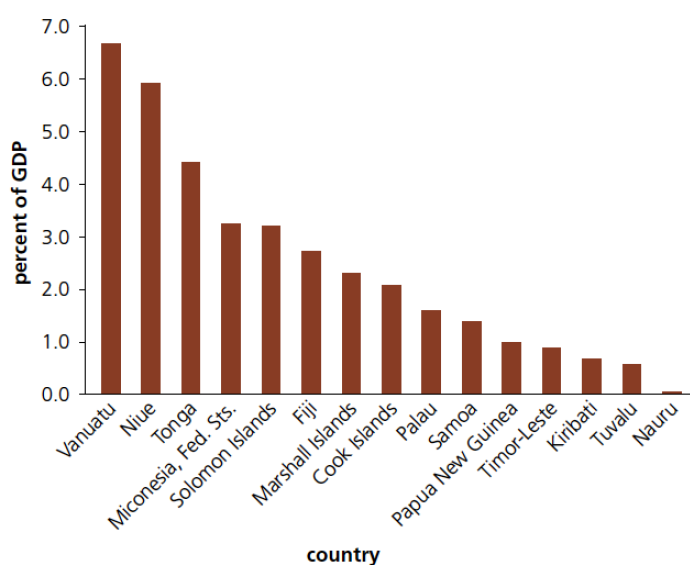


Figure 8. Economic losses due to tropical cyclones, earthquakes, and tsunami. (Source: World Bank, 2012b).

Tropical cyclones have traditionally been the most serious climate hazard for Pacific Island Countries in terms of total damage and loss (Figure 9). Vanuatu is the most at risk from cyclone events, and is expected to lose on average USD 36.8 million annually. The potential impacts of earthquakes and tsunamis also vary significantly between Pacific Island Countries (Figure 10).

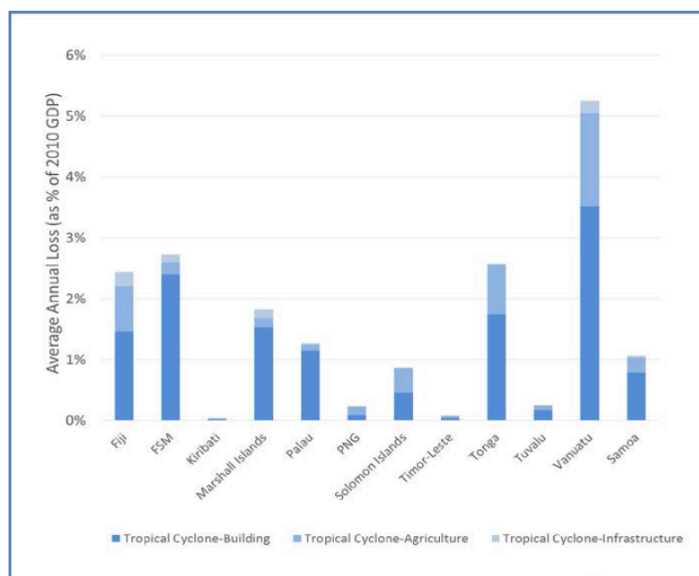


Figure 9. Expected Average Annual Losses due to Cyclones in Pacific Island Countries. (source: World Bank, 2016).

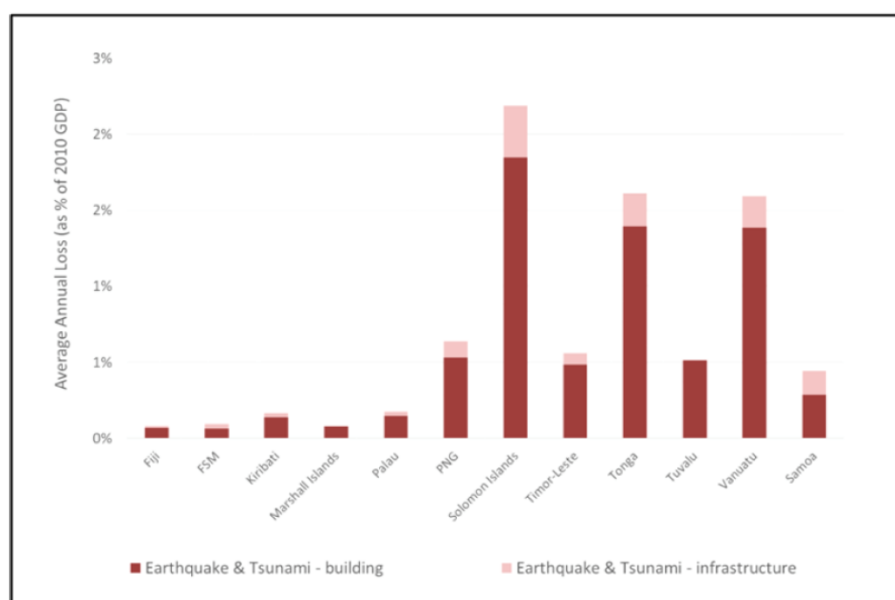


Figure 10. Expected Average Annual Losses due to Earthquakes and Tsunamis in Pacific Island Countries. (Source: World Bank, 2016).

A recent study (PCRAFI, 2013) compared current and future tropical cyclone risk for 14 Pacific Island Countries. Outputs from 11 global climate change models were analysed to calculate projected financial losses from cyclone damage to buildings, infrastructure and crops in each country, for both mid-century and

end-of-century. No adjustment was made for future changes for any of these assets.

The findings reflect the increased losses for the region, largely as a result of the projected increase in category 5 cyclones. For the regional as a whole the increase in ground up average annual loss is relatively small – from USD178 million to USD180 million (1%) by mid-century, and to USD185 million (3.9%) by end-of-century. But the end-of-century increases for many individual countries are considerably larger – 25.4% for Samoa, 14.8% for Niue and 7.6% for Vanuatu. In contrast, decreases are projected for Kiribati (-50%), Palau (-10.6%) and Solomon Islands (-8%).

Changes in loss are greater for buildings than for infrastructure and crops. Wind is the main contributor to building loss, while flooding mainly contributes to infrastructure loss. The climate projections indicate a slight increase in wind contribution and a slight decrease in flood contribution for both buildings and infrastructure (PCRAFI, 2013)

Vulnerability, Adaptation and Disaster Risk Management: Recent Trajectories, and Projections

As a whole, the Pacific region is amongst the most vulnerable in the world as it combines high exposure to frequent and damaging natural hazards with low capacity to manage the resulting risks and outcomes. Looking to the future, this situation will be exacerbated by climate change. For example, the subsistence lifestyles common in the Pacific region are highly vulnerable to the impact of inter-annual and longer-term variations in climate (Hay and Pratt, 2013a).

The **Economic Vulnerability Index** measures the structural economic vulnerability of a country. The Index is the simple arithmetic average of 2 sub-indexes: (i) the exposure sub-index, which is a weighted average of 5 component indexes: population size (25%), remoteness from world markets (25%), exports concentration (12.5%), share of agriculture, forestry and fishery in GDP (12.5%) and the share of population living in low elevated coastal zone (25%); and (ii) the shocks sub-index, which is a weighted average of 3 component indexes: the victims of natural disasters (25%), the instability in the agricultural production (25%), and the instability in exports of goods and services (50%).

By this measure, the economic vulnerability of Pacific Island Countries declined marginally between 1990 and 2013 (Figure 11), but remains considerably higher than the average for 127 countries for which data are available (Figure 10). An earlier, but incompatible, version of the Index showed a similar pattern for 1984 to 2008 (Hay and Pratt, 2013a).

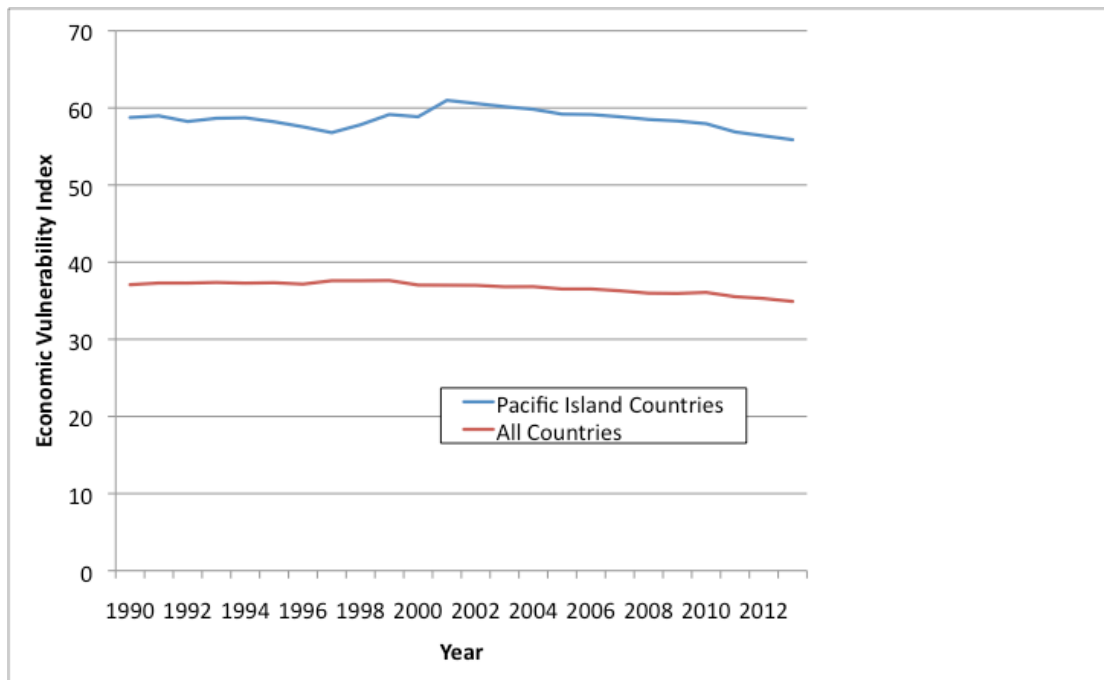


Figure 11. Average values of the Economic Vulnerability Index for ten Pacific island countries and for the 145 countries for which data are available. Data (Source: Feindouno and Goujon, 2016).

The **Environmental Vulnerability Index** is based on 50 indicators of natural/anthropogenic risks, resilience and ecosystem integrity. It thus covers issues related to climate change, biodiversity, water, agriculture and fisheries, human health, desertification, and exposure to natural hazards. The Index for most of the 14 PICs is considerably higher than the average for all Least Developed Countries (Hay and Pratt, 2013a). Since 2004, when the Index was last calculated, the environmental vulnerability of Pacific Island Countries has increased further (SPREP, 2012).

The 2015 Human Development Report (UNDP, 2015c) assesses progress as a result of investing in people's capabilities - especially health, education, and nutrition - and in building resilience to economic, environmental and other threats and shocks, recognizing that this is key to advancing human development. The Report covers 40 developing countries of the South, but only nine of the 14 in the Pacific Islands Region.

Unlike the majority of the 40 countries, where there have been significant gains in the **Human Development Index**, the nine Pacific countries for which data are available show little change in their Index since the early 2000s, in marked contrast to the improvements achieved before that time (Figure 12). Four Pacific Island Countries (Palau, Tonga, Fiji and Samoa) are now in the high human development group, with three countries (Federated States of Micronesia, Kiribati and Vanuatu) in the medium human development group. Two countries (PNG and Solomon Islands) are in the low human development group.

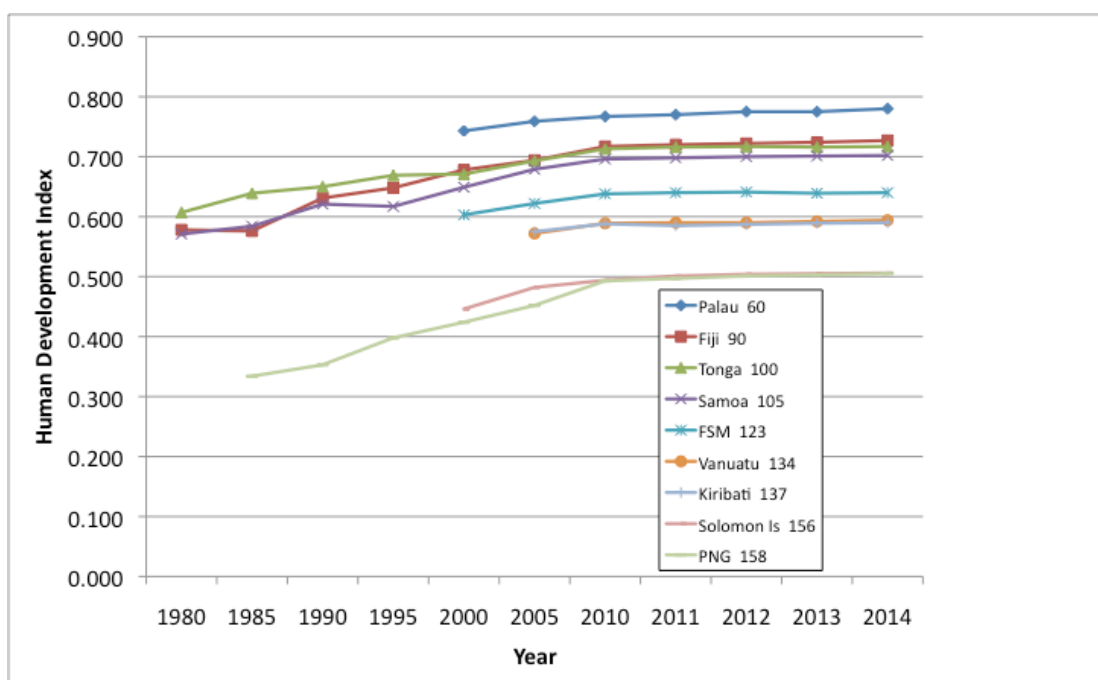


Figure 12. Human Development Index for nine Pacific Island Countries. The number following each country name is the Human Development Index rank in 2014 (Source: <http://hdr.undp.org/en/data#>).

At the deadline for achieving the **Millennium Development Goals** (MDGs), the Pacific recorded mixed results regarding their achievement, with only two countries achieving all the MDGs (Cook Islands and Niue), three countries achieving at least half of the MDGs (Fiji, Palau and Tonga), while the rest of the countries achieved less than half of the goals (PIFS, 2015b). Three countries (Kiribati, PNG and Solomon Islands) did not achieve any of the MDGs (Table 8).

The MDGs have now given way to the Sustainable Development Goals (SDGs). At the 47th Pacific Islands Forum (September, 2016) Leaders commended progress by the Pacific SDGs Taskforce and Reference Group, including development of a draft Outline of the Pacific SDGs Roadmap for regional reporting and implementation of the SDGs, the Samoa Pathway and the Framework for Pacific Regionalism. The final Roadmap will be submitted for approval in September, 2017.

As part of its follow-up and review mechanisms, the 2030 Agenda for Sustainable Development encourages member states to “conduct regular and inclusive reviews of progress at the national and sub-national levels, which are country-led and country-driven”. These voluntary national reviews (VNRs) aim to facilitate the sharing of experiences, including successes, challenges and lessons learned, with a view to accelerating the implementation of the 2030 Agenda. The VNRs also seek to strengthen policies and institutions of governments and to mobilize multi-stakeholder support and partnerships for the implementation of the Sustainable Development Goals.

Table 8

Pacific Island Countries Achievements on the Millennium Development Goals,
and their Sensitivity to Climate Change and Disasters
(Source: Adapted from World Bank, 2012b; Performance data from PIFS, 2015b).

Goal	Sensitivity of Goal to Climate Change and Disasters	PICTs’ MDG Performance			Potential for CCA and DRR to Improve Performance
		Number of countries			
		Achieved	Mixed	Not Achieved	
Goal 1: Eradicate extreme poverty and hunger	H	2	6	6	H
Goal 2: Achieve universal primary education	M	7	5	2	M
Goal 3: Promote gender equality and empower women	M	3	10	1	M
Goal 4: Reduce child mortality	M	9	3	2	M
Goal 5: Improve maternal health	M	7	5	2	M
Goal 6: Combat HIV/AIDS, malaria, and other diseases	M	6	7	1	H
Goal 7: Ensure environmental sustainability	H	7	3	4	H

Twenty-two countries participated in the first round of VNRs, held during the 2016 meeting of the High-level Political Forum, under the auspices of the Economic and Social Council. Samoa was the first Pacific country and Small Island Developing State to submit its VNR Report on the SDGs. The Report highlighted the total commitment of the Government of Samoa to the implementation of its development framework inclusive of the SDGs and noted that early review for Samoa as a SIDS could provide encouragement for others to follow suit and learn from Samoa's experience. Preparation of the report for Samoa generated considerable public interest and awareness of the SDGs. In Samoa integration and mainstreaming processes are carried out as a matter of priority at country level. As much as possible, existing systems, processes and institutions are used. Understanding the different ways that 'leave no one behind' can be interpreted will make implementing the SDGs more effective in practice. The consultation processes that have taken place as part of Samoa's national preparations for its National Voluntary Review Report has strengthened the framework for coordinated monitoring.

Coping capacity and **adaptive capacity** are two of the four components that make up the World Risk Index. The other two are exposure (to natural hazards) and susceptibility. Susceptibility and coping and adaptive capacities combine to give a measure of vulnerability.

Coping capacity is the lack of capacities to reduce negative consequences and in the Index is made up of indicators related to governance, disaster preparedness and early warning, medical services, social networks and insurance. On the other hand, adaptive capacity is the lack of capacities for long-term strategies for societal change. Its indicators relate to education and research, gender equity, state of the environment, ecosystem protection, adaptive strategies and investment in health services.

Table 9 presents the values of the coping and adaptive capacities that are available for seven Pacific Island Countries. It shows that coping capacity is assessed to be relatively low. This is despite the fact that Pacific communities and intact natural ecosystems have a significant degree of inherent resilience and a long history of coping with extreme events and variability (Hay, 2013). In general, there has been little change in coping capacity between 2011 and 2016. In contrast, adaptive capacity is assessed as being relatively high, with a few instances of notable changes (positive and negative) in adaptive capacity.

Table 9

Coping and Adaptive Capacities for seven Pacific Island Countries
(Source: Bündnis Entwicklung Hilft and United Nations University – EHS, 2016)

Country	Lack of Coping Capacity (%)		Lack of Adaptive Capacity (%)	
	2011	2016	2011	2016
Fiji	76.44	74.69	44.67	43.55
Kiribati	83.54	83.69	45.56	49.56
Papua New Guinea	84.83	83.94	64.36	58.95
Samoa	79.85	-	47.43	-
Solomon Islands	85.95	85.56	63.74	61.90
Tonga	81.80	81.80	44.93	54.90
Vanuatu	79.34	81.16	53.96	54.90

These findings highlight the need to further increase adaptive capacity, in light of the generally high exposure of Pacific Island Countries to natural hazards, as well as the high vulnerability of these countries. For example, Duvat et al. (submitted) found that in the Pacific most urban and rural reef and high islands have undergone increasing exposure and vulnerability as a result of major changes in settlement and demographic patterns, lifestyles and economies, natural resources availability and environmental conditions.

Adaptation aid to the Pacific was about USD705 million between 2010 and 2014, according to the OECD data (Betzold, 2016). The level of such aid steadily declined from a high of USD242 million in 2011 to USD124 million in 2014. Of the USD705 million, about USD461 million (65 percent) targeted adaptation as a significant purpose, while for projects worth USD243 million (35 percent) adaptation was the principal purpose.

Australia as the single largest provider of adaptation aid is driving this decline; it reduced its support for adaptation from \$169 million in 2011 to less than \$40 million in 2014. In 2015 Australia announced that it will commit at least \$1 billion to build resilience and reduce emissions over the next five years (2015/16 to 2019/20). Due to the importance of climate change to the Pacific, the region will receive a significant proportion of this climate expenditure. However, the sequential drop in Australia's aid budget since 2013 means the level of climate finance announced in the 2016-17 budget rose to around 5 per cent of ODA, even though the average amount per annum didn't change (Oxfam, 2016).

Adaptation aid to the Pacific comes from only a small number of mostly bilateral donors. It is distributed unevenly among Pacific Island Countries, on both a per capita basis as well as in percent of overall development aid. The very small countries freely associated with or territory of New Zealand – that is, Niue, the Cook Islands and Tokelau – receive very high levels of adaptation aid per capita. They are, together with Tuvalu, the largest per capita recipients of adaptation aid. In contrast, other very small countries, including the dependent territory of Wallis and Futuna, receive low levels of adaptation aid per capita, partly because some of the financial support is not registered as official development assistance. Regional programmes in Oceania received over one quarter of all adaptation aid to the Pacific, largely for principal adaptation projects (Betzold, 2016).

Atteridge and Canales (2017) present the results of an analysis of published data reported by donor countries and multilateral climate funds to the Development Assistance Committee of the Organisation for Economic Co-operation and Development. The analysis covered 15 countries, collectively and individually: the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu and Vanuatu. They found that between 2010–2014 a total of US\$748 million in finance principally targeting climate change was committed to those countries, almost all as grants. Around 59% was for adaptation, 36% for mitigation, while 5% covered both adaptation and mitigation. About 72% was sourced through bilateral channels. Among the multilateral funds, the Global Environment Facility, combining the Facility's Trust Fund and the Least Developed Countries Fund, was by far the largest source through 2014, though since 2015, there have been several large allocations to some Pacific countries, particularly from the Pilot Programme for Climate Resilience and the Green Climate Fund. The vast majority of the funding (86%) was delivered as project-based support, while direct budget support was rare. In terms of sectoral distribution, the largest share of funding has supported work to create an "enabling environment"

The highest adaptation costs for PICs by 2040 will be coastal protection (World Bank, 2016). To protect Pacific Island Countries from coastal erosion, sea and river flooding, and submergence, the World Bank assessed three "hard" adaptation options, namely: (i) beach nourishment (particularly in areas with high tourism revenue); (ii) sea and river dike construction; and (iii) port upgrades. The level of protection required and the associated costs of these

options varies considerably, between countries and the sea level rise scenarios, but the costs are always significant. In the best case, with a sea level rise of 40cm by 2100, costs in the 2040s vary between USD3 million per year in Palau (1% of GDP assuming constant growth) to USD97 million in the Solomon Islands (3% of GDP), USD17 million in Kiribati (4% of GDP). In the worst case, with a sea level rise of 126cm by 2100 and increased cyclones intensity, costs go up to USD329 million per year in Fiji, USD347 million per year in the Solomon Islands and USD161 million per year in Vanuatu.

The above cost estimates assume that only the principal population centres will be protected, and not the outer islands and less densely populated coastal segments. This means that additional costs will be associated with internal migrations and densification of the population behind coastal protections.

The preceding figures far exceed the cost of coastal adaptation reported in other regions – 0.8 % of the GDP for Sub Saharan Africa and less than 0.4% in other regions. Those high costs are primarily comprised of expenditure on the construction and maintenance of sea walls (more than 75% of the total in most countries).

Looking to the future from another perspective, continuation of the roughly USD141 million of adaptation disbursed to the Pacific per year is very likely insufficient. Adaptation costs for the Pacific region have been estimated at about USD447 million every year until 2050, for a worst-case scenario (ADB, 2013b; ADB, 2016). Even with an extreme reduction in global greenhouse gas emissions annual average costs would be about USD158 million every year.

Although the USD141 million per year disbursed between 2010 and 2014 may seem nearly sufficient under the best-case scenario, it must be recognised that not all of this aid has a clear adaptation focus. Moreover part of the USD705 million will need to be paid back, as it includes both grants and loans. While the OECD data does not include all donors and all flows, it seems that overall, adaptation aid to PICs is less than what is needed for the region to effectively cope with and adjust to climate change (Betzold, 2016).

Parties to the UNFCCC were invited to submit **Intended Nationally Determined Contributions** (INDCs) in the run-up to COP21. The INDCs outline greenhouse gas emission reduction targets, which upon the entry into force of the Paris Agreement countries will start implementing as nationally determined contributions (NDCs). As of September 2016 a total of 162 INDCs have been submitted by 190 Parties to the Convention.

Parties were also invited to communicate their adaptation planning efforts in their INDCs. This invitation has been taken up by 140 Parties. Article 3 of the Paris Agreement states that Parties should communicate ambitious efforts with a view to achieving the objective of the Agreement, including mitigation and adaptation purposes referred to in Article 2. However, the Paris Agreement is ambiguous as it indicates that NDCs should cover mitigation and gives no mandate for NDCs to include adaptation components (cf. Art. 4), whereas its

Article 7 outlines the option of submitting adaptation communications as a component of, or in conjunction, with an NDC (GIZ, 2016).

All 14 Pacific Island Countries have submitted INDCs. Only two (Palau and Tuvalu) chose not to elaborate adaptation undertakings in their INDC (Table 10). The INDCs for the other countries provide a concise update on the progress being made regarding planning for, and implementing, adaptation (GIZ, 2016). Their responses parallel those in the 141 countries globally that included an adaptation component in their INDC. Thus some 92% of these countries refer to existing, qualitative forward looking goals, plans or actions. 34 % of countries provide both backward and forward looking perspectives. Around 15% of countries also include some quantitative adaptation goals in their INDCs. 30% of countries include estimated costs of adaptation. The costs, and the methods used to generate them, vary greatly from country to country.

Over 80% of the INDC adaptation components identify water as a priority sector, 77% agriculture, 62% health, 52% ecosystems, 50% infrastructure, 59% forestry, 38 % energy, 36% disaster risk reduction, 35% coastal protection and 29% fisheries. Around 30% include references to disaster risk management and/or sustainable development.

According to information in the INDC adaptation components, many countries have, or are planning to integrate climate change adaptation into relevant sectors and/or to integrate adaptation into national/regional/ local development planning.

Table 10

Extracts from the Adaptation Component of the Intended Nationally Determined Contributions Submitted by Pacific Island Countries
(Source: <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>)

Country	Undertakings in Adaptation Planning
Cook Islands	<p>The Cook Islands has developed key plans and policies that articulate its priorities to reduce vulnerability and strengthen resilience. This includes the first 20 year national vision 'Te Kaveinga Nui', accompanied by the first National Sustainable Development Plan (NSDP) 2007-2010, and subsequently the second and third NSDP 2011-2015 and 2015-2020. The Joint National Disaster Risk Management and Climate Change Adaptation Plan (JNAP) is a five-year (2011-2015) roadmap that is currently being updated to 2020. The Climate and Disaster Compatible Development Policy 2013-2016 provides direction for more coordinated adaptation and mitigation actions within and across all sectors. The Renewable Energy Chart provides the pathway of transforming the electricity sector from diesel based to renewable energy sources.</p> <p>The Cook Islands is confident that its existing frameworks and robust systems guiding ongoing climate change mitigation and adaptation measures are considerable, and its commitments are ambitious to the global goal despite its unique circumstances.</p> <p>Loss and Damage is not factored into the policy and planning processes outlined above. Nor are the full costs associated with building resilience to climate change, which the Cook Islands expects will be covered by the international community over time.</p> <p>The Cook Islands is confident that its strategies and policies pre 2020 and post 2020 will reduce and offset its carbon emissions and strengthen resilience. These actions include inter alia coastal protection, water security, agriculture, forestry, marine conservation, waste, tourism and land management.</p> <p>The Cook Islands is confident that it can deliver 100 per cent of its adaptation measures, provide tools and technologies and strengthen capacities in all its inhabited islands, conditional on external support.</p>
FSM	<p>Adaptation constitutes a priority for FSM. FSM does not consider the INDC as the vehicle to address its adaptation needs in the post 2020 context, even if these need careful consideration and assessment. Such assessments are being made in the context of the Nation Wide Integrated Disaster Risk Management and Climate Change Policy 2013 and the FSM Climate Change Act 2014, as well as the joint state action plans for disaster risk management and climate change adaptation. All</p>

	necessary efforts are being made to engage the country in the formulation and implementation of transformational adaptation investment plans to protect the country against climate change, through various sources of funding including from the UNFCCC financial mechanisms, and the Green Climate Fund in particular.
Fiji	<p>The goal of the adaptation objective of Fiji's National Climate Change Policy is to reduce the vulnerability and enhance the resilience of Fiji's communities to the impacts of climate change and disasters. As such, Fiji is proactively creating and refining policies, institutions and budgetary systems that can mobilize resources toward climate change and disaster risk management activities.</p> <p>Some progress has already been made towards building resilience Government has commenced with the conducting of Vulnerability and Adaptation assessments for the whole of Fiji, invested in improving early warning systems, dredging of river mouths, construction of inland retention dams and the construction of cyclone proof homes in the most affected areas. Rehabilitation plans are focused on the principle of "building back better" especially for rural housing and infrastructure such as roads, water and energy. In the agriculture and forestry sector, the planting of traditional tree and root crops is being undertaken to minimize soil erosion and land degradation and desertification. The planting of mangroves, construction of seawalls and the relocation of communities to higher grounds are part of ongoing adaptation initiatives.</p> <p>Key needs are to:</p> <ul style="list-style-type: none"> ▪ develop an integrated approach and policy and operational level to effectively address climate change; ▪ ensure that buildings constructed in urban and rural areas are cyclone resistant; ▪ strengthen the role of local governments in building resilience; ▪ increase understanding of the impacts of climate change in order to better plan for long term development; ▪ ensure climate change mitigation and adaptation become a part of the national and sub national development planning and budgetary process; ▪ increase the resourcing of adaptation and mitigation measures; ▪ strengthen partnerships at all levels for building resilience for climate change.
Kiribati	<p>Kiribati has received external assistance to formulate its Kiribati Joint Implementation Plan on Climate Change and Disaster Risk Management (KJIP) (2014) (comparable to NAPA required under UNFCCC) which defines priority adaptation measures to address current and ongoing risks from climate change. Similarly, the Kiribati Adaptation Project III (KAP), initiated by the World Bank, is currently on-going. The need for Kiribati to build national capacity to facilitate direct access to climate change adaptation financing is a high priority in the immediate future.</p> <p>Kiribati has been working actively on climate change adaptation for 20 years, and with the development of pioneering tools</p>

	<p>and methodologies that are regarded as best practices regionally and internationally, has made and continues to make a considerable contribution to the global and regional adaptation planning and management process and pool of knowledge on building climate resilience. This contribution is made in the face of severe constraints and challenges confronted by Kiribati as a small island developing States (SIDS) and Least Developed Country (LDC).</p> <p>A whole-of-nation approach is being pursued by government to address the impacts of climate change and sea level rise and related environmental issues in Kiribati. Climate change and disaster risks are being addressed in policies and strategies relating to population, water and sanitation, health and environment. Similarly disaster risk management is progressively being incorporated into policies and strategies relating to fisheries, agriculture, labour, youth and education. The new Kiribati Integrated Environment Policy encourages all government programs to collect, manage and use environmental data to safeguard the environment and strengthen resilience to climate change and disasters.</p> <p>The Kiribati Development Plan (KDP) 2012–2015 is the overarching national development plan detailing national priorities. The KDP has six broad key policy areas (KPAs). Climate change is incorporated into KPA 4 on environment, providing the link to the KJIP. The key objective of KPA 4 is to facilitate sustainable development by mitigating the effects of climate change through approaches that protect biodiversity and support the reduction of environmental degradation by the year 2015.</p> <p>The National Adaptation Program of Action (NAPA) (2007) set out a 3 year plan for urgent and immediate actions in the Republic of Kiribati to begin work in adapting to climate change. The goal of the NAPA was to contribute to and periodically complement a long term framework of adaptation through identifying immediate and urgent adaptation needs that are consistent with national development strategies and climate change adaptation policies and strategies. The objective is to communicate in a simplified way the identified immediate and urgent adaptation needs of Kiribati, which is also relevant to the national communication obligation required by the UNFCCC. These adaptation needs are identified through a participatory, consultative and multidisciplinary planning process. The NAPA outlines 9 priority projects valued at US\$11.983 million to address short-term (3 years) needs in critical sectors (water, coastal zone management, agriculture, coastal infrastructure) and to strengthen national adaptive capacity and information systems.</p> <p>The National Framework for Climate Change and Climate Change Adaptation (April 2013) establishes a framework for an effective national response to address the impacts of climate change that requires that climate change and climate change adaptation assume a prominent role within the national development planning process. This process is comprised of five main parts that include long range policy and strategy statements, namely: Kiribati Development Plan (KDP), annual GoK Budget, multi-year budget framework and Ministry Operational Plans (MOPs) and Public Enterprise Business Plans (PEBPs). This document extends the 2005 Climate Change Adaptation Strategy which was developed as part of the World Bank funded</p>
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	<p>Kiribati Adaptation Project. Under this strategy the following five headings outline Kiribati action to strengthen its capability to meet the challenge of climate change. These are:</p> <ul style="list-style-type: none"> · Mitigation - aim to improve energy efficiency and enhance the use of renewable energy both on the main islands and in the outer islands; · Integration of climate change and climate change adaptation into national planning and institutional capacity – aim to integrate climate change adaptation considerations into Kiribati Development Plan (KDP), annual GoK Budget, multi-year budget framework and Ministry Operational Plans (MOPs) and Public Enterprise Business Plans (PEBPs); · External financial and technical assistance - have international climate change funds channeled directly into the mainstream activities of line Ministries involved with climate change adaptation as direct budget support as a national priority; · Population and resettlement – aim to reduce the vulnerability of Kiribati to increasing physical risks caused by climate change by establishing host country agreements to government-sponsored and self-sponsored emigration to resettle I-Kiribati overseas and assist the inevitable migration of the population, due to climate change as and when this eventually arrives; · Governance and services – aim to improve policy coordination and planning on climate change adaptation, strengthen capacity of government to implement climate change adaptation measures, and build improves technical services capacity to address risks from climate change; · Survivability and self-reliance – ensure that risks associated with climate change and the intellectual and practical processes for the planning for the consequence of climate change are undertaken at the earliest opportunity. <p>The Kiribati Joint Implementation Plan on Climate Change and Disaster Risk Management (KJIP) (2014) has been developed to reduce the vulnerabilities to the impacts of climate change and disaster risks and to coordinate priorities so that investments will derive maximum value. The KJIP is part of the commitments Kiribati made under the Pacific Islands Framework for Action on Climate Change (PIFACC), the Regional Framework for Action on Disaster Risk Management endorsed by the Pacific Leaders in 2005 and the Pacific Islands Meteorological Strategy (PIMS) approved in 2012. As party to the United Nations Framework Convention on Climate Change (UNFCCC), the Government sees the KJIP as its National Action Plan on climate change. Similarly, the KJIP is contributing to the implementation of the Hyogo Framework for Action (2005–2015) under the United Nations International Strategy on Disaster Risk Management (UNISDR) and the Climate Services priorities of the World Meteorological Organisation (WMO).</p>
Republic of the Marshall	<p>RMI is committed to the strongest possible efforts in safeguarding security and human rights, as well as advancing development aspirations, in light of projected climate impacts and risks. RMI has no choice but to implement urgent</p>

Islands (RMI)	<p>measures to build resilience, improve disaster risk preparedness and response, and adapt to the increasingly serious adverse impacts of climate change. RMI commits to further developing and enhancing the existing adaptation framework to build upon integrated disaster risk management strategies, including through development and implement of a national adaptation plan (and further integration into strategic development planning tools), protecting traditional culture and ecosystem resources, ensuring climate-resilient public infrastructure and pursuing facilitative, stakeholder-driven methods to increase resiliency of privately-owned structures and resources. RMI seeks to consider, as appropriate, the legal and regulatory means to best support these approaches.</p> <p>RMI also considers that adaptation action will have mitigation co-benefits, with efforts such as mangrove and agriculture rehabilitation programs likely to enhance carbon sinks as well as assist with protection of water resources and the health of the RMI people.</p> <p>The RMI National Climate Change Policy Framework (NCCPF) sets out the Government of RMI's commitments and responsibilities to address climate change. This policy framework is intended to guide the development of adaptation and energy security measures that respond to RMI's needs with an "All Islands Approach", foster an environment in which the RMI can be better prepared to manage the current and future impacts of climate change while ensuring sustainable development, and provide a blueprint for building resilience in partnership with regional and global partners.</p> <p>In the NCCPF, RMI has identified a series of priority areas for urgent response. It is clear that RMI faces major impacts on its communities' livelihoods and infrastructure from sea-level rise, sea surges, typhoons and rainfall intensity; water and food security issues from changing rainfall patterns and ocean acidification; health issues from rising temperatures and prolonged drought periods, as well as the potential for increasing peak wind speeds and changes to ocean circulation patterns.</p> <p>In addition to the NCCPF, RMI has also developed an innovative Joint National Action Plan (JNAP) for Climate Change Adaptation and Disaster Risk Management National Action Plan (DRM NAP) that sets out actions to adapt against the effects of natural disasters and climate change.</p> <p>The JNAP is an important and integral supportive element towards the achievement of RMI's sustainable national development imperatives. The JNAP's strategic goals, which are a combination of those addressed in the DRM NAP and the National Climate Change Policy Framework (NCCPF).</p> <p>RMI intends on regularly updating its climate vulnerability assessments and subsequently build on its existing policies to meet its ultimate goal of minimizing impacts and harm incurred by the Marshallese people. At all steps of the way, local stakeholders will be consulted to ensure community needs are best served.</p>
Nauru	Nauru's INDC hinges on its National Sustainable Development Strategy (NSDS) 2005 – 2025 (revised in 2009), The Nauru

	<p>Energy Road Map 2014-2020, The Second National Communication (SNC) to the UNFCCC (submitted in 2015), and The Republic of Nauru Climate Change Adaptation and Disaster Risk Management Framework (RONAdapt).</p> <p>Nauru is keen to improve its resilience which has been severely compromised by nearly a century of intensive phosphate mining. One such improvement will be transition to untapped clean energy sources, such as renewable resources rather than relying on the traditional imported dirty liquid fuels. The other pressing adaptation strategy is to improve the indigenous food supply and potable water availability and storage. In addition there is a concurrent need to rehabilitate the environment and improve the health of the population. The issue of loss and damage is important to Nauru, particularly when considering the current low level of mitigation ambition internationally and the science is telling us that there will be limits to adaptation. For our very survival it is fundamental that loss and damage must be considered as a separate and distinct element from adaptation in the 2015 COP21 agreement.</p> <p>Priority actions are given to those that will work towards the goals in the NSDS, as well as those in sectoral plans and strategies where these already give consideration to climate change and disaster risks. The priorities outlined targets the following goals: Water security; Energy security; Food security; A healthy environment; A healthy people; and Productive, secure land resources.</p> <p>High priorities are given to actions that can contribute towards multiple development and resilience objectives simultaneously, often cross cutting across sectors. The priority actions are arranged under sectors targeting the following areas: water; health; agriculture; energy; land management and rehabilitation; infrastructure and coastal protection; biodiversity and environment; community development and social inclusion; and education and human capacity development. However, as highlighted earlier, the actions generally contribute to the goals of multiple sectors and at the same time to the overall NSDS goals.</p> <p>Lack of funding at the national level has prevented many larger infrastructure projects from getting underway, such as a new hospital, electricity transmission system, improvements to port and airport, and land rehabilitation. At the national level, there are no nationally focussed adaptation projects due largely to the very limited funds available at the national level. At the regional level, Nauru is also involved in a relatively low but increasing number of adaptation projects and programmes and through the regional projects and programmes, some actions are being implemented on the ground that addresses the needs in relation to coastal zone management, water, capacity building, gender, policy and planning.</p> <p>Addressing the challenges, barriers and gaps are therefore important for building the resilience of Nauru. These can be addressed through building and strengthening the information gap that are vital for planning and management in many sectors as sectors are currently constrained by poor information about current conditions and/or likely future changes.</p>
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	<p>Strengthening institutions are also important actions and undertakings for adaptation in Nauru and this includes the finalisation of policies and plans that have only been progressed to draft form. Strengthening institutions for Nauru will also entail the need to build the human capacity of sectors. Human capacity is a critical part of capacity building in Nauru and is currently a major weakness in almost every sector. This could be addressed through activities funded and/or implemented with support of external partners, aiming to maximise opportunities for skills transfer to local staff and/or communities and to require future externally funded development projects, including those focused on climate change adaptation and disaster risk management to emphasise skills transfer components. In addition, the up-skilling of local staff should be a core priority of all project activities, since it will help position Nauru better to be able to respond to an array of future challenges, including planning for and responding to climate change and disasters.</p> <p>The need for development of new technologies and transfer of existing appropriate technologies for adaptation in Nauru cannot be overstated. Technology Needs Assessment (TNA) will help countries like Nauru track their needs for new equipment, techniques, services, capacities and skills necessary to build resilience to climate change. However, TNA has not been initiated in Nauru due to various constraints including lack of institutional, human and financial capacity. The preparation of a detailed technology needs for adaptation is an important next step.</p> <p>Implementation of many of the adaptation priorities will be heavily dependent on resources being made available by external development partners, to supplement limited domestic funds. While dedicated climate funds are available at the international level, these can be challenging to access for a small country like Nauru. Therefore, Nauru intends to place considerable emphasis on working with its bilateral partners, regional agencies, for the financial and technical resources needed to implement its adaptation priorities, including the improvement of access and facilitation to international climate finance.</p> <p>The priority activities highlighted in the RONAdapt require, in most cases, further development through some additional steps before they are ready to be implemented. The financial costs for the activities are not provided, since there is insufficient detail on individual activities to be able to accurately indicate costs. The preparation of detailed cost estimates is an important next step in implementing each activity and it is expected to be undertaken in conjunction with the process of detailed design of the activities.</p> <p>Loss and damage is a significant issue for Nauru. The inclusion of loss and damage in the INDC is twofold. First, its purpose is to highlight the significance of the issue for Nauru and second, to present our views on loss and damage in the 2015 climate agreement.</p> <p>The reality of the impacts of climate change that Nauru and Small Island Developing States (SIDS) are already experiencing</p>
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	<p>means adaptation is absolutely critical. However, the science is telling us that we are quickly moving towards a reality where adapting will not be sufficient.</p> <p>Nauru called for loss and damage to be included as a separate element of the 2015 agreement, one that is separate and distinct from adaptation. Loss and damage must be addressed in a robust, consistent and sustained manner. This can only be accomplished through a loss and damage mechanism that is anchored in the 2015 agreement. Anchoring the mechanism in the 2015 agreement will ensure that it is permanent.</p> <p>Defining the relationship between mitigation, adaptation and loss and damage needs to be considered and reflected in the 2015 agreement, including a clearly defined relationship between mitigation ambition, adaptation costs as well as loss and damage, particularly when mitigation ambitions are currently grossly inadequate and adaptation measures are not sufficient to address climate impacts.</p>
Niue	<p>Within the context of the draft National Strategic Plan (2014-2019), the key guiding documents for building resilience to climate change in Niue are the National Climate Change Policy (2009) and Niue's Joint National Action Plan (JNAP) for Disaster Risk Management and Climate Change Adaptation (2012).</p> <p>The Vision of the National Climate Change Policy is for a "Safer, More Resilient Niue to Impacts of Climate Change and Towards Achieving Sustainable Livelihood". The Policy Goal is "To promote understanding of and formulate appropriate responses to the causes and effects of climate change in support of national sustainable development objectives."</p> <p>A number of recent policies have integrated climate change considerations into the decision making process. Other priority sectors for integration of climate change considerations into policies and plans include: Water Resource management; Food security; Health; Waste & sanitation management; and the Building Code.</p> <p>By 2020 new sector plans will be required that are all fully costed for donor funding.</p>
Palau	<p>No specific undertakings related to adaptation, but the INDC is grounded in the Palau Climate Change Policy. The Policy establishes Palau's National Appropriate Mitigation Actions and the National Adaptation Plan as well as the institutional and policy frameworks for: (a) climate change mitigation via management of greenhouse gas emissions and sinks; and (b) climate change adaptation and risk reduction and management.</p>
Papua New Guinea	<p>The government, through the Office of Climate Change and Development, has put its emphasis on identifying the specific nine hazards prevalent in PNG, namely:</p> <ol style="list-style-type: none"> 1. Coastal Flooding and Sea Level Rise 2. Inland Flooding 3. Food Insecurity caused by crop failures due to droughts and inland frosts

	<p>4. Cities and Climate Change 5. Climate Induced Migration 6. Damage to Coral Reefs 7. Malaria and Vector Borne Diseases 8. Water and Sanitation 9. Landslides</p> <p>In the National Climate Change Development Management Policy the Adaptation Strategies, Risk Management has been prioritised and quantifying and prioritising hazards is one of the key activities of the strategies as given above.</p> <p>The country needs financial support, capacity building and technical support to face the uncertain future posed by climate change.</p>
Samoa	<p>Samoa recognises that the adverse effects of climate change will have significant impact on the country, particularly in sectors such as agriculture, coastal infrastructure, health, forestry, meteorology, tourism, and water. These sectors were prioritized in the National Adaptation Programme of Action (NAPA)⁴ and adaptation projects in these sectors have been successfully implemented with external financial support. While the focus of Samoa's INDC is on Mitigation, Samoa highlights the need to build on work that has been undertaken to ensure actions that have been identified during the implementation of previous adaptation objects are addressed at a future stage.</p> <p>The effects of climate change and climate variability in the short and long term will continue to impact Samoa and through the implementation of some of the adaptation projects, emissions reductions are also possible. As with mitigation activities, implementation of adaptation projects are heavily dependent upon external financial assistance from the international community. Building climate resilience, disaster risk reduction as well as adaptation projects in vulnerable sectors require significant external assistance and this has been highlighted through the prioritisation of climate change in national planning.</p>
Solomon Is	<p>The Climate Change Policy (2012-2017), which is linked to National Development Strategy (2011-2020), provides a policy framework for developing and describing ongoing and planned actions (changes in institutions, modified policies and measures, major projects/programs, planning processes, and financial investments) using international and country resources.</p> <p>Institutional challenges relating to high staff turnover rates in senior executive positions, limited sector specific training, and a lack of clarity on internal roles and responsibilities in some sectors hampers national efforts on adaptation. Adaptation knowledge sharing, coordination and collaboration among ministries as well as with non-governmental organisations (NGOs), the private sector, faith-based organisations and development partners is less than adequate in the Solomon Islands.</p>

	<p>There needs to be a focus on development of knowledge, skill levels to address capacity gaps with regards to climate change adaptation and disaster risk reduction throughout Solomon Islands society, particularly in the outer islands and among marginalised populations.</p> <p>There is also a need to translate the climate science and predicted impacts into messages that support action by Solomon Islanders. “Kastom” barriers also hamper awareness and action as with very limited capacity at the community level to undertake local level vulnerability mapping, adaptation planning and the implementation of priority adaptation interventions.</p> <p>Some adaptation projects have been grouped into thematic areas linked to the priority sectors established in the National Adaptation Programme of Action (NAPA) as well as some recently identified priorities. The total adaptation cost would be US\$126,650,000; NAPA would cost US\$17,250,000 covering agriculture and food security, water and sanitation, human settlements and human health, education awareness and information; low-lying and artificially built-up islands; waste management; coastal protection; fisheries and marine resources, infrastructure development and tourism. However the total cost of NAPA will have changed considerably upward and therefore will require further evaluation and costing. Other priorities identified through the national communication process would cost additional US\$109,400,000. It is expected that a considerable portion of the necessary financing will be provided in the forms of grants from the Green Climate Fund, Global Environment Facility (GEF), Adaptation Fund, and from various bi-lateral climate change programs.</p> <p>It is the intention of the Government that a community-based vulnerability mapping, adaptation planning and management approach (tied to direct access to financing for community-based resilience-building projects) be employed on a whole of island basis that will build capacity in vulnerable villages for localised adaptation actions which represents a critical contribution to the implementation of adaptation.</p> <p>The Government will establish the institutional structures and strengthen capacities at the community level in order to support the country-wide implementation of community-based vulnerability mapping and adaptation planning, and the community-based design and implementation of priority resilience measures through direct access to financing for such measures.</p>
Tonga	<p>The goal of new Tonga Climate Change Policy is ‘A Resilient Tonga’; Integral to the policy is the planning process which links national, island, and community planning (under Objective 1: Mainstreaming) with action (under Objective 4: Resilience Building Actions). Over the past six years more than 30 percent of development assistance supported Tonga’s climate change work. A new climate change policy and JNAP with further identified costed activities will be prepared by 2020. Funding to implement this policy and plan will be strongly dependent on donor support.</p>

Tuvalu	Notwithstanding the invitation to Parties in Decisions 1/CP.20, par. 12 to “consider communicating their undertakings in adaptation planning or consider including an adaptation component in their INDCs”, Tuvalu’s vulnerability and the adaptation actions continue to be comprehensively articulated in other national documents such as the NAPA, National Communications, National Strategic Action Plan for Climate Change and Disaster Risk Management, and the National Climate Change Policy. The government plans to develop its National Action Plan in 2016.
Vanuatu	<p>The adaptation component of the INDC does not seek to set adaptation targets for Vanuatu however it provides an opportunity to reiterate the adaptation priorities as identified and prioritised in key national documents such as the National Adaptation Programme of Action (NAPA) and the National Climate Change and Disaster Risk Reduction Policy.</p> <p>The NAPA process identified and prioritised adaptation priority needs that were urgent and immediate - those needs for which further delay could increase vulnerability or lead to increased costs at a later stage. The five NAPA priorities include: Agriculture and food security; Sustainable tourism development; Community based marine resource management; Sustainable forest management and Integrated water resource management. The National Climate Change and Disaster Risk Reduction Policy identifies five key adaptation strategic priorities and associated actions to further enhance the national adaptation efforts and build resilience across sectors which include the need for: Climate Change vulnerability and multi sector impact assessments; Integrated climate change and disaster risk reduction; Community based adaptation; Loss and damage and Ecosystem based approaches.</p>

Annex 2

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 latter sustained Pacific Islanders for thousands of years.

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: (i) climate change acting as a threat multiplier by exacerbating the impacts of other environmental changes such as invasive pests and diseases, and water shortages; (ii) 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; (iii) a high dependency on natural and managed ecosystems which are very sensitive to temperature extremes and extremes and variations in rainfall; and (iv) 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 their 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 (see Section 3.5). 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. 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 Table 1. Comparable measures of uncertainty in sea-level rise projections for individual PICs (Australian Bureau of Meteorology and CSIRO, 2014) are always higher, sometimes by a wide margin.

Table 1

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	Likely range ^d	Mean	Likely range ^d
Global Mean Sea Level Rise (m) ^b	RCP2.6	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 scientifically supported 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 m. 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 (0.3m), Intermediate-Low (0.5m), Intermediate (1.0m), Intermediate-High (1.5m), High (2.0m) and Extreme (2.5m).

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 PICs, 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. Such changes will be discussed in Working Papers 5 and 6 (Hay et al., 2016b; 2016c), as will the possibility that the direct and indirect physical impacts of sea-level rise could cross a threshold that causes social systems to collapse due to ineffectiveness of the institutions mandated to fund and implement adaptation.

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 and 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, with including reductions in the overall elevation of the islands. This might prove to be highly problematic for both fresh water resources and protection to coastal flooding (World Bank, 2016).

As noted in the main body of this report, 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 and Kench, 2015).

Biribo and 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 20m 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 2m 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 twenty-first 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 2m sea-level rise, suggests that as many as two 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, 2013b). 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 in 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 some 63,000 people in Papua New Guinea and Solomon Islands alone. 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 ENSO 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 m to 0.70 m), 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 (Table 1). 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, Table 1 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 Table 1 are characterized 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 salinization 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 fresh water lenses to become immediately brackish. It took around eleven 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).

Table 1

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 m by 2100, while the latest date is based on a sea-level rise of approximately 0.5m.

Source: Nunn (2012), based on Dickinson (2009)

Atoll cluster			Earliest date		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

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).

Thus 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 others 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 per cent and 46-73 per cent by 2050, respectively. The total fertility rates in Kiribati (3.9) and Tuvalu (3.7) are amongst 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 per cent, 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 per cent 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 per cent.

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 (Campbell and Warrick, 2014).

A. 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).

Migration for Work. 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 though 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 (457) visas were granted to migrants to Australia from the Pacific, less than one per cent of total arrivals under this visa category over that period. Over the same period, a total of 11,777 NZ Essential Skills visas were awarded to Pacific migrants, or nine per cent 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 and its people. Given the unique development challenges faced by the Pacific Island countries, there is now broad consensus that expanding labour mobility is vital for their future. Given their youth bulge, 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 stabilize 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.

B. 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 and 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.

Migration as an Adaptation Response. Climate change is already impacting migration patterns in Kiribati and Tuvalu (Table 2).

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. However, Nauru lacks a culture of sending remittances. In comparison, only 1.3% of people in Kiribati experienced an internal 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 stabilize the population size or result in a sizeable volume of remittances to support households that remain and must adapt to climate change impacts.

Table 2

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 per km ² of land			
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	0.80	0.00
Likely unable to migrate (%)	25	25	25
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
Reason for migration decisions – Work (%)	41		
Reason for migration decisions – Climate Change (%)	23	8	
Reason 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.

Both 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. In 2011 only 625 people migrated to Australia from the two countries combined. For New Zealand in 2013 it was 2,922 migrants.

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. But 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 (\$A1.2 billion) (Curtain et al., 2016).