December 2009

GFDRR Project

Preparedness, Planning, and Prevention

Assessment of National and Regional Efforts to Reduce Natural Disaster and Climate Change Risks in the Pacific

THE WORLD BANK / SYNTHESIS REPORT / EAST ASIA AND THE PACIFIC REGION

GFDRR
GLOBAL FACILITY FOR DISASTER REDUCTION AND RECOVERY

THE WORLD BANK

SOPAC

Acronyms and Abbreviations

CCA	Climate change adaptation
CHARM	Comprehensive Hazard and Risk Management
CRMI	Caribbean Risk Management Initiative
CROP	Council of the Regional Organizations in the Pacific
DRM	Disaster risk management
DRR	Disaster risk reduction
GDP	Gross domestic product
GEF	Global Environment Facility
GFDRR	Global Facility for Disaster Reduction and Recovery
GIS	Geographic information system
HFA	Hyogo Framework for Action
IPCC	Intergovernmental Panel on Climate Change
LOCATE	Local Options for Communities to Adapt and Technologies to Enhance Capacity
NGO	Nongovernmental organization
PRIVA	Participatory Rapid Integrated Assessment of Vulnerability and Adaptation
SOPAC	South Pacific Applied Geoscience Commission
SPREP	Secretariat to the Pacific Regional Environment Program
SRES	Special Report on Emission Scenarios
SSNAP	South-South-North Adaptation Project Protocol
UN	United Nations
UNDP	United Nations Development Program

Contents

Acknowledgments 5

Background 7

Executive Summary 9

I. Introduction 19

Mobilizing support 19

Watching the trends 20

Synthesizing the analysis 24

Aligning DRR and CCA activities 27

II. Context and Framework for Synthesis of the Country Assessments 31

Framework for the multi-country synthesis 31

Governance: organizational, institutional, policy, and decisionmaking frameworks 34

Creating and applying knowledge, skills, and tools, and building absorptive capacity 36

Analyzing and evaluating risks and associated vulnerabilities 45

Mainstreaming DRR/CCA in policy, planning and budgetary processe 45

Installing early warning systems 47

Reducing underlying risk factors 48

Engaging grassroots action by the private sector and civil society 49

Harmonizing needs-driven donor contributions 50

Monitoring and evaluating for accountability 51

III. Some Lessons Learned and Good Practice Beyond the Pacific Region 53

IV. Summary of Country and Regional Assessments 57

Fiji 57

Kiribati 59

Republic of Marshall Islands 62

Papua New Guinea 63

Solomon Islands 65

Timor-Leste 67

Vanuatu 69

Regional Assessment 71

V. Next Steps 73

Annex A. Madang Framework Guiding Principles 74

Annex B. Results Management Framework of the Global Facility for Disaster Risk Reduction and Recovery 75

References 77

Acknowledgments

The Global Facility for Disaster Reduction and Recovery (GFDRR) provided financing for the "Preparedness, Planning, and Prevention: Assessment of National and Regional Efforts to Reduce Natural Disasters and Climate Change Risks in the Pacific." Special thanks go to the partners who support GFDRR work to protect livelihoods and improve lives: Australia, Canada, Denmark, European Commission, Finland, France, Germany, Italy, Japan, Luxembourg, Norway, Spain, Sweden, Switzerland, United Kingdom, UN International Strategy for Disaster Reduction, USAID Office of Foreign Disaster Assistance, and the World Bank.

Quantitative information on natural disasters in the Pacific Islands Region was obtained from EM-DAT, the OFDA/CRED International Disaster Database, Universite Catholique, Brussels, Belgium (www.emdat.be).

The country-specific assessments for Fiji, Kiribati, Papua New Guinea, Republic of Marshall Islands, Solomon Islands, Timor-Leste, and Vanuatu, as well as a regional assessment plus a business plan were prepared by the consultancy team comprised of John Norton, Alfred Simpson, Graham Shorten, Richard Warrick, and Peter Waterman, working in collaboration with SOPAC and in-country partners. World Bank staff updated initial draft reports based on additional in-country consultations and comments received from other partners. John Hay prepared the draft Synthesis Report from the individual assessment reports and other relevant information.

Background

This (draft) report, along with more detailed country and regional assessments, describes the extent to which disaster risk reduction (DRR) and climate change adaptation (CCA) have progressed in 7 Pacific island countries – Republic of Fiji Islands (Fiji), Republic of Vanuatu (Vanuatu), Solomon Islands, Papua New Guinea, Republic of Kiribati, Republic of Marshall Islands, and the Democratic Republic of Timor-Leste.

The report focus is on disaster risk reduction and climate change adaptation as opposed to disaster management measures that prepare for, respond to, and recover from the occurrence of actual disaster events in the Pacific Island Region. With a DRR/CCA focus, the report identifies the gaps and impediments that can, in turn, provide a basis for identifying opportunities for progressing DRR/CCA initiatives. These initiatives can relate to improving the understanding of hazard information (informing DRR/CCA planning and activities), strengthening the enabling environment (improving risk reduction focus and activity in-country), and implementing "on-the-ground" activities that actually reduce risk.

The synthesis reporting as well as the detailed country and regional assessments are part of Sustainable Management through the Reduced Risk from Disasters and Climate Project, with funding from the Global Facility for Disaster Reduction and Recovery (GFDRR). The World Bank-implemented project is expected to ultimately deliver the following outcomes:

At regional level

- Regional disaster risk management (DRM) priorities affirmed through a scoping/stocktaking exercise carried out at the beginning of the proposed project's implementation;
- Regional climate change, variability, and sea-level rise scenarios and trends;
- Regional early warning system designed for operationalization;
- Increased number of hazard risk maps made available to the Region and countries;
- Strengthening of donor coordination mechanisms to support disaster risk management in the region and countries;
- Pilot activities launched in a few countries; and
- Specific sections in relevant development frameworks, strategies, and plans to include DRR/CCA concerns.

At country level

- Review and assessment of overall country adoption of the 5 Hyogo Framework for Action (HFA) priorities – also addressed through the Madang Framework for Action adopted by the Pacific Islands Forum in October 2005 (Annex A) – as well as such regional commitments as the Niue Declaration on Climate Change and related material, along with their progress in creating and sustaining the corresponding policy, legal, institutional, administrative, and related framework to do what is needed;
- Legislative- and policy-level changes required to support proposed country-level options;
- Baseline and other needed information on climate change, variability, and sea-level rise scenarios and trends for national and local hot-spot levels for analyzing and providing appropriate responses;
- Risk assessments, some of which may be carried out through the study on the feasibility of a catastrophic insurance pool (also GFDRR financed);
- Country-based DRM priorities agreed with governments, some of which would commence implementation on a pilot basis at the national, subregional, and regional levels, where feasible DRR/CCA strategies will be developed as part of the pilot activities and where gaps and opportunities are identified;
- Implementation support tools such as codes of practice (e.g., building codes) and operational manuals for improved engineering designs;
- Awareness of and possible utilization of various complementary and supplementary mechanisms (e.g., catastrophic insurance) as part of an overall DRR/CCA preparation strategy.

Executive Summary

Natural disasters leave perpetual consequences in their aftermath. The prospects of rapidly increasing numbers of natural disasters due to climate change have generated considerable discussions and actions at international, regional, and national levels among nations. In past decades it was widely believed that causes of natural disasters were phenomena that humans could do little or nothing about. Today, the growing pool of scientific evidence offers greater credibility in support of ameliorative measures through appropriate actions.

Regional endorsements. In October 2005, the 36th Pacific Islands Forum adopted the ***Disaster Risk Reduction and Disaster Management Framework for Action 2005–2015: An Investment in the Pacific Island Countries***. Pacific island leaders endorsed the ***Pacific Islands Framework for Action on Climate Change (2006-2015)*** at the Forum and endorsed the first climate change declaration at its 39th Pacific Island Forum held in Niue in August 2008. The 2006 World Bank policy note "Not If But When" heeded the abundance of such international, regional, and national strategies, frameworks, and declarations and the increased support for climate change adaptation (CCA) and disaster risk reduction (DRR) initiatives in the Pacific Island Region by development assistance partners. However, the policy note warned that the battle to reduce the negative impact of weather, climate, and other natural hazards was being lost, not won.

Assessing 7 island countries. This review is one of two activities related to natural hazard risk management in the Pacific Islands Region being funded by the Global Facility for Disaster Reduction and Recovery (GFDRR). The other, the Pacific Catastrophe Risk Pool Initiative Technical Assistance, focuses on catastrophe risk financing and transfer options.

This review is divided into two phases. Phase I is a quick assessment of needs, gaps, and opportunities for advancing risk reduction from natural hazards and climate-induced changes in 7 countries – Fiji, Kiribati, Solomon Islands, Marshall Islands, Papua New Guinea, Timor-Leste, and Vanuatu – plus one regional stocktaking analysis (World Bank, 2008a; 2008b). Since the 7 country reports and regional analysis had a vast amount of information, this synthesis report (Phase 2) helps in reviewing the approach, quality, and direction of the stocktaking exercise. Readers are urged to refer to specific country assessments for details relative to a particular country.

The results of the 7 country assessments, as well as regional data analysis and synthesis, are used to assess the degree to which analyses, warnings, and advice of the Bank's policy note and other similar international and regional declarations are being used to address climate-related and other natural hazard risks. Within this context, the national stocktaking exercises conducted in the 7 Pacific island countries were also intended to identify the adaptations and other risk-reduction initiatives that are delivering intended results and are hence worthy of replication and upscaling. Potential key priority areas of intervention will be identified from those with large payback for relatively small incremental efforts (e.g., improving existing systems in deterioration/neglect or increasing efficiency through reduced duplication of efforts).

A total approach. The focus is on successes and lessons related to both regional and national initiatives and the roles of key players and instruments, and on opportunities to catalyze significant and sustainable reductions in disaster- and climate-related risks, including entry points, actions, and players.

The trends of increasing numbers and strength of natural disasters highlighted in "Not If But When" are continuing. For now, the consequences are also

continuing to grow or show no downward trend, except for the number of fatalities per disaster. While natural hazards are not under human control, reducing the economic and social consequences of disasters requires governments, donors, private sector, and communities to work together to overcome the incalculable challenges. Consistent with the first priority of the Hyogo Framework for Action, an "all-hazards, all-of-government, and total-society" approach to hazard risk management must be pursued. Such concerted efforts are required when all available evidence supports the trend of climate-related hazards attributed to global warming increasing at an accelerated rate into the foreseeable future.

With disasters increasing in frequency and intensity as well as more and more losses per disaster, the traditional efforts focused on preparing for and responding to the impact of these catastrophes has clearly been insufficient. Particularly for developing countries (and most particularly for small developing island states) disaster losses can exceed 10 percent of gross domestic product (GDP) in disaster years and thus seriously impact already fragile economic and social development programs. More intensive land use arising from growing population pressures plus actual and potential increase in climate extremes tend to increase population vulnerability as well as the impact of disasters. Difficult and crosscutting actions are needed to fully address such issues. Both in-country commitment and sustained internal and external support are necessary when addressing the risks facing vulnerable Pacific economies and communities.

Room for optimism. While almost all donor countries now appear to believe that DRR/CCA measures are necessary in countries at risk, a comparison between assistance for pre-disaster DRR/CCA and post-disaster reconstruction activities appears to indicate that there may still be strong, residual, perverse incentives provided for reconstruction funding. This could very likely be grounded in legitimate humanitarian and other concerns. However, it also promotes status quo; the need might be for more explicit transition programs under which, for example, increased incentives support pre-disaster DRR/CCA measures.

Encouragingly, there is room for optimism. High-level policy guidance at both regional and most national levels is slowly generating action. There is growing recognition that a silo-system approach to climate and other natural hazard risks facing the Pacific Region impedes progress. The existing degree of narrow focus indicates that not all parties recognize DRR/CCA and reconstruction activities as having its own place in land use, disaster, and other planning tasks; time horizons; and other mitigation activities. Additionally, limited human and financial resources, along with the significant DRR and CCA similarities, should help countries to decide in favor of combining efforts to reduce inefficiencies arising from any such largely artificial and counter-productive distinctions between disaster risk reduction and climate change adaptation.

HFA priorities and rationale. Different sources tend to have slightly varying descriptions of the 5 priority areas of the ***Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters***. However, the main HFA message to participants is that in their approach to disaster risk reduction, states, regional, and international organizations and other actors concerned should take into consideration the following key activities and should implement them, as appropriate, to their own circumstances and capacities:

(1) Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.

A primary reason for this priority is that countries with DRM policy, legislative, and institutional frameworks and with the ability to

develop and track progress through specific and measurable indicators have greater capacity to manage risks and achieve widespread consensus for, engagement in, and compliance with DRR measures across all sectors of society.

(2) ***Identify, assess and monitor disaster risks and enhance early warning.***
The starting point for reducing disaster risk and for promoting a culture of disaster resilience lies in the knowledge of the hazards and the physical, social, economic, and environmental vulnerabilities to disasters that most societies face, and of the ways in which hazards and vulnerabilities are changing in the short and long term, followed by action taken on the basis of that knowledge.

(3) ***Use knowledge, innovation, and education to build a culture of safety and resilience at all levels.***
The rational is that disasters can be substantially reduced if people are well informed and motivated toward a culture of disaster prevention and resilience, which in turn requires the collection, compilation, and dissemination of relevant knowledge and information on hazards, vulnerabilities, and capacities.

(4) ***Reduce the underlying risk factors.***
This priority recognizes that disaster risks are related to changing social, economic, environmental conditions and land use; and the impact of hazards associated with geological events, weather, water, climate variability, and climate change are addressed in sector development planning and programs as well as in post-disaster situations.

(5) ***Strengthen disaster preparedness for effective response at all levels.***
At times of disaster, impacts and losses can be substantially reduced if authorities, individuals, and communities in hazard-prone areas are well prepared and ready to act and are equipped with the knowledge and capacities for effective disaster management.

Implementation. Upon deciding to adopt the HFA priority action plan, various actions should be taken. Most countries, which are use to post-disaster reconstruction efforts, generally have in place various institutional and related arrangements, some of which can also be used for DRR/CCA activities. However, given the more comprehensive approach called for under DRR/CCA initiatives, asking appropriate questions as a type of checklist could help to ascertain where the country is in terms of preparedness and what is subsequently needed:

- ***Taking into consideration the broader direct and indirect impacts of climate change (e.g., changing rainfall pattern, diseases, etc.), is there need for a new national DRR/CCA action plan or is the current one adequate?***
- ***If there is an adequate plan, is there an established mechanism for periodic progress review and update of the plan based on the level of actual implementation and resource mobilization?***
- ***Does development and implementation of national DRR/CCA programs include enough resourcing and support for emphasis on local and community-led initiatives?***
- ***Are there priority implementation partnerships among National Disaster Management Offices and planning, finance, and sectoral ministries on mainstreaming and sustaining DRR/CCA activities as planned?***
- ***What commitment, resources, etc. are there for taking stock of initiatives at all levels on hazard and vulnerability assessment, which can form the base for carrying out a comprehensive multi-hazard risk assessment at the national scale?***

- ***Is the country building and maintaining adequate warning system(s) for more frequent hazards it typically faces?***
- ***Is there a program of continued advocacy with wider stakeholders, especially with the private sector for integrating disaster risk reduction into appropriate activities, including school curricula?***
- ***Are there explicit agreements, plans, etc., under which donors/lenders agree to become more active partners in transition from perverse incentives to DRR/CCA over time and so shift the focus away primarily from reconstruction to DRR/CCA sustainable assistance?***
- ***Are there develop action plans to initiate implementation for retrofitting of critical buildings such as schools and hospitals in all countries of the Region?***
- ***To what degree are there partnerships with national training institutes and similar technical, planning, and related institutions to promote and support sustainable nationwide programs on capacity building for disaster risk reduction?***
- ***Have the authorities identified specific selected high-risk provinces, districts, and cities for focused implementation of local DRR/CCA programs to work in partnership with local authorities, local institutions, humanitarian NGOs, and other development partners?***

Progress made in Pacific island countries. As already noted, to varying degrees most of the 7 Pacific island countries being assessed had experience with reconstruction, along with some type of DRR and more recently with CCA programs, with the assistance in general of external donors and lenders. Available evidence indicates that all 7 countries have made substantive progress toward meeting at least some of the 9 key requirements that underpin the assessment framework used for the present 7 country assessments. However, the assessments themselves provide clear evidence of systemic difficulties in establishing an enabling environment and cross-sector focus for DRR/CCA. It is also apparent that there may be strong need for many countries to revisit the implementation list of questions above in order to better assess several weak areas (e.g., policy, regulatory, resource allocation, information base) if progress is to be made toward a more comprehensive and sustainable national response system. Overall, none of the 7 countries appears to have made substantive progress across all 9 key requirements for effective reduction of climate-related and other natural hazard risks that they face.

There are examples of explicit risk-reduction activities in most countries. However, the available evidence suggests that they are mostly donors or NGO pilots or similar initiatives with no indication of strong policy, institutional, or other such underpinning and no inter-sectoral, inter-institutional, or long-term, comprehensive and entrenched programs of risk reduction.

At the national level, an important central government function is to ensure a strong enabling environment that encourages and supports sustainable interventions to reduce risks. At the same time, local intervention by individuals, infrastructure and service agencies, the private sector, and communities is expected to tackle on-the-ground risk reduction tasks. In terms of perception, many governments in partnership with various donors, lenders, NGOs, and others appear to have commenced with DRR/CCA initiatives by formulating some key policy, legal, institutional, and related framework. In some, these (mostly data gathering and monitoring activities) predate their political independence. In the immediate post-independence period, several of these initiatives have continued but unfortunately, as noted in the detailed country reviews, data gathering and assessments and many important follow-up actions have suffered over the past decade. In communication, operational, and institutional linkages between regional, national, provincial, and local levels, as well as across

sectors, several significant gaps now exist in all 7 Pacific island countries. A key reason to improve governance, including organizational, institutional, policy, and decisionmaking frameworks, is to increase effectiveness of leadership and coordination and to provide the basis for more informed decisionmaking.

Human resource capacity. A recurrent theme throughout the Pacific Region is the ephemeral nature of capacity development. A major gap that undermines DRR/CCA is the human resources capacity issue. Capacity built is often not sustained. There is little incentive for individuals with new knowledge and skills to remain in positions for which they received training. They often seek employment that rewards their skills and expertise, or another employer takes advantage by hiring the newly trained recruits. Capacity shortfalls are acute across all 7 countries. Only when employees feel adequately rewarded and compensated in their current position will sustained capacity development be achieved. A comprehensive review is required to help identify real and sustainable solutions. Major effort is required to determine and implement the measures needed to improve retention rates. On the other hand, for the most part, the donor space is seriously crowded, notably for DRR and increasingly for CCA support. The lack of capacity within countries to absorb such assistance in an efficient and effective manner will not be easy to resolve, especially in the short term. The special relationship among several Pacific island countries with Australia, New Zealand, and other countries in hiring skilled and unskilled workers from Pacific island countries will continue to pose resource constraints for the Pacific island countries when trying to recruit and retain highly skilled workers. Therefore, priority consideration should be given to this issue if planned donor/lender initiatives are to be successfully implemented. Potential sources of relief could be found through more efficient use of regional technical assistance and technical institutions; however, this is an area that still has to be fully assessed.

Assessments and mapping. Another significant impediment to sound planning and decisionmaking related to management of natural hazard risks is the lack of assessments and hazard maps that inform identification and evaluation of risk-reducing interventions. There is a regionwide constraint related to the lack of high-resolution elevation data for both near-shore and land. An additional knowledge gap relates to understanding how future changes in climate will affect the risks posed by climate-related hazards. This gap is, in part, yet another consequence of the gulf that separates the DRR/CCA communities in the Pacific Region. Identification of the most effective and efficient ways to reduce climate and other natural hazard risks faced by communities also requires projections of climate change at subnational scales (state, island, and community), as well as realistic representation of the behavior of both the El Niño-Southern Oscillation and tropical cyclones. Both sets of information are necessary to identify hazard zones at a scale appropriate for implementing risk-reducing measures, both for present climate variability and extremes and for longer-term changes. In particular, this situation is crucial for assessment of coastal hazards, including ubiquitous erosion and storm surge risks as well as flooding risks, which are of concern to all islands in the Pacific Region.

An appropriate way to begin addressing this constraint is to undertake a regionwide program that identifies key "hot-spots" that are high priority for hazard mapping and to then provide the support for the preparation of the high-resolution digital elevation maps and locally applicable scenarios that are prerequisite to hazard mapping, risk assessments, and promotion of risk-reducing measures. In parallel, activities should be undertaken to ensure that planners and decisionmakers are equipped to make effective and efficient use of the available information.

Monitoring networks. Given the general degradation of meteorological and hydrological networks over

the past decade or so and their critical importance to climate hazard risk management, there is a need for a regional overview to ensure the re-instatement and maintenance of minimum monitoring networks and to promote synergies for in-country organizational arrangements. In all 7 countries the availability of analyzed data to inform local climate hazard assessments, infrastructure design, and land use decisions is woefully lacking. Fortunately, technological advances may be working in favor of simpler alternatives under which all countries can obtain the needed information, analysis packages, and more custom-enhanced products from third parties without incurring the traditionally high cost associated with directly owning and managing such systems.

DRR/CCA mainstreaming. Experience shows that stand-alone climate and disaster risk strategies and plans are often undermined by unfavorable national policies or investment activities even when a fully integrated and functional economic development and planning cycle is in place. Risk management of climate and other natural hazards can only be effective on a national scale when it is incorporated in these key economic and social planning instruments as well as in other national processes that are crucial to decision-making. Moreover, when such risk management is included in project planning and design, this results in the "climate proofing" of investments on the ground.

In terms of DRR/CCA mainstreaming into development policies, planning, and projects, there is clear evidence that the need is being recognized regionally and action has begun. Unfortunately, for various reasons, none of the 7 Pacific island countries appears to have so far been successful in overall mainstreaming of sustainable DRR/CCA operations as an integral part of national policies, plans, legislation, and regulations. On the other hand, several countries have achieved or are making good progress toward implementing economic development and planning cycles that include integration of longer-term development strategy, sector and project planning, and performance-based budgeting.

Integrating efforts. Rationalization of development planning and processes also provides an opportunity to address the fact that DRR and CCA programs require similar skills and institutional arrangements. Since both are elements of hazard risk management, there may be no strong reasons for countries, which face human and financial resource constraints, to establish, operate, and otherwise maintain separate strategic and planning frameworks embedded in separate departments (such as National Action Plans for Disaster Risk Reduction and National Adaptation Programs of Action). Integration of regional frameworks, national plans, and administrative systems are similarly in urgent need of rationalization to maximize the synergies between climate change adaptation and disaster risk reduction. Across the 7 countries there is also extreme urgency to update both the need for and current capabilities of appropriate early warning systems.

Local and community needs. Implementation of risk-reducing measures has largely been through a top-down flow of substantial resources into the Region and thence to countries. The investments have delivered few tangible benefits at local and community levels where risk-reduction needs are greatest. For many countries there is a wide gulf between the village/community level and the provincial or national levels. It is at the latter where scientific knowledge, mainstreaming, and capacity building are usually directed.

Success of DRR/CCA investments depends heavily on the cooperation of and coordination with local government, civil society, and the private sector. This requires extensive and inclusive consultations in order to generate significant in-country commitment. Ultimately, many risk reduction initiatives are implemented locally by civil society and the private sector.

The important roles of these key players cannot be underestimated: engagement and participation of local government, civil society, and the private sector are essential for DRR/CCA success.

In the 7 countries, there is little or no evidence of private sector activity in either disaster risk reduction or climate change adaptation. On the other hand, in the Pacific Region, civil society has a long history of coping with climate variability and extremes as well as with natural disasters, although with only a recent involvement in adaptation to climate change. There are significant obstacles to be overcome in order to establish an enabling environment that would provide for channeling of private sector activity in adaptation to climate change. This is different to the case for mitigating climate change, where commercial factors encourage private sector participation.

Regional versus country issue. Based upon various speeches of key Pacific island leaders (including Papua New Guinea and Kiribati prime ministers), the need for climate change adaptation and much of disaster risk reduction is considered externally driven and thus activities will be externally funded. It is therefore important for the countries that expectations are set out clearly and explicitly at the outset to avoid confusion and misinformed discussions. Importantly, donors should be explicit about regional versus country perspectives for disaster risk reduction. There is a widely held view by donors to Pacific island countries that natural hazard risk reduction is a regional issue. As a result, donors tend to be reluctant to fund bilaterally implementation of National Action Plans for Disaster Risk Reduction, National Adaptation Programs of Action, and other such country-specific tasks.

Monitoring and evaluation. Risk management of climate and other natural hazards requires sustained support and commitment. Monitoring and evaluation provides opportunity for accountability to and by all key players, including governments and their development assistance partners. Monitoring and evaluation provides opportunity to assess progress, which includes identifying successful interventions worthy of upscaling and replication as well as those interventions needing to be modified or terminated. With respect to DRR and CCA interventions in the Pacific, if monitoring and evaluation is undertaken, it is done so largely on a programmatic or project basis with an emphasis on procedures, outputs, and auditing. There is very little in the way of internal and consistent on-going assessment of outcomes. Therefore, at present there is no systematic way of determining if the large expenditures on DRR and CCA programs are delivering on-the-ground benefits. Given the relatively large and growing investment, a regional system should be set up for monitoring and reporting DRR/CCA-relevant inputs, outputs, and outcomes.

Country-specific interventions. The individual country assessments (World Bank 2008a) detail the participatory process by government and stakeholders in identifying priorities for investment in future DRR/CCA projects. A summary of proposed interventions in each country follows:[1]

Fiji Islands

- Establish integrated hazards information system and tools, with geographic information system capability;
- Strengthen risk reduction policy, planning, and budgetary arrangements: and
- Rationalizing and strengthening the hydrological and meteorological capability for Fiji.

Kiribati

- Establish and maintain integrated hazards information system and tools, with GIS capability;
- Establish a simple DRR/CCA institutional framework; and

[1] These will be finalized following further consultations in the countries.

- Develop effective arrangements for national disaster risk management following the appointment of a national coordinator in the Office of the President.

Marshall Islands

- Support implementation of the National Action Plan;
- Establish integrated hazards information system and tools, with geographic information system capability;
- Climate-proofing water supply systems; and
- Review, revise, and promote a building code.

Papua New Guinea

- Develop a coordinated hazard policy and integrated spatial hazard risk information and mapping system;
- Prepare and implement a CCA policy framework;
- Disseminate drought-coping strategies to at-risk rural communities;
- Develop a water supply action plan for rural communities at risk from drought;
- Support demonstration projects for climate proofing of community-based fisheries in vulnerable coastal areas; and
- Support demonstration of ecosystem-based management of prawn fishery project.

Solomon Islands

- Review the volcanic hazard and establish volcano monitoring and early warning system;
- Establish an integrated hazards unit with information system, tools, and geographic information system capability;
- Prepare a Guadalcanal flood plain management regime and monitoring and warning system;
- Support the Climate Change Division for development of a CCA policy, governance arrangements, and action plans;
- Support implementation and integration of the new institutional framework of the National Disaster Council, including climate change adaptation through national agencies and provincial government and into communities with linkages to civil society;
- Institute provincial and community awareness and DRM education; and
- Support the implementation of DRR activities and pilot investments in priority sectors and at community level.

Timor-Leste

- Develop an institutional and policy framework and organizational mechanism for disaster risk management and climate change adaptation, which allows for activities to be differentiated with an integrated framework;
- Develop meteorological monitoring capability with data management, analysis, and forecasting systems and skills;
- Support for NGO community-based DRM program at the district, subdistrict, and village levels, within a structured institutional framework as developed above; and
- Develop and support a range of professional development initiatives for cross-sector staff in areas of hazards, vulnerability assessment, and organizational management for disaster risk management and climate change adaptation.

Vanuatu

- Develop risk mapping to support town planning and village development;
- Support for implementation of the National Action Plan and National Adaptation Program of Action, including for integration of disaster risk reduction and climate change adaptation;
- Incorporate disaster risk reduction and climate change adaptation in the tourism sector;
- Institute awareness raising and education to foster links between national, provincial, and community

governance, planning, and implementation; and
- Support to the Ministry of Lands for reforming land-use policy and regulation.

Regional assessment. Interventions are required in response to needs, constraints, and opportunities that can best be addressed in ways that recognize commonalities across the Region. The efficiency and effectiveness of these interventions would also be increased through the use of regional mechanisms.

The interventions that have been identified as best serving at the regional level follow:

- Review regional hydrological and meteorological service needs of Pacific island countries;
- Develop a regional program-funding mechanism for National Action Plans for Disaster Risk Reduction and implementation of risk reduction initiatives in Pacific island countries;
- Progressively develop regional and local climate projections, especially for the larger topographically diverse countries;
- Prepare regionally consistent technical guidelines and codes for infrastructure and buildings to ensure adequate resilience of weather and climate extremes and other natural hazards; and
- Develop collaborative regional institutional arrangements for professional development and knowledge uptake in disaster risk reduction and climate change adaptation, including training focusing on the convergence of these two areas of activity.

The way forward. Success in natural hazard risk management ideally requires an "all-hazards, all-of-government, and total-society" approach. While achieving this will be exceedingly difficult for most if not all Pacific island countries, at least in the foreseeable future, it is important that all initiatives work toward implementing such an approach. Thus both in-country commitment and sustained support are necessary if the risks facing vulnerable Pacific economies and communities are to be addressed.

I. Introduction

Since the late 1980s, regional and national studies have highlighted, with increasing detail and certainty, the costly impact of natural disasters in the Pacific Island Region and how these disasters might become an even greater economic and social burden as a result of global warming. These studies were both motivated and informed by a growing number of international assessments, including the first major international assessment of global warming in 1985 by the United Nations Environment Program, the World Meteorological Organization, and the International Council of Scientific Unions, and reports of the Intergovernmental Panel on Climate Change (IPCC).[1] It soon became apparent that efforts to slow the rate of climate change by reducing greenhouse gas emissions were too little, too late. The inevitability of significant impacts quickly turned climate change from an environmental issue to one of development. Adaptation is now receiving increased attention, especially for the most vulnerable countries such as the small developing island states and the least developed countries. It may help to clarify at this point that while climate change adaptation (CCA) can have several common features with mitigation and disaster risk reduction (DRR), adaptation can also be found in better education, training, and awareness of climate change, as well as more technical measures such as drought-resistant seeds, water capture, better coastal protection, and land use policies. This synthesis report focuses upon the more common areas associated with hazard and risk reduction and mitigation in infrastructure, housing, and social amenities.

Mobilizing support

The growing consequences of natural disasters, and the prospect of these increasing even faster due to climate change, have mobilized considerable action at the international level. Under the United Nations Framework Convention on Climate Change, the ***Nairobi Work Program on Impacts, Vulnerability and Adaptation*** assists countries to improve the understanding of climate change impacts, vulnerability, and adaptation in order to better inform adaptation decisions, to enhance the integration of adaptation-related actions with those designed to achieve sustainable development, and to strengthen adaptive capacities and cooperation. Similarly, the ***Yokohama Strategy for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation*** and its ***Plan of Action*** were adopted in 1994. This Strategy identifies disaster prevention and preparedness as integral aspects of development policy and planning. Some 10 years later, in 2005, the ***Hyogo Framework for Action (HFA) 2005–2015*** identified priorities for action and key activities that would lead to (a) more effective integration of disaster risk considerations into sustainable development policies, planning, and programming at all levels, with a special emphasis on disaster prevention, mitigation, preparedness, and vulnerability reduction; (b) increased resilience to hazards by developing and strengthening institutions, mechanisms, and capacities, in particular at the community level; and (c) systematic incorporation of risk reduction approaches into the design and implementation of emergency preparedness, response, and recovery programs in the reconstruction of affected communities.

These same priorities for action in the Pacific Islands Region are addressed in the ***Disaster Risk Reduction and Disaster Management Framework for Action 2005–2015: An Investment for Sustainable Development in the Pacific Island Countries*** (***Madang Framework for Action***) adopted by the Pacific Islands Forum in October 2005 (Annex A). The Madang Framework reflects increasing national and regional commitment to disaster risk reduction and disaster management on an "all hazards" basis, in support of sustainable development. These commitments derive from the decision by Pacific Islands Forum leaders in Madang 1995 and the Auckland Declaration in

[1] The IPCC Assessment Reports were published in 1990, 1996, 2001, and 2007.

2004. In parallel, the Pacific island leaders endorsed the ***Pacific Islands Framework for Action on Climate Change*** (2006-2015) at the 36th Pacific Islands Forum held in 2005. The 2005 Pacific Islands Framework builds on ***The Pacific Islands Framework for Action on Climate Change, Climate Variability and Sea-Level Rise 2000-2004*** and has led to the ***Action Plan for the Implementation of the Framework for Action on Climate Change*** in which national activities are complemented by regional programming. The 2006-2015 timeframe of the 2005 Framework is consistent with the timeframes of the ***United Nations Millennium Declaration,*** the ***Johannesburg Plan of Implementation,*** and the subsequent work of the United Nations Commission on Sustainable Development.

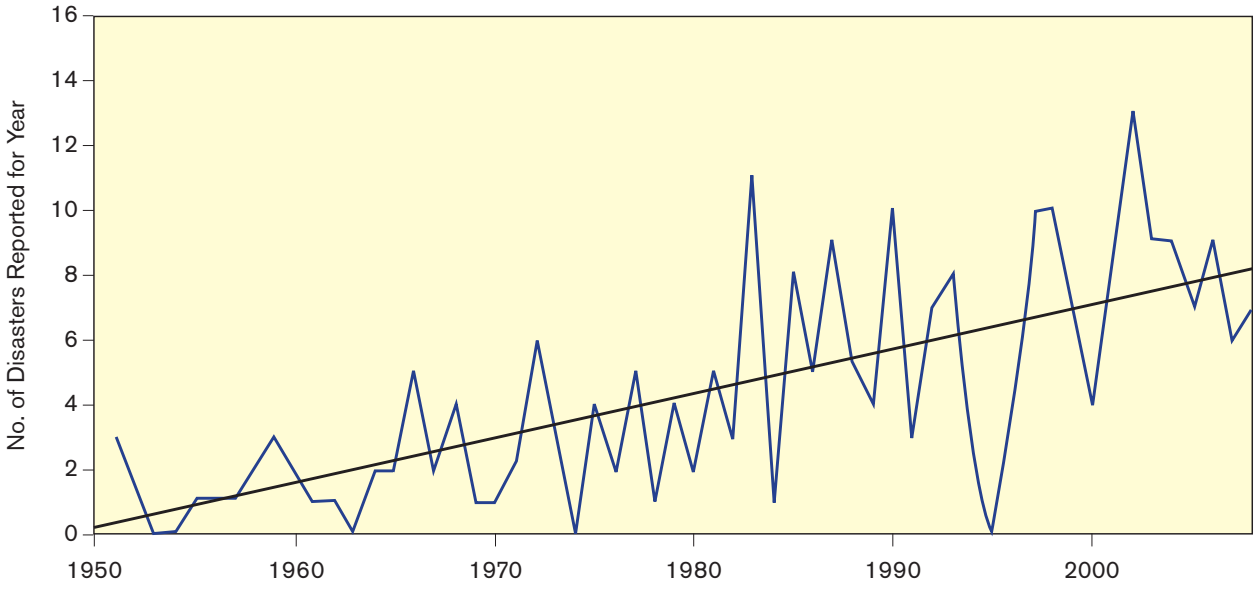
The World Bank (2006) policy note "***Not If, But When***" heeded the abundance of international, regional, and national strategies, frameworks, and declarations, and the increased support of adaptation and other natural hazard risk management initiatives in the Pacific Islands Region by development assistance partners. However, it warned that the battle to reduce weather, climate, and other natural hazards was being lost, not won. The policy note highlighted the combination of increased frequency and intensity of tropical cyclones, more people living in vulnerable areas, and the low and declining resilience of infrastructure and other development assets.

Watching the trends

Since the early 1950s, when the quality of disaster monitoring and reporting improved, there has been a general increasing trend in the number of disasters reported annually in the Pacific Islands Region (Figure 1). However, the frequency of disasters reached a maximum in 2002 – the six years following (2003-2008) represent the longest period with a consistent decline in disaster numbers.

The lower number of disasters reported in recent years should not be used as early evidence of the benefits flowing from the increased efforts in disaster risk management (DRM), both nationally and regionally.[2]

Figure 1. Number of natural disasters reported in the Pacific Islands Region, 1950-2008



Source: EM-DAT, the International Disaster Database.

[2] All trend data presented in this report must be interpreted with care, as the accuracy of reporting has improved substantially in recent years.

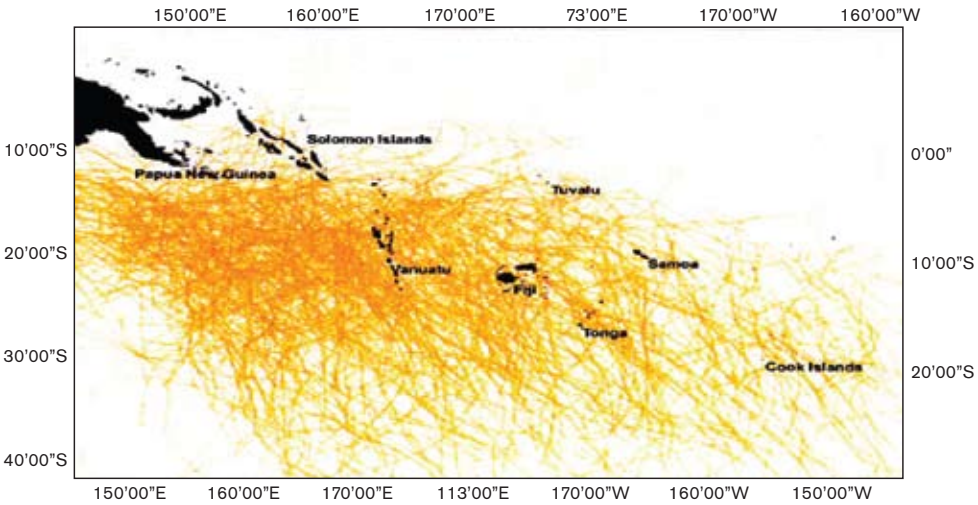
Most of the natural disasters experienced in the Pacific Islands Region are weather and climate related with flood, storms, and wave surges associated with tropical cyclones being the predominant causes (Table 1). Tropical storm risk zones have been determined based on historical data (Figures 2 and 3). Figure 3 shows the minimum intensity of a tropical storm that can be expected to occur on average once every 100 years. The substantial variation in recurrence interval across the Region is a major reason for the significant differences between countries in the cumulative social and economic consequences of natural disasters (Table 2).

Table 1. Frequency and estimated economic and social impacts of disasters in the Pacific Islands Region (1950-2008)

Type	*Number*	*Killed*	*Total Affected*	*Total Victims*	*Economic Damages US$ 2008*	*No. with Economic Damages*
Drought	8	60	947,635	947,695	66,666,667	1
Eartquake	28	139	38,400	38,539	205,616,905	7
Epidemic	11	306	9,668	9,974	0	0
Flood	26	110	433,517	433,627	221,092,362	10
Landslide	15	525	2,563	3,088	0	0
Storm	134	1,566	1,937,467	1,939,033	6,129,849,318	57
Volcano	17	3,009	194,399	197,408	159,420,290	1
Wave Surge	4	2,534	11,574	14,108	0	0
Wild Fire	2	0	9,000	9,000	67,340,426	1
Total	**245**	**8,249**	**3,584,223**	**3,592,472**	**6,849,985,967**	**77**

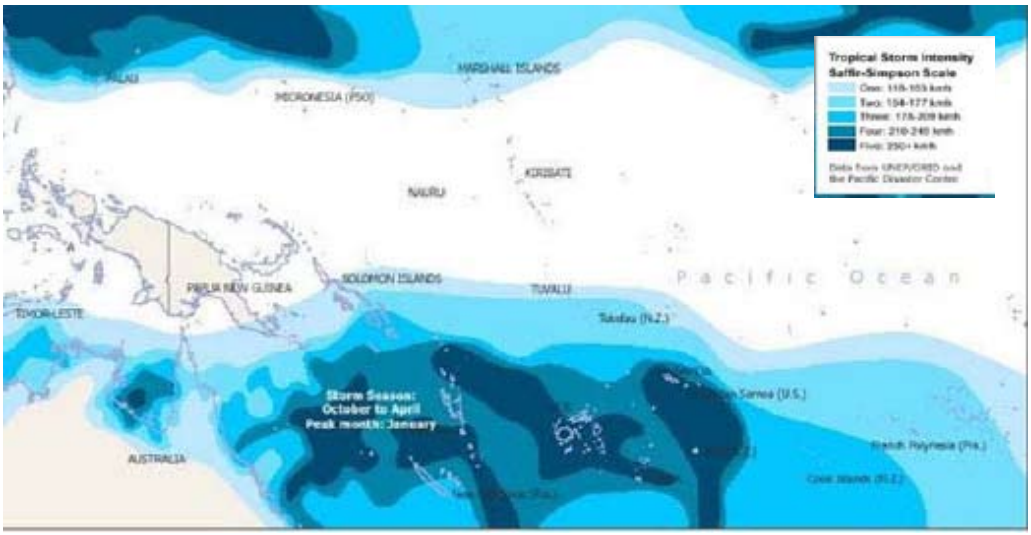
Source: EM-DAT, the International Disaster Database.

Figure 2. Historical tropical cyclone activity in the South Pacific Region,1945-2007



Source: Air Worldwide Corporation (2008).

Figure 3. Tropical storm risk zones in the Pacific Islands Region



Source: OCHA (2006).

Table 2. Estimated economic and social impact of disasters in selected Pacific Island countries (1950-2008)

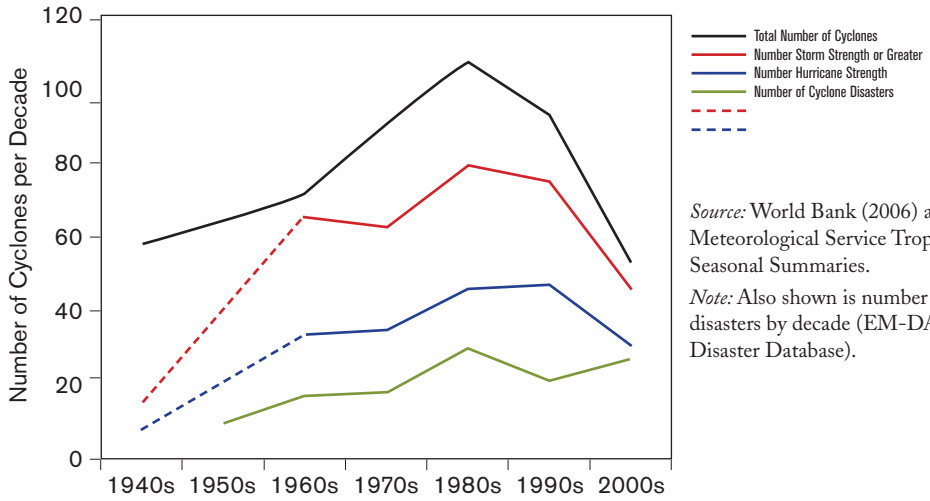
Country	No. of Disasters	Loses (US$ 2008)	Average Population Affected %		Average Impact on GDP %	
			Disaster Years	All Years	Disaster Years	All Years
American Samoa	6	237,214,770	5.81	0.61	7.76	0.82
Cook Islands	9	47,169,811	5.13	0.63	3.48	0.43
Fiji	43	1,276,747,934	5.39	2.74	3.48	0.78
French Polynesia	6	78,723,404	0.53	0.04	0.31	0.02
FSM	8	11,915,993	6.20	0.65	0.82	0.09
Guam	10	3,294,869,936	1.97	0.28	10.13	1.42
Kiribati	4	0	29.19	1.54	0.00	0.00
Marshall Islands	3	0	6.40	0.22	0.00	0.00
New Caledonia	15	69,623,803	0.14	0.03	0.09	0.02
Niue	6	56,461,688	73.15	7.70	80.88	8.51
Papua New Guinea	58	271,050,690	0.69	0.36	0.14	0.07
Samoa	11	930,837,187	21.15	3.71	16.97	2.98
Solomon Islands	21	39,215,686	2.93	0.98	0.52	0.17
Tokelau	4	4,877,822	39.70	2.79		
Tonga	12	129,344,561	21.32	3.37	5.76	0.91
Tavalu	5	0	3.19	0.28	0.00	0.00
Vanuatu	36	406,402,255	5.33	2.06	3.78	1.46
Wallis & Futuna Island	4	0	9.74	0.51		

Source: EM-DAT, the International Disaster Database.

Figure 4 shows that the number of cyclone-related disasters continued to increase into the current decade. This is likely related to the fact that, while the annual occurrence of tropical cyclones of all strengths has declined substantially since the peak in the 1980s, the number of cyclone disasters has not shown a similar decline.

The occurrence of natural hazards is beyond human control. Increases in both frequency and intensity of these extreme events, a possible consequence of global warming, are something humans must learn to live with. However, the economic and social consequences that turn these hazardous events into disasters are definitely under human influence. For example, major investments in disaster preparedness and response in recent decades appear to be associated with a decline in the number of fatalities per disaster (Figure 5). However, population growth and relocation have contributed to an overall trend of more people being affected by disasters (Figure 6),

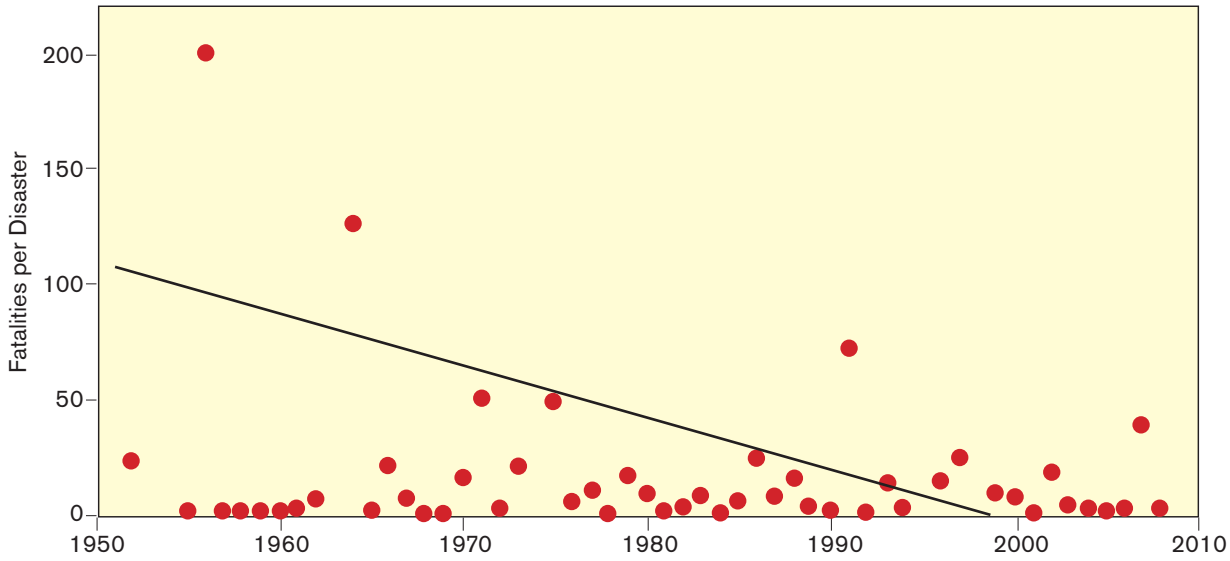
Figure 4. Reported number of cyclones in the southwest Pacific, 1940s – 2000s



Source: World Bank (2006) and Fiji Meteorological Service Tropical Cyclone Seasonal Summaries.

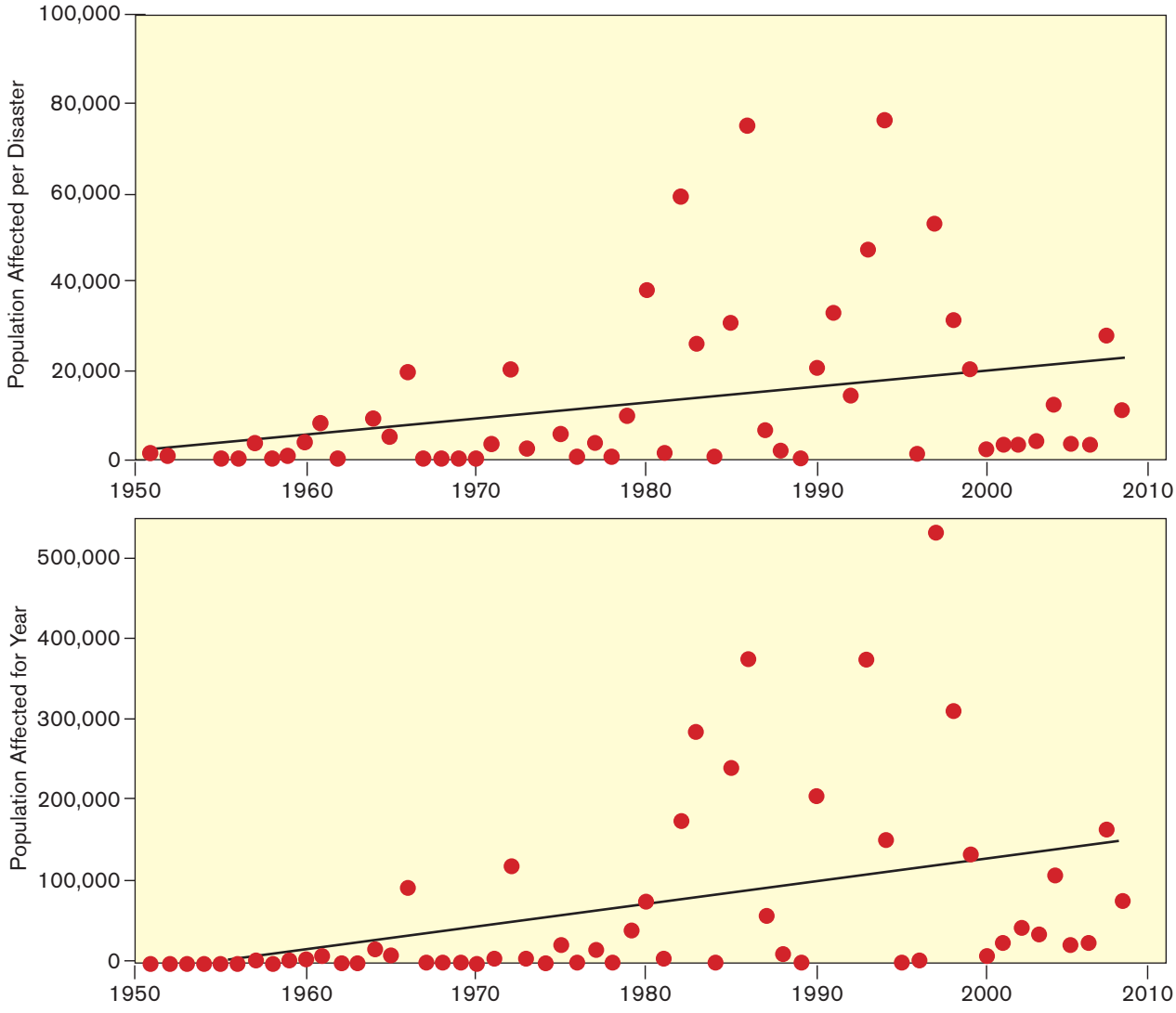
Note: Also shown is number of cyclone-related disasters by decade (EM-DAT, International Disaster Database).

Figure 5. Number of human fatalities per disaster reported in the Pacific Islands Region, 1950-2008



Source: EM-DAT, the International Disaster Database.

Figure 6. Total population affected per disaster (*top*) and annually (*bottom*) in the Pacific Islands Region, 1950-2008



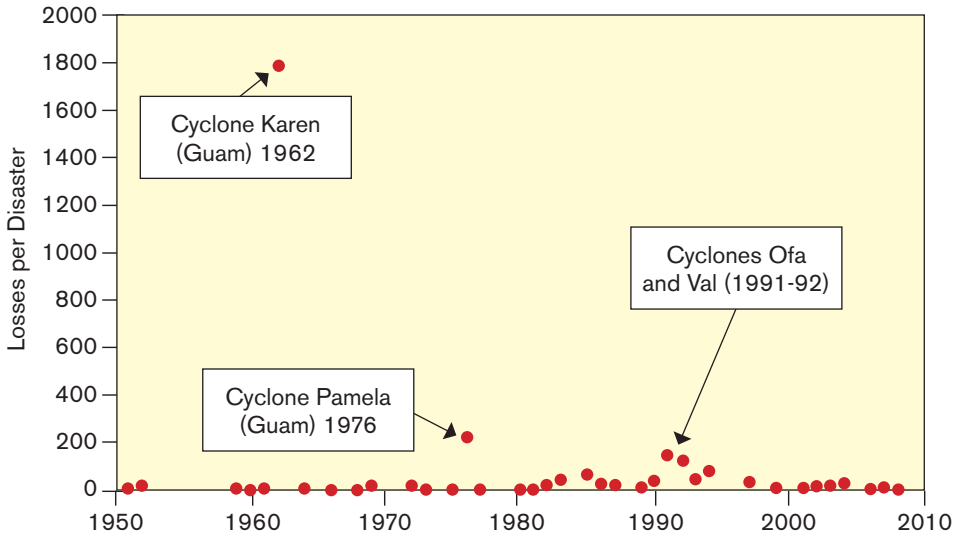
Source: EM-DAT, the International Disaster Database.

though the numbers of people affected are consistently lower for disasters occurring in the present decade. Encouragingly, economic losses per disaster have also been consistently low in recent decades (Figure 7) although here again, it is rather difficult to compare the path, intensity, and other such characteristics of different events and their impact upon any specific location at different times.

Synthesizing the analysis

Two important findings arise from the preceding analyses. First, the considerable national and regional efforts in disaster management (disaster risk reduction and disaster preparedness and response) appear to be delivering results, notably in declining number of fatalities per disaster, but more recently in the number of people affected by disasters. This is despite

Figure 7. Average losses per disaster reported in the Pacific Islands Region, 1950-2008
(in millions of constant 2008 US$)



Losses computed only for disasters where economic losses were reported

Source: EM-DAT, the International Disaster Database.

population changes that now place more people at risk and despite indications that the intensities of tropical cyclones have increased in recent decades.

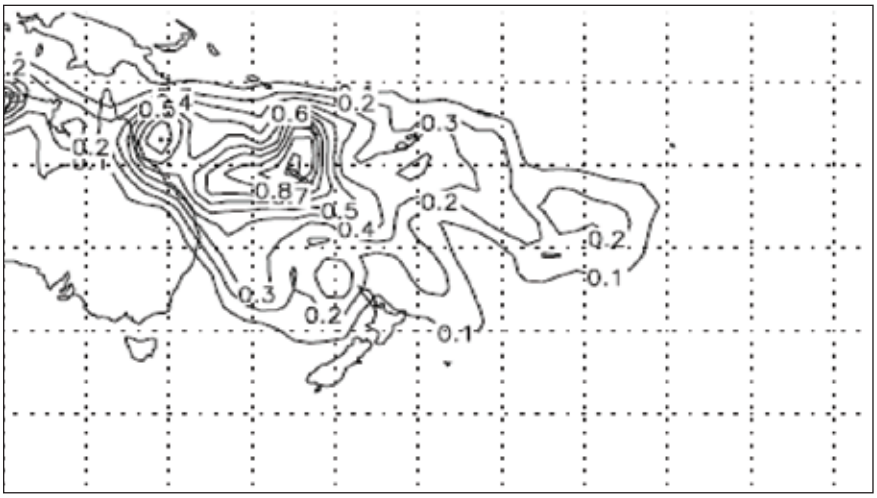
Second, and in contrast to the good news in the first finding, the present decade is anomalous in that there have been relatively fewer tropical cyclones, and hence fewer extreme events of disastrous proportions. This is likely associated with the decade being dominated by La Niña conditions, during which cyclone frequency is low for much of the Pacific (Figure 8). Importantly, climate projections suggest that, as a result of global warming, conditions in the Pacific will become increasingly El Niño-like. For this reason, cyclone frequencies are likely to increase for much of the Pacific Island Region, more consistent with the pattern shown in Figure 9. Moreover, the observed increases in the intensity of tropical cyclones may well continue.

Thus the immediate future will likely see a change from the relatively benign conditions of the present decade to conditions more reminiscent of those of the 1980s when El Niño conditions dominated and the frequency of weather and climate extremes was much greater than now. On top of this, the intensity of tropical cyclones may well be substantially higher.

All available evidence points to a combination of natural variability and global warming resulting in a substantially higher number of extreme weather events in the foreseeable future. This leads to a key question. ***Will the recent and ongoing progress in disaster management, and especially in disaster risk reduction, be sufficient to protect people and property from a future increase in the number of potentially disastrous events brought about by a combination of climate variability and change?***

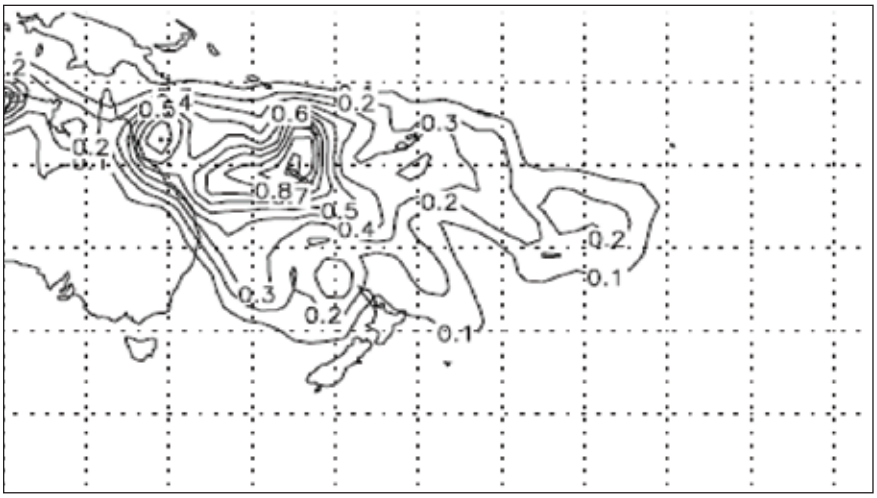
Particularly for developing countries, especially for small developing island states, disaster losses can exceed 10 percent of GDP in disaster years (refer back to Table 2), thus seriously impacting already fragile economic and social development programs. In contrast, in industrialized countries, disaster losses seldom approach 1 percent of GDP. The increase in hazard risks

Figure 8. Average annual number of tropical cyclones in the Southern Hemisphere in La Niña (Years in 2° x 2° boxes)



Source: Kuleshov and others (2008).

Figure 9. Average annual number of tropical cyclones in the Southern Hemisphere in El Niño (Years in 2° x 2° boxes)



Source: Kuleshov and others (2008).

due to land use changes and population pressures along with the observed and anticipated future increases in extreme weather and climate events mean that reducing the consequences of these events/disasters presents a major challenge. The required responses involve crosscutting and, hence, difficult actions. Reducing the consequences of disasters requires governments, donors, private sector, and communities to work together. Success will require an "all-hazards, all-of-government, and total-society" approach to hazard management. While achieving this will be difficult for most if not all Pacific island countries, at least in the foreseeable future it is important that all initiatives work toward implementing such an approach. Thus both in-country commit-

ment and sustained support are necessary if the risks facing vulnerable Pacific economies and communities are to be addressed.

The reduced economic and social consequences of the extreme natural events experienced in the current decade suggests that the high-level policy guidance that is now in place at both regional and most national levels is seeing action, albeit slowly. Both the regional frameworks for disaster risk management and for addressing climate change highlight the importance of a strong enabling environment at national level, even for community-based responses. Many countries have taken important steps in this direction. As part of its ongoing adaptation project, Kiribati is now implementing the second stage of its action plan for climate change adaptation and disaster risk reduction. The Marshall Islands has been making good progress at the higher level of government in developing governance structures and an enabling environment favorable to "on-the-ground" DRR/CCA initiatives. The DRR/CCA policy framework, provided by the Marshal Islands' ***Vision 2018: The Strategic Development Plan Framework 2003-2018***, foreshadows the synergies between disaster risk reduction and climate change adaptation. The National Disaster Council Act (1989) of the Solomon Islands, supported by the National Disaster Plan (1987), established a National Disaster Council, which in turn is supported by a National Disaster Management Office. In part as a result of recent shortcomings in responses to disasters, the National Disaster Council is reviewing the institutional framework for disaster risk management. The Solomon Islands intends to develop a National Action Plan for Disaster Management, and a new Climate Change Division of the Ministry of Environment, Conservation and Meteorology has responsibility for climate change adaptation.

Unfortunately, such discrete initiatives are limited in the effort to reduce climate and other natural hazard risks. While necessary, they are unlikely to be sufficient to address the likely return to more frequent and more extreme weather and climate events. One of the important realizations in recent years is that sustained reductions in natural hazard risks can be achieved only through an integrated, ongoing, and dynamic strengthening process (Figure 10). This encompasses five major components of the enabling environment:

- Wider knowledge and decision support tools;
- Specific assessments of risk and vulnerability for decisionmakers and other users;
- Mainstreaming risk reduction into plans, policy, legislation, and regulations;
- Monitoring and evaluation; and
- Awareness raising and capacity building through a wider range of sources (peer to peer, academic institutions, NGOs, etc).

The integrated, ongoing, and dynamic strengthening process also encompasses initiatives that achieve outcomes providing for and promoting sustainable risk reduction:

- Mobilizing and capturing the benefits of grassroots action by the private sector and civil society;
- Good governance and informed decisionmaking;
- Effective leadership and coordination among government agencies;
- Harmonization of needs-driven donor contributions; and
- Well-organized and integrated policy, planning, and budgetary processes.

Aligning DRR and CCA activities

Disaster risk reduction and climate change adaptation are at different stages of implementation in the Pacific Islands Region. The former has been around longer and has more well-established frameworks and pathways to risk reduction. Despite the limitations arising from the narrow focus on disasters, disaster

Figure 10. Policy framework for climate change adaptation and disaster risk reduction

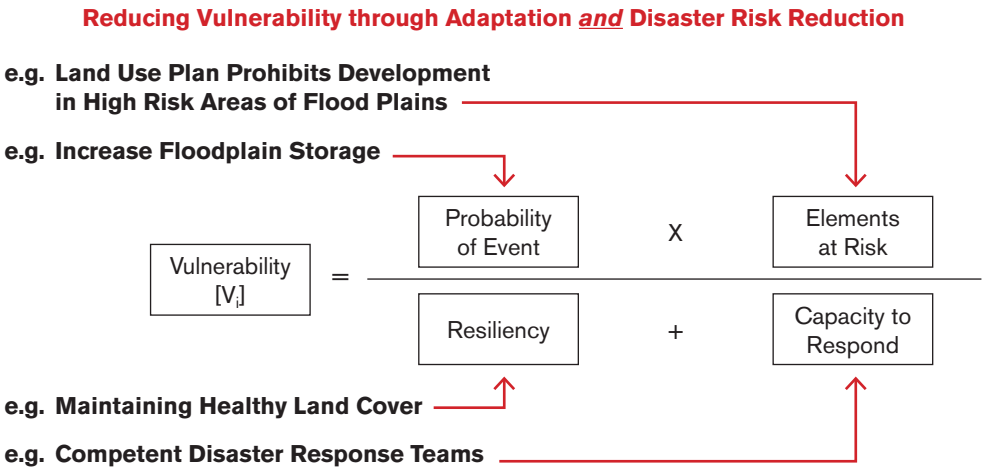
risk reduction has developed steps that lead to implementation and tangible reductions in risk. In contrast, climate change adaptation is still in its relative infancy. Many stakeholders appear to still have difficulty identifying exactly what constitutes climate change adaptation; a brief definition follows to aid in understanding:

> ***Disaster risk reduction*** is concerned with risks from ***present*** climate variability and extremes while ***climate change adaptation*** is focused relatively more upon increasing extremes of climate events and the ***future*** changes in those risks which should be taken into account.

Consequently, the primary difference between the two lies more in their respective timescales. In spite of this, the fact that DRR and CCA activities came into focus over different time periods has to some degree influenced the institutional, administrative, and legal frameworks, as well as the scientific knowledge base, regional and national policy approaches, methodologies, funding mechanisms and related ways that several countries, especially those in the Pacific, have responded to the challenges posed. This ignores the strong alignment between climate change adaptation and disaster risk reduction (Figure 11) and the major synergies to be captured, especially where many of the Pacific island countries face such challenging resource constraints.

This recognition requires both conceptual understanding of the commonality of interests in terms of risk reduction and additional risks posed by climate change, as well as a rationalization of the work programs of regional and national organizations in ways that are more outcome-driven, instead of their current mandate-driven approaches.

Figure 11. Illustrating the conceptual and practical commonalities between climate change adaptation and disaster risk reduction.



Hay (2008); adapted from Cord & van der Vink (2007)

Rationalization of development planning and processes can also provide an opportunity to address the fact that climate change adaptation and disaster risk reduction are both elements of hazard risk management, requiring similar skills and institutional arrangements. There may therefore be no strong reasons for countries, especially those facing human and financial resource constraints to establish, operate, and otherwise maintain separate strategic and planning frameworks embedded in separate departments (for such things as National Action Plans for Disaster Risk Reduction and National Adaptation Programs of Action, and the like). Integration of regional frameworks, national plans, and administrative systems are similarly in urgent need of rationalization to maximize the synergies between climate change adaptation and disaster risk reduction. One benefit of disaster risk reduction and climate change adaptation converging would be the opportunity for the latter to build on the work of the former in order to get fast-track adaptation on the ground. Across the 7 countries included in the assessment there is also extreme urgency to update both the need for and current capabilities of appropriate early warning systems.

Especially in the short and medium term, most impacts of climate change will materialize through extreme events that often reach disaster proportions. Thus reducing disaster risk is a key "no-regrets" CCA strategy – regardless of whether or not global efforts are successful in arresting climate change. Investing more in disaster risk reduction is a fail-proof way to avoid setbacks to the development agenda and at the same time, reduce requests for post-disaster humanitarian and crisis-related assistance. Achieving a DRR/CCA convergence will require strong national and regional coordination mechanisms that encourage systematic dialogue and information exchange among relevant agencies, focal points and experts.

In the following sections, a synopsis of the country assessments and a synthesis of the findings will be used to identify which efforts to reduce climate and other natural hazard risks are working, how these successes can best be replicated and up-scaled, which interventions are failing to deliver, and how best to respond to these lessons learned.

II. Context and Framework for Synthesis of the Country Assessments

The ***Madang Framework*** identifies 6 guiding principles for accelerating the implementation of disaster risk reduction and disaster management policies, planning, and programs (Table 3 and Annex A). While they are consistent with the 5 priorities of the ***Hyogo Framework for Action*** and are applicable at national, regional, and international levels, they reflect needs of the Pacific Islands Region. Priority is given to national and local actions that address community-based needs and support relevant responses. The ***Pacific Islands Framework for Action on Climate Change*** is also guided by 6 principles, though one relates to mitigation specifically and is thus not listed in Table 3. Clearly the two frameworks share many principles in common, further highlighting the substantive commonalities between supporting disaster risk reduction, response, and recovery on the one hand, and facilitating climate change adaptation on the other. However, the principles underpinning the ***Madang Framework*** are far more comprehensive and overall are more consistent with the enabling environment and process outcomes discussed in the Introduction.

Framework for the multi-country synthesis

The 9 key requirements in the framework used for the synthesis of the country assessments are listed in Table 3. These are based not only on common elements of the Madang and Pacific Islands Frameworks, the enabling environment components, and the process outcomes, but also on elements that are not common but are nevertheless critical to advancing adaptation and management of other natural hazard risks in the Region. All 7 assessed Pacific island countries have made substantive progress toward meeting at least some of the 9 key requirements for effective reduction of climate-related and other natural hazard risks. Vanuatu has completed both a National Action Plan for Disaster Risk Management and a National Adaptation Program of Action and has made significant progress in establishing influential task forces and committees for implementation and cross-sectoral coordination. Fiji has made a start in mainstreaming by explicitly incorporating disaster risk reduction and climate change adaptation into its national development strategy and has an active awareness-raising program for outreach to provinces and communities in terms of disaster response. The Solomon Islands Government has demonstrated commitment to climate change adaptation by creating a new, higher-level Climate Change Division and bolstering its staff and resources. The Marshall Islands has completed a National Action Plan for Disaster Risk Management and has created a cross-sector mechanism for implementation aimed, in the first instance, at mainstreaming activities. Papua New Guinea has established a new Office of Climate Change and Environment Sustainability to focus broader climate change activity, including adaptation. Timor-Leste has adopted a strong disaster risk management policy. In Kiribati there have been concerted efforts to improve the enabling environment through the two phases of the Kiribati Adaptation Project.

Table 3. Frameworks for Disaster Management, Climate Change Adaptation and the Present Synthesis

Disaster management framework (Madang)	*Climate change framework (Pacific Islands)*	*Enabling environment and process outcomes (World Bank) **	*Key requirements (Framework for present synthesis)*
Governance: organizational, institutional, policy and decisionmaking frameworks	Governance and decisionmaking	Good governance and informed decisionmaking	(1) Governance: organizational, institutional, policy and decisionmaking frameworks, fostering effective leadership and coordination, and informed decisionmaking
	Partnerships and cooperation	Effective leadership and coordination among government and regional agencies	
Knowledge, information, public awareness and education	Education, training and awareness	Wider knowledge and decision support tools	(2) Creation and application of knowledge and skills, wider understanding, and decision support tools; and building absorptive capacity
		Awareness raising and wider capacity building	
Analysis and evaluation of hazards, vulnerabilities and elements at risk	Improving general understanding of climate change	Assessments of risk and vulnerability	(3) Analysis and evaluation of climate and other natural hazard risks and associated vulnerabilities
Planning for effective preparedness, response and recovery		Mainstreaming risk reduction into plans, policies, legislation, regulations	(4) Well-organized and integrated policy, planning and budgetary processes, including mainstreaming risk reduction into national and sector plans, policies, legislation, regulations
		Well-organized and integrated policy, planning and budgetary processes	
Effective, integrated, and people-focused early warning systems			(5) Effective, integrated and people-focused early warning systems
Reduction of underlying risk factors	Implementing adaptation measures		(6) Reduction of underlying risk factors through adaptation and other interventions
		Grassroots action by the private sector and civil society	(7) Mobilizing and capturing the benefits of grassroots action by the private sector and civil society
		Harmonization of needs-driven donor contributions	(8) Harmonization of needs-driven donor contributions
		Monitoring and evaluation	(9) Monitoring and evaluation

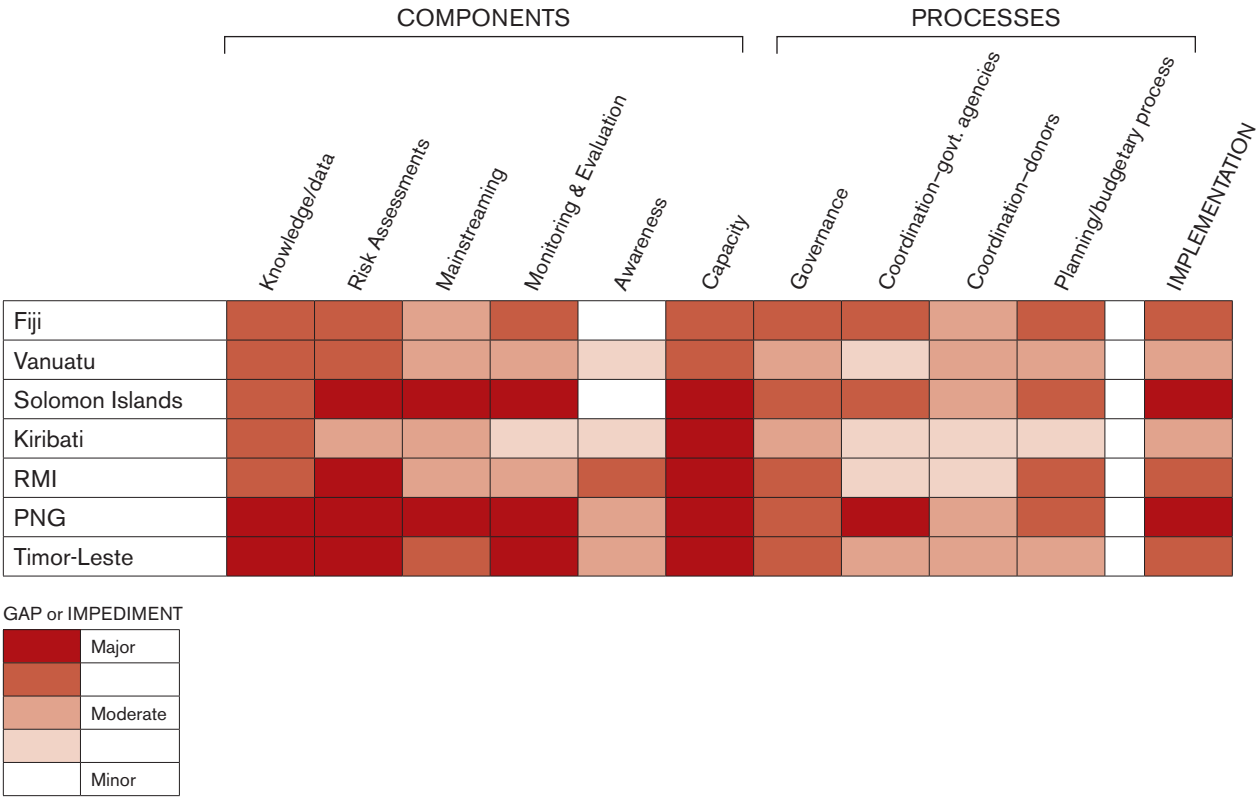
* World Bank (2008b).

While in all cases there is still a long way to go for implementation, in terms of change over the last decade, progress in policy development with various accompanying institutional/administrative provisions have been comparatively substantial. The challenge is how to consolidate and build upon these initiatives, many of which initially offered great promise but in time were unable to maintain momentum.

Having noted some progress, the 7-country assessments also provide clear evidence of some systemic difficulties in establishing an enabling environment and cross-sector focus for disaster risk reduction and climate change adaptation. It is also clear that the actions taken so far, while necessary, are not sufficient for sustained and systematic DRR/CCA progress; and at several key political, administrative, regulatory, sectoral, spatial, and related levels, there is still need for much stronger government commitment and action. Overall, none of the 7 countries has made substantive progress across all 9 requirements, leading to the checkered pattern in Figure 12, as well as the conclusion that there has been relatively little progress with implementing tangible, on-the-ground risk reduction interventions.

This is not to say that nothing is happening. There are examples of explicit risk-reduction activities in most countries. Vanuatu has re-located a village at risk from coastal flooding and added roof water-harvesting systems against the risk of droughts. The Marshall Islands, with European Union support, is embarking on a project to improve water-harvesting and water-quality

Figure 12. The relative importance of the components and processes of the enabling environment as gaps or impediments to risk reduction across the 7 countries.



Source: World Bank (2008a).

improvements to reduce drought impact and risks to health. Papua New Guinea has explicitly undertaken activities to reduce drought risks in the highlands by promoting crop diversification and by provision of wells in villages. However, these again tend to be one-off activities or pilot projects at best, often driven by donors or NGOs, with no evidence of long-term, comprehensive and entrenched programs of risk reduction.

The reasons that have been identified by the World Bank (2006) and the Global Environment Facility (GEF, 2008) and confirmed in the country assessments can be summarized by the following:

- Insufficient commitment to sustained national programmatic support for the development and application of mechanisms for hazard risk reduction across sectors and in communities.
- Assistance programs are typically externally driven, with a short-term project focus – reflecting a lack of champions, ownership, and commitment for in-country interventions that are longer term and needs driven.
- Insufficient attention to multi-faceted governance frameworks and mainstreaming of risk reduction in policies, plans, and operational activities.
- Universally weak institutional frameworks at national level for defining roles, accountabilities, and linkages across sectors and between levels of government, in ways that would give effect to the existing or emerging national hazard risk management policies.
- Separation of climate change adaptation and disaster risk reduction, both regionally and nationally, and hence the failure to capture the synergies and reduce redundancies and other inefficiencies across sectors, levels of government, and civil society.
- Shortfalls of in-country capacity for hazard and vulnerability assessment and for program development and implementation, exacerbated by the separation of disaster risk reduction and climate change adaptation at all levels. Peer systems, local academic institutions, and other such sources could also be called upon to help in this task.
- Widespread degradation of hazard and climate monitoring and information management systems, impeding the identification of areas, assets, operations, and communities at risk as well as their vulnerabilities.
- Weak regional collaboration mechanisms for financial and technical assistance that supports implementation of national policies and programs such as the National Action Plans and National Adaptation Programs of Action.

Other key overall findings emerging from the 7 country assessments are presented using the analytical framework presented in Table 3. The focus is on successes and lessons related to both regional and national initiatives, the roles of key players and instruments and on opportunities to catalyze significant and sustainable reductions in disaster- and climate-related risks, including entry points, actions, and players.

Governance: organizational, institutional, policy, and decisionmaking frameworks

An important function of a national government is to ensure a strong enabling environment that encourages and supports interventions to reduce risks. However, individuals, infrastructure and service agencies, the private sector, and communities will for the most part make on-the-ground risk reductions locally. But in terms of perception, communication, and operational and institutional linkages between regional, national, provincial, and local levels, as well as across sectors, there are large and debilitating gaps in all 7 Pacific island countries.

In both the Solomon Islands and Vanuatu about 75 percent of the population is rural and pursues subsistence livelihoods. These people have little identification with, or connection to, the national economy or

government. Similar situations exist elsewhere in the Pacific, especially in relation to the large disconnections between the urban centers and the outer islands. These, along with several unique socio-cultural features (e.g., communal land ownership, ethnic, linguistic and related diversity) tend to impede attempts to implement risk-reduction measures such as land-use planning, improved communications, building codes, and compliance with provisions for environmental protection. For instance, various groups opposed building codes for the Marshall Islands drafted over a decade ago (reportedly opponents saw a win-lose rather than a win-win proposal); consequently, local governments never enacted these laws. Fostering the close linkages between the various levels of governance and between government, civil society, and the private sector is one of the biggest challenges facing the 7 countries in their attempt at DRR/CCA implementation.

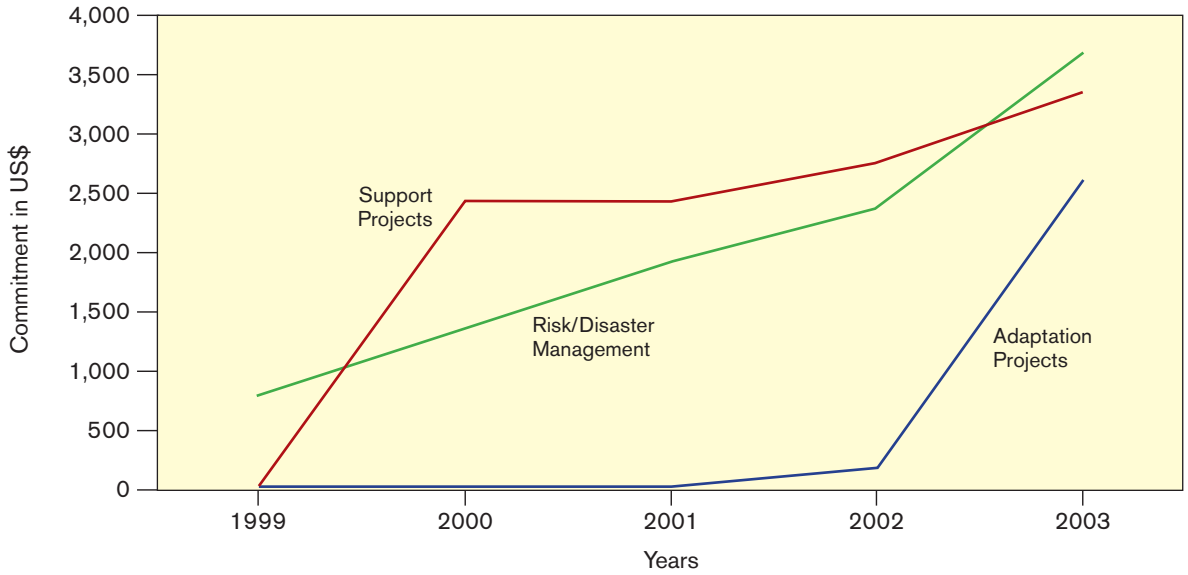
Key reasons to improve governance are to increase the effectiveness of leadership and coordination and to provide the basis for more informed decisionmaking. More effective institutional arrangements at the country level may result if there is stronger strategic and operational planning. All 7 countries require guidance and other assistance to achieve such outcomes. Support for the development of appropriate institutional arrangements for mainstreaming hazard risk management is paramount. Given the importance of this issue, it is imperative that assistance be available to countries to support hazard monitoring, development and utilization of analysis tools, information systems, and codes and guidelines for good practice. In all countries these mechanisms appear to have degraded over the past 10-15 years. There is a need to identify the sources of decline and to work with the appropriate stakeholders to help address the causes of such degradation. Information tools and other instruments are part of the institutional requirements for mainstreaming and for understanding on-the-ground risks in ways that inform planning and decisionmaking. There are historical and current support arrangements with Australia and New Zealand that could form the basis of a new focus and strengthened framework. However, while such sources of assistance will be important for the foreseeable future, special efforts will have to be made to encourage greater transition arrangements under which efforts by the individual Pacific island countries, aided by stronger regional and related institutions, become more prominent.

Regional organizations have an important role to play here. The mandated regional agency for managing hazard risks is the South Pacific Applied Geoscience Commission (SOPAC). For matters related to climate change, the Secretariat to the Pacific Regional Environment Program (SPREP) is the mandated agency. Pacific Islands Forum leaders decided in 2007 that at least part of SOPAC should be merged with SPREP. This is consistent with the recommendation to consider the similarities and possible synergies between the DRR/CCA issues, along with the need for improved alignment of regional cooperation and coordination related to financial and technical assistance to reduce national exposure to climate and other natural hazards.

There is an urgent need for a strategic regional initiative that will provide guidance to the relevant agencies in the Council of the Regional Organizations in the Pacific (CROP), as well as to the member countries. Through this and other ways, more careful consideration could be given toward acquiring the relevant knowledge and skills to help in dealing with barriers that are reducing the effectiveness of current efforts to reduce climate and other hazard risks and also delaying the implementation of needed interventions. Such guidance could also help identify sources of co-financing and also monitor and evaluate activities designed to address regional needs.

Internal regional and local peer-to-peer initiatives, with judicious and strategically provided bilateral/multilateral assistance and a more proactive government role, will

Figure 13. Funding commitments for adaptation and risk/disaster management



Note: Support projects include capacity building, research, and monitoring.

Source: World Bank (2006).

be among the key tools for promoting sustainable DRR/CCA activities. The SOPAC-sponsored Pacific Disaster Risk Management Partnership Network and the SPREP-sponsored Pacific Climate Change Roundtable could be two important foundation pieces for such an approach.

The SOPAC and SPREP should refrain from over-assuming a service-provider function that over-stretches their resources required for their leadership and mentoring roles. By working together within a unified structure and assisting member countries to work through their own HFA priorities, SOPAC and SPREP can help ensure an appropriate policy, institutional, legal, and administrative framework while improving alignment of DRR and CCA initiatives and setting an example to countries and other stakeholders with meaningful measurable outcomes and performance indicators.

As SOPAC and SPREP make progress in harmonizing and aligning their interests, there will also be need to widen the focus to other UN-affiliated agencies and regional NGOs and other organizations and groups that are incorporating climate change into their strategies and work programs. Attempts appear thwarted to use regional partnerships and networks to ensure effective cooperation and commonality of purpose among the mandated lead organizations and these other agencies. A lack of knowledge of what roles each can play tends to lead to each one to play to its perceived individual comparative advantages.

Creating and applying knowledge, skills, and tools, and building absorptive capacity

A major gap that threatens DRR/CCA implementation is human resources capacity. This issue is one on which DRR/CCA success depends, and one that deserves serious consideration in the context of capacity building in small Pacific island states. Project technical assistance is unsustainable and regional organizations, because of the sheer scale of the challenge, are often limited to an advisory role and some limited backstopping. The required investment in fully covering human

resource capacity needs in the Region is far too ambitious for this particular project; a comprehensive review is required to identify a real and sustainable solution.

Capacity shortfalls are acute across all 7 countries (refer back to Figure 12). On the other hand, for the most part the donor space is seriously crowded, notably for disaster risk reduction and, increasingly, for climate change adaptation (Figure 13). Moreover, there is a general lack of capacity within countries to absorb such assistance in an efficient and effective manner. Kiribati, for example, has benefited from concerted donor attention over the last decade aimed at creating an enabling environment conducive to sustainable risk reduction, particularly with regards to climate change adaptation, but the country is severely limited by in-country expertise for implementation. Vanuatu has explicitly recognized this problem and is adamant that any external technical assistance should be aimed at building the in-country capacity required for sustained risk reduction. Where human capacity is enhanced, there is often little incentive for skilled people to remain. While these problems remain, there is little chance to build effective, sustained, in-country programs of Kiribati and the other countries without continual "top-up" by external agencies.

Significant barriers to effective risk reduction that is common to all countries are the relatively low-level availability and utilization of relevant knowledge, skills, wider understanding, and decision-support tools; and shortfalls in data management and information-sharing mechanisms. These contribute to the scarcity of hazard maps, risk analyses, and vulnerability assessments for planning and decisionmaking. In several countries the situation regarding data collection has been deteriorating rather than improving. Evidence in Vanuatu, the Solomon Islands, and Papua New Guinea points to declining coverage and reliability of climate and hydrological data collection networks (subsequent to independence). For various reasons (scarce resources, lack of knowledge, etc.), both governments and donors generally prefer not to fund long-term data collection activities even if essential for supporting informed decisionmaking related to risk reduction over time, especially for climate change issues. Such long-term data archives are also essential for assessing the effectiveness of risk reduction initiatives and determining what, if any, changes should be made.

In addition to both SOPAC and SPREP, other relevant regional, several UN-affiliated, and nongovernmental organizations are actively involved in data collection and analyses, awareness raising, and capacity building. Once again, sustainability of such activities is an issue. There is usually little incentive for those with newly gained knowledge and skills to remain in positions for which they received training over the years if their remuneration level has not been appropriately adjusted. A recurrent theme throughout the Pacific is the ephemeral nature of capacity development. Individuals often seek employment elsewhere in order to be rewarded for their new capabilities, or another employer recruits them to take advantage of already trained staff. Only when employees feel adequately rewarded will sustained capacity development be achieved.

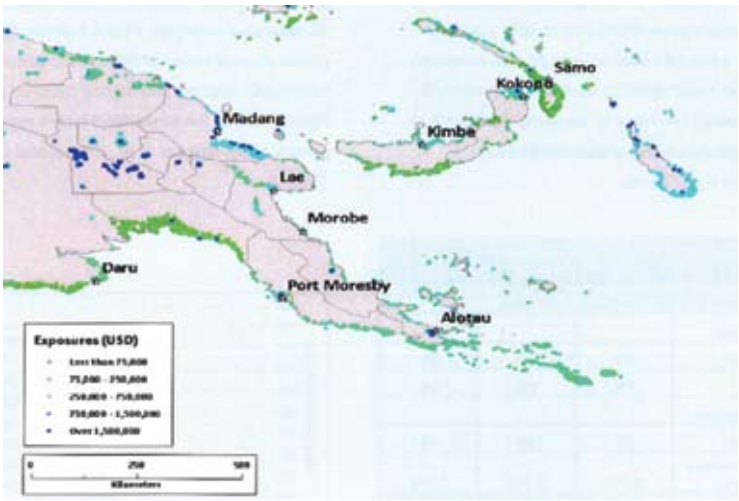
Technological advances over the past decades could offer solutions to the chronic problem of skills constraint. Satellite technology might save small nations from trying to collect and process data on their own when this could be done on a wider basis and with cost sharing. There are ways for relevant agencies to join with a third party or conglomerate to collect data and assessments that save the direct cost of owning and maintaining a system of their own. The HFA emphasis upon improved data gathering and analysis is consistent with such an approach. This may be an opportunity for governments and other stakeholders to look more directly at alternative data collection, assessment, and related activities in the DRR/CCA process, an area where perhaps SPREP and others can work with the countries to explore further.

If an appropriate alternative system can be worked out, it may also help to address the problem of information sharing and systematic data management, analysis, and presentation. In several countries where data are reasonably abundant and efficiently collected (for instance, climate data in the Marshall Islands), more often than not, data are maintained and contained within separate government agencies with little means of access by other agencies. Climate and disaster risk management require cross-sectoral coordination and cooperation. The capacity to share and access data across sectors is crucial. Similarly, the problem of how to find skilled people to translate data into tools assisting the specific needs and capacities of end users could be helped greatly via third-party provision of hazard maps, risk profiles, vulnerability assessments, and other such tools.

A key knowledge gap leads to the question: ***How will future changes in climate affect the risks posed by climate-related hazards?*** The 7 country risk profiles prepared as part of the Pacific Catastrophic Risk Financing Initiative evaluates present levels of natural hazard risks (Figure 14a) but does not consider the way in which climate change will change risk levels into the future. The Asian Development Bank prepared climate risk profiles for 10 Pacific island countries. These quantify the current and anticipated levels of climate-related risks – high rainfall events, drought, high sea levels (Figure 14b), strong winds, and high air temperatures – providing a promising basis for establishing indicators and benchmarking, and facilitating action plans for CCA initiatives for various development sectors. An example of the improved knowledge base, which should be available for the Pacific Region, is provided in Box 1.

Over the last decade or so, donors have made major contributions to building in-country capacity. However, available evidence suggests this assistance has not delivered the intended long-term outcomes because it appeared to be largely supply-driven and lacking a strong policy context. The approach developed by Vanuatu to ensure sustained outcomes from assistance

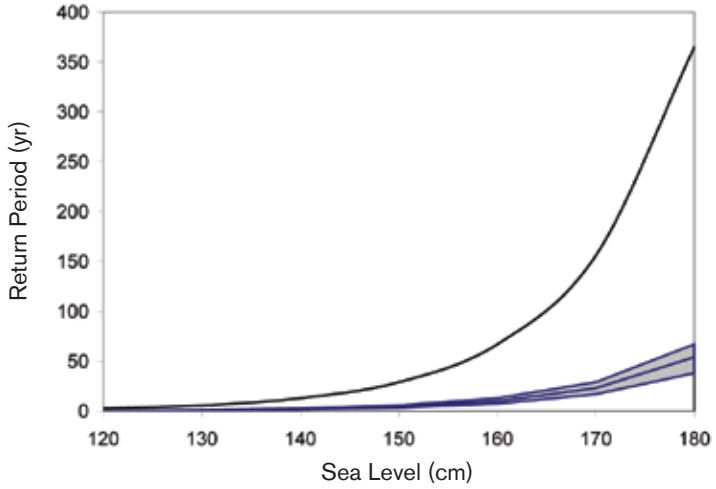
Figure 14a. Exposure distribution in Papua New Guinea, by individual exposure location



Source: World Bank and SOPAC (2008).

Figure 14b. Example of content of Climate Risk Profile for Fiji - relationship between hourly sea level and return period for Lautoka, Fiji

Present day (black line) and 2050 (blue lines)



Note: The uncertainty envelope shows the maximum and minimum estimates of return periods for 2050, based on all possible combinations of the available global *climate models and emission scenarios.*
Source: Asian Development Bank (2006).

that addresses national priorities is worthy of replication (Box 2). However, resources available to SPREP and SOPAC for managing climate and other natural hazard risks appear insufficient to provide comparable support to all their member countries. Moreover, there are common country needs for which responses can be efficiently developed at a regional level and subsequently refined for application in individual countries. Neither SPREP nor SOPAC appears currently resourced to provide for this. The option of facilitation of peer-to-peer exchanges on successful cases within the Pacific island countries may be one way of both reducing time and costs while promoting more rapid adaptation of successful practices.

Identification of the most effective and efficient ways to reduce climate and other natural hazard risks faced by communities requires projections of climate change at a subnational scale (state, island, community) as well as realistic representation of the behavior of both the El Niño-Southern Oscillation and tropical cyclones. The relatively small spatial extent of states, islands, communities, as well as the major influence of orographic and other local topographic features on local weather and climate, presents a major challenge. Current local climate models based on global climate model projections are unable to differentiate potential effects across different topographical parts of the larger hilly nations of Papua New Guinea, Fiji, Vanuatu, and the Solomon Islands. The Kiribati Adaptation Project has demonstrated how a regional climate model can be used to generate information that will better inform local understanding of the potential changes in climate extremes, including incidence of droughts and extreme rainfall events (Figure 15). While this represents a major exercise, the practicalities of building on Australian and New Zealand modeling expertise represents an important opportunity to reduce the current high levels of uncertainty in climate change projections for Pacific island countries.

Box 1. United Nations Development Program Climate Change Country Profiles

Preparation of the country profiles were developed to address the climate change information gap in many developing countries by making use of existing climate data to generate country-level data plots from the most up-to-date climate observations and the multi-model projections. The project was funded jointly by the National Communications Support Program and the United Kingdom Department for International Development.

A consistent approach was used to prepare profiles for 52 countries, resulting in an off-the-shelf analysis of climate data and the underlying data for each country for use in further research. While profiles have been prepared for 13 small island countries in the Caribbean, none has yet been prepared for Pacific island countries.

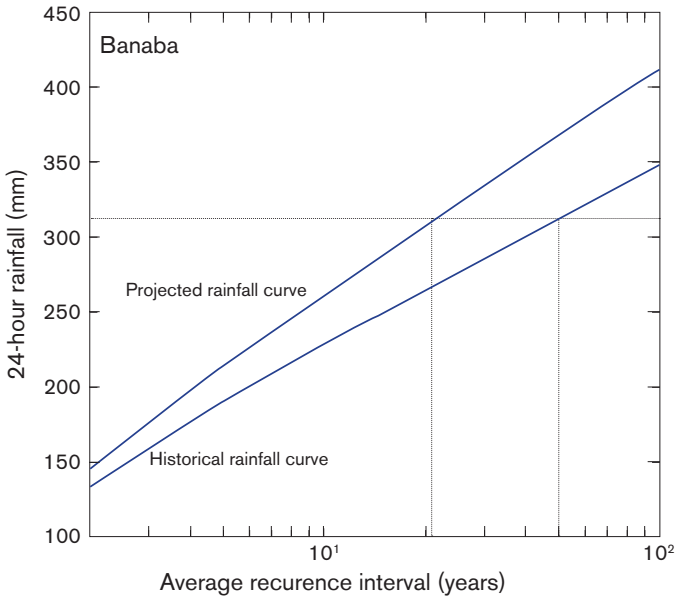
Each of the climate change county profile reports includes:

- Maps and diagrams illustrating the observed and projected climates for a given country as:
  - (a) An area-average time series for each country showing observed climate combined with model-simulated recent and future climate under three scenarios (A2, A1B, and B1) from the IPCC-issued Special Report on Emission Scenarios (SRES). For the models, the series depict the recent climate and future changes as a 'plume' that encompasses the range of the 15 model ensemble under each scenario to demonstrate the degree of model uncertainty.
  - (b) Maps depicting projected changes for 10-year-average time-slices for the 2030s, 2060s, and 2090s under SRES emissions scenario A21 on a 2.5°x2.5°-grid demonstrating spatial variations in change across the country. For each grid box the ensemble median change is provided, along with the ensemble range.
- Summary table of observed trends and projected change, averaged over the whole country, 2030s, 2060s, and 2090s under SRES emissions scenarios A2, A1B, and B1.
- Narrative summarizing the above data, and placing it in the context of the country's general climate and known inadequacies in climate model performance affecting that region.
- Dataset containing the underlying observed and model data for that country, for use in further research projects; the files are smaller and more manageable than the global fields made available by the Program for Climate Model Diagnosis and Intercomparison and in text format, which can easily be read and used with widely available software packages or simple text editors.

The country profiles include analyses of the following climatic parameters on an annual and seasonal basis:

- Mean temperature
- Mean monthly precipitation
- Indices of extreme daily temperatures
  - (a) Frequency of hot days and cold days
  - (b) Frequency of hot nights and cold nights
- Indices of extreme daily precipitation
  - (a) Proportion of total rainfall falling in 'heavy' events
  - (b) Maximum 1-day rainfall
  - (c) Maximum 5-day rainfall

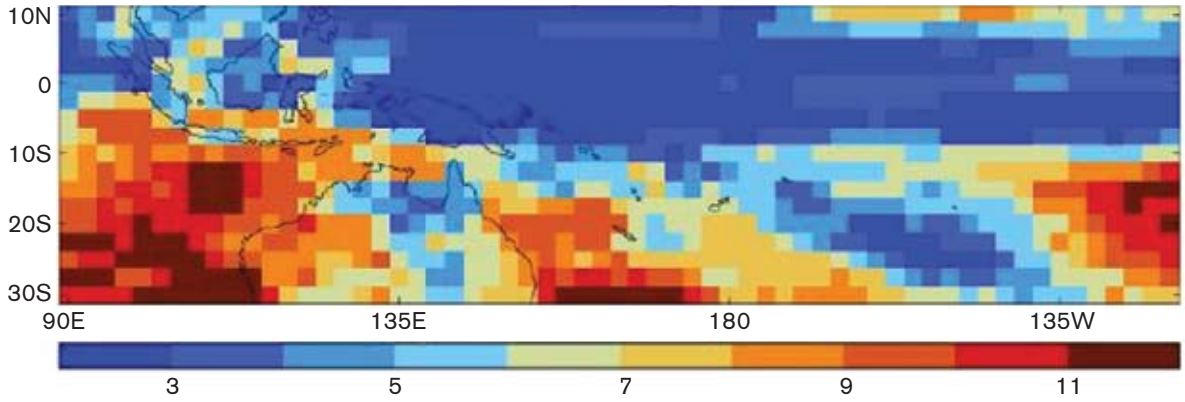
Figure 15. Return periods (average recurrence interval) of 24-hour rainfall events for Banaba, Kiribati, for the current climate and for the projected climate for a mid-range temperature scenario for the 2090s



Source: NIWA (2008).

Such modeling efforts can also help quantify the uncertainties in rainfall projections for the Pacific Islands Region where even the direction of future changes in mean annual rainfall is often unclear. Figure 16 shows how well the 12 Global Climate Models used to estimate changes in the mean rainfall in the Pacific Region agree on future trends. The models validate well for the South Pacific. There is general agreement that the mean rainfall will increase along the tropical belt in the 21st century; but for the remainder of the South Pacific, the certainty of change is much less.

Figure 16. Number of models, out of 12, that show a decrease in mean annual rainfall between 1980-1999 and 2080-2099



Source: NIWA (2008).

Box 2. Vanuatu's Medium-Term Strategic Framework

Vanuatu's Medium-Term Strategic Framework provides a basis for setting priorities in sector development plans, corporate plans, departmental budgets, and project proposals. It provides a structure that creates a basis for setting development priorities, for linking the strategic priorities of the Government of Vanuatu to corporate plans, business plans, national and ministerial budgets, and the Government Investment Program. The Framework was endorsed by the Council of Ministers in November 2006 as the basis of national development planning and budgeting in Vanuatu, and announced to a meeting of development partners in the same month.

Endorsed by the Government in June 2006, the Priorities and Action Agenda, a key component of the Framework, serves as the guiding document for development efforts through 2015. Medium-term development programs will be formulated and included in Ministry Corporate Plans, which have been restructured and strengthened. The Government is working to change the budget process to link expenditure plans more directly with Government policy. The changes are the first step toward a budget process that ensures funding, whether from recurrent revenue or donors, is used effectively to pursue national policy objectives.

The Government Investment Program ends in 2010, after which ministries and agencies will include development initiative proposals in their annual budget submissions. Approved development initiatives will together form the development component of the budget (the development budget). The funding for the development budget will combine aid donor investment, currently managed through the Government Investment Program; Government investment currently managed through New Policy Initiatives; and Government co-contributions to projects of the Government Investment Program. The new database system is linked to the Government's Financial Management Information System.

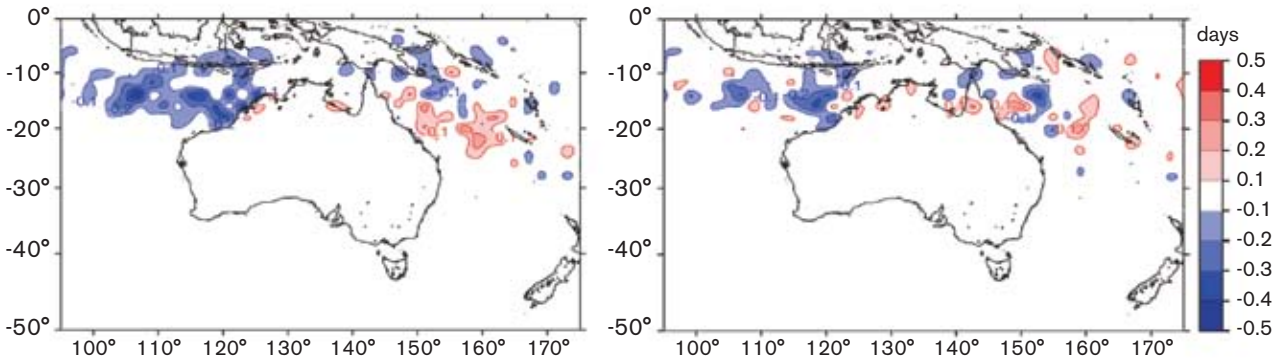
In 2008, the Government amalgamated the two units responsible for policy and planning together under the Ministry of Prime Minister, including Aid Coordination Unit. The two units had previously been under the Ministry of Foreign Affairs. This improves effectiveness of aid coordination and harmonization of donor-funded programs to complement the development efforts of the Vanuatu Government.

Full and successful implementation of the Medium-Term Strategic Framework is critically important to the overall success of the reform process. Sustainability of the key outcomes of the reform is supported under the AusAID-assisted Governance for Growth program.

A monitoring system for the Priorities and Action Agenda and development programs is under development with funding support from AusAID. Sector analysts are taking a proactive and leading role in the preparation of Ministry Corporate Plans and medium-term development programs. Guidelines for these activities have been prepared and distributed to staff in line ministries.

The potential benefit of having access to projections based on regional climate models is also illustrated in Figure 17. It shows simulated changes in annual average tropical cyclone occurrence in the Australian region for 40-year time slices centered on 2030 and 2070. An increase of 60 percent and 140 percent in the intensity of the most extreme storms for 2030 and 2070, respectively, was found using a model with a 15-kilometer-grid spacing. Projected changes in tropical cyclone characteristics are inherently tied to changes in the El Niño-Southern Oscillation, sea-surface temperature, and other conditions. With improvements in global and regional climate models, their simulation of tropical cyclones, heavy rainfall, and other extreme events are expected to improve, thus providing greater certainty in the spatially detailed projections of weather and climate conditions that are critical to sustainable development efforts in the Pacific.

Figure 17. Simulated changes in annual average tropical cyclone occurrence in the Australian region for 40-year time slices centered on 2030 and 2070



Note: Blue regions indicate a decrease in tropical cyclone occurrence and red regions indicate an increase in occurrence.

Source: CSIRO and Australian Bureau of Meteorology (2007).

The above examples show how information provided by scenario-driven global and regional climate models can be used to inform decisionmakers and planners. However, the general experience in the Pacific Islands Region is that these and other "top-down" approaches are too costly, data intensive, and time consuming. The typically large uncertainties in the model outputs are also a major impediment to their effective use by the intended end users. As a result, Pacific island countries and other countries facing similar challenges and constraints have developed more "bottom-up" approaches, such as those presented in Figures 18a for disaster risk management and Figure 18b for vulnerability and adaptation assessment in the Pacific Region.

Figure 18a. Comprehensive Vulnerability and Adaptation (CV&A) Assessment methodology

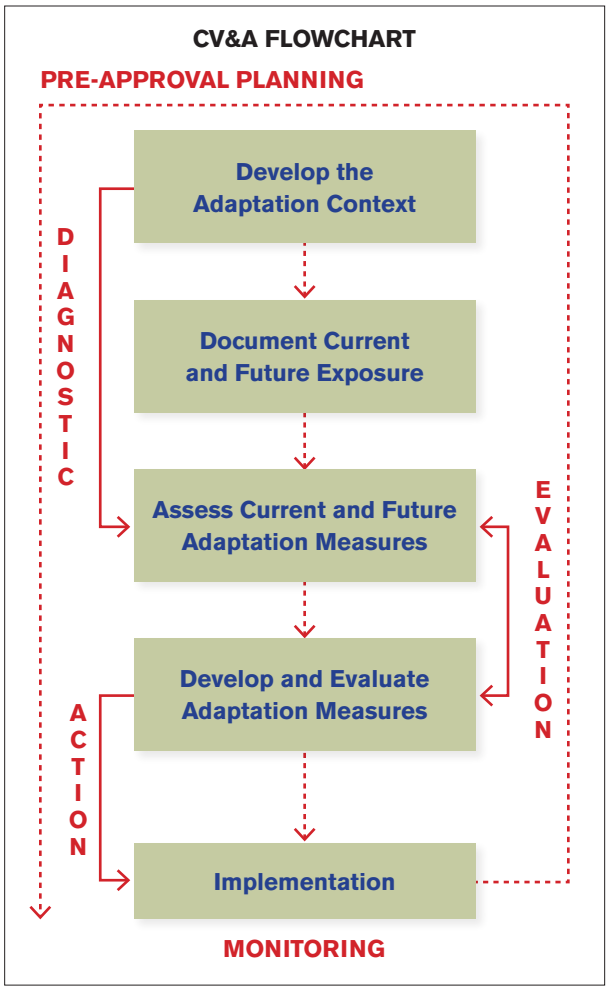
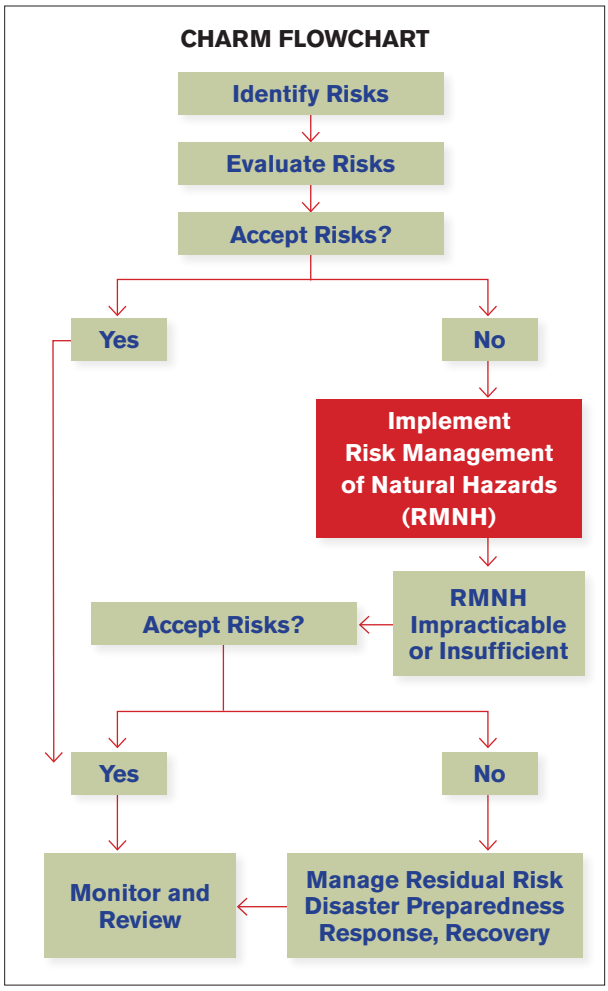


Figure 18b. Comprehensive Hazard and Risk Management (CHARM) methodology

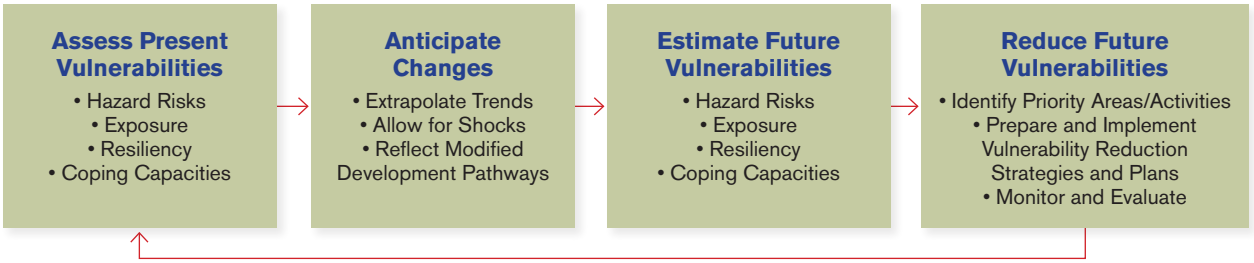


Adapted from Australian/New Zealand Standard, AS/NZS 4360: 1999.

The benefits of a "bottom-up" approach that also combines DRR/CCA initiatives suggest the use of a revised approach based on the conceptual framework presented in Figure 11. The common objective is to reduce vulnerabilities – of individuals, communities, infrastructure, commerce, and, ultimately, an entire country. The methodology reflects the importance of identifying what is happening on the ground in order to conceptualize and implement the actions that will reduce vulnerability to natural disasters and to the adverse impacts of climate change.

The four conditions that influence vulnerability, formulated in Figure 11, are first assessed for the present, for example, by hazard risk, exposure, resiliency (e.g., poverty, environmental quality), and capability mapping. The findings are then modified by taking into account readily available information on historic trends, anticipated shocks, and development initiatives to provide estimates of future vulnerabilities. This information is used to identify priority areas and activities for vulnerability reduction, for example, by determining the location and activities for which the

Figure 19. A disaster risk reduction and climate change adaptation methodology more consistent with the implementation capacities of Pacific island countries



four components of vulnerability overlap in ways that result in the overall vulnerability to be at their highest levels. The expedient approach, consistent with the capacities of Pacific island countries, is diagrammed in Figure 19 and has many aspects consistent with methodologies such as Participatory Rapid Integrated Assessment of Vulnerability and Adaptation (PRIVA) and the South-South-North Adaptation Project Protocol (SSNAPP), recently renamed as Local Options for Communities to Adapt and Technologies to Enhance Capacity (LOCATE).

Analyzing and evaluating risks and associated vulnerabilities

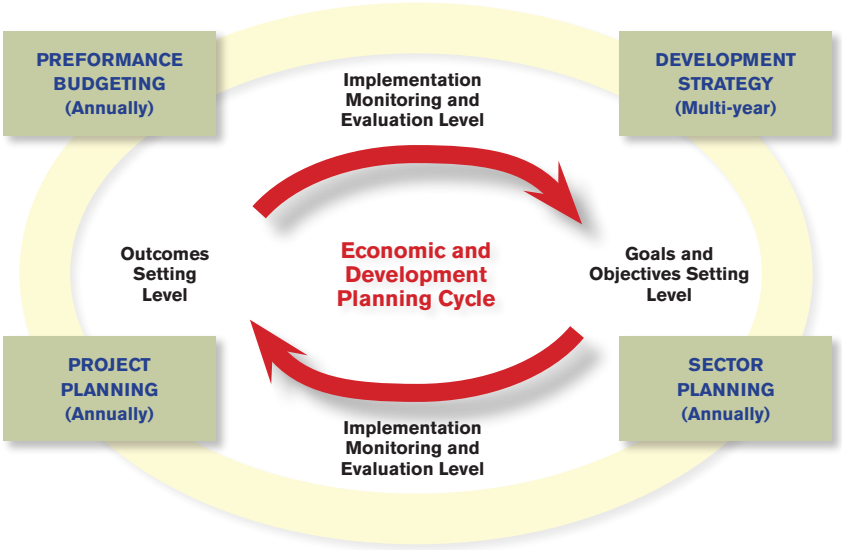
One of the major impediments to sound planning and decisionmaking related to the management of natural hazard risks is a lack of assessments and hazard maps that inform the identification and evaluation of risk-reducing interventions, such as that presented in Figure 19. In addition to a shortfall in the human and financial resources needed to prepare such information, there is a regionwide constraint related to the lack of high-resolution elevation data for both near-shore and land areas. This information is necessary to identify hazard zones at a scale appropriate for implementing risk-reducing measures, for present climate variability and extremes, as well as for longer-term changes. In particular, this situation is crucial for assessment of coastal hazards, including the regionally ubiquitous erosion and sea-surge risks as well as the flooding risks that are of concern to all islands in the Pacific.

An appropriate way to begin addressing this constraint is to work with third parties to see to what degree alternatives to direct ownership of equipment, in-house staff, and other means exist and if possible, undertake a pilot regionwide program that identifies key "hotspots" that are high priority for hazard mapping and the subsequent activities indicated in Figure 19. Such a regional effort could build on the methodologies and information developed under such initiatives as those undertaken by Air Worldwide Corporation (2008); CARE International and Maplecroft (Ehrhart and others, 2008); Harmeling (2009); UNDP (2008); Geoscience Australia (2008); and World Bank (2008c). This would require financial, technical, and other support for the preparation of high-resolution digital elevation maps that are prerequisite to hazard mapping, risk assessments, and promotion of risk-reducing measures. In parallel, activities should be undertaken to ensure that planners and decisionmakers are equipped to make effective and efficient use of the information once it is available.

Mainstreaming DRR/CCA in policy, planning, and budgetary processes

In terms of DRR/CCA mainstreaming into development policies, planning, and projects, there is clear evidence that regionally the need is being recognized

Figure 20. Economic development and planning cycle



and action has begun. However, at country level, where on-the-ground, risk-reducing initiatives should be focused, country uptake in the Region still remains low overall. There is a need to move from individual, one-off pilot interventions to a concerted program based on regional coordination with national implementation. Such a program should accelerate the DRR/CCA mainstreaming at national and sub-national levels, and desirably in an integrated manner. Both mandated regional organizations, SOPAC and SPREP, are providing assistance to Pacific island countries to strengthen elements of governance. Mainstreaming assistance and activities have been included in the pilot climate-proofing projects of the Asian Development Bank in addition to CCA mainstreaming into its own development assistance policies and projects. The World Bank has made mainstreaming adaptation a priority in its in-country assistance projects, particularly the Kiribati Adaptation Project.

Most countries have achieved or are making good progress toward implementing an economic development and planning cycle that includes integration of longer-term development strategy, sector, and project planning and performance-based budgeting (Figure 20). At a project level, experience gained under the Sustainable Integrated Water Resources and Wastewater Management Project in Pacific island countries shows the importance of improving the coordination and integration of planning and management, while also highlighting that much greater political and financial commitment was required at both the country level and internationally.

Wider experience also shows that, even when a fully integrated and functional economic development and planning cycle is in place, stand-alone climate and disaster risk strategies and plans are often undermined by unfavorable national policies or investments. Risk management of climate and other natural hazards can only be effective on a national scale when it is incorporated in these key economic and social planning instruments as well as in other national processes that are crucial to decisionmaking. Moreover, when such risk management is included in project planning and design, this results in the "climate proofing" of investments on the ground. Recent experience with infrastructure projects in Samoa and the Cook Islands

shows the benefits of government commitment to including risk management in development and planning processes and of sustained institutional support for engagement with communities.

While some Pacific island countries have made important steps toward meeting this requirement, no country has yet been successful in the overall mainstreaming of disaster risk reduction and climate change adaptation in national policies, plans, legislation, and regulations. This is true even for Kiribati where a substantial commitment to supporting the implementation of its Kiribati Adaptation Project over several years is not achieving targets. This is due in part to a shortfall in capacity but is also a result of difficulties in achieving a well-integrated and politically supported system comprising a development strategy, sector and project plans, and performance-based budgeting, all of which include risk management of climate and other natural hazards.

Even where a noteworthy start has been made, as in Fiji, Kiribati, Vanuatu, and the Marshall Islands, large gaps remain. One of the critical needs common to most countries is addressing the policy and institutional frameworks and accountability as well as the planning arrangements to allow risk reduction to be mainstreamed into sectoral plans and budgets, and then to ensure that it is championed through the national financial planning and budgetary processes.

In Vanuatu, the Government approved provisional funding for the National Action Plan for Disaster Risk Reduction, but the financial resources required for its implementation have yet to be provided for in the national budget. In Fiji, despite the fact that DRR/CCA initiatives are clearly reflected in the national development policy and strategy, they are not incorporated into sectoral action plans or supported through budgetary processes. Without the institutional accountabilities and linkages in place, mainstreaming is only as effective as the weakest link. This is one of the possible paths which donors and lenders could explicitly change de facto post-disaster reconstruction assistance into pre-disaster funding efforts to mainstream sector plans, budgets, etc., as part of the DRR/CCA initiative. When countries show an interest in risk reduction, mitigation, and adaptation, they have demonstrated an incentive to take actionable steps before the next disaster occurs.

Rationalization of development planning and processes can also provide opportunities for converting National Action Plans for Disaster Risk Reduction and National Adaptation Programs of Action into improved tools for all participants to use to address several crosscutting issues for national development planning, which could be reflected in accountable performance-based budgeting, participatory planning, and inter-sectoral coordination. Establishing the appropriate structures and mechanisms to achieve such outcomes will require concerted regional leadership and support to ensure equitable benefits to all member countries with SPREP, SOPAC, as well as donors and lenders, all initially working together to agree on a common acceptable framework.

Installing early warning systems

Across the 7 countries in the assessment there is an extreme range in the need for and current capabilities of early warning systems. Evidence from Timor-Leste indicates that it has no credible monitoring system or capacity for systematic analysis of natural hazards and is totally dependent on information and warnings from Indonesia, Australia, and Japan. Due to the lack of both additional country-specific data and the professional capability within country to undertake any assessment of the information provided, there is no ability to provide full risk estimation and evaluation. The creation and operation of an early warning system is a high priority of the Government, particularly relating to rains and droughts. Timor-Leste may be one of those cases to answer the first question: ***Does it matter how the ear-***

ly warning is provided? Once that is decided, the next questions cascade down: ***Who provides it? With what degree of expected reliability? Under what conditions? For what period? With what transition horizon?***

In terms of damage and loss of life, volcanic eruptions in the Solomon Islands are rare but yet high-impact events. However, monitoring capacity is very limited, and there is no alert and response system in the event of an impending volcanic eruption. There is also a paucity of river and rain gauges and thus no effective warning and response system. The Meteorological Division of the Solomon Islands issues flood warnings based on weather forecast and satellite data, but there is no monitoring of their accuracy or whether people respond appropriately. Here again, the issue of quick, efficient, and reliable access to the needed information will have to be assessed and an appropriate system put in place as the stakeholders work toward developing intermediate systems followed later with more permanent and sustainable ones, whether directly or via third parties.

For the Marshall Islands, improvements in the forecasts of seasonal rainfall conditions issued from Hawaii have proven to be beneficial in allowing preparation and adjustments to water supplies and usage. Impacts of the 2003 drought were reduced due to actions taken based on prior warning. Additional investments in early warning capability in the Marshall Islands should focus on the communication and response measures that would reduce vulnerability given a warning rather than on the physical warning system itself.

Hazard monitoring in Fiji, such as for cyclones and earthquakes, is conducted through both national and international bodies. The Hawaii-based Pacific Tsunami Warning Centre issues tsunami warnings. The Fiji Meteorological Service, with support of the U.S. National Oceanographic and Atmospheric Administration, tracks cyclones. This has resulted in a well-established national and regional cyclone warning system. However, the Fiji Meteorological Service suffers from the resource constraints common to most Pacific island countries, specifically lack of funding and shortfalls in professional capacity. An assessment of the most suitable option for ensuring that needed information is available on an accurate, reliable, timely, and related basis, an assessment of the most suitable option would help in determining how to organize the system for such an outcome.

In common with other Pacific island countries, some coastal tourist developments in Fiji are sited in vulnerable areas. This raises a range of disaster risk management and liability issues in relation to early warning and evacuation. At present, early warning mechanisms and community arrangements are limited. The scattered islands of Fiji are particularly at risk to cyclones and droughts, with resultant water and food shortages.

Planning is underway in Fiji and throughout the Region on an all-hazards early warning system. Fiji plans to promote this initiative at the village level. As such, the early warning could catalyze the revival of traditional early warning and disaster preparedness customs and practices. There is a sizeable body of professional opinion that, in terms of time and resources, the considerable effort being invested in a regional tsunami warning system may be somewhat misdirected with respect to understanding the geotechnical vulnerability of the Fiji islands. There is some experiential evidence that the tsunami threat to Fiji will be from locally generated tsunamis, as illustrated by the 1953 event. Tsunamis similar to the one that struck the Solomon Islands on April 2, 2007, make impact faster than the reaction time of any known early warning system. On the basis of such regional and local experience, emphasis might be better placed on building public awareness and education and taking precautionary measures rather than investing in a system that might not be capable of delivering timely warnings.

Reducing underlying risk factors

Implementation of risk-reducing measures has largely

been through a top-down flow of substantial resources into the Region and then on to countries. The investments have delivered few tangible benefits at the local and community levels where risk-reduction needs are greatest and where the action should be focused. For many countries there is a sizable gap between the village or community level and the provincial or national level at which scientific knowledge, mainstreaming, and capacity building are usually directed.

One of the major reasons for this state of affairs is the lack of institutional arrangements and capacity at the national and local level. There is also a lack of opportunity or incentive to make good use of the existing capacity. Often this reflects the manner in which information or assistance is provided, frequently inappropriate in the native cultural or organizational context.

However, some organizations have identified this gap and are making an effort to address it in the following ways:

- Growing emphasis on community-based adaptation, as pursued by the Red Cross;
- Community-based resource management and risk-reducing work carried out by the University of the South Pacific;
- Increasing number of international, regional, and national NGOs whose entry point for engagement is the community level; and
- Inclusion of community-based disaster risk management in projects implemented by the World Bank, Asian Development Bank, and other development assistance partners.

Engaging grassroots action by the private sector and civil society

The success of DRR/CCA investments depends heavily on the cooperation of and coordination with local government, civil society, and private sector. This requires extensive and inclusive consultations in order to generate significant in-country commitment. Ultimately, many risk reduction initiatives will be implemented locally by civil society and the private sector. The important roles of these key players cannot be overestimated – engagement and participation of local government, civil society, and the private sector are essential for success of DRR/CCA investments.

In the 7 Pacific island countries there is little or no evidence of private sector activity in either disaster risk reduction or climate change adaptation. It is similarly evident that the private sector is not seeking to influence or drive government to strengthen the enabling environment. Rather, in the regulatory vacuum that exists around these issues, private sector activity is at times focused on exploiting weak governance arrangements. When infrastructure was being repaired or replaced in the Solomon Islands following the April 2007 earthquake/tsunami in Western and Choiseul provinces, external consultants were reportedly not incorporating risk-reduction measures in the recovery activities, despite international funding policies requiring them.

The problem in part is the lack of understanding that rising risk levels are a key development and financial issue. If private sector involvement is to become more effective, risk reduction must be recognized as a means of ensuring sustainable development, including reducing operational and capital expenditures by the private sector. In some private sector enterprises, risk reduction is viewed as an environmental impact assessment or a disaster response issue. On the other hand, civil society in the Pacific Region has a long history of coping with climate variability and extremes as well as with natural disasters, though only with a more recent involvement in adaptation to climate change.

Establishing an enabling environment that would provide for channeling of private sector activity in climate change adaptation is different than mitigating climate change when commercial factors encourage private

sector participation. There are still significant obstacles to be overcome in the former action. As long as government commitment is weak and the enabling structures and policies remain underdeveloped, there is little scope for DRR/CCA implementation being promoted or undertaken by the private sector. Without a strong enabling environment or government or local authority partnership, civil society and private sector initiatives are likely to be unsustainable.

Harmonizing needs-driven donor contributions

Pacific island governments have tended to consider the need for climate change adaptation and much of disaster risk reduction as being externally driven and have thus come to expect that activities will be externally funded. It is therefore important that expectations on countries be set out clearly and explicitly to avoid confusion and misinformed discussion. Importantly, donors should be explicit about regional versus country perspectives for disaster risk reduction. Despite a perception that donors to Pacific island countries see natural hazard risk reduction as a regional issue and are reluctant to bilaterally fund implementation of National Action Plans for Disaster Risk Reduction, National Adaptation Programs of Action, and the like, the evidence is to the contrary. While both the Australian and New Zealand Agencies for International Development may view disaster risk reduction as crosscutting and regional in scope, they are both generous supporters of national activities related to adaptation and disaster risk reduction. Australia's Vulnerability and Adaptation Initiative funds small grant programs in 6 countries as well as a water and sanitation project. The Australia-funded National Action Plan Facility assists 12 countries to enhance sustainable development through implementation of measures identified in National Action Plans to reduce underlying risks to disasters caused by both natural and human-induced hazards and to improve preparedness and response to disasters caused by such hazards. New Zealand does rely more on delivering assistance through regional institutions and projects, but it also has initiatives that provide assistance on a bilateral basis.

Other development assistance agencies in the Pacific Islands Region are beginning to integrate climate change into their programs and activities, including:

- World Health Organization, whose regional offices in Samoa and Fiji are cognizant of the commitment expressed by their organization at the global level, are becoming actively involved in climate change adaptation.
- The Food and Agriculture Organization, which has had a long-term awareness of the importance of disaster risk reduction, is taking on board the need to support adaptation as a result of directives from both global headquarters and regionally from the Heads of Agriculture and Forestry in each Pacific island country.
- United Nations Educational, Scientific and Cultural Organization includes climatic change adaptation in its new strategic plan.

The new United Nations Inter-Agency Climate Change Center will support the Pacific Region through both existing and new initiatives to adopt integrated and sustainable human development-oriented strategies to address climate change mitigation, and adaptation to climate risks and other hazards. The Center will be located in Samoa.

Recently, Mitchell and others (2008) drew on the principles already included in the United Nations Framework Convention on Climate Change, and on learning from development assistance, to propose a series of principles for the effective delivery of integrated adaptation finance. The principles, which are equally applicable to financing disaster risk reduction, are presented in Box 3 and highlight the desirability of joint programming of development assistance. When undertaken at either country or regional level, it will

help address the call for increased donor coordination as well as delivering both immediate and longer-term outcomes that are sustainable.

In addition, there are several other steps that donors could take. The SOPAC-sponsored Pacific Disaster Risk Management Partnership Network and the SPREP-sponsored Pacific Climate Change Roundtable play important and growing roles in donor coordination but separately with respect to DRR/CCA issues. Donors should work with countries and the relevant regional organizations to bring these two institutions into closer alignment. This would do much to encourage a DRR/CCA convergence as well as improve donor coordination. An important first step would be to hold meetings of the Network and the Roundtable at the same time and in the same location so that joint sessions are possible.

Monitoring and evaluating for accountability

The proposals for strengthening monitoring and evaluation can also be facilitated by donor involvement at policy, technical, and financial levels. Risk management of climate and other natural hazards require sustained support and commitment. Monitoring and evaluation provides an opportunity for accountability to and by all players, including governments and their development assistance partners (Box 3). Monitoring and evaluation provides the opportunity to assess progress, including identifying successful interventions worthy of upscaling and replication and those interventions that need to be modified or terminated. With respect to disaster risk reduction and adaptation interventions in the Pacific islands, when monitoring and evaluation is undertaken, it is done so on a programmatic or project basis with an emphasis on procedures, outputs, and auditing. There is very little in the way of internal and consistent on-going assessment of outcomes. Only when this is undertaken will it be possible to determine whether risk-reducing measures are being adopted and risks are being reduced. In other words, at present there is no systematic way of determining if the large expenditures on disaster risk reduction and climate change adaptation are delivering on-the-ground benefits.

Given the growing investment in disaster risk reduction and climate change adaptation, it is important that there be a regional system for monitoring and reporting relevant inputs, outputs, and outcomes. This system could provide an umbrella for similar systems at national level, and be informed by the monitoring at national level. The Global Facility for Disaster Reduction and Recovery has prepared a set of core indicators to assess the effectiveness of its investments, including those related to adaptation to climate change. The indicators cover both GFDRR program objectives and the priorities of the Hyogo Framework for Action, and include assessing effective integration of DRR and CCA strategies in national poverty reduction plans, country assistance strategies, development and implementation of a national policy and action plans for disaster risk reduction, and institutionalization of disaster risk reduction through a robust legal and administrative framework. Annex B presents a results management framework of core indicators for the GFDRR priority countries, which includes 6 Pacific island countries. These indicators are a starting point for developing more specific benchmarks. There would be considerable value if this monitoring and evaluation system were broadened to include all Pacific island countries and all DRR/CCA investments, regardless if they are national or regional.

Box 3. Principles for Financing the Management of Climate and Other Natural Hazard Risks Faced by Developing Countries

Country ownership. Countries should set their own risk reduction priorities through dialogue with other in-country stakeholders, supported by finance delivery mechanisms that promote programmatic approaches. However, recognizing the considerable differences between countries, delivery mechanisms will need to be flexible and tailored to specific needs, absorptive capacities, and contexts. Before programmatic approaches can be supported, some countries may need assistance to increase their ability to manage fiduciary risk in order to improve accountability and transparency. Other countries may require assistance to scale up risk reduction efforts or to create effective institutions and planning approaches. In some cases, project-based funding will be needed to catalyze, develop capacity, mobilize, and test up-scaling possibilities. Without compromising this principle of country ownership, donors should play a key leadership role in disaster risk reduction and climate change adaptation, not only via their funding allocation decisions but also by encouraging and facilitating adoption of best practices in climate change adaptation and disaster risk reduction.

Prioritizing the most vulnerable. By casting climate change as a social justice issue by many people, risk reduction delivery mechanisms must channel resources effectively as a priority to those most in need. Integration of risk reduction into poverty reduction and related strategies and national social protection mechanisms are options where pro-poor, state-led processes are potentially effective in reaching the most vulnerable groups. Where countries are unable to deliver risk reduction outcomes to these people, alternative delivery mechanisms – such as through community-based organizations or regional institutions – may be necessary. In many cases, a combination of delivery channels is likely to be most effective at reaching these target groups. Care must be taken to protect the 'country ownership' principle.

Mutual accountability. Governance of international risk reduction delivery mechanisms must be transparent and equitable in representation and power, and possess clear lines of accountability. At country-level, monitoring and evaluation systems should also be transparent, locally owned, formulated in partnership with other stakeholders, and subject to clear accountability measures.

Harmonization. Delivery mechanisms at the country level must not become unnecessarily fragmented and must not duplicate functions. Measures to counter such fragmentation include joint programming of development assistance and multi-donor trust funds. Once eligibility criteria are set, eligible countries, and those prioritized within states, should be able to directly access financial and technical resources, with minimal transaction costs.

Source: Mitchell and others (2008).

III. Some Lessons Learned and Good Practice Beyond the Pacific Region

A World Economic Forum (WEF 2007) report lists common reactions to risks that prevent a proactive approach to risk reduction:

- "Someone else will manage my risk."
- "The risk is not relevant to my organization."
- "Won't taking action just slow me down?"
- "No one is telling me that I must act."
- "What reward do I get from reducing risk?"
- "It is too costly."
- "Why worry about it."
- "It could never happen to me."
- "It is too large to manage, and success is not guaranteed."

World Economic Forum recommendations. In one form or other, all these reactions are prevalent in the Pacific and represent significant barriers to climate change adaptation and disaster risk reduction. The World Economic Forum also recommends 5 pathways to effective risk reduction:

- ***Improving insight***. Moving risks from the unknown to the known through research. The best mitigation strategies often derive from the changed mindset, which can result from enhanced knowledge and information.
- ***Enhancing information flow***. Allowing information to flow effectively between decisionmakers and those experiencing the risk first-hand as a means to provide early warning, inform the public, and exchange best practice.
- ***Refocusing incentives.*** Creating the incentive frameworks that will allow decisions to be made to reduce risks previously considered unmanageable.
- ***Improving investment***. Providing the investments necessary to mitigate risk.
- ***Implementing through institutions.*** Strengthening (or creating) the framework where an institutional response is needed in order to reduce risks.

These 5 initiatives are consistent with the 5 major components of the enabling environment and process outcomes highlighted earlier as providing for and promoting sustainable risk reduction. The WEF Report also suggests creating "coalitions of the willing" – an avant-garde of relevant players from government, civil society, and the private sector. Such coalitions reflect the fact that no one group has the ability to effectively reduce climate and other natural hazard-related risks while also helping risk reduction to be a process of gradually expanding alliances rather than a proposition requiring permanent consensus. The coalition-of-the-willing idea allows for flexibility and clarity in adopting risk reduction initiatives. The appropriate governance, management, and reduction of risks are only likely to emerge from the expanding participation of interested parties. Often the impact of risk reduction initiatives is reduced by the partial nature of their adoption. Structured coalitions of the willing allows momentum to build up around risk reduction interventions, bringing key players into an evolving set of policies and practices rather than seeking to achieve an overarching arrangement at the outset.

Caribbean Risk Management Initiative. It is also informative to look for lessons learned and good practice in the Caribbean where countries and communities are facing increasing threats similar to those in the Pacific Region. These threats include sea-level rise, more intense hurricanes, changing rainfall patterns, diminishing water availability, new health-related hazards, and adverse impact on livelihoods, especially of the most vulnerable people. Efforts must link climate adaptation strategies with development, poverty reduction, and disaster risk reduction efforts in the Region. An early response was the Caribbean Risk Management Initiative (CRMI). Launched in 2004 the CRMI is an umbrella program designed to build capacity across the Caribbean Region for the management of climate-related risks. It

provides a platform for coordinating and sharing knowledge and experiences on risk management throughout the Caribbean, across language groups and cultures. The Region has also implemented 3 GEF-funded projects: assistance in developing First National Communications, the Caribbean Planning for Adaptation to Global Climate Change (1997-2001), and the Mainstreaming Adaptation to Climate Change (2003-2007). The Canadian International Development Agency also funded the Adaptation to Climate Change in the Caribbean (2001-2004). The Caribbean Platforms Program is a multi-agency initiative to promote disaster risk reduction at regional and national levels for the Greater Caribbean, including development of national platforms.

A recent evaluation report (Pallen 2008) of the CRMI contains pertinent lessons for the Pacific. Seen as a highly ambitious endeavor, the CRMI attempts to build relationships and share information between stakeholder communities that transcend 3 main linguistic communities in the Caribbean – French, Spanish, and English – as well as 2 distinct technical communities committed to building better practices related to climate change/meteorological service and disaster response and management. Historically these communities have not collaborated at a level that many feel is necessary to properly manage climate-related risks. Since its inception, the CRMI has been co-managed by the UNDP Country Offices located in Cuba and Barbados, with intermittent support from other partners and Country Offices in the Caribbean. The idea for the CRMI originated in the Cuba Country Office. The co-management model was put in place for both strategic and practical reasons. As a Spanish-speaking country in the Western Caribbean, Cuba has a great deal to share with other Caribbean countries in terms of experience and capacity in how to reduce climate-related risk. At the same time, managing a program solely from Cuba would be difficult given its location and political situation. Hence the Barbados Country Office has served as a counterpoint, taking the administrative lead and acting as a technical entry point into the English-speaking Caribbean.

In the first few years of its existence, the CRMI encountered difficulties with high staff turnover in the Cuban office, changes at the Resident Representative level contributing to inconsistent program supervision, and constant changes and leadership gaps in several country offices. Differing visions within the UNDP about how the CRMI should be managed at regional and subregional levels also had an impact. During the first few years, legitimate concern was expressed about the utility of the CRMI. Its visibility was limited both at the Country Office level and throughout the Caribbean.

In 2005 the CRMI, in conjunction with project partners that included the University of West Indies began to establish a foundation through the Barbados office. The CRMI was further enhanced when a Cuban-based program manager was recruited. Slowly the CRMI began to reinforce its reputation through training seminars, a reinvigorated website, and the publication of relevant documents and field activity. Additional funding for project activity was also secured.

Once CRMI established a stronger regional presence, its relevance and importance came into clearer focus for its stakeholders, including the Association of Caribbean States, the Caribbean Disaster Emergency Response Agency, the Caribbean Community Climate Change Centre, and other regional partners. While not totally unanimous, there is now broad support for seeing the CRMI continue. Support is qualified by a desire to see changes take place toward establishing mechanisms that would provide greater autonomy and flexibility to establish country-to-country relationships that build relevant capacity. There is a desire to see the recent training and workshop format evolve into another level of partnership building with activities with stronger practical implications. New possible programming directions include more strongly linking the CRMI to development decisionmaking. The CRMI should continue to play a leadership role in identifying and promoting greater understanding on key issues and the tracking and promotion of best practices.

Although the co-management of the CRMI by the Barbadian and Cuban Country Offices is seen as being far from ideal, in the current geo-political context it is considered a viable management model until a more ideal and capable Caribbean alternative emerges. The two Country Offices have established an improved working relationship. At this time it is considered more important to solidify the foundation, which the CRMI has been slow to build, than to transfer management to a third party. However, Pallen (2008) recommends that in the next two years an exercise should be undertaken to identify a suitable institution to replace the UNDP as CRMI manager.

The CRMI has demonstrated the potential for becoming a more important regional entity with a strong foundation and broad-based stakeholder support. However, the present budget and ongoing uncertain status of project staff are a concern. The evaluation report outlines options for moving forward, including increased funding, more pro-active fundraising and networking, and increased staffing.

Canadian Standards Association model. At a technical level, the Canadian Standards Association's ***Risk Management Guidelines for Decision-Makers*** is a climate change risk management model that has influenced the Caribbean's approach to the management of natural hazard risks. Under the Adaptation to Climate Change in the Caribbean project, the Guidelines of the Canadian Standards Association have been adapted to assess climate change risks in the Caribbean. The aim is to integrate climate change into the physical planning process using a risk management approach.

Comprehensive Hazard and Risk Management (CHARM). The Comprehensive Hazard and Risk Management (CHARM) approach developed for the South Pacific Region (refer back to Figure 18b) is another climate change risk management model that has had influence in the Caribbean. The CHARM approach is considered to effectively manage unacceptable risks associated with major hazards by moving the hazard and risk management approach away from response and relief toward a more holistic risk management containment strategy linked to national development strategies. Another identified strength is its involvement of all national and regional partners.

There is a growing awareness of the need for and a growing movement to develop sustainable linkages between disaster management and climate change. This has resulted in new linkages between disaster management and climate change in institutional contexts, including development of a formal relationship between Caribbean Disaster Emergency Response Agency, the Caribbean Community Secretariat, and the Caribbean Development Bank.

Since coping measures for climate variability and extremes already exist in the Caribbean, adaptation to future climate change focuses on identifying gaps in the current capacity for addressing present-day climate variability and extremes. Reducing vulnerability to near-term hazards is also considered to be an effective strategy for reducing long-term climate change risks. CHARM has been adopted as the framework in which the necessary future changes and adaptation initiatives can be implemented. It is considered to have a several advantages:

- The focus is on sustainable development.
- All phases of the disaster management cycle are considered, not just preparedness and response but also disaster risk reduction.
- Management of hazards and hazard information is integrated into development planning and the planning process.
- It takes a multi-sectoral approach built on partnerships with stakeholders.
- It builds a culture of safety.

IV. Summary of Country and Regional Assessments

This section summarizes the findings of the 7 country assessments (World Bank 2008a) and identifies the key country-respective opportunities for investment in disaster risk reduction and climate change adaptation.[3] The information presented focuses on the same elements of the framework presented in Table 3, and hence reflects the ***Hyogo Framework for Action*** and ***Disaster Risk Reduction and Disaster Management Framework for Action 2005–2015: An Investment for Sustainable Development in the Pacific Island Countries,*** and the ***Pacific Islands Framework for Action on Climate Change*** (2006-2015). The summaries also focus on information relevant to the interventions that are proposed for each country.

The investment projects proposed for each country reflect not only national needs, opportunities, and circumstances but also findings of the more general assessments based on the analytical frameworks as well as the findings related to lessons learned and good practice beyond the Pacific Islands Region.

At both regional- and country-level activities, which should have priority investment, have been identified to the extent influenced by the following:

- Support government priorities in-country and are in turn supported by government commitments to on-going activity and sustainable outcomes;
- Address or promote the integration of DRR and CCA frameworks and activities;
- Provide for sustained capacity development, including support;
- Reinforce explicit institutional frameworks across sectors and levels of government, as well as regionally;
- Provide for opportunities to increase understanding of hazards and vulnerabilities over time; and
- Address or contribute to tangible reduction of climate-related and other natural hazard risks.

In addition, it is suggested that investments should be made only if the following occur:

- An in-country champion is identified and has direct accountability for initiatives related to tangible reduction of climate-related and other natural hazard risks.
- Sustained (preferably) or intermittent programmatic support from relevant sources is committed or identified.
- There is in-country commitment to provide for on-going operational support and other relevant assistance and participation.

Fiji

Fiji is exposed to geological, climatological, and hydrological hazards and risks. Fiji is in the tropical cyclone belt, and one cyclone on average passes through Fijian waters each year. The consequences are a considerable drain on the nation's economy, but the exact value of the average annual social and economic losses from geological and climatic hazards is unclear. Fiji's location on the Pacific "ring of fire" puts it at geological risk, in particular from earthquakes and locally generated tsunamis. Other hazards include landslides, storm waves, and swell and rising sea levels. Since 1978 several droughts have also had a major impact on economic productivity and subsistence and commercial livelihoods.

Despite hazard-related agencies having substantial knowledge and historical information on hazards in Fiji, much of this information is not readily accessible

[3] These recommendations and priority actions are at present being reconfirmed with the individual countries through a final round of in-country consultation.

or transferable to other agencies. Hazard monitoring and data collection has regressed in the past decade and data to inform future risk analyses and priorities for natural hazard risk management is being lost. There does not appear to be any systematic monitoring of policy implementation within or between government agencies. Thus, it is extremely difficult to ascertain whether natural hazard risk reduction activities and programs are achieving their planned outcomes.

Disaster risk often appears to be based on post-event perceptions and is usually not quantifiable. The descriptions of threats are often anecdotal. Some risks and threats from climate change, such as increasing aridity, marine sedimentation, coastal erosion, and ecological variants need tools and programs for identifying trends based on long-term monitoring rather than waiting until the damage is readily apparent and possibly irreversible. Currently, such biophysical changes are not being monitored except for coral bleaching studies undertaken by the University of the South Pacific. Adaptation is largely pursued as a pilot project or a site-specific study, with no obvious upscaling strategy.

While the enabling environment in terms of policies and regulation is reasonably well structured, the institutional structures for implementation or giving effect to the policies and regulations are comparatively weak. This situation is compounded by a widely acknowledged lack of capacity. This in turn tends to preclude urgency for reducing risks. The reasons for the inaction are complex; many have to do with financial, structural, functional, and perceptual "disconnections" between short-term government priorities and the need to address natural hazard risk reduction, which is seen as a long-term issue. In addition, there is a lack of political champions and institutional commitment. This situation is further complicated by culture and traditional practices involving land ownership, power relationships, and leadership. A general lack of awareness, poor consultation, and weak engagement mechanisms exacerbate the problems.

The DRR/CCA policies exist, but the institutional arrangements for implementation are ineffective. National and sector planning and budgetary provisions do not exist. In 2007 the Interim Government approved a national development strategy with a goal to "reducing vulnerability to disasters and risks and promoting sustainable development." However, the strategy lacks practical targets, and there is no implementation plan. As a result there are no planned risk reduction activities arising from the strategy. Although the national development strategy highlights mainstreaming as a key challenge and states that government efforts are underpinned by a "risk management approach," no particular strategy is offered to address the issue. Also, there was no evidence to support the assertion that effective risk reduction projects would be identified and implemented.

At the sector level, a national framework for disaster risk reduction had been proposed through two instruments, but implementation is stalled through lack of institutional and political commitment. Effective implementation of natural hazard risk reduction remains problematic without the proactive involvement and leadership from the Ministry of Finance and Planning, leading to inclusion of risk reduction initiatives in national planning and budgets. While the policy frameworks are reasonably strong, their implementation through the institutional frameworks and the commitment of other departments is comparatively weak. The Government has proposed that line ministries establish environmental management units to address the crosscutting aspects of climate change. However, this may be difficult, as illustrated by the problems being encountered in recruiting personnel with the requisite skills. A number of line agencies are pursuing natural hazard risk reduction activities. However, this is largely being done on a site-specific,

project basis. These risk reduction and adaptation projects are often driven by donor initiatives.

There are on-going disaster risk management awareness programs. These have a primary focus on disaster management, but with some elements of family risk reduction. The media in Fiji provides substantial coverage to disaster-related news. The University of the South Pacific, the region's largest tertiary institution, located in Suva, initiated a climate change adaptation program in 1999. Subsequently, the program was suspended due to lack of scholarships to maintain a critical number of trainees. It was re-instated in 2008, but still faces problems due to limited financial support for students from Fiji and other Pacific island countries.

Investments in natural hazard risk reduction projects appear to be minimal. This could be attributed to the prevailing political and economic situation. There is little evidence of donors ensuring that their support for natural hazard risk reduction addresses priority issues such as institutional strengthening, capacity building, and technical support. Donor support is needed urgently to start addressing these core risk reduction and climate change vulnerability and adaptation issues. The lack of donor attention to core needs is probably influenced by the fact that support for such assistance has not been high on Fiji's own list of priorities during bilateral aid negotiations.

Critical shortages of human resources are hampering disaster risk reduction and adaptation. The Fiji Meteorological Service is arguably the best resourced technical agency, yet it is operating with the minimum sustainable staffing level. Greater project funding alone is not a viable solution for enhancing disaster risk reduction and adaptation efforts. Fiji does not appear to have the absorptive capacity to implement risk reduction and climate change policy through mainstreaming in plans and projects. The same situation also applies to the use of risk information on projects to reduce vulnerability and potential adverse impacts from climatological, geophysical, and hydrological hazard.

The Fiji country assessment (World Bank 2008a) details the participatory process by government and stakeholders in identifying priorities for investment in future DRR/CCA projects. In light of the above, the recommendations for investments include the following:

(a) Establishing integrated hazards information system and tools with geographic information system (GIS) capability;
(b) Strengthening risk reduction policy, planning, and budgetary arrangements; and
(c) Rationalizing and strengthening the hydrological and meteorological capability for Fiji.

Kiribati

The main risks are those arising from sea-level rise, coastal erosion and inundation, droughts, saline intrusion, and ecosystem degradation. Due to its geographic location along the equatorial belt, Kiribati generally faces little risk from cyclones. However, the relatively small size of Kiribati islands means it is highly vulnerable to most other climate-driven impacts, including high wave incidents. The limited information base does not allow a definitive assessment of any geologic hazards to which Kiribati may be prone.

The physical vulnerability of the low-lying atolls is extremely high. This has been exacerbated in hot-spot areas such as South Tarawa by unsustainable population growth, environmental degradation, many social pressures, and the exploitation of scarce and fragile natural resources. The primary source of potable water in Kiribati is the narrow, shallow, and often fragile groundwater lenses. The recharge of these lenses, and therefore their viability as community water sources, is directly related to rainfall recharge. Rainfall is in turn

linked to the El Niño-Southern Oscillation, which has a major impact on water availability on the atolls. Severe, prolonged droughts are common in the drier islands in the central and southern equatorial region. Tools are required for better climate modeling, including rainfall prediction.

Among Pacific island countries, Kiribati has a higher-than-average level of awareness with regard to potential climate change and associated issues. This is as a result of the significant number of studies, communications, and climate-related projects undertaken over the past 15 years. Awareness raising has been one noticeable success of the Kiribati Adaptation Project and National Adaptation Program of Action processes. Both initiatives were developed at the core of community consultations. The countrywide awareness raising also extends to the Office of the President. Despite this greater awareness, an absence of long and reliable data sets and better scientific understanding limits in-depth knowledge and understanding. The message is still not getting through if actions do not affect behavioral change with regard to continuing beach mining, over-fishing, and beach-toileting. In cases where there is clear understanding, the absence of alternatives offers little choice.

Kiribati is also unique in terms of the effort and process being followed to address the impact of natural disasters and climate change. Kiribati is now implementing the second stage of its National Adaptation Program of Action through the Kiribati Adaptation Project. Considerable progress has recently been made in preparing climate change projections for Kiribati (Figure 15 and 16; NIWA, 2008). These consider future temperatures, mean and extreme rainfall, sea-level rise and sea surges. In terms of process, the "Kiribati model" demonstrates much that is desirable. More importantly, it provides a valuable opportunity to learn some critical lessons.

The critical shortage of human resources and experience at different levels of government is largely responsible for the unsatisfactory state of knowledge and absence of data. The ineffectiveness or absence of mechanisms to collect, collate, and interpret the data and information is a basic weakness. This issue of general scientific capacity and a need for a whole-of-government information management system or spatial database recurs time after time. If the processes of mainstreaming, coordination, capacity building, and taking an integrated and holistic approach are to be successful and the goal of sustainability beyond the Adaptation Project and the donor support is to be achieved, a significant re-evaluation is required on how skills, expertise, and absorptive capacity should be addressed. Kiribati is one of the most vulnerable countries, where small threats or minor incremental changes are likely to have a disproportionate impact. Decisionmakers and planners should be provided with robust guidance that includes explicit acknowledgement of uncertainties while ensuring that this does not provide an excuse for inaction.

The Adaptation Project process commenced with much to commend the governance structure, coordination mechanisms, and, most of all, the leadership. The focus, plans, and strategy were developed with a sound design. However, there now appears to be a feeling that progress is not as fluent, delivery is a bit more difficult, and implementation is falling behind. As issues become more technical, the management, direction, and timing of the process presents a not unexpected challenge for the generalist leadership. Coordinating the existing expertise and capacity in the various ministries worked well in the early planning stages and still does in the case of normal bureaucratic oversight. However, DRR/CCA mainstreaming requires more than just accepting a defined process; it is contingent on available capacity to deliver technical and scientific substance.

Box 4. Principal Findings: Third Review Mission Phase II of the Kiribati Adaptation Project

The progress made since April 2008 through the proactive engagement of the Project Director and the Project Management Unit shows that Phase II implementation can be improved.

However, ongoing implementation will not significantly improve without appointing a senior officer in charge of climate change adaptation in the Office of the President to enable it to effectively implement Phase II and lead climate change adaptation activities. Other changes to Phase II (e.g., reduction in scope) will not be sufficient to meet the project's development objectives.

The future of the Project depends on timely action by Government in that respect. The confirmation of the appointment of the CCA official in the Office of the President needs to be completed expeditiously to avoid any major disruption to the Project.

The Project is therefore at a critical stage. The Government's commitment is needed for staffing the Office of the President to support implementation of the next phase of the Kiribati Adaptation Project.

Source: AusAID, NZAID, and World Bank (2008).

There is also an observation that there might be too much supply-driven activity for the limited in-country capacity to manage. Absorptive capacity, rather than need for the assistance, is a bottleneck. All the usual concerns about coordination, sequencing, value adding, and sustainability post-project seem to apply (Box 4). However, this is a difficult argument since much of the analysis and justification of issues is based on the benefits of individual inputs and projects. The effective leadership does not appear to have extended to oversight and control of all external assistance. There is no question of the need for donor support, but the issue is its effectiveness and sustainability. In spite of the many opportunities for investment in natural hazard risk management through the Global Facility for Disaster Reduction and Recovery, most have been left to the ongoing Adaptation Project and to the National Adaptation Program of Action, as well as to the generously subscribed donor-supported sector projects. Stand-alone DRR/CCA efforts have historically caused limited nationwide impact. Mainstreaming requires that it be tied into national economic, environmental, and social planning. Disaster risk reduction and climate change adaptation will only be effective when reflected in the key policy and planning instruments. Kiribati is well endowed with plans, policies, and legislations. Whatever strategies and plans employed in the past are not as yet totally effective although the Adaptation Project efforts might prove otherwise. The Government is working on the establishment of national disaster risk management arrangements to be coordinated by the Office of the President, which provides an opportunity to consolidate Kiribati's CCA and DRR efforts while learning from early implementation of CCA initiatives

The Kiribati country assessment (World Bank 2008a) details the participatory process by government and stakeholders in identifying priorities for investment in future DRR/CCA projects. In light of the above, the recommendations for investments include the following:

- Establish and maintain an integrated hazards information system and tools, with GIS capability;
- Establish a simple DRR/CCA institutional framework;
- Develop effective arrangements for national disaster risk management following the appointment of a national coordinator in the Office of the President.

Republic of Marshall Islands

The 22 low-lying atolls and the 4 coral islands are extremely vulnerable to climate-related hazards such as typhoons, sea surges, and droughts. These highly populated areas are also vulnerable to fires and pandemics and many water and sanitation-related diseases. The very survival of the atoll communities is dependent on the security of these small landmasses and their water resources. Especially on the highly populated islands of Majuro and Ebeye, increased human-induced degradation, including over-development, has severely undermined the natural resilience of the islands to climatic impacts. The vulnerability of major public assets to natural hazards is a concern.

Overall, there is a relatively well-developed base of knowledge, data, and tools for some sectors in the Marshall Islands, particularly with regards to climate data. However, there appears to be limited conversion of this information into useful products for policymakers and resource managers for purposes of planning, risk assessments, and responses. The Meteorological Service has effectively translated data that it in turn issues as 3-month climate rainfall forecasts. Water resource managers have used the forecasts for reducing drought impacts. There is a critical need to map coastal changes, and identify hazardous locations and vulnerable areas. With the increasing availability of satellite-based and GIS imagery, such spatial information is becoming easier to prepare.

Systematic data and information gathering related to specific operations of relevant government and sector agencies are needed in order to provide a basis for monitoring and evaluating risk reduction activities over time. As a prerequisite to monitoring and evaluation, many sectors need to first develop strategic plans. When sectoral planning is carried out, explicit standards and performance indicators related to risk reduction should be developed and operationalized for monitoring and evaluation purposes.

The Marshall Islands has been making some good progress at the "higher end" of government in developing governance structures and an enabling environment favorable to on-the-ground DRR/CCA activities. However, while important and necessary, such progress has not been sufficient to make significant progress with on-the-ground DRR and CCA interventions. At the "lower end" of local government and at community level where such actions often take place, little is being accomplished. Vulnerability is increasing despite efforts to reduce it.

There are large financial, structural, functional, and perceptual "disconnections" between national and local government. These are further complicated by culture and traditional practices involving land ownership, power relationships, and leadership. The lack of awareness, consultation, and engagement exacerbates the problems. Another major overall constraint relates to the lack of strategic planning and performance-based budgeting in the majority of government agencies. Currently, only a few government agencies develop strategic plans and have performance-based budgeting. Until this underlying deficiency is addressed, it is unlikely that mainstreaming and implementation of risk-reducing activities and actions will be effectively or efficiently managed.

The DRR/CCA policy framework is provided by ***Vision 2018: The Strategic Development Plan Framework 2003-2018***. It also foreshadows the synergies between DDR and CCA issues. Existing DRM arrangements have to date been heavily focused on the conventional approach to disaster management (i.e., preparedness, response, and recovery) with less attention being fo-

cused on disaster risk reduction. The National Action Plan for Disaster Risk Management has been drafted and is soon to be submitted for Cabinet approval. Through a long period of consultation involving the participation of national and local governments, NGOs, and stakeholders, the Action Plan documents the current situation; evaluates gaps and barriers; and identifies key goals, objectives, and actions required for risk reduction, including ensuring alignment with government development policies and plans. The Plan seeks not only to review existing DRM legislative and institutional arrangements but also to ensure a better balance between disaster management (response) and disaster risk reduction.

There are large differences between national and local levels with regards to awareness of and the needs for DRR/CCA interventions. There needs to be a mechanism to bridge this gap, with a combination of awareness raising, education, and participatory engagement of local government and civil society in the process.

A strategy for effective capacity building to sustain risk reduction is lacking. Disaster risk reduction and climate change adaptation are generally not included in education curricula. A large gap in the whole process is the non-participation of the government agency responsible for human resources development. If DRR/CCA activities are to move beyond short-term goals and technical assistance projects, there needs to be a strategy for relevant capacity building and sustainable human resources development within the government institutions.

In general, the planning and budgetary processes across many sectors in the Marshall Islands are not well developed. As a result, it is very difficult to ensure critical capital expenditures required for risk reduction are explicitly included in the budget. This problem is likely due to a combination of lack of willingness, awareness, and accountability as well as lack of available funds. Since performance-based budgeting is limited to only a few sectors of government, personnel are generally not accountable. As a consequence, available funds are often dissipated, and critical needs go unfunded. Absence of a comprehensive donor coordination processes increases the risk of critical gaps being unaddressed. Often assistance is provided out of sequence, is not value adding, or fails to build on previous successes.

The NGO sector in the Marshall Islands is not particularly vibrant and only plays a limited advocacy and capacity-building role. This is, in part, the result of dependence on government funding, as well as the pervasiveness of non-confrontational cultural norms.

The Marshall Islands country assessment (World Bank 2008a) details the participatory process by government and stakeholders in identifying priorities for investment in future DRR/CCA projects. In light of the above, the recommendations for investments include the following:

(a) Supporting implementation of the National Action Plan;
(b) Establishing integrated hazards information system and tools (with GIS capability);
(c) Climate-proofing water supply systems; and
(d) Reviewing, revising, and promoting a building code.

Papua New Guinea

For the past 25 years, multiple hazards have taken their toll in Papua New Guinea: earthquakes (508 deaths), volcanic eruptions (9 deaths), tsunami/wave surges (2,182 deaths), cyclones (47 deaths), flooding (58 deaths), landslides (314 deaths), and droughts (98 deaths). The economic effects of disasters in Papua New Guinea have also been severe in the past. Despite being the largest Pacific island country and one of the most exposed to hazards and potential impacts of climate change, Papua New Guinea has very precarious arrangements to manage them or reduce their impacts. In the absence of

recovery support following a disaster, communities are forced to pick themselves up despite their meager resources and continue from where the event left them. Cycles of disasters in vulnerable communities negate government objectives to alleviate poverty.

At a strategic level, government has difficulty acknowledging that disaster and climate change hazards represent a substantial risk. The conditions for DRR/CCA mainstreaming do not exist. Currently across the hazard sectors, there is a lack of clarity of the scope, purpose, and end-use needs of monitoring and its relationship to environmental resource, land use, and disaster planning and management purposes. Until there is policy commitment to addressing these issues, there is little scope for sustainable risk reduction activity or for engaging existing capacity such as exists locally, including in universities and NGOs. There is also a lack of practical understanding of risk reduction mechanisms that can be applied with varying degrees of complexity according to information available applying to both disaster risk reduction and climate change adaptation.

Apart from volcanic monitoring, there is only nominal attention paid to understanding natural hazards. Monitoring has decreased to marginal levels over recent years. While there is a significant body of historical data available, it is generally not easily accessible and tools for analysis and mapping are often inadequate. Given this degraded monitoring and analysis capability relative to all hazards, including potential climate change impacts, it is difficult to prioritize the allocation of appropriate resources. Available historical data could provide a relatively quick overview to inform a minimum monitoring and vulnerability analysis program. In this context, the high potential for short-term drought conditions and the large population exposure to critical water shortages should be addressed as a matter of urgency.

There is little activity in planning for disaster risk reduction through the National Disaster Center. Responsibility for climate change adaptation has been relegated to a new Office of Climate Change and Carbon Trade, reporting into the Prime Minister's Office. A Climate Change Task Force has also been established as part of these recent developments. The initial focus of the Office on Climate Change and Carbon Trade will be on reducing carbon emissions. It is expected that adaptation policies will be addressed in the second phase of its development.

In the context of development, there are opportunities to support sector programs in food and water security and fisheries, which have some relationship to potential climate change but which have not been initiated by climate change considerations. All have elements of technical development and promulgation of outcomes to communities. Any initiatives would be ideally linked with a governance framework development in a bottom-up, top-down context. Resources required for these initiatives are substantial and cooperative arrangements through those sectors would be needed.

The way forward is unclear. There is little point in proceeding with any initiative unless an in-country champion at either the national or provincial level can be identified to provide some basis for a sustainable outcome. Any initiatives should also see in-country capacity development. Further work is required to identify appropriate areas of activity, which meet these criteria, and for the development of project contexts with the appropriate sector. Any proposals should form the basis of a longer-term, strategic commitment.

Core hazard understanding and the on-going monitoring necessary to inform risk reduction initiatives, whether from disasters or climate change, are considered to be seriously deficient. While this is clearly understood within individual agencies (both hazard agencies and line agencies that have a need for the information), the Government does not fully acknowledge the issue. Aid programs designed to strengthen monitoring networks will have little long-term impact if operational capacity, budgets, and information sys-

tems with associated decision support tools are inadequate. There is a need for institutional strengthening to ensure hazard and vulnerability information is available to inform future risk reduction decisions.

Operational separation of government departments and agencies and lack of co-ordination are both endemic. There is no co-ordination mechanism for climate change adaptation. There is no policy framework within either the DRR/CCA areas to facilitate the planning and institutional arrangements that would support mainstreaming. Thus such mainstreaming is not occurring. National or provincial land-use planning should require consideration of hazards and environmental impacts. However, this information is not sought from the relevant hazard-focused government agencies.

To help address deficiencies, the Government of Papua New Guinea has requested assistance from the World Bank to prepare a progress report as an interim step toward a national Climate Change Strategy and Action Plan. The report will describe progress in dealing with climate change issues since the First National Communication to the United Nations Framework Convention on Climate Change delineates national priorities for both mitigation and adaptation. The report preparation process will also help build capacity in the Office of Climate Change and Carbon Trade. Once accepted by the Government, the report could also be used to facilitate dialogue with donors.

In Papua New Guinea there is a growing understanding among donors of the crosscutting issues of adaptation, including the linkages with disaster risk reduction. This will help particularly with the strengthening of in-country institutional arrangements. Importantly, the absence to date of national DRR/CCA program development increases the potential for donors to identify ad hoc initiatives for funding. There is a lack of donor coordination mechanisms and leadership for effective identification and sustainable support for DRR/CCA initiatives.

The Papua New Guinea country assessment (World Bank 2008a) details the participatory process by government and stakeholders in identifying priorities for investment in future DRR/CCA projects. In light of the above, the recommendations for investments include the following:

(a) Developing a coordinated hazard policy and integrated spatial hazard risk information and mapping system;
(b) Preparing and implementing a CCA policy framework;
(c) Disseminating drought-coping strategies to at-risk rural communities;
(d) Developing a water supply action plan for rural communities at risk from drought;
(e) Supporting demonstration projects for 'climate proofing' community-based fisheries in vulnerable coastal areas; and
(f) Supporting a demonstration of an ecosystem management-based prawn fishery project.

Solomon Islands

Risk levels in the Solomon Islands are increasing. Natural hazards are tropical cyclones, earthquakes, tsunamis, landslides, volcanic eruptions, floods, and droughts. Exposure and vulnerability to volcanic eruptions and tsunamis are very high. Flood hazards are perceived as a lesser but more common threat. With population pressure and urbanization, people are encroaching on low-lying land subject to river flooding. There is a surprising amount of existing relevant DRR/CCA data but little analysis. And there has been an alarming decline in continuous time-series recordkeeping that includes recent data. Monitoring networks have been severely degraded in the past 10 to 15 years. This is creating gaps in time-series data and impeding the analysis of trends and extreme events required for risk and vulnerability assessments.

There is a need to locate, compile, collate, and systematize this data as a basis for decision support. Absence of centralized and systematic databases and retrieval systems for data across the range of hazards is constraining. A lack of willingness, procedures, and protocols for reciprocal data sharing between sector agencies will make it difficult to move forward.

The National Disaster Council Act (1989), supported by the National Disaster Plan (1987), established the National Disaster Council, which is supported by a National Disaster Management Office. The National Disaster Council reviews the institutional framework for disaster risk management and intends to develop a National Action Plan for Disaster Management. A new Climate Change Division of the Ministry of Environment, Conservation and Meteorology has responsibility for climate change adaptation, following a reorganization of the Climate Change Office in the Meteorological Service in 2008. A National Advisory Committee on Climate Change has replaced the informal, multisectoral Solomon Islands Alliance on Climate Change. A policy to frame the activities of climate change adaptation will be prepared; the National Adaptation Program of Action will be implemented. The institutional framework to support the National Adaptation Program is in its developmental stage, but there is potential to connect into the proposed disaster risk management framework.

Advisors on hazards are spread over 3 agencies. Their work is impeded by the lack of relevant information to underpin strategies, plans, and actions to reduce risks of hazards and vulnerability. Government is considering the integration of hazards advice since there is value in bringing the separate departments into a common unit and developing skills and systems for an all-hazards capability.

Until recently the Solomon Islands Government had been pre-occupied with internal difficulties and with political uncertainties in the country. The structures of governance are therefore generally weak across all sectors, with weak national planning and budgetary management. Within this environment there has been no substantive government focus on initiatives to reduce risk from hazards or climate change. Across government as a whole, there is a moderate level of awareness but low-level capacity and commitment to disaster risk reduction and climate change adaptation. Government has been slow in developing the required governance structures; and mainstreaming of disaster risk reduction and climate change adaptation into policies, plans, legislation, and regulations has not occurred. There are gaps and barriers that will need to be overcome before effective implementation can occur. These include capacity issues. Support will be required to make progress.

There is no evidence of private sector activity in DRR/CCA areas. And there is no evidence of the private sector seeking to influence or drive the government to strengthen the enabling environment. There are obstacles to overcome before establishing any semblance of an enabling environment that would direct department or agency activity or provide for channeling of private sector activity in disaster risk reduction or climate change adaptation.

The focus for disaster risk reduction and climate change adaptation needs to be championed to gain cross-sector support. Disaster risk reduction and climate change adaptation suffer from lacking in both policy commitment and national planning and budgetary processes. A political champion could ensure these issues are included in national planning and budgetary arrangements. The institutional arrangements under consideration for the National Disaster Council would provide for this. There is political support for the inclusion of CCA processes.

With lessons from the 2007 earthquake/tsunami still fresh on the minds of government leaders (and with a new government in place), there are indications of

opportunities for progress of these issues on a broader government front. As ethnic tensions and political uncertainties lessen, disaster risk reduction and climate change adaptation appear to be gaining some traction and momentum in government, at least at the national level. However, questions still require answers before the country can adequately identify its key vulnerabilities and risks – ***Who is at risk? Where and how might risk exposure best be reduced?***

The National Disaster Management Office has the lead mandate for disaster management. Inclusion of disaster risk reduction is new. While it is recognized that vulnerability and risk assessments will be central to its activities, its current focus is to strengthen disaster management arrangements and develop capacity in the provinces. It has not yet provided the guidance to other sector agencies that could either provide relevant information or use it for reducing disaster risk. This is again reflective of the fact that disaster risk reduction has not yet been mainstreamed into policies, plans, and legislation and into the relevant sector agencies. The institutional framework to provide for this focus, as well as for accountability and increased connectedness, is being established for disaster risk management. The challenge will be the commitment to give effect to the new framework in-country and for donors to assist in funding the required capacity development. The situation is similar for adaptation. Because there is no "end-user" interest, the Meteorological Division has not taken a proactive approach to vulnerability and risk assessment in support of active risk reduction. It has previously focused on coordinating vulnerability and adaptation assessments only at a broad-brush scale.

The Solomon Islands country assessment (World Bank 2008a) details the participatory process by government and stakeholders in identifying priorities for investment in future DRR/CCA projects. As a result, proposed investments include the following:

(a) Review the volcanic hazard and establish volcano monitoring and early warning system;
(b) Establish an integrated hazards unit with information system, tools and GIS capability;
(c) Prepare a Guadalcanal flood plain management regime and monitoring and warning system;
(d) Support the Climate Change Division for development of a CCA policy, integration of governance arrangements through the National Disaster Council, and action plans;
(e) Support the implementation and integration of the new institutional framework of the National Disaster Council, including climate change adaptation, through national agencies and provincial government and into communities with linkages to civil society;
(f) Institute provincial and community awareness and DRM education; and
(g) Support the implementation of DRR activities and pilot investments in priority sectors and at community level.

Timor-Leste

Timor-Leste is one of the world's most recent post-conflict nations. Following a period of civil and militia disturbance that required major international intervention, citizens overwhelmingly voted for autonomy in 1999, and Timor-Leste was internationally recognized as an independent democratic state in May 2002. The withdrawal of the Indonesian authority was accompanied by the destruction of some 90 percent of the new nation's physical infrastructure. In addition many people with the technical and administrative skills necessary to rebuild a fledging nation departed the country. Consequently, Timor-Leste has had to establish a new enabling environment to deliver coherent governance across all areas of public and private endeavor. This rebuilding process is continuing and is being delivered with considerable national spirit and pride and with governmental and community resolve. However, arising from these circumstances, considerable capacity issues need to be addressed as part of the country rebuilding process.

Timor-Leste is located in an area of high seismic activity and is exposed to earthquakes and tsunamis. Earthquakes are common and cause localized damage. Seasonal monsoon rains and strong winds or cyclones affect the country and regularly damage and destroy homes, particularly in rural areas. The island country is also greatly influenced by inter-annual variations in climate associated with the El Niño-Southern Oscillation. Weather-related hazard risks (both rapid and slow onset) promote vulnerability to food security and water supplies. These are likely to be exacerbated by increasing climate variability. The country is vulnerable to potential climate change impacts and has no means of monitoring or understanding changes let alone dealing with them. There is no credible monitoring or analysis of hazards; Timor-Leste is dependent on information and warnings from Indonesia, Australia, and Japan.

It is clear that, given the major capacity issues in both climate change adaptation and disaster risk reduction, especially in the relevant sector departments and at district and community levels, it is counter-productive to continue with parallel development of climate change adaptation and disaster risk reduction. The institutional requirements and needs for knowledge and skills are similar at the national as well as district and village levels. Emphasis should be placed on identifying a mechanism within which DRR/CCA activities can be differentiated (as appropriate) within a practical integrated framework. This requires in-country agreement and an adjustment of policy.

Efforts are being made by the National Disaster Management Directorate to establish capacity in districts to deal with local disaster and related events, but the continual call on their resources to provide relief is presenting a situation desperately in need of coordinated and sustained support. In these circumstances there is no pretence that the root problems of weak infrastructure and weak institutional capacity are being dealt with through risk reduction initiatives. Recently the Government adopted a National Disaster Risk Management Policy. This is a comprehensive and ambitious document prepared with international support. What is missing is a pragmatic institutional framework for disaster risk management that involves government and stakeholder agencies across all levels, as well as a coordinated DRM program over five years to give effect to the Policy.

Government is also following up on its commitments under the United Nations Framework Convention on Climate Change, including its Initial National Communication and expected development of a National Adaptation Program of Action. This work is also constrained by critical capacity issues at the middle operating level of all government departments. There is capacity at the senior department levels, resulting in sound policy development. There is a call from these senior people to work with mid-level officials to develop their capacity over time.

Several NGOs are establishing district and community programs for disaster management in some districts. These would benefit from a national and district institutional framework within which to frame a consistent set of arrangements.

The Government has included goals in the Annual Action Plan of the Ministry of Social Solidarity for the institutional, systemic, and individual development of the National Directorate of Disaster Management and development of an efficient Disaster Management Service for reducing disaster risks. This is consistent with both the National Development Plan and the IV Constitutional Government Program. Thus, there is the political support and the policy commitment for this work. What is missing is the means for practical application by Timorese people.

With the multitude of issues being dealt with in Timor-Leste, there are many donors, stakeholders, and NGOs active in the country. Some have noted the extreme difficulty in securing internal engagement

with programs due to capacity constraints as well as a need for better coordination among donors and government agencies. While there is little evidence of programmatic coordination of donor initiatives, there is NGO coordination of community initiatives through the Community-based Disaster Risk Management Working Group. There is also widespread acceptance among donors and stakeholders of the desirability of achieving some form of integration of assistance for disaster risk reduction and climate change adaptation. For this to occur, donors and key stakeholders will need to acknowledge and address this issue and facilitate the processes necessary to differentiate the activities within an integrated framework.

Both the National Disaster Management Directorate and the Environment Directorate report that they spend significant amounts of their time addressing donor and stakeholder enquiries. There was a plea by both Directorates to move beyond short-term project support to addressing capacity development in line with government priorities and on a programmatic basis.

The Timor-Leste country assessment (World Bank 2008a) details the participatory process by government and stakeholders in identifying priorities for investment in future DRR/CCA projects. In light of the above, the recommendations for investments include the following:

(a) Develop a simple institutional and policy framework and organizational mechanism for disaster risk management and climate change adaptation, which allows for activities to be differentiated within an integrated framework;
(b) Develop meteorological monitoring capability with data management, analysis, and forecasting systems and skills;
(c) Support for NGO community-based DRM program at the district, subdistrict, and village levels, within a structured institutional framework as developed above; and
(d) Develop and support a range of professional development initiatives for cross-sector staff in areas of hazards, vulnerability assessment, and organizational management for disaster risk management and climate change adaptation.

Vanuatu

Vanuatu faces a range of hazards – more than most other Pacific countries – including earthquakes, landslides, tsunami, volcanoes, coastal erosion, tropical cyclones, floods, and droughts. The latter four are likely to be affected in future by climate and sea-level changes, and by the largely coincident increasing population and development in urban and coastal locations. The country is subject to climate variability due largely to cycles of El Niño and La Niña increasing the risks of droughts and floods, respectively.

Despite these risks and the fact that there is moderately high-level national awareness and commitment to reducing them, there is only rudimentary assessment and understanding of the degrees of risk: ***who is at risk?*** and ***where is risk predictable?*** Overall only minimal monitoring or data analysis is being conducted, but ongoing data collection is not occurring. As a result, there is a severe paucity of data, tools, and capacity to quantify hazard risks and to interpret them in a manner that allows risk reduction to be integrated explicitly into development planning and decision-making. Currently there are weak land use regulations and hence little control over land uses that exacerbate disaster risks. Expansion of towns and villages is occurring largely without regard to geologic and climatic risks. The Ministry of Lands is reforming policy and developing strategic plans that will address this shortcoming to some extent.

In recent years Vanuatu has embarked upon a Comprehensive Reform Program to strengthen its national and provincial governance arrangements, including a Priority Action Agenda for cross-sector reforms. This has resulted in a willingness to address issues across

sectors and on a sectorwide basis. While substantial capacity constraints exist, planning is progressing. Vanuatu has completed a National Action Plan for Disaster Management as well as the National Adaptation Program of Action. The former has received budget approval but not budget appropriation. It also awaits donor support. The Program of Action, including preparation of sector plans, advanced due to championing by senior government officials. However, departments and ministries have not yet promoted these action plans for appropriation in the government budget process. To date, management of natural hazard risks has not been implemented at provincial level. This omission is recognized in the policies currently being developed.

The National Advisory Committee on Climate Change provides a strong cooperative mechanism for adaptation and is promoting the development of coordinated national and sector policies. The National Task Force for Disaster Risk Management is the national coordinating mechanism for disaster management. The Task Force is in abeyance while waiting funding at both the national budget level and through donor contributions. There is significant opportunity for alignment of disaster risk reduction and climate change adaptation through common membership of these two coordinating bodies. Funding to implement the Action Plan prepared by the Task Force did not reach the appropriation commitment due to lack of sponsorship. As a result it did not reach donors for consideration of the wider package. For their part, some bilateral donors have said they would not have considered it a priority for bilateral funding due to a preference to treat disaster risk reduction as a regional issue.

In general, in comparison to most Pacific island countries, the Vanuatu Government has a heightened level of awareness and appreciation of the constraints to sustainable development posed by its particularly high-level exposure to natural hazards. This is evident across a range of ministries and departments. As a consequence there appears to be a willingness to work across sectors to address areas of common interests in risk reduction. Government has also demonstrated some readiness to adjust governance structures and planning arrangements in order to enhance the chances of successful implementation of disaster risk reduction and climate change adaptation.

However, these positive developments are somewhat tempered by shortfalls in technical knowledge and hazard data, and in risk and vulnerability assessments and the capacity to perform them. Disconnects between national, provincial, and community levels of governance and absence of departmental follow-through to reflect sector plans for disaster risk reduction and climate change adaptation in national planning documents, budget appropriations, and donor support are also significant impediments.

Until recently the National Planning Office had responsibility for ensuring budget allocations reflected Government decisions. They did not have disaster risk reduction or climate change adaptation in their checklist, considering it to be a department responsibility to promote. The budget monitoring process has now been transferred to the Office of the Prime Minister, which has expressed disappointment at the general lack of interest in natural hazard risk management by departments and donors, as well as that at the regional level.

In general there is no systematic monitoring and evaluation of risk reduction efforts in the country. There are efforts to assess damages in post-disaster situations, but these are largely ad hoc and are not harmonized across hazards or carried out in such a way that would allow systematic post-audit evaluation of long-term disaster risk reduction programs or projects. The National Action Plan recognizes the need for monitoring and evaluation for such purposes. However, the National Adaptation Program of Action does not include monitoring and evaluation in any of its five priority

projects. It is expected that this will be addressed in it implementation plan.

As with most Pacific island countries, Vanuatu has large deficiencies in human capacity, generally across all sectors. There are large problems in retaining expertise once the capacity is built. The deficiencies are most acute in the technical areas of knowledge, data analysis, and interpretation required for vulnerability and risk assessments – areas where the country is weakest in terms of disaster risk reduction and climate change adaptation. The limited capacity may well prove to be a major constraint to plans to increase staff numbers in ministries that deal with DRR/CCA issues. Capacity development is a high priority for government.

There is relatively little bilateral donor support for either disaster risk reduction or climate change adaptation. In part this was due to the fact that sector plans are still evolving from the broader action plans and in part because government has not raised DRR/CCA issues as priority areas for engagement with in-country donors. Donors felt the mechanisms for engagement with the DRR/CCA coordinating bodies were weak, reflecting their lack of involvement in the preparation of the two action plans.

The Vanuatu country assessment (World Bank 2008a) details the participatory process by government and stakeholders in identifying priorities for investment in future DRR/CCA projects. In light of the above, the recommendations for investments include the following:

(a) Develop risk mapping to support town planning and village development;
(b) Support for implementation the National Action Plan and National Adaptation Program of Action, including for integration of disaster risk reduction and adaptation;
(c) Incorporate disaster risk reduction and climate change adaptation in the tourism sector;
(d) Awareness raising and education to foster links between national, provincial, and community governance, planning, and implementation; and
(e) Support to the Ministry of Lands for reforming land-use policy and regulation.

Regional Assessment

Recommended country-specific investments have been identified in the previous section and detailed in the individual country assessments (World Bank 2008a). Additionally, several interventions at regional level are required in order to respond to needs, constraints, and opportunities that can best be addressed in ways that recognize commonalities across the Pacific Islands Region. The efficiency and effectiveness of these interventions will also be increased through the use of regional mechanisms. Interventions that are best undertaken at regional level are recommended in the following:

- Review regional hydrological and meteorological service needs of Pacific island countries;
- Develop a regional program funding mechanism for National Action Plans for Disaster Risk Reduction and implementation of risk reduction initiatives in Pacific island countries;
- Progressively develop regional and local climate projections, especially for the larger topographically diverse countries;
- Prepare regionally consistent technical guidelines and codes for infrastructure and buildings to ensure adequate resilience of weather and climate extremes and other natural hazards; and
- Develop collaborative regional institutional arrangements for professional development and knowledge uptake in disaster risk reduction and climate change adaptation, including training focusing on the convergence of these two areas of activity.

V. Next Steps

While extensive consultations have taken place initially in order to identify needs, gaps, success stories, lessons learned, and opportunities to address the shortfalls and build on existing capacities, the next round of "ground truthing" draft assessments and recommended interventions are being undertaken at the country level. Some of the identified interventions are already being incorporated; others will be incorporated in projects under development once funding sources have been secured (e.g., GEF and European Community for Vanuatu; GEF and GFDRR for the Solomon Islands; GFDRR for Papua New Guinea and the Marshall Islands; and GEF for Kirabati). Further consultations with relevant governments, donors, and regional and international intergovernmental organizations and international and regional organizations will take place at the next SOPAC meeting in Nadi, Fiji, to ensure coordination and explore collaboration mechanisms as well as prioritize regional/subregional activities.

The Nadi meeting will also provide an opportunity to explore a regional programmatic approach as well as a regional coordination mechanism to ensure efficiency and effectiveness of investment and technical assistance activities. Two obvious candidates for regional coordination are the Pacific Disaster Risk Management Partnership Network and the Pacific Climate Change Roundtable. However, their present mode of operation could not deliver the important outcome of increasing convergence between disaster risk reduction and climate change adaptation, regionally or nationally. It has already been proposed that meetings of both the Pacific Disaster Risk Management Partnership Network and the Pacific Climate Change Roundtable be held simultaneously at the same location, with joint sessions wherever possible and appropriate. In this way synergies and efficiencies will be maximized. This important change is likely to be instrumental in integrating disaster risk reduction and climate change adaptation at the regional level, in terms of frameworks, operational strategies, plans and work programs, resource mobilization, and monitoring and evaluation. This could well lead to the Pacific Disaster Risk Management Partnership Network and the Pacific Climate Change Roundtable eventually being joined into one institution. This initiative might serve as an example to other regions.

Another important role of a strengthened regional coordination mechanism would be to identify and follow-up on opportunities that result in the proposed investment initiatives being designed and implemented in an integrated manner so as to increase the leveraging of funding as well as building on on-going activities funded either by the targeted government or by donors.

As emphasized in this report, there is an urgent need to improve the monitoring and evaluation of DRR/CCA initiatives in the regional and national levels. An important function of the proposed regional mechanism would be to work with countries as well as with donors; international intergovernmental organizations; and international, regional, and national NGOs to establish a monitoring and evaluation system that serves the needs of all these players. The indicators prepared by the Global Facility for Disaster Reduction and Recovery provide important input to this work (Annex B).

Annex A

Madang Framework Guiding Principles

1. ***Governance: Organizational, Institutional, Policy and Decisionmaking Frameworks***. National governments have the key responsibility for disaster risk reduction and disaster management policy development and planning, ensuring they reflect the principles of good governance, and security within the context of sustainable development.

2. ***Knowledge, Information, Public Awareness and Education***. Capacity building for disaster risk reduction and disaster management is facilitated by information gathering, storage and dissemination leading to knowledge acquisition and management, education, training and professional development programs, and information management systems and technologies that underpin the successful implementation of policies and plans.

3. ***Analysis and Evaluation of Hazards, Vulnerabilities and Elements at Risk***. Developing a better understanding of hazards, together with analysis and evaluation of their vulnerabilities and risks, that enables people to be well informed and motivated toward a culture of prevention and resilience.

4. ***Planning for Effective Preparedness, Response, and Recovery***. While all hazards cannot be eliminated or some even substantially mitigated, improving disaster preparedness, response, and recovery can significantly reduce their devastating impacts on vulnerable communities.

5. ***Effective, Integrated, and People-Focused Early Warning Systems***. Warnings must be timely and understandable to those at risk; take into account the demographics, gender, cultural and livelihood characteristics of target audiences; and support effective operations by decisionmakers.

6. ***Reduction of Underlying Risk Factors***. Risk factors relating to changing social, economic, and environmental conditions need to be addressed in national sustainable development strategies or similar documents, as well as sectoral development policies, plans, and programs in order to provide a basis for effective disaster risk reduction and disaster management.

Annex B

Results Management Framework of the Global Facility for Disaster Risk Reduction and Recovery

GFDRR Results Management Framework for Priority Countries

Priority Countries*	Program Support Objective/HFA Priority	Core Indicators
Bangladesh Bolivia Burkina Faso Cambodia Costa Rica Djibouti Ecuador Ehtiopia Fiji Ghana Guatemala Haiti India Indonesia Kenya Kyrkyz Republic Lao PDR Madagascar Malawi Mali Mrashall Islands Mozambique Nepal Nicaragua Niger Nigeria Pakistan Panama Papua New Guinea Philippines Senegal Solomon Islands Sri Lanka Timor-Leste Togo Vanuatu Vietnam Yemen, Rep.	**Institutional Capacity and Consensus Building for Disaster Risk Reduction (Includes Advocacy and Training).** (HFA Priority 1: Ensure that DRR is a national and local priority with a astrong institutional basis for implementation)	A legal framework for disaster risk reduction exists with explicit responsibilities defined for all levels of government. A national policy framework fir disaster risk reduction exists that requires plans and activities at all administrative levels, from national to local levels. An established DRR policy for all relevant sectors An established DRR agency for multi-sector coordination and monitoring. A national public awareness strategy for disaster risk reduction exists that reaches all communities and people of all educational levels. Dedicated and adequate resources are available to implement disaster risk reduction plans at all administrative levels.
	Disaster Risk Management and Monitoring (HFA Priority 2: Identify, assess and monitor disaster risks and enhance early warning)	Analysis of expected damage to property and livelihood due to relevant hazards completed. Analysis of potential mitigation measures for cost/effectiveness completed. Analysis of social and institutional impacts of relevant hazards completed. Regional-scale risk assessments completed for transboundary risks. National risk assessment based on hazard data and vulnerability information for key sectors are updated periodically. Key officials and stakeholders trained in risk and vulnerability assessment. Systems are in place to monitor, archive and disseminate data on key hazards and vulnerabilities. Disaster risks and climate impacts assessed for major urban centers. Plan for strengthening national and regional early warning systems developed. Increased investment in strengthening and maintaining the early warning and response systems. Early warning systems including weather forecasting and climate modeling in place.
	Knowledge Capacity Enhancement for Disaster Risk Reduction (HFA Priority 3: Use knowledhe, innovation and education to build a culture of safety and resiliency at all levels)	Development of educational strategy for DRR completed. Development of media strategy for DRR completed. Development of technical and professional trainings for DRR completed. A national institute for Disaster Risk Reduction to institutionalize knowledge and capacity enhancements conducted. A well-funded program for community-based disaster risk reduction exists. Broader disaster risk reduction training programs for Government counterparts and other stakeholders conducted. Compilation, dissemination and use of disaster risk reduction information becomes practice.

Continues

Annex B. Results Management Framework of the Global Facility for Disaster Risk Reduction and Recovery

GFDRR Results Management Framework for Priority Countries

Priority Countries*	Program Support Objective/HFA Priority	Core Indicators
Bangladesh Bolivia Burkina Faso Cambodia Costa Rica Djibouti Ecuador Ehtiopia Fiji Ghana Guatemala Haiti India Indonesia Kenya Kyrkyz Republic Lao PDR Madagascar Malawi Mali Mrashall Islands Mozambique Nepal Nicaragua Niger Nigeria Pakistan Panama Papua New Guinea Philippines Senegal Solomon Islands Sri Lanka Timor-Leste Togo Vanuatu Vietnam Yemen, Rep.	**Disaster Risk Reduction and Financing for Sustainable Development** (HFA Priority 4: Recue the Underlying Risk Factors)	A procedure is in place to assess the disaster risk implications of major infrastructure project proposals. Analysis of costs and benefits of available mitigation options/ investments in sectoral investment plans. Sectoral development strategies have incorporated disaster risk reduction into the planning and implementation. A long-term national program is in place to protect schools, health facilities and critical infrastructure from relevant natural hazards exists. Health facilities and schools conform to hazard resistant standards. Analysis of national macro-economic impact of expected disaster losses. Development and enforcement of risk reducing urban land use. Development of DRR as a component of ecosystem and environmental management. Environmental protection, natural resource management and climate change policies include disaster reduction elements. Building codes exist and include disaster risk related elements that are rigorously enforced. Specific policies and plans are being implemented to reduce disaster risk to vulnerability of marginalized groups. Financial institutions have included disaster risk reduction criteria for approval of project financing. A program for disaster risk financing is in place. Micro-credit for disaster risk reduction and recovery is available. Public or private disaster insurance is available. Premiums for disaster insurance are risk-based and reward mitigation measures. National MDG reports included elements of disaster reduction. Risk reducing disaster recovery plans prepared as a practice when disasters occur.
	Disaster Preparedness and Sustainable Recovery (HFA Priority 5: Srengthen disaster preparedness for effective reponse at all levels)	All organizations, personnel and volunteers responsible for maintaining preparedness are equipped and trained for effective disaster preparedness and response. An independent assessment of disaster preparedness capacities and mechanisms has been undertaken and the responsibility for implementation of recommendations have been assigned and resourced. Development of global and regional mutual assitance agreements. Disaster preparedness plans and contingency plans are in place at all administrative levels, and regular training drills and rehersals are held to test and develop disaster response programs. An early warning systems and a protocol for dissemination and response are in place for all major hazards. Early warnings reach and serve people at the community level. Financial reserves and contingency mechanisms are in place to support effective response, relief and recovery when required. Gloabl and regional cooperataion of damage and loss assessment. Global and regional cooperation of recovery planning. Procedures are in place to document experience during hazard events and disasters and to undertake post-event reviews.

References

Air Worldwide Corporation. 2008. Country Risk Profiles. General Methodology. Pacific Catastrophic Risk Financing Initiative. 6pp.

Asian Development Bank. 2006. Climate Risk Profile for Fiji.

AusAID, NZAID, and World Bank. 2008. Kiribati Adaptation Project II (KAP II). Third Review Mission (November 11-18, 2008). Aide Memoire. 19pp.

Cord, L., and G. van der Vink. 2008. Climate Change, Disaster Management and Poverty: Towards an Integrated Framework, Climate Change, Disaster Risks and Poverty Reduction—A Common Approach to Reduce Vulnerability. Stockholm. October 2008. 20pp.

CSIRO and Australian Bureau of Meteorology. 2007. Climate Change in Australia. Technical Report.

Ehrhart, C., A. Thow, M. de Blois, and A. Warhurst. 2008. Humanitarian Implications of Climate Change: Mapping Emerging Trends and Risk Hotspots. Cooperative for Assistance and Relief Everywhere, Inc. (CARE). 36pp.

GEF (Global Environment Facility). 2008. GEF-Pacific Alliance for Sustainability: Program Framework. Washington, D.C.

Geoscience Australia. 2008. A Natural Hazard Risk Assessment of the Asia Pacific Region. Government of Australia, Canberra. 124pp.

Harmeling, S. 2008. *Global Climate Risk Index 2009: Weather-Related Loss Events and their Impacts on Countries in 2007 and in a Long-Term Comparison.* Bonn: Germanwatch e.V. 28pp.

Kuleshov, Y., L. Qi, R. Fawcett, and D. Jones. 2008. "On Tropical Cyclone Activity in the Southern Hemisphere: Trends and the ENSO Connection." *Geophysical Research Letters,* 35, L14S08, doi:10.1029/2007GL032983.

Mitchell, T., S. Anderson, and S Huq. 2008. Principles for Delivering Adaptation Finance. Institute of Development Studies. University of Sussex.

NIWA. 2008. Kiribati Adaptation Programme. Phase II: High Intensity Rainfall and Drought. NIWA Client Report: WLG2008 – 12, NIWA Project GOK 08201.

OCHA (Office for the Coordination of Humanitarian Affairs). 2006. Regional Hazard Maps, OCHA Regional Office for Asia and the Pacific, Tropical Storm Risk Zones, Map Ref: OCHA_ROAP_Tropical_Storm_Zones_v1_060804 http://ochaonline.un.org/roap/MapCentre/RegionalMaps/tabid/3808/language/en-US/Default.aspx (accessed April 6, 2009).

Pallen, D. 2008. Evaluation of the Caribbean Risk Management Initiative (CRMI): Evaluation Report. CRMI Project Steering Committee. 40pp.

World Bank. 2008a. Reducing the Risk of Disasters and Climate Variability in the Pacific Islands. Country Assessments. Washington, D.C.

———. 2008b. Reducing the Disaster- and Climate- Related Risks in the Pacific Islands. Regional Stocktake Report.

———. 2008c. Identification of Global Natural Disaster Risk Hotspots Project. Washington, D.C.

———. 2006. Not If But When: Adapting to Natural Hazards in the Pacific Islands Region. A Policy Note. Washington, D.C.

World Bank and SOPAC. 2008. Country Risk Profile. Papua New Guinea. Pacific Catastrophic Risk Financing Initiative.

WEF (World Economic Forum). 2007. Global Risks 2007: A Global Risk Network Report. Geneva, Switzerland. 34pp.

UNDP (United Nations Development Program). 2008. Disaster Risk Indexing (DRI) Project.

THE WORLD BANK

East Asia and the Pacific Region
The World Bank
1818 H St. NW, Washington, D.C. 20433

http://www.worldbank.org/eap

Special thanks and appreciation are extended to the partners* who support GFDRR's work to protect livelihood and improve lives: ACP Secretariat, **Australia**, Belgium, Brazil, **Canada**, **Denmark**, **European Commission**, Finland, **France**, Germany, India, Ireland, **Italy**, **Japan**, **Luxembourg**, **The Netherlands**, **Norway**, **Spain**, **Sweden**, **Switzerland**, Turkey, **United Kingdom**, **United States**, UN International Strategy for Disaster Reduction, and **The World Bank**.

**In bold, GFDRR Donors*