



# Acting on Climate Change & Disaster Risk for the Pacific



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Picture: Ciril Jazbec



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# Acting on Climate Change & Disaster Risk for the Pacific

The World Bank's report "Turn Down the Heat" highlighted the risk that, without global action, the world could potentially be 4°C warmer by the end of the century, which would be devastating in many regions. Pacific Island Countries are on the front line of climate change and natural hazards. In some countries, tides have already flooded homes and devastated livelihoods, while rising sea levels have contaminated precious fresh water supplies. As World Bank Group President Jim Kim has highlighted, "a 4°C warmer world can – and must – be avoided".

At the same time, climate and disaster resilient development has to be a priority for governments and donors.

The World Bank has now mobilized over US\$140m for climate change adaptation and disaster risk management in the Pacific, and globally, it provided more than \$7 billion towards mitigation efforts in 2012. World Bank support in the Pacific includes investments in disaster and climate risk assessments, and for risk reduction across a range of areas including community driven development, water and coastal management, transport and agriculture.

- In Samoa, the World Bank is helping to "climate proof" key transport infrastructure, and is working with the UN to build the resilience of coastal communities. Support has also been provided to assist in recovery from Tropical Cyclone Evan, helping to rebuild damaged roads and bridges and providing seeds, tools and livestock to affected farmers.
- In Vanuatu, the World Bank is partnering with the European Union to encourage farmers to introduce climate resilient livestock and crops, and implementing disaster risk management programs in some 35 communities. In partnership with Japan, a tsunami warning system is being installed for Port Vila and Luganville, and national hazard response systems are being strengthened.

- In Kiribati, with the Global Environment Fund (GEF), Australia and New Zealand, an adaptation project is helping the country improve water management, and initial improvements in the capital, South Tarawa, aim to increase bulk water supply by 20 percent. It is also working with communities to build seawalls and has planted over 37,000 mangroves to protect coastlines.
- With Japan, the World Bank has introduced a pilot risk insurance scheme for six countries in the Pacific to provide immediate financial support following disasters. It draws upon a similar scheme in the Caribbean.

Much more remains to be done. This booklet provides a snapshot of: the challenges posed by climate change and natural hazards in the Pacific; policy recommendations, and information about the World Bank Group's work across the region in helping build resilience to disasters and climate change.





# PART I: PACIFIC ISLAND COUNTRIES ARE AMONG THE MOST VULNERABLE IN THE WORLD TO NATURAL HAZARDS AND CLIMATE CHANGE

## NATURAL HAZARDS

Pacific Island Countries combine high exposure to frequent and damaging natural hazards with low capacity to manage the resulting risks. Since 1950, extreme events have affected approximately 9.2 million people in the Pacific region. They have caused almost 10,000 reported deaths and damage of around US\$3.2 billion. Vulnerability is exacerbated by poor socioeconomic development planning, which has increased exposure and disaster losses, and by climate change, which is predicted to amplify the magnitude of cyclones, droughts, and flooding.

### Exposure

Most of these countries are prone to multiple hazards (not only climate related), although not all at the same level of severity. The distribution by peril type and country is shown in figure 1 below.

In the last 60 years, the Pacific Region has experienced more than 2,400 tropical cyclones, about 41 per year (more than 1,400 formed in the North West Pacific and almost 1,000 formed in the South Pacific). Areas both North and South of the equator are known for the frequent occurrence of tropical cyclones, throughout the year in the North Pacific and between the months of October and May in the South Pacific. The tracks of historical tropical cyclones are shown in the figure on the opposite page. This also includes tropical storms with winds below hurricane strength, because they can produce torrential precipitation and, consequently, devastating floods.

Many of these storms have impacted one or more Pacific Island Countries, causing widespread destruction, high economic losses, and many casualties.

Sources: PCRAFI Risk Assessment Summary Report 2013

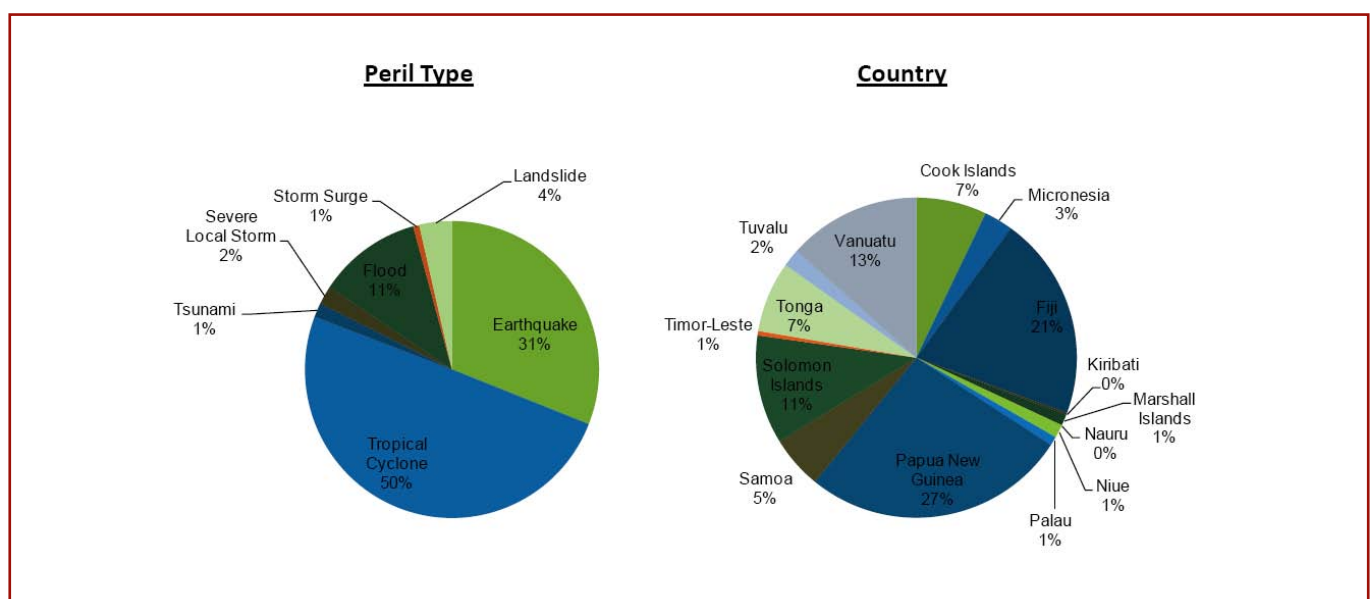
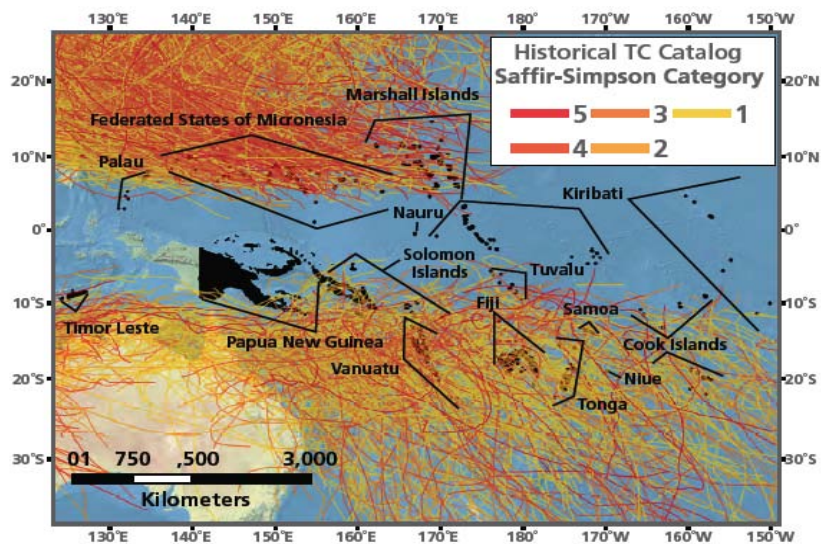


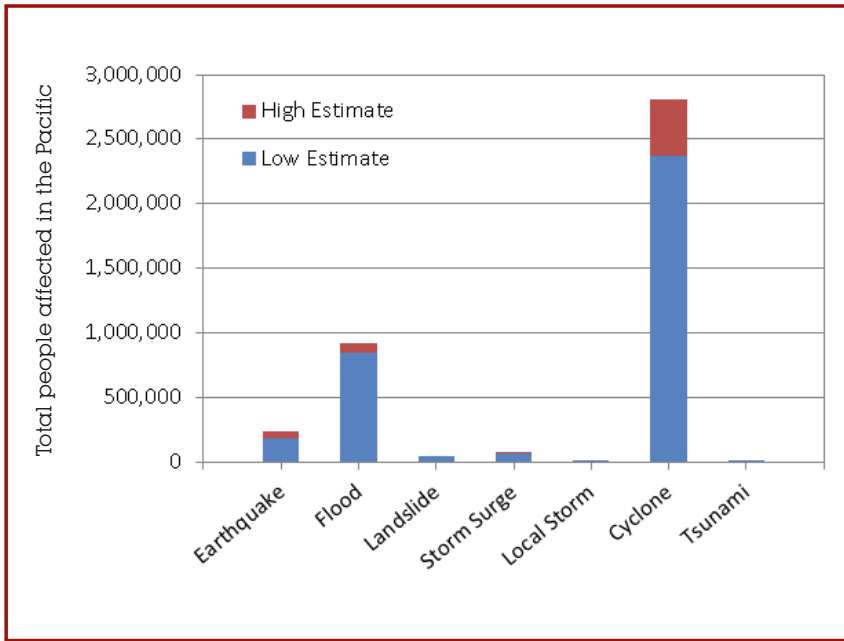
Figure 1: Distribution of natural hazards by peril and country - Source: PCRAFI Risk Assessment Summary Report 2013



Note: The maximum wind speeds generated by these events range from 74-95 mph for a Category 1 storm to greater than 155 mph for a Category 5 storm.

**Figure 2:** Tracks of the approximately 2,400 historical tropical cyclones in the Pacific Islands Region in the last 60 years



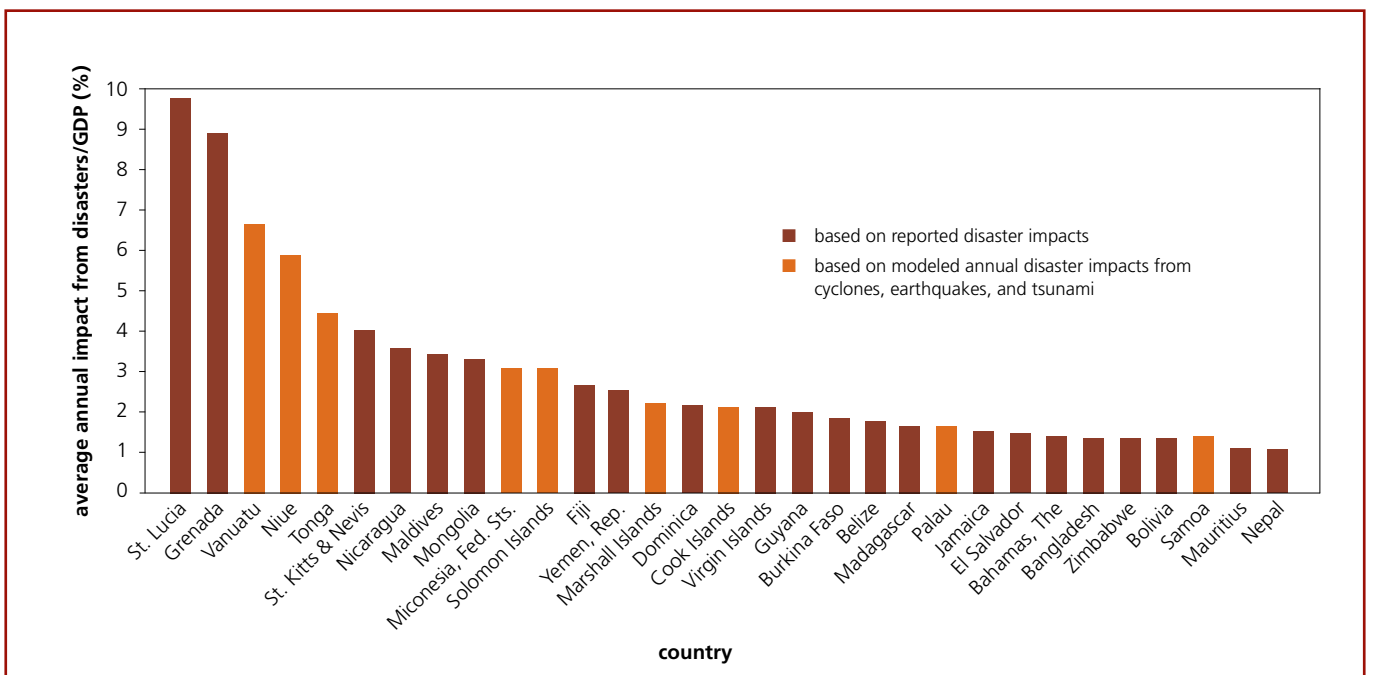


**Figure 3:** Total people affected by natural disasters in all 15 PICs Source: PCRAFI Risk Assessment Summary Report 2013

### Economic impacts of natural hazards

Of the 20 countries with the highest average annual disaster losses scaled by gross domestic product (GDP), eight are Pacific island countries: Vanuatu,

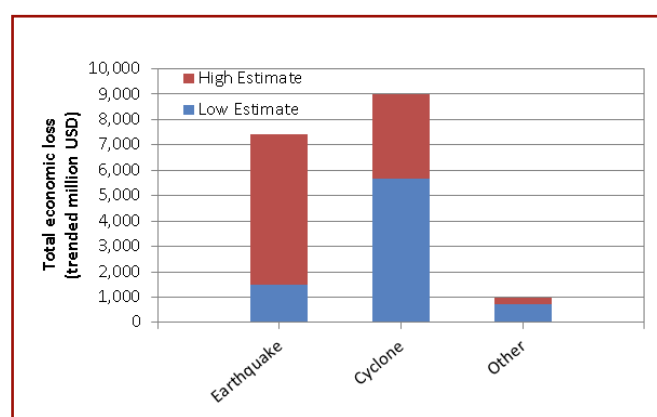
Niue, Tonga, the Federated States of Micronesia, the Solomon Islands, Fiji, the Marshall Islands, and the Cook Islands (figure 4 below).



**Figure 4:** All time economic loss due to natural hazards - based on modeled annual disaster losses (Pacific) and reported disaster losses (remaining areas).

# COSTS OF INACTION WILL BE SUBSTANTIAL FOR PACIFIC ISLAND COUNTRIES AND WILL INCREASE OVER TIME

Figure 5 below shows that tropical cyclones are reportedly the most damaging peril in terms of economic loss, while earthquakes are close behind. Together, all disasters reportedly caused at least 7.9 billion US dollars in economic losses (trended to 2009). To put this in perspective, the total GDP for all Pacific Island Countries in 2009 was about 14 billion U.S. dollars.



**Figure 5:** Economic loss due to natural hazards in the 15 Pacific Island Countries Source: PCRAFI Risk Assessment Summary Report 2013



The total value of infrastructure, buildings, and cash crops considered at some level of risk in the Pacific is estimated at over US\$112 billion (see figure 6 below). Inaction could therefore prove extremely costly and will only grow more expensive in the future (see table below for asset replacement costs and economic losses due to extreme events).

Country	Assets replacement cost US\$ million	Annual average economic losses		Losses from 100-Year event	
		US\$ million	% GDP	US\$ million	% GDP
Cook Islands	1,422	4.9	2.0	103.0	42.2
Fiji	22,175	79.1	2.6	844.8	28.1
Micronesia, Fed. Sts.	2,048	8.3	2.9	150.7	52.4
Kiribati	1,182	0.3	0.2	4.0	2.6
Marshall Islands	1,696	3.1	2.0	67.4	43.3
Nauru	453	0.00	0.00	0.00	0.00
Niue	249	0.9	5.8	22.7	143.4
Palau	1,501	2.7	1.6	46.7	27.5
Papua New Guinea	49,209	85.0	0.9	794.9	8.4
Samoa	2,611	9.9	1.7	152.9	27.0
Solomon Islands	3,491	20.5	3.0	280.6	41.4
Timor-Leste	20,145	5.9	0.8	143.7	20.5
Tonga	2,817	15.5	4.3	225.3	63.0
Tuvalu	270	0.2	0.8	4.8	15.1
Vanuatu	3,334	47.9	6.6	370.1	50.8
<b>TOTAL</b>	<b>112,602</b>	<b>284.2</b>		<b>3211.6</b>	

**Figure 6:** Source: World Bank, Pacific Catastrophe Risk Assessment and Financing Initiative, Country Risk Profiles (Washington, DC: World Bank, 2011).



Picture: Carlo Iacovino



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## CLIMATE CHANGE

Projections for a 4°C warmer world show that the impacts could be severe for Pacific Island Countries. These include:

- A dramatic increase in the intensity and frequency of high-temperature extremes. Extreme heat waves are likely to be regular and of unprecedented magnitude and duration, essentially becoming the new norm – and shifting the local climate to a fundamentally new regime.
- The average maximum cyclone intensity (ie. maximum speed) is likely to increase.
- Coral reef systems are threatened with extinction, which would be catastrophic for the environment and the people who depend on them for food, income and shoreline protection. This could occur well before 4°C is reached. Coral reefs are acutely sensitive to changes in water temperatures, ocean pH, and intensity and frequency of tropical cyclones. Coral reefs may stop growing as early as the 2030s, with total dissolution of reefs by the 2060s.
- The World Health Organization identifies small island developing states as particularly vulnerable to health impacts of climate change, because of the salinization of fresh water and arable land, as well as exposure to storm surges and extreme events. Meanwhile regional warming of just +2°C indicates a risk that the rise “could substantially undermine future global food security”.
- Sea-level rise in the Pacific poses an existential threat to many island countries. In the Western Pacific it will be larger than the global mean, and will have far-ranging adverse consequences for small island states - especially when combined with the projected increased intensity of tropical cyclones, climate change – induced effects on oceanic ecosystems (eg. loss of protective reefs due to temperature increases and ocean acidification), and other extreme events.
- Some scientists argue that forced abandonment seems a possible outcome for small islands, even with relatively minor changes in sea level, due to small populations and challenges adapting. Further, there is the potential that physical impacts might breach a threshold that pushes social systems into complete abandonment, as institutions that could facilitate adaptation collapse.
- Vulnerability to temperature extremes is particularly acute for small island biota, which are very limited in their ability to respond to range shifts. Finding comparable climates in a warmer world would require large geographical displacements for those biota, such as flooded grasslands, mangroves and desert biomes.

Sources: Turn Down the Heat: Why a 4°C Warmer World Must be Avoided and Climate Extremes, Regional Impacts, and the Case for Resilience (World Bank, Potsdam Institute for Climate Impact Research and Climate Analytics, and November 2012, June 2013)

# PART II: KEY MESSAGES FOR POLICY MAKERS



## ACTING TODAY FOR TOMORROW ON CLIMATE CHANGE AND DISASTER RISK REDUCTION WILL SAVE LIVES AND REDUCE ECONOMIC LOSSES

### THE CONSEQUENCES OF NOT ACTING TODAY

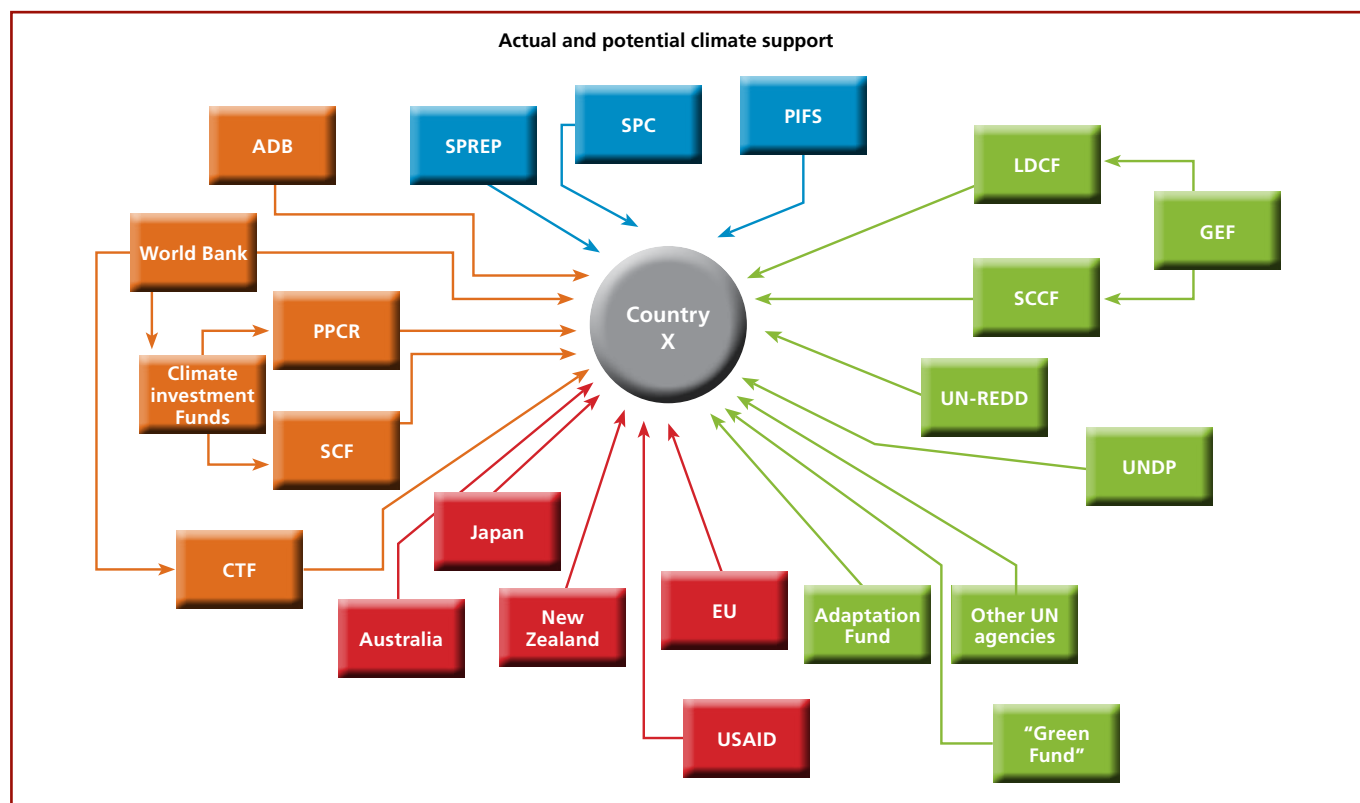
1. Unless development planning in Pacific island Countries addresses risks from natural hazards, these countries will remain among the most vulnerable in the world.
2. A “business as usual” approach to managing risks- one that focuses more on disaster relief than on long-term disaster risk reduction and climate change adaptation—will result in increased economic and human losses from extreme events.
3. A “business as usual” approach will slow economic growth and delay or even set back progress toward Millennium Development Goals, and the poor and marginalized will suffer the most.

### LESSONS FROM THE LAST DECADE

1. Many projects in disaster risk reduction and climate change adaptation have relatively short time frames, which encourage fragmented efforts, and ultimately do little to reduce underlying vulnerability.
2. Weak coordination between institutions limits the impact of interventions, and the institutional rigidity of donor organizations can make cooperation and partnership still more difficult.
3. Reducing vulnerability requires stronger political leadership, improved monitoring and evaluation, and the availability of accessible, user-friendly data and information. These factors will help ensure: disaster and climate risk considerations are integrated in development plans and budgets; well-designed initiatives are delivered efficiently; and that leaders can make informed decisions.

Sources: Acting Today for Tomorrow, A policy and Practice Note for Climate and Disaster Resilient Development in the Pacific Islands Region (The World Bank, GFDRR, 2012)

# RESILIENT DEVELOPMENT REQUIRES STRONG COORDINATION AND PARTNERSHIPS



**Figure 7:** The diversity and complexity of climate funding and support sources to a typical Pacific Island Country

Source: Courtesy of Toily Kurbanov, Deputy Resident Representative, UNDP, Fiji.

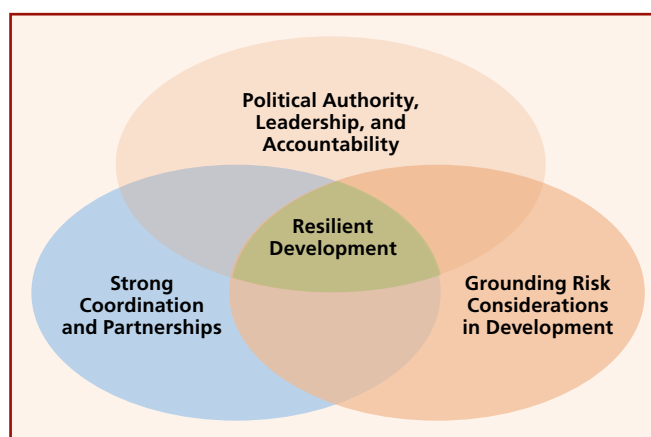
Note: Orange boxes indicate support from multilateral development banks; green boxes indicate support from other multilateral sources; red boxes indicate support from bilateral sources; and blue boxes indicate support from regional organizations. ADB = Asian Development Bank, CTF = Clean Technology Fund, EU = European Union, GEF = Global Environment Facility, ICCAI = International Climate Change Adaptation Initiative, JICA = Japanese International Cooperation Agency, LDCF = Least Developed Country Fund, MDGF = Millennium Development Goals Achievement Fund, PPCR = Pilot Programme for Climate Resilience, SCCF = Special Climate Change Fund, SCF = Strategic Climate Fund, UNDP = United Nations Development Programme, UN-REDD = United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation, USAID = United States Agency for International Development .

## THE WAY FORWARD

### OVERCOMING REMAINING BARRIERS

Critical barriers to achieving climate- and disaster-resilient development can be overcome if:

- Risk considerations are grounded in development, and coordinated at all levels;
- Political authority, leadership, and accountability are robust and effective, at regional as well as national levels; and
- Coordination and partnerships are strong between Pacific Island Countries and relevant partners.



**Figure 8:** Key requirements for climate- and disaster resilient development

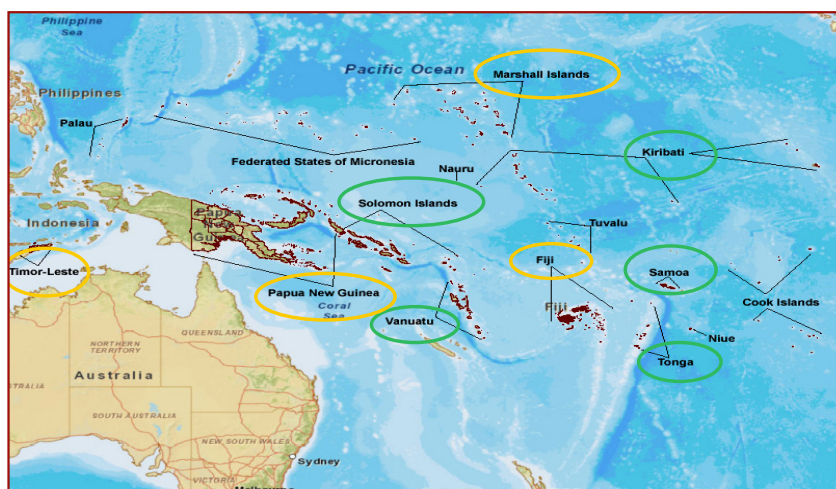
# PART III: WORLD BANK ENGAGEMENT

The World Bank Group is working: (i) to strengthen Pacific Island Governments' ability to respond to climate and disaster risks, and to integrate climate change adaptation and disaster risk reduction across the development agenda; and (ii) to offer financial support for initiatives that address these issues and transfer knowledge, as exemplified by the Pacific Catastrophe Risk Financing and Insurance Initiative (PCRAFI).

## ACCESS TO CLIMATE FINANCE

- There is a complex web of financing instruments available for climate finance (US\$364 billion globally, including \$171 billion in developing countries). Most of these funds (\$350 billion) are for mitigation, and \$14 billion for adaptation.
- The menu of climate finance instruments to leverage and catalyze climate adaptation is growing. This includes:
  - > **AF:** The Adaptation Fund,
  - > **SCCF:** Special Climate Change Fund,
  - > **GEF/ LDCF:** Global Environment Fund/ Least Developed Country Fund,
  - > **CIF/PPCR:** Climate Investment Funds/Pilot Program for Climate Resilience,
  - > **GFDRR:** Global Facility for Disaster Reduction & Recovery,
  - > **IDA/IBRD:** International Development Association/International Bank for Reconstruction and Development (IDA/IBRD).
- Funding sources for disaster risk management and climate change adaptation mobilized by World Bank for the Pacific amount to US\$140 million and include:
  - > **IDA** which has been used to support post disaster recovery and reconstruction, and disaster and climate resilient infrastructure.
  - > **Various trust funds** from a number of donors, including: CIF/PPCR, Australia and New Zealand; the Pacific Region Infrastructure Facility (PRIF); European Union; Global Environment Fund/LCDF; GFDRR, and the Japan Policy and Human Resources Development Fund (PHRD).
  - > The viability of market-based **disaster risk insurance** solutions in the Pacific is being examined under PCRAFI.

The World Bank already has a strong engagement in climate change and disaster risk reduction, with US\$140 million invested in related policy assistance and projects in Kiribati, PNG, Samoa, Solomon Islands, Timor-Leste, and Vanuatu. Supported activities combine policy support, disaster and climate risk assessments, investments for risk reduction and resilience in various sectors, including community driven development, water and coastal management, transport and agriculture, and post disaster recovery and reconstruction.

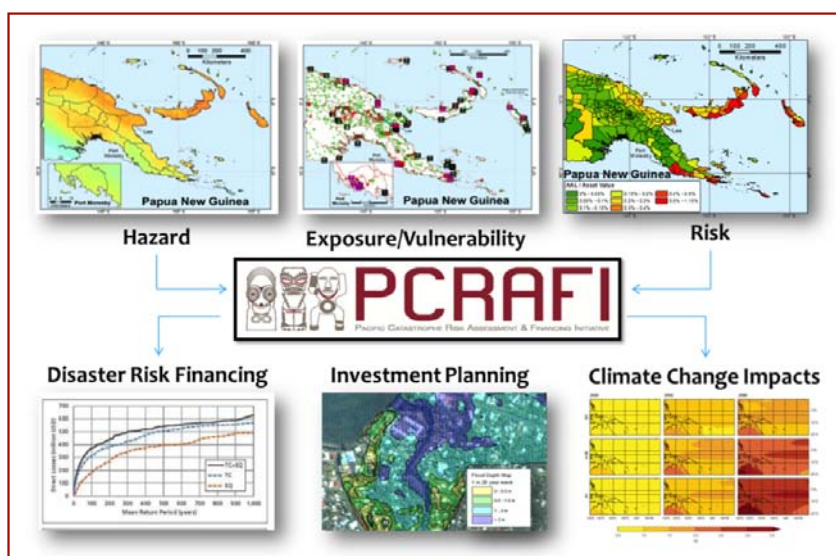


**Figure 9:** World Bank Portfolio  
(Green: project, Yellow: technical assistance)



At the regional level, PCRAFI is an innovative program that builds on the principle of regional coordination and provides Pacific Island Countries with state-of-the-art disaster risk information and tools for enhanced disaster risk management, and improved financial resilience against natural hazards and climate change.

**Figure 10:** Pacific Disaster Risk Information System



## PACIFIC CATASTROPHE RISK INSURANCE PILOT

In January 2013, Japan, the World Bank and the Secretariat of the Pacific Community (SPC) teamed up with five Pacific island nations (Marshall Islands, Samoa, Solomon Islands, Tonga and Vanuatu) to launch the first Pacific Catastrophe Risk Insurance Pilot, which draws on the experiences of a similar program in the Caribbean.

- This innovative scheme works through a regional risk pooling mechanism that allows the five countries to secure US\$45 million of earthquake, tsunami and tropical cyclone catastrophe coverage on the international reinsurance market.
- Rather than traditional insurance, the program uses “parametric triggers” to determine pay-outs. Should a triggering event (e.g. earthquake or cyclone) occur, insurance payouts can be given within weeks.
- If a disaster strikes, an independent modeling firm – AIR Worldwide – will use reported event parameters and a catastrophe risk model, developed specifically for the pilot, to model emergency losses. If the parameters trigger a payout, disbursements are made within 17 days. Speed of payout is assured because the policies do not require individual damage assessment, as with traditional insurance.
- The program is part of an integrated national disaster risk financing strategy, which also includes advisory services on budget planning and post-disaster budget execution.
- The Government of Japan is co-financing the catastrophe risk insurance premiums for the first two years of the pilot operations. After two years, it will become available to other Pacific Island Countries.
- The Pacific Catastrophe Risk Insurance Pilot was renewed on 1 November, 2013 for its second season, with Cook Islands newly joining five other participating Pacific island countries.



The World Bank also completed in 2012 the Policy and Practice Note (PPN) for Climate and Disaster Resilient Development in the Pacific Islands Region (see figure 11). This policy note emphasized the need to incorporate risk considerations in social and economic development policies and plans; and ensure that political authority, leadership, and accountability are robust and effective. The report also highlighted that donors in the region have operated mostly on a country by country, project by project basis, whilst recognizing that disaster risk reduction and climate change adaptation assistance is a crowded space. Coordination and strong partnership remains a critical issue.

Building on on-going national and country initiatives, the World Bank will strengthen its support to Pacific Island Countries and Regional Organizations on Disaster and Climate Resilient Development with the following key strategic objectives:

**OBJECTIVE 1:**

**Streamlining disaster risk reduction and climate change adaptation in key sectors** (e.g. transport, energy and agriculture) that are particularly vulnerable to natural hazards and climate change. If successful, this initiative will lead to more tangible results on the ground in these areas, and potentially leverage additional resources for incremental costs related to disaster and climate resilience.

**OBJECTIVE 2:**

**Develop a regional program on Disaster and Climate Resilience.** This will build on the PCRAFI and will link investments in resilience and disaster preparedness with improved financial protection of Pacific Island Countries and will promote an integrated disaster risk financing strategy (as outlined in figure 12 below) - critical given the frequency and severity of disasters in the region. In addition, it will create a regional

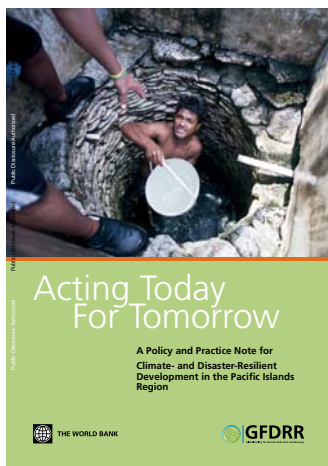
framework for prioritized resilient investment, disaster risk reduction and early warning systems. Partnership with donors will be improved through joint planning mechanisms, building a community of practice, and exploring the possibility of pooling funds. Overall the aim is more efficient and effective delivery of projects and funding, with more tangible results on the ground.

**REGIONAL PROGRAM ON DISASTER AND CLIMATE RESILIENCE**

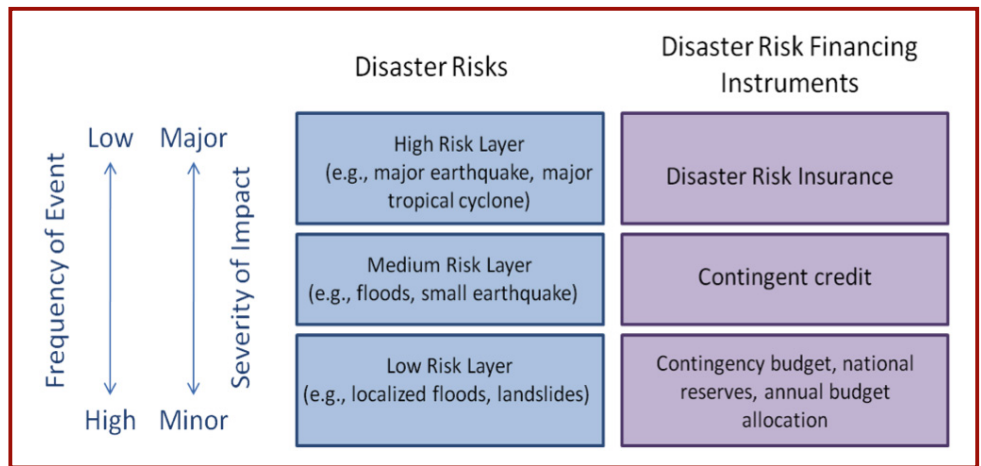
The World Bank's new regional program will build on PCRAFI, and will aim to strengthen the ability of Pacific Island Countries to prepare for and manage the economic impacts of natural hazards. Even with efforts to reduce risks, disasters will continue to cause economic losses. Pacific Island Countries, and the region, must be prepared.

The program will strengthen the countries resilience and preparedness systems and provide immediate post-disaster budgetary support to help countries improve post-disaster financial response. A proposed national integrated disaster risk financing strategy would cover all risk layers (figure below):

- National reserves to support an immediate response to low disaster risk layer (high frequency - up to 1 in 5 year return period, low cost events),
- A regional contingent credit facility for immediate response to medium disaster risk layer (medium frequency - up to 5 in 20 year return period, medium cost events),
- Catastrophe risk transfer mechanisms (such as catastrophe risk insurance) for high disaster risk layer (low frequency – greater than 1 in a 20 year return period, high cost events). Program preparation will start in the last quarter of 2013.



**Figure 11:** A policy and practice note for climate and resilient development



**Figure 12:** a national integrated disaster risk financing strategy would be established and would cover all risk layers.



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