

SOLOMON ISLANDS



GFDRR



SPC
Secretariat
of the Pacific
Community



WORLD BANK GROUP

Country Note

SOLOMON ISLANDS

February 2015

Disaster Risk Financing and Insurance

PCRAFI 2015



GFDRR



SPC
Secretariat
of the Pacific
Community



WORLD BANK GROUP

© 2015 International Bank for Reconstruction and Development /
International Development Association or

The World Bank

1818 H Street NW

Washington DC 20433

Telephone: 202-473-1000

Internet: www.worldbank.org

This work is a product of the staff of The World Bank with external contributions. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of The World Bank, its Board of Executive Directors, or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Rights and Permissions

The material in this work is subject to copyright. Because The World Bank encourages dissemination of its knowledge, this work may be reproduced, in whole or in part, for noncommercial purposes as long as full attribution to this work is given.

Any queries on rights and licenses, including subsidiary rights, should be addressed to the Office of the Publisher, The World Bank, 1818 H Street NW, Washington, DC 20433, USA; fax: 202-522-2422; e-mail: pubrights@worldbank.org.

Photo Credits

Photos specifically credited are done so under Creative Commons Licenses. The licenses used are indicated through icons showcased next to each image.

- Ⓒ 2.0 Attribution License
(<http://creativecommons.org/licenses/by/2.0/legalcode>)
- ⒸⒹ Attribution No-Derivatives License
(<http://creativecommons.org/licenses/by-nd/2.0/legalcode>)
- ⒸⒺ Attribution Share Alike License
(<http://creativecommons.org/licenses/by-sa/2.0/legalcode>)

If not indicated otherwise, photos used in this publication have been sourced from the following locations with full rights:

- World Bank Flickr Website
- United Nations Flickr Website

All non-Creative Commons images in this publication require permission for reuse.

Cover Photo Credit: Kyle Post / Flickr Ⓒ

Table of Contents

01	Acknowledgments
02	Acronyms and Abbreviations
03	Executive Summary
04	Introduction
06	Economic Impact of Natural Disasters
08	Public Financial Management of Natural Disasters
08	Post-Disaster Budget Mobilization
09	Ex-Ante Practices and Arrangements
11	Ex-Post Practices and Arrangements
12	Total Response Funds Available
13	Post-Disaster Budget Execution
15	Domestic Catastrophe Risk Insurance Market
17	Options for Consideration
18	End Notes
19	References
20	About PCRAFI
21	Annex 1

Table of Contents

28	Annex 2
29	Annex 3
29	Executive Summary
30	Insurance Market Overview
32	Catastrophe Risk Exposure and Capacity
33	Insurance Law and Regulation
34	Building Controls and Standards
34	Insurance of Public Assets
35	Options for Consideration
35	References
36	Glossary
37	Annex 4

Acknowledgments

This note has been prepared by a team led by Olivier Mahul (Disaster Risk Financing and Insurance Program Manager, World Bank) and comprising Samantha Cook (Financial Sector Specialist) and Barry Bailey (Consultant).

The team gratefully acknowledges the data, information, and other invaluable contributions made by the Pacific Island Countries. Without their skills and expertise, the compilation of this note would not have been possible.

This note benefitted greatly from the technical expertise of the following persons: Franz Drees-Gross (Country Director Timore-Leste, Papua New Guinea, and Pacific Islands, World Bank), Olivier Mahul (Disaster Risk Financing and Insurance Program Manager, World Bank), Denis Jordy (Senior Environmental Specialist, World Bank), Michael Bonte-Grapentin (Senior Disaster Risk Management Specialist, World Bank), Paula Holland (Secretariat of the Pacific Community), and David Abbott (Secretariat of the Pacific Community).

Inputs and reviews from Robert Utz, David Knight, Kim Edwards, Oscar Ishizawa, Rashmin Gunasekera, Keren Charles, Francesca de Nicola and Susann Tischendorf greatly enhanced the final note. Design and layout developed by Bivee.co.

The Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) is a joint initiative between the Secretariat of the Pacific Community

(SPC) through its Applied Geoscience and Technology Division (SOPAC), the World Bank, and the Asian Development Bank, with financial support from the government of Japan and the Global Facility for Disaster Reduction and Recovery (GFDRR).

The Disaster Risk Financing and Insurance Program is grateful for the financial support received from the government of Japan and the Global Facility for Disaster Reduction and Recovery.

Acronyms and Abbreviations

CBSI	Central Bank of Solomon Islands
DRFI	disaster risk finance and insurance
GDP	gross domestic product
HFA	Hyogo Framework for Action
ISR	Industrial Special Risks
MoFT	Ministry of Finance and Treasury
NDC	National Disaster Council
N-DRM Plan	National Disaster Risk Management Plan
PCRAFI	Pacific Catastrophe Risk Assessment and Financing Initiative
PIC	Pacific Island Country
RFA	Regional Framework for Action
SIDS	Small Island Developing States
SOPAC	Applied Geoscience and Technology Division of SPC
SPC	Secretariat of the Pacific Community
TC	Tropical Cyclone
UNDP	United Nations Development Programme
UNISDR	United Nations International Strategy for Disaster Reduction

Currency: Solomon Islands Dollar (SI\$)

Average exchange rate: US\$1 = SI\$7.23

Section

A

Executive Summary

This report aims to build understanding of the existing disaster risk financing and insurance (DRFI) tools in use in the Solomon Islands and to identify gaps where engagement could further develop financial resilience. It also aims to encourage peer exchange of regional knowledge, specifically by encouraging dialogue on past experiences, lessons learned, optimal use of these financial tools, and the effect these tools may have on the execution of post-disaster funds.

The Solomon Islands is located in an area known for frequent tropical cyclones and is also in the Pacific Ring of Fire, an active seismic area. Consequently, it is exposed to both hydrometeorological and geophysical hazards. This exposure was clearly demonstrated at the end of December 2012, when the country experienced Tropical Cyclone Freda, followed in early February 2013 by a magnitude 8.0 earthquake and a subsequent tsunami affecting the Santa Cruz Islands.

The Solomon Islands is expected to incur, over the long term, average annual losses of SI\$145 million (US\$20 million) due to earthquakes or tropical cyclones. In the next 50 years, the Solomon Islands has a 50 percent chance of experiencing a single event loss exceeding SI\$1.7 billion (US\$240 million), and a 10 percent chance of experiencing a single event loss exceeding SI\$3.7 billion (US\$520 million) (PCRAFI 2011).

The Solomon Islands government has a variety of tools for financing the cost of disasters, but the funds are limited and can be quickly exhausted. The disaster relief budget allocated to the National Disaster Council (NDC) is small—SI\$2.2million (US\$305,250) in 2013—and is quickly exhausted, as happened during the response to the Santa Cruz earthquake and tsunami. There is a 77 percent chance that disaster losses will exceed this budget amount in any given year. If these funds were exceeded, the government would need to source remaining funds from the contingency warrant and pursue budgetary reallocation. Consequently the Solomon Islands tends to rely heavily on donor support to fund post-disaster expenditures.

The NDC met on the day of the Santa Cruz earthquake and was able to immediately mobilize SI\$1 million (US\$138,000) to purchase relief supplies. This is equivalent to approximately half of the annual budget for response. The remaining SI\$1.2 million was exhausted shortly for the additional supplies needed, for the first shipment following updates from situation reports identifying the need for greater quantities of relief goods. The first shipment of goods to the affected area had fully exhausted the annual response budget. In light of the small amount of dedicated funds allocated to the NDC and the speed with which they can be used up, the Solomon Islands government should

consider the reactivation of the National Disaster Council Fund, or the use of other DRFI instruments such as contingent credit to ensure additional sources of liquidity following an event.

Anecdotal evidence suggests that the Ministry of Finance and Treasury (MoFT) would benefit from the development of a post-disaster budget execution manual to improve staff awareness of post-disaster procedures and processes. During the Santa Cruz response, the bid waiver process was not adhered to; MoFT staff were unaware of this process because it is rarely used. As a result, there were significant delays in the purchase of necessary relief items.

A number of options to improve DRFI are presented here for consideration:

- (a) Develop a post-disaster budget execution manual to improve awareness of post-disaster procedures and processes;
- (b) Develop an integrated disaster risk financing and insurance strategy; and
- (c) Explore the use of other DRFI tools such as contingent credit to access additional liquidity post-disaster.

▼ **Photo Credit**

Australian Department of Foreign Affairs and Trade/Flickr ©



Introduction

Located in the Pacific Ring of Fire, the Solomon Islands is susceptible to both hydrometeorological and geophysical disasters. Hydrometeorological hazards include tropical cyclones, floods, and droughts, whereas geophysical hazards include earthquakes and resulting tsunamis and landslides. The population of the Solomon Islands is estimated to be 515,870, with an estimated growth rate of 2.3 percent.¹ The population is spread across 845 of the country's 992 islands, which cover an area of 24,000km². With 80 percent of the total population living in rural areas, disaster response is often time-consuming and expensive; post-disaster transportation costs create a significant fiscal burden and have led to delays in the distribution of relief goods in the past.

The Solomon Island government has demonstrated commitment to disaster risk management through its National Disaster Risk Management (N-DRM) Plan 2010, which was adopted by the cabinet under the 1989 National Disaster Council Act. The N-DRM Plan provides the government with a comprehensive institutional framework to address hazards, reduce risks (including those associated with climate change), and implement activities for disaster management, recovery, and rehabilitation across sectors at the national, provincial, and village levels.

The N-DRM Plan lays out procedures for the Recovery and Rehabilitation Committee,

which is responsible for developing funding arrangements for cabinet approval. These plans can include reallocation of sector budgets, as well as international partner and stakeholder support (Solomon Islands Government 2010).

Both independently and in conjunction with many partners—such as Secretariat of the Pacific Community Applied Geoscience Division (SPC-SOPAC), the Secretariat for the Pacific Regional Environment Programme (SPREP), United Nations Development Program (UNDP) Pacific Centre, and the United Nations International Strategy for Disaster Reduction (UNISDR)—the Solomon Islands has developed several institutional frameworks on disaster risk management and climate change adaptation at the national, subregional, and international level, including the following:

- Hyogo Framework for Action (HFA) 2005–2015
- Pacific Disaster Risk Reduction and Disaster Management Framework for Action (Regional Framework for Action or RFA) 2005–2015
- National Adaptation Programme of Action (NAPA), 2008
- National Disaster Risk Management Plan, 2010
- Solomon Islands National Climate Change Policy, 2012–2017
- National Development Strategy, 2011–2020

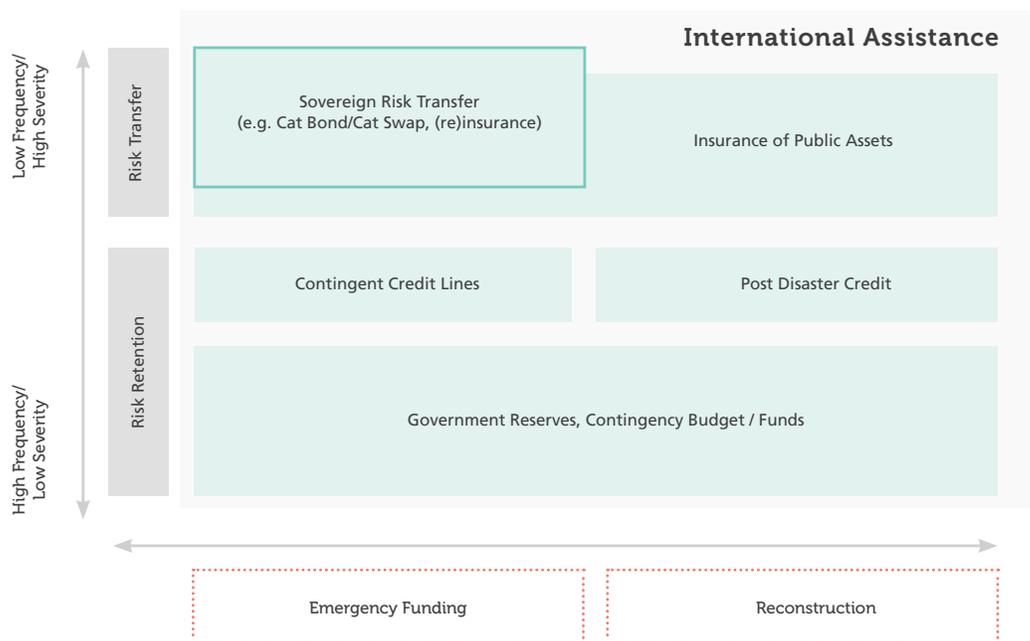
Disaster risk financing and insurance (DRFI) is a key activity of the HFA Priorities for Action 4 and 5.² The HFA is a result-based plan of action adopted by 168 countries to reduce disaster risk and vulnerability to natural hazards and to increase the resilience of nations and communities to disasters over the period 2005–2015. In the Pacific, the HFA formed the basis for the development of the Regional Framework for Action.

The RFA cites DRFI activities as a key national and regional activity. Theme 4—“Planning for effective preparedness, response and recovery”—has an associated key national activity, “Establish a national disaster fund for response and recovery.” Theme 6 of the RFA—“Reduction of underlying risk factors”—cites the development of “financial risk-sharing mechanisms, particularly insurance, re-insurance and other financial modalities against disasters as both a key national and regional activity” (SOPAC 2005). These regional implementation activities align with the three-tiered

disaster risk financing strategy developed by the World Bank.

The Pacific DRFI Program enables countries to increase their financial resilience against natural disasters by improving their capacity to meet post-disaster funding needs without compromising their fiscal balance. This program is one application of the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI). The Pacific DRFI Program is built upon a three-tiered approach to disaster risk financing. These layers align to the basic principles of sound public financial management, such as the efficient allocation of resources, access to sufficient resources, and macroeconomic stabilization. The three tiers acknowledge the different financial requirements associated with different levels of risk: (i) self-retention, such as a contingency budget and national reserves, to finance small but recurrent disasters; (ii) a contingent credit mechanism for less frequent but more severe events; and (iii) disaster risk transfer (such as

Figure 1 — Three-Tiered Disaster Risk Financing Strategy



Source: World Bank 2010.

Section

01

insurance) to cover major natural disasters. See figure 1.

This note aims to build understanding of the DRFI tools in use in the Solomon Islands and to identify gaps where engagement could further develop financial resilience. It also aims to encourage peer exchange of regional knowledge, specifically by encouraging dialogue on past experiences, lessons learned, optimal use of these financial tools, and the effect of these tools on the execution of post-disaster funds.

▼ **Photo Credit**

Australian Department of Foreign Affairs and Trade/Flickr ©



Economic Impact of Natural Disasters

Since 1980, the Solomon Islands has experienced approximately 111 disasters that affected over half a million people. Just over half of these events were earthquakes, about a quarter were tropical cyclones and storms, 11 percent were attributable to tsunamis, and 12 percent were man-made disasters, landslides, and droughts (PDN 2013).

The Solomon Islands is located in an area known for frequent tropical cyclones, and is also situated in the Pacific Ring of Fire, an active seismic area. Consequently, it is exposed to both hydrometeorological and geophysical hazards. This exposure was clearly demonstrated at the end of December 2012, when the country experienced Tropical Cyclone Freda, followed in early February 2013 by a magnitude 8.0 earthquake and a subsequent tsunami affecting the Santa Cruz Islands.

The majority of the population works in the agriculture, fishing, and forestry sectors, which are highly susceptible to natural hazards, as the Santa Cruz earthquake demonstrated. The tsunami following that earthquake increased saline levels in the country's water sources. This had a severe impact on the living standards of and livelihoods of residents, most of whom practice subsistence agriculture

(Solomon Islands Government 2013d). The Santa Cruz earthquake affected 37 percent of the resident population, totally destroying 588 houses and partially damaging an additional 478.

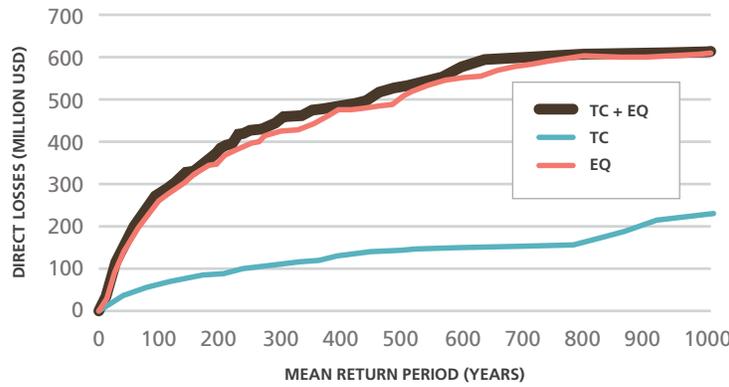
Logging, fishing, and more recently gold mining drive the economy of the Solomon Islands, and all of these industries can be impacted by a natural disaster, which in turn reduces the limited sources of government revenue. Like many small island states, the Solomon Islands has limited sources of domestic revenue and thus limited budget flexibility. In 2013, domestic revenue grew by 8 percent (SI\$202 million or US\$28 million), which reflects growth in the national economy, ongoing improvement in revenue administration, and compliance efforts (Solomon Islands Government 2013).

The Solomon Islands is expected to incur, over the long term, average annual losses of SI\$145 million (US\$20 million) due to earthquakes or tropical cyclones. In the next 50 years, the Solomon Islands has a 50 percent chance of experiencing a single event loss exceeding SI\$1.7 billion (US\$240 million), and a 10 percent chance of experiencing a single event loss exceeding SI\$3.7 billion (US\$520 million) (see figure 2).

Section

02

Figure 2 — Direct Losses by Return Period



Source: PCRAFI 2012

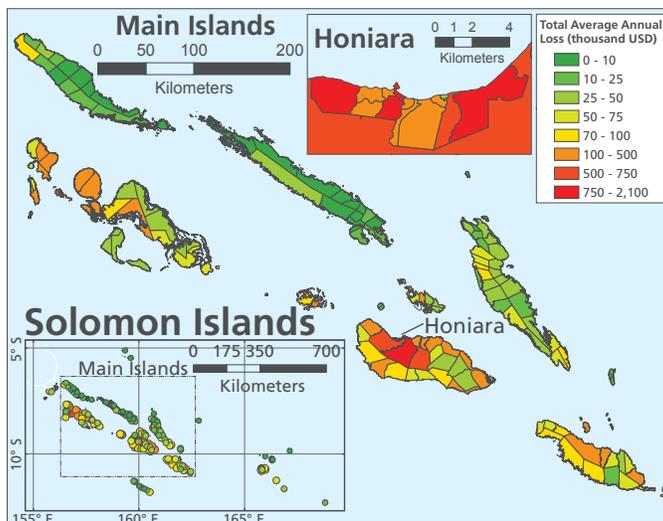
Note: TC = tropical cyclone; EQ = earthquake

Figure 3 shows average annual loss by geographic area. Areas highlighted in red are likely to incur the highest level of loss, between US\$0.75 million and \$2.1 million per year. The full country risk profile for the Solomon Islands can be found in annex 4.

In April 2014, flash flooding in Honiara, Guadalcanal, Isabel, Malaita, and Makira-Ulawa caused damage and loss estimated at S\$787.3 million (US\$108.9 million), equivalent to 9.2 percent of gross domestic product (GDP). A slow-moving tropical depression caused persistent heavy rains, with over 732mm of rainfall

recorded over four days at the Honiara rain gauge. These floods caused 22 fatalities across the country, internally displaced some 10,000 people initially, and affected approximately 52,000 people in total. The flooding caused damage to major infrastructure, fully destroying some 675 houses along with the food gardens that many people depend upon for their livelihood. This event took place at the time of writing, and information from the event has been incorporated into this report where possible.

Figure 3 — Average Annual Loss by Area



Source: PCRAFI 2011.

Public Financial Management of Natural Disasters

Although the Solomon Islands has developed many policies to facilitate timely mobilization and execution of post-disaster funds for disaster response, these policies are little known outside the NDC. This situation has led to delays in the purchase and distribution of relief goods and has had a significant impact on both the budget for the NDC and the national contingency warrant (contingency budget).

All Solomon Islands government programs receive 100 percent of their budget allocation (also known as a warrant) at the start of the calendar year. This provides government agencies with the flexibility to manage their allocated funds as they see fit throughout the year. Purchases can be made as long as they are within budget. But the arrangement can also create difficulty with post-disaster finance, particularly if a disaster should occur toward the end of the year. Conversely, there is a risk that an event at the start of the year could exhaust the entire year's worth of funds.

structure recognizes the need for MoFT to be part of the decision-making process for disaster response purchases. MoFT staff, however, remain uncertain of their role in post-disaster finance; in the past they have not adhered to the correct bid waiver process, which created unnecessary delays in purchasing needed goods.

Effective post-disaster financial response relies on two fundamental capabilities: (i) the ability to rapidly mobilize funds post-disaster; and (ii) the ability to execute funds in a timely, transparent, and accountable fashion. This section discusses the existing procedures for post-disaster budget mobilization and execution and where possible provides examples of their use.

Section

03

The National Disaster Risk Management Plan lists the permanent secretary of the Ministry of Finance and Treasury (MoFT) as a member of the National Disaster Council (NDC). This

Post-Disaster Budget Mobilization

The Solomon Islands government takes an ex-post approach to financing the cost of disasters. The disaster relief budget allocated to the NDC is small—SI\$2.2 million (US\$ 304,000) in 2013 and SI\$1.9 million (US\$262,000) in 2014. Both amounts were quickly exhausted following one event during the first four months of the fiscal year. In other words, for two years in a row a single disaster has exhausted not only the relief budget of the NDC but also the operational budget. In addition, anecdotal evidence suggests that the majority of the national contingency budget was depleted following the event in Santa Cruz. It appears that the Solomon Islands continues to rely heavily on donor support to fund post-disaster expenditures.

The Solomon Islands has a variety of DRFI tools available to it, and the time needed to mobilize and execute these funds varies

significantly. Building on the World Bank disaster risk financing and insurance framework (see annex 1), table 1 shows the ex-ante and ex-post financial tools available, indicates those utilized by the Solomon Islands, and gives indicative timings. The tools utilized by the Solomon Islands are highlighted in blue. Those sections highlighted in gray are for generic instruments that to date have not been used in the Solomon Islands.

The sections below discuss the financing tools available in the Solomon Islands in detail, providing information on the time needed to mobilize these funds and the amount of funds available.

Ex-Ante Practices and Arrangements

The uncertainty surrounding international assistance has placed pressure on countries to establish domestic sources of finance for post-disaster relief, such as national reserves or transfer of risk to the international insurance market. The Solomon Islands has a variety of ex-ante practices and arrangements, which are discussed below.

Table 1— Sources of Funds Available

	SHORT TERM (1-3 MONTHS)	MEDIUM TERM (3-9 MONTHS)	LONG TERM (OVER 9 MONTHS)
<i>Ex-post Financing</i>			
Donor Assistance (relief)			
Budget Reallocation			
Domestic Credit			
External Credit			
Capital Budget Realignment			
Donor Assistance (reconstruction)			
Tax Increase			
Tax Incentives (Flash Appeal)			
<i>Ex-ante Financing</i>			
National Disaster Council Fund			
Contingency Budget			
Contingent Credit			
Sovereign (parametric) Catastrophe Risk Insurance			
Traditional Disaster Insurance			

Source: Solomon Islands government; World Bank.

National Disaster Council Fund

The National Disaster Council Fund was established under Section 17 of the NDC Act (1989). However, this fund has not received an appropriation since 2008, when a special audit conducted by the Office of the Auditor General found that the National Disaster Council Fund was misused and that funds were often diverted away from disaster response activities (Solomon Islands Government 2008). In response to this finding, an account was established at the Central Bank of Solomon Islands (CBSI) to give the NDC greater control of any monies received from external sources. (See “Flash appeal” below.)

Contingency warrant

In 2011 the Solomon Islands government established a national contingency warrant to set aside funds to meet unforeseen spending needs throughout the year (Solomon Islands Government 2013c). The warrant enables the government to meet an urgent need for expenditure on matters that were not foreseen at the time of the last appropriation bill; for example, it can be used in response to a national emergency or natural disasters, but can also be appropriated for less imperative financing demands.

Contingency warrants for disaster relief and response can be released only following a national declaration of emergency. The aggregate allocation for the 2013 contingency warrant was SI\$38 million (US\$5.2million), a 28 percent reduction from 2011. This decline raises questions about the long-term sustainability of the fund.

The Solomon Islands participated in the first two seasons of the Pacific Catastrophe Risk Insurance Pilot but chose to discontinue this insurance in the third season. This decision was influenced by the fact that neither the Santa

Cruz earthquake nor the flash floods of early 2014 generated a payout under the terms of the insurance. Nor was either event eligible under the terms of the insurance: the Santa Cruz earthquake generated emergency losses that were below the attachment point of the policy, and the insurance does not cover flood risk in itself.

The experience of the Solomon Islands highlights the importance of capacity building in DRFI. Countries need to decide exactly what type of risk they wish to cover and what tools are best suited to covering it. Insurance cannot be used as a singular solution to hazard risk. The experience of the Solomon Islands has also given impetus to development of additional DRFI products tailored to the specific needs of countries.

Ex-Post Practices and Arrangements

Because disasters generally exceed a country’s capacity to cope with them, there will always be a need for ex-post practices and arrangements. An optimal strategy for DRFI relies on a combination of ex-ante and ex-post financial instruments. Ex-post arrangements benefit from being able to establish the extent of the disaster and prioritize the response needs. As a result these arrangements take longer to implement than ex-ante arrangements, but they can often mobilize larger amounts of finance. This section discusses the ex-post practices and arrangements that have been made by the Solomon Islands.

Flash appeal

During the 2014 flash floods, an account was established at the CBSI to receive funds from a flash appeal conducted by the NDC. The appeal received SI\$2.3 million (US\$318,000), which has been used to help emergency relief and recovery needs. Donations came from private companies, individuals, embassies of the Solomon Islands, and other governments, including Papua

Box 1— The Pacific Catastrophe Risk Insurance Pilot

The Pacific Catastrophe Risk Insurance Pilot aims to provide immediate budget support following a major tropical cyclone or earthquake/tsunami. The insurance is designed to cover emergency losses, which are estimated using both a modeled representation of the event based on hazard parameters and a calculation of total modeled physical damage. Unlike a conventional insurance scheme, where a payout would be assessed against actual incurred costs, this scheme pays out on the results of a model. The advantage of this approach is that it results in a much faster payout. The payout would act as a form of budget support and would go some way to cover the costs that would be incurred by the

government in the aftermath of a severe natural disaster that disrupts the provision of government services. Countries can choose between three layers of coverage—low, medium, and high—depending on the frequency of events. The lower layer will cover events with a return period of 1 in 10 years, that is, more frequent but less severe events. The medium layer will cover events with a 1-in-15-year return period, while the higher layer will cover less frequent but more severe events, or those with a return period of 1 in 20 years. However, countries may request that a more customized option be developed for them.

New Guinea and China. This account was opened to receive funds from external parties following an event and has acted as a replacement to the National Disaster Council Fund—and given the NDC greater control over and accountability for any expenditures.

Donor funds for relief and reconstruction

While donor funds will always be required, there is often an element of uncertainty surrounding how much will be provided, what will be provided, and when the funds will arrive in country. Consequently, overdependence on international relief as a source of post-disaster financing can delay the provision of initial relief and inhibit ex-ante contingency planning. Development partners, international organizations, local nongovernmental organizations, businesses, and individuals contribute in the form of cash grants and aid in kind. The provision of aid in kind, while vital, can affect the costs borne by governments for the distribution of these goods.

Donor assistance for reconstruction often takes significant amounts of time and involves negotiation between the country and its donors to establish key priorities.

However, significant amounts of finance can be assigned. For example, the Solomon Islands government had received SI\$7.9 million (US\$1million) by February 19, 2013, less than two weeks after the Santa Cruz earthquake and tsunami took place. Within one month of the disaster, the amount of international assistance received had increased to SI\$13 million (US\$1.8 million). Approximately 5 percent of this was received as aid in kind while the remainder was provided as cash grants.

Following the flash floods in 2014, the Solomon Islands was able to access SI\$13 million (US\$1.8 million) in grant funds from the United Nations Central Emergency Response Fund. These funds are to be used to support health, nutrition, and water and sanitation activities. However, access to these funds came almost two months after the event, creating a lag in recovery activities.

Budget reallocation

The NDC has three options for acquiring additional funds to facilitate response activities:

- (a) Transfer funds between accounts within an agency, which requires approval of the head of agency and the minister of finance;
- (b) Seek a contingency warrant, subject to cabinet approval and in the event that the contingency warrant allocated for that financial year is depleted; or
- (c) Request a supplementary budget allocation from the contingency warrant.

According to the Public Financial Management Bill, the finance minister may seek supplementary appropriations when an urgent and unforeseen need has arisen and the

cabinet has granted its approval (Solomon Islands Government 1978).

External debt

During the global economic crisis, the Solomon Islands economy was hit hard. An 18-month Standby Credit Facility Arrangement approved in June 2010 succeeded in stabilizing the economy and catalyzing donor support. The country's fiscal position has improved substantially since then as a result of improved tax compliance and tax arrears collection. The government cash balance increased from almost zero in the first quarter of 2010 to about two months of recurrent spending by the second quarter of 2011 (IMF 2011).

In 2012, the government introduced a debt management framework incorporating a debt management strategy. This new framework

▼ **Photo Credit**
Jenny Scott/Flickr 



will guide any future debt decisions. The debt management strategy aims to provide a robust and pragmatic approach to ensure that the volume of new borrowing is limited to sustainable and affordable levels (Solomon Islands Government 2013). MoFT has set the debt-to-GDP ratio at 25 percent, and has set the future maximum debt-servicing cost at 8 percent of forecast domestically sourced revenue. At present, 10 percent of revenue is set aside for debt servicing (Solomon Islands Government 2013).

The Solomon Islands government has been improving its debt service ratio, which suggests that the option of contingent credit could be considered to facilitate an immediate injection of liquidity following a disaster.

However, any new credit facility must be affordable and satisfy all the criteria outlined in the debt management strategy. Furthermore, costs of use (including opportunity costs) must be balanced against the benefits of the potential post-disaster liquidity injection.

Total Response Funds Available

The Solomon Islands has a maximum amount of SI\$41 million (US\$5.7 million) available to facilitate disaster response. Figure 4 shows the three-tiered DRFI strategy alongside the sources of funds and the maximum amounts of funding available to the Solomon Islands following an event. However, it should be acknowledged that the contingency warrant is issued at the start of the financial year and is not exclusively for disaster response. The full amount of the contingency warrant will probably not be available for response, and there is likely to be a gap between the amount available and the disaster relief budget line.

The Solomon Islands government has SI\$2.2 million (US\$0.3 million) available in dedicated response funds, and there is a 77 percent chance that disaster losses will exceed this

amount in any given year. If these funds were exceeded, the government would need to source remaining funds from the contingency warrant and pursue budgetary reallocation. This situation demonstrates the financial constraints the government faces in financing disaster response. The government should investigate the possibility of expanding the amount of dedicated funds available and the use of contingent credit to fund the level of retained risk.

Post-Disaster Budget Execution

Following the Santa Cruz earthquake and tsunami, a Humanitarian Action Plan was developed that identified 41 activities with an estimated total cost of SI\$68.8 million (US\$9.5 million), of which SI\$47.5 million (US\$6.6 million) remained unmet two months after the event (Solomon Islands Government 2013d).

The NDC met on the day of the Santa Cruz earthquake and was able to immediately mobilize SI\$1 million (US\$138,000) to purchase relief supplies. This is equivalent to approximately half of the annual budget for response. The remaining SI\$1.2 million was exhausted shortly afterward following updates from situation reports identifying the need for greater quantities of relief goods. The first shipment of goods to the affected area had fully exhausted the annual response budget.

The location of the earthquake in Santa Cruz was remote, and the Solomon Islands government faced high transportation costs to facilitate relief. This experience provides a strong case for establishing some form of national reserves for disaster response and recovery. At the moment the government depends on the recurrent budget of the NDC, which is insufficient for high post-disaster transportation costs. In fact the response to the Santa Cruz earthquake drained the annual budget for the National Disaster Management Office and the majority of the national contingency budget.

Anecdotal evidence suggests that the bid waiver process was not adhered to after the Santa Cruz earthquake or the flash floods in 2014; MoFT staff were unaware of this process, which is rarely used. In a statement of emergency, normal tendering procedures should be waived upon submission of a bid waiver. But following the earthquake and floods, the NDC was required to submit a copy of the statement of

Figure 4 — Amount of Ex-Ante Funds Available for Immediate Response

Disaster risks	Disaster risk financing instruments	Amount of funds available
<p>High-risk layer (E.G. Major earthquake, major tropical cyclone)</p>	<p>Disaster risk insurance</p>	<p>Catastrophe risk insurance coverage: (US\$10.9M)</p>
<p>Medium-risk layer (E.G. Floods, small earthquakes)</p>	<p>Contingent credit</p>	
<p>Low-risk layer (E.G. Localized flood, landslides)</p>	<p>Contingency budget, national reserves, annual budget allocation</p>	<p>Contingency budget: (US\$0.2M) DAEF: (US\$2.8M)</p>

Source: World Bank.

emergency and a bid waiver form to accompany each quote for purchase. At times three quotes were sought despite the submission of a bid waiver. This created significant delays in the purchase of necessary relief items. Some agencies, including the Ministry of Health, asked nongovernmental organizations to pay for goods, as this was easier than procuring essential equipment through government. These anecdotes suggest that a post-disaster budget execution manual would help MoFT raise staff's awareness of post-disaster procedures and processes.

Some government departments indicated that they had sufficient funding to respond to the flash floods, but lacked the institutional capacity to expend the funds. Key line ministries such as Health and Education cited the lack of institutional capacity as a major constraint—not only on the required response to the 2014 floods but also on their day-to-day operations. These ministries have significant sector budget support from donors but do not have sufficient capacity to implement the work required. One staff member

was reported to oversee over 30 maintenance contracts across the islands.

Practical policies and procedures for post-disaster finance are contained within the National Disaster Risk Management Plan. But there is limited awareness of these policies and procedures across the Solomon Islands government and in particular in the MoFT.

The small volume of dedicated funds allocated to the NDC is easily exhausted, and the government should consider reactivating the National Disaster Council Fund or using other DRFI instruments such as contingent credit to ensure additional sources of liquidity following an event.

▼ Photo Credit

Australian Department of Foreign Affairs and Trade/Flickr ©



Insurance of Public Assets

Total Solomon Islands non-life (general) insurance premium, all classes, was SI\$95.6 million (US\$13 million) in 2012. Local insurers underwrite SI\$48.7 million (US\$6.6 million) of this amount, and the balance of SI\$46.9 million (US\$6.3 million), or 48 percent of the market, is placed with offshore insurers.

The Solomon Islands non-life local insurance market is small and currently has two locally registered insurers, QBE Insurance (International) Limited, Tower Insurance Limited, and a new entrant, Pacific Assurance Group (Solomon Islands) Limited, which joined the market in 2014.

The Solomon Islands has legislation in place—the Insurance Act Cap. 82 (1985) and regulations—to regulate the insurance industry. The CBSI is the regulator. The CBSI requires insurers to report quarterly, ensures that solvency margins are met, and receives copies of all reinsurance contracts. Offshore insurance placements must be approved by CBSI before coverage is placed overseas.

The Solomon Islands is exposed to the catastrophic perils of cyclone, volcanic eruption, and earthquake. The Solomon Islands is located at the northern edge of the Southern Hemisphere tropical cyclone zone. The most recent

damaging earthquakes were a magnitude 8.1 earthquake in April 2007 in Western Province and magnitude 8.0 earthquake in February 2013 near the Santa Cruz Islands.

Non-life premium per capita is estimated at SI\$174 (US\$24), which is lower than the rate in other Pacific Island Countries (PICs) and indicates a low insurance penetration. The current low insurance market premium suggests that the insurance market is, like the economy, still recovering from the ethnic tension and unrest of the past decade. The non-life insurance market premium prior to 1999 was estimated by insurance industry sources at over SI\$181 million (US\$25 million) (1999 value).

Insurance for catastrophe insurance perils of earthquake and cyclone is available in the market and is automatically included in property insurance products. Property insurance rates for cyclone in the Solomon Islands are below average rates for PICs, at 0.13 percent, due to comparatively lower frequency of cyclones. The earthquake insurance rates in the Solomon Islands—0.17 percent—are higher than average rates for other PICs because of recent major earthquake events.

The Solomon Islands government does not have indemnity property insurance programs in place for its public assets, including major transportation assets such as wharves, roads, and bridges. This could result in delays in reconstruction following a catastrophic event.

Since 2012, the government has had a property asset register in place, managed by the MoFT. The MoFT advised that individual ministries have their own existing asset registers and that these are not integrated or updated with the MoFT asset register.

According to insurance industry sources, some Solomon Islands statutory bodies and state-owned enterprises that manage public assets have insurance programs in place that include indemnity property insurance for catastrophe

perils. Some statutory bodies do not have property insurance.



Options for Consideration

The Solomon Islands has developed a variety of DRFI processes and procedures, as detailed in this note. However, these could be strengthened to reduce the time it takes to expedite post-disaster funds. Toward that end, a number of options for consideration are presented:

Recommendation 1: Develop a post-disaster budget execution manual to improve awareness of post-disaster procedures and processes. A manual will help to reduce the time it takes to approve post-disaster expenditures by ensuring normal tendering procedures are waived. Any new process developed should align to the National Disaster Council Act (1989). Agencies and suppliers alike need to be familiar with post-disaster processes to remove any unnecessary delays in the system.

Recommendation 2: Develop an integrated disaster risk financing and insurance strategy. This should establish potential sources of immediate liquidity post-disaster, such as a dedicated reserve fund for disaster response. It is recommended that a feasibility study be conducted to look at reactivating the National Disaster Council Fund, considering in particular identification of a sustainable source of funds, any necessary amendments to legislation to

safeguard expenditures, and development of an operations manual.

Recommendation 3: Explore the use of contingent credit to access additional liquidity post-disaster, including identification of the providers of this type of finance. The advantage of contingent credit is that it is used only following an event and does not affect the current debt-servicing ratio unless a disaster of an agreed-upon magnitude occurs. This option could plausibly finance response efforts following intermediate disaster events—that is, those that exceed the capacity of options from within the budget, but that are too expensive to fund through risk transfer due to their frequency.

End Notes

¹ Data are from Solomon Islands National Statistics Office, available at <http://www.spc.int/prism/solomons/>.

² Priority for Action 4—“Reduce the Underlying Risk Factors”—has an associated key activity of financial risk-sharing mechanisms, such as insurance, while Priority for Action 5—“Strengthen disaster preparedness for effective response at all levels”—includes the establishment of emergency funds such as contingency budget, national reserves, and annual budgetary allocations. See UNISDR (2005).

References

- GFDRR (Global Facility for Disaster Reduction and Recovery) 2012 *The Sendai Report: Managing Disaster Risks for Resilient Future*, Washington D.C., U.S.A.
- IMF (International Monetary Fund). 2011. "Solomon Islands 2011 Article IV Consultation." IMF, Washington, D.C.
- PCRAFI (Pacific Catastrophe Risk Assessment and Financing Initiative). 2013. "Country Risk Profile: Solomon Islands." June. <http://www.pacris.sopac.org>.
- PDN (Pacific Disaster Net). 2013. <http://www.pacificdisaster.net>.
- Solomon Islands Government. 1978. *Public Finance and Audit Act 1978*. Solomon Islands Government.
- . 1989. *The National Disaster Council Act 1989*. Solomon Islands Government.
- . 2008. *Special Audit Report: Tsunami and Earthquake Relief Fund within the National Disaster Council (NDC) under the Ministry of Home Affairs*. Honiara, Solomon Islands: Office of the Auditor General, Solomon Islands Government.
- . 2010. "National Disaster Risk Management Plan 2010 for Disaster Management Arrangements and Disaster and Climate Change Risk Reduction." National Disaster Council, Solomon Islands Government.
- . 2012. "Approved Development Estimates." Government of Solomon Islands. December 2011.
- . 2011a. "Approved Recurrent Estimates Budget Paper." Vol. 2. Government of Solomon Islands. December 2011.
- . 2011b. "Budget Strategy and Outlook Budget Paper." Vol. 1. Government of Solomon Islands. December 2011.
- . 2012. "National Climate Change Policy 2012–2017." Ministry of Environment, Climate Change, Disaster Management and Meteorology, Solomon Island Government.
- . 2013a. "Approved Development Estimates." Government of Solomon Islands, December 2012.
- . 2013b. "Budget Strategy and Outlook Budget Paper." Vol. 1. Government of Solomon Islands, December 2012.
- . 2013c. "Approved Recurrent Estimates Budget Paper." Vol. 1. Government of Solomon Islands, December 2012.
- . 2013d. *Humanitarian Action Plan for the Santa Cruz Earthquake and Tsunami Response 2013*. Ministry of Environment, Climate Change, Disaster Management & Meteorology and Disaster Management Partners, Government of Solomon Islands.
- SOPAC (Pacific Islands Applied Geoscience Commission). 2005. *Pacific Disaster Risk Reduction and Disaster Management Framework for Action (Regional Framework for Action or RFA) 2005–2015*. SOPAC, Suva, Fiji.
- . 2009. "Implementation of the Hyogo Framework for Action and the Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005–2015: Report for the Period 2007–2009." Regional Synthesis Report, SOPAC Miscellaneous Report 674. SOPAC, Suva, Fiji.
- SPC (Secretariat of the Pacific Community) 2011 *Cook Islands: Investment in DRM*, Suva, Fiji
- SPC (Secretariat of the Pacific Community) 2011 *Fiji: Investment in DRM*, Suva, Fiji
- SPC (Secretariat of the Pacific Community) 2011 *Republic of Marshall Islands: Investment in DRM*, Suva, Fiji
- SPC (Secretariat of the Pacific Community) 2011 *Vanuatu: Investment in DRM*, Suva, Fiji
- SPC (Secretariat of the Pacific Community) 2012 *Papua New Guinea: Investment in DRM*, Suva, Fiji
- SPREP (Secretariat of the Pacific Regional Environment Programme). 2013. "JNAP Development and Implementation in the Pacific: Experiences, Lessons and Way Forward." SPREP, Apia, Samoa
- UNISDR (United Nations International Strategy for Disaster Reduction.) 2005. *Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters*. UNISDR, Hyogo, Japan.
- . 2013. "Country Study Solomon Islands." In *The Pacific Experience in Developing Policy and Legislation on Disaster Risk Reduction and Climate Change Adaptation*, chap. 5. UNISDR.
- World Bank 2010 *Financial Protection of the State against Natural Disasters; A Primer*, Washington D.C., U.S.A.

About PCRAFI

The Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) is a joint initiative between the Secretariat of the Pacific Community through its Applied Geoscience and Technology Division (SPC-SOPAC), the World Bank, and the Asian Development Bank, with financial support from the government of Japan, the Global Facility for Disaster Reduction and Recovery (GFDRR), and the European Union, and with technical support from Air Worldwide, New Zealand GNS Science, and Geoscience Australia.

The initiative aims to provide the Pacific Island Countries (PICs) with disaster risk modeling and assessment tools for enhanced disaster risk management, and to engage PICs in a dialogue on integrated financial solutions to increase their financial resilience to natural disasters and climate change. The initiative is part of the broader agenda on disaster risk management and climate change adaptation in the Pacific region.

The Pacific Disaster Risk Financing and Insurance (DRFI) Program is one of the many applications of PCRAFI. It is designed to increase the financial resilience of PICs by improving their capacity to meet post-disaster financing needs without compromising their fiscal balance. Through DRFI, technical assistance is available to PICs to build capacity in the public financial management of natural disasters. The technical assistance will build on the underlying principles of the three-tiered

disaster risk financing strategy and focus on three core aspects:

- the development of a public financial management strategy for natural disasters, recognizing the need for ex-ante and ex-post financial tools;
- the post-disaster budget execution process, to ensure that funds can be accessed and disbursed easily post-disaster; and
- the insurance of key public assets, to resource the much larger funding requirements of recovery and reconstruction needs.

The PICs involved in PCRAFI are the Cook Islands, the Federated States of Micronesia, Fiji, Kiribati, the Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, the Solomon Islands, Timor-Leste, Tonga, Tuvalu, and Vanuatu.

For further information, please visit <http://pacrisk.sopac.org> or contact PCRAFI@spc.int.

Annex 1

World Bank Framework for Disaster Risk Financing and Insurance

Major disasters increase public spending requirements and reduce revenues, placing further strain on limited national budgets. The immediate and long-term fiscal consequences of a disaster depend on the sources of revenue available to the government versus its public expenditure commitments. Investment in disaster risk financing instruments can help prevent the diversion of funds from key development projects and significantly reduce the time needed to activate an initial response. Financial protection is a core component of any comprehensive disaster risk management strategy, and should be implemented alongside the pillars of risk identification, risk reduction, preparedness, and post-disaster reconstruction (see figure A.1).

The World Bank framework for disaster risk financing and insurance advocates a three-tiered approach for the development of financing arrangements to cover the residual disaster risk that cannot be mitigated. These layers align to the basic principles of sound public financial management, such as the efficient allocation of resources, access to sufficient resources, and macroeconomic stabilization. The first layer, retention, relates to countries' development of an internal layer of protection against natural disasters to prevent the diversion of funds from

development projects (see figure A.2). This layer uses tools such as contingency budgets and national reserves. The aim is to finance small but high-frequency disasters. The second layer is aimed at less frequent but more severe events that are too costly to pre-finance through retention mechanisms. Here, liquidity mechanisms—such as contingent credit, which can mobilize additional funds immediately following an event—become cost-effective.

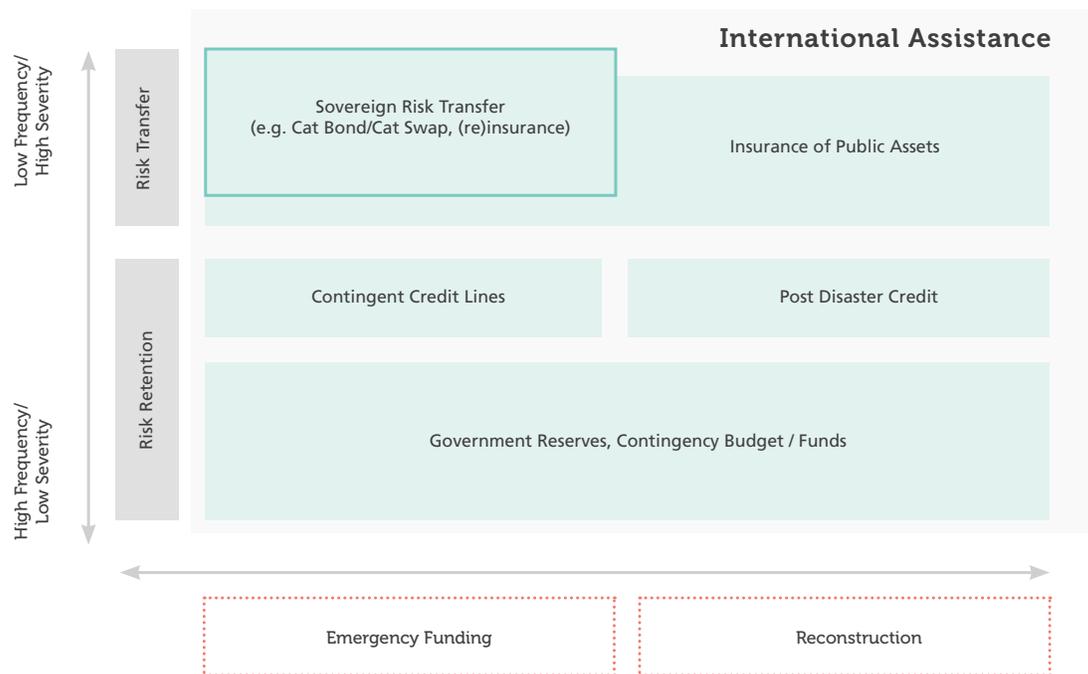
The third layer, disaster risk transfer (such as insurance), focuses on mobilizing large volumes of funds for large but infrequent natural disasters. For events of this type, risk transfer instruments—such as insurance or catastrophe swaps and bonds—become cost-effective in averting a liquidity crunch.

There is a clear time dimension to post-disaster funding needs and the various phases of relief, recovery, and reconstruction. Some financing instruments can be activated rapidly. Others may take longer to activate but can generate substantial funding. The disaster risk financing strategy needs to reflect both time and cost dimensions, ensuring that the volume of funding available at different stages in the response efforts matches actual needs in a cost-efficient manner.

Figure A.1 — Disaster Risk Management Framework



Figure A.2 — Three-Tiered Disaster Risk Financing Strategy



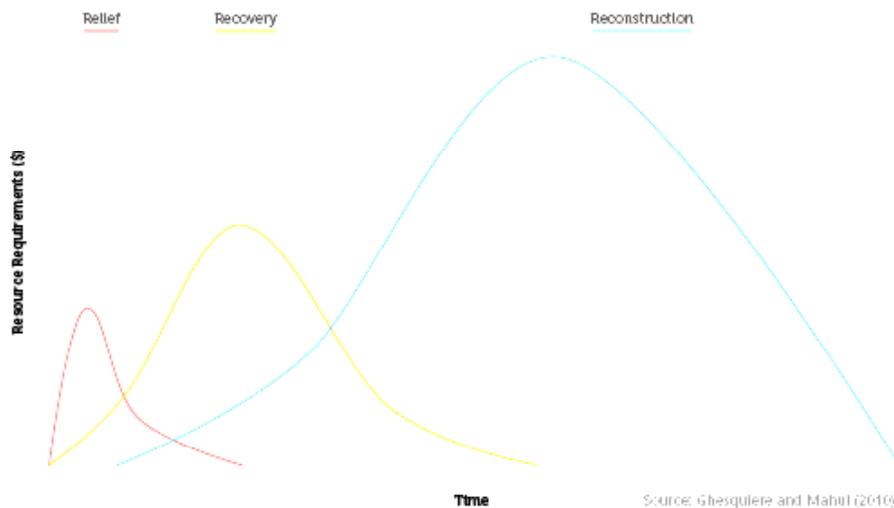
The initial relief phase requires a quick injection of liquidity from day 0 but does not need to be sustained for a long period of time (see figure A.3). Rapid budget mobilization and execution are key for financing initial disaster response, and governments should develop appropriate policies and procedures for procurement and acquittals to facilitate them. Initial relief should be met via annual budget allocations and the establishment of dedicated reserves for disaster response that can be accessed immediately; major catastrophes will exhaust these funds quickly. The residual risk associated with higher-cost events should be transferred to third parties via a mixture of more expensive (re)insurance tools and catastrophe bonds and, for the most extreme events, international assistance.

The recovery phase requires additional funds but not immediately (see figure A.3). Some of

the funds for this phase can therefore be raised via post-disaster budget reallocation and the realignment of national investment priorities. However, the opportunity cost for these options is high, given that they can lead to reduced expenditure on other key investment areas, such as health and education. Consequently, governments may also choose to utilize development partner contingent credit arrangements.

In contrast, the reconstruction phase has much larger financing requirements needed over a much longer period of time (see figure A.3). Given the large funding requirements associated with reconstruction, this phase often requires post-disaster reconstruction loans to complement traditional disaster insurance. Governments may also introduce temporary post-disaster tax increases aligned to budget restructuring.

Figure A.3 — Post-Disaster Phases: Funding Requirements and Duration



If adequate and timely funding arrangements are not in place, the adverse socioeconomic impact of a disaster can be significantly exacerbated, at both the macroeconomic and household levels. An optimal disaster risk financing and insurance strategy aims to combine ex-ante and ex-post financial instruments to secure adequate and timely funding at lower cost for the successive post-disaster phases. The optimal mix of finance instruments will be unique to each country based upon its associated hazard and exposure. Table A.1 lists potential finance instruments that can be used to address disasters. Those that are shaded in blue indicate the generic timelines for mobilizing and executing these funds, though each country may be slightly faster or slower depending on its internal processes. The table can be adapted by countries to reflect these differences according to the financial instruments they have utilized and the time it takes to mobilize these funds. Given the

innovative nature of the work in this area and the number of products under development, this list is not exhaustive.

Ex-post financing vehicles are those that become available in the wake of an event. The most familiar form of ex-post disaster financing is donor assistance for relief. There are two forms this finance can take, cash grants and aid in kind, and both play an important role in response. The provision of aid in kind, while vital, can affect the distribution costs for these goods. While donor funds will always be required, there can often be an element of uncertainty surrounding how much will be provided, what will be provided, and when funds will arrive in country.

Budget reallocation often plays a key role for the continuation of relief and the initial stages of the recovery program. Generally, this process takes time, as the reallocation of funds will need to be

Table A.1— Availability of Financial Instruments Over Time

	SHORT TERM [1-3 MONTHS]	MEDIUM TERM [3-9 MONTHS]	LONG TERM [OVER 9 MONTHS]
<i>Ex-post Financing</i>			
Donor Assistance [relief]			
Budget Reallocation			
Domestic Credit			
External Credit			
Capital Budget Realignment			
Donor Assistance [reconstruction]			
Tax Increase			
Flash Appeal			
<i>Ex-ante Financing</i>			
Emergency Fund			
Contingency Budget			
Contingent Credit			
Sovereign [parametric] Catastrophe Risk Insurance			
Traditional Disaster Insurance			

Source: World Bank 2013.



agreed upon by the cabinet and across ministries. Budget reallocation can sometimes divert funds from key development projects and hence seriously harm the long-term growth prospects of the country. The same issues are relevant to capital budget realignment, although the timelines for that process are typically significantly longer.

Domestic credit, such as the issuance of government bonds, can be used to raise additional revenue to fund post-disaster expenditures. Again, due to the processes involved, domestic credit will take some time to operationalize and is best suited to financing recovery and reconstruction activities. External credit will likewise take time to be agreed upon with providers and will require clear articulation of the activities it is to finance. Both of these forms of credit will have an impact on the debt-servicing ratio of a country and may not be a viable option for heavily indebted countries.

Donor assistance for reconstruction can be delivered as a form of direct budget support, grant, or a post-disaster reconstruction loan. The form of finance used here will depend on the size of the event, the development status of a country (for example, low-income countries may have access to concessional loans and have more access to grants), and the debt-servicing ratio of a country. Typically, this form of finance is conditional and requires sufficient lead time for aligning the priorities of countries and donors to meet reconstruction and recovery needs.

Tax increases will help redress the increase in public expenditure following a disaster by generating additional revenue. Although higher taxes could be politically unfavorable, they create a sustainable source of finance for reconstruction activities. Conversely, some governments have applied tax incentives to encourage donations to response

Section

07

funds from both the private sector and members of the public. This approach can be popular when tax credits are written off on annual tax returns.

Ex-ante financing provides an element of financial certainty during a disaster, because governments have established these sources of finance in advance. These funds can be quickly disbursed following an event so that essential relief work commences immediately. A reserve fund provides a dedicated amount of funding for response and if properly managed can accrue over time to increase the level of funding available. However, the opportunity cost of holding money in a dedicated fund is high, as it diverts funds from the operational budget. Careful analysis should be undertaken to identify the optimal level of reserves that a country should hold and maintain.

Contingent credit is a relatively new instrument, with current forms offering disbursement following an event whose magnitude has been agreed upon in advance. It can be fungible or conditional by design. As with other sources of credit, the amount available will depend on the development status of the country and the debt-servicing ratio. The advantage of contingent credit is that a drawdown can be made within a 24-hour period.

Parametric insurance uses hazard triggers, linking immediate post-disaster insurance payouts to specific hazard events. Unlike traditional insurance settlements that require an assessment of individual losses on the ground, parametric policies do not pay based on actual losses incurred. Instead, the payout disbursements are triggered by specific physical parameters for the disaster (e.g., wind speed and earthquake ground motion). The payouts provide a rapid, yet limited, injection of liquidity that can be a valuable boost to relief funds.

Traditional disaster insurance offers indemnity coverage. Receipt of funds may take longer than with parametric insurance, as a detailed damage assessment is required. However, as payouts are directly linked to the damage experienced, the payout will better match the needs of the insured party.

Public financial management in the Pacific is dictated by the fact that many PICs are classified as Small Island Developing States (SIDS). Typically, countries in this classification have a narrow revenue base, are net importers, and have a consequential reliance on aid as an income stream. These characteristics can limit the options available for post-disaster finance. It is unlikely that a SIDS government could afford to reallocate the capital



budget, and a tax increase could make many items unaffordable and hence be detrimental to citizens' quality of life. Given these constraints on the national budget, alternatives such as contingent credit and risk transfer options should be used to reduce the drain on limited public funds.

PIC governments face critical challenges for financial resilience to natural disasters. Most PICs have restricted options for securing immediate liquidity for swift post-disaster emergency response without compromising their long-term fiscal balance. In addition, PICs are constrained by their size, borrowing capacity, and limited access to international insurance markets. In the absence of easy access to debt and well-functioning insurance markets, a large portion of the economic losses stemming from adverse natural events is borne by governments and households, with support from development partners.

The Pacific has seen several recent cases that show the need for immediate liquidity post-disaster. In the Cook Islands, in the immediate aftermath of TC Pat in 2010, a delay in the receipt of travel funds meant that key government personnel could not immediately commence the initial damage assessment. Following TC Vania in 2010, Vanuatu had to reallocate a significant amount of the national budget. Similarly, Fiji and Samoa had to reallocate budgetary funds in the wake of TC Evan in 2012 and 2013; and the Santa Cruz earthquake in the Solomon Islands in February 2013 drained the annual budget for the National Disaster Management Office and used the majority of the national contingency budget.

Lacking contingency reserves and access to short-term loan funds, PICs have limited post-disaster budget flexibility and rely heavily on post-disaster donor assistance. Studies by SPC (2011 and 2012) that look at the fiscal impact of past disasters in selected PICs demonstrate the financial constraints

in post-disaster budget reallocation and build a case for establishing national reserves. While international assistance will always play a valuable role, overdependence on such assistance as a source of financing carries limitations; international aid can be uncertain, which inhibits contingency planning, and can be slow to materialize. Increasingly, PICs such as the Cook Islands are establishing national reserves for funding initial response.

The World Bank, SPC, and their partners, with grant funding from the government of Japan, have implemented the Pacific Disaster Risk Financing and Insurance Program to help the PICs increase their financial resilience to natural disasters and improve their financial response capacity in the aftermath of natural disasters. This program is part of the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI).

Section**07**

Annex 2

Glossary

Attachment point. The attachment point (deductible) amount is essentially the excess payable before any payout is made under a policy. That is, anything under this value will be borne by the policy holder.

Catastrophe swap. A catastrophe swap, also known as a cat swap, is a financial tool used to transfer some of the risk that the covered party faces from catastrophes to the international reinsurance or capital markets. In the case of the Pacific Catastrophe Risk Insurance Pilot, tropical cyclone and/or earthquake risk is passed to the financial markets.

Coverage limit. This indicates the maximum payout as defined under the policy.

Emergency losses. Emergency losses in the context of the Pacific Catastrophe Risk Insurance Pilot are calculated by using a percentage of the estimated ground-up losses.

Exhaustion point. The exhaustion point indicates the loss level at which the payout under a policy reaches its maximum point.

Ground-up losses. Ground-up losses in this context refer to estimated total damage to buildings, infrastructure, and cash crops.

Payout. A payout refers to the amount of cash that countries will receive following an eligible event.

Premium. The premium is the cost that an insured party will pay for a given level of coverage: the more that is included in the coverage provided, the higher the premium will be. Premiums are determined by the amount of coverage a country chooses, the event attachment point (deductible) and exhaustion point (limit) of that coverage, and the risk profile of the country.

Risk pool. A risk pool is a group of people, institutions, or countries that collaborate to manage risk financially as a single group.

Annex 3

Insurance Market Review, April 2014

Executive Summary

Total Solomon Islands non-life (general) insurance premium, all classes, was SI\$95.6 million (US\$13 million) in 2012. Local insurers underwrite SI\$48.7million (US\$6.6 million) of this amount, and the balance of SI\$46.9 million (US\$6.3 million), or 48 percent of the market, is placed with offshore insurers.

The Solomon Islands non-life local insurance market is small and currently has three locally registered insurers, QBE Insurance (International) Limited, Tower Insurance Limited, and a new entrant, Pacific Assurance Group (Solomon Islands) Limited, which joined the market in 2014.

The Solomon Islands has legislation in place—the Insurance Act Cap. 82 (1985) and regulations—to regulate the insurance industry. The Central Bank of Solomon Islands (CBSI) is the regulator and requires insurers to report quarterly to ensure that solvency margins are met. All reinsurance contracts must be sent to CBSI, which also approves offshore insurance placements before coverage is placed overseas.

The Solomon Islands is exposed to the catastrophic perils of cyclone, volcanic eruption, and earthquake. The Solomon Islands is located at the northern edge of the Southern Hemisphere tropical cyclone zone. The most recent

damaging earthquakes were a magnitude 8.1 earthquake in April 2007 in Western Province and magnitude 8.0 earthquake in February 2013 near the Santa Cruz Islands.

Non-life premium per capita is estimated at US\$24, which is lower than the rate in other Pacific Island Countries (PICs) and indicates a low insurance penetration. The current low insurance market premium suggests that the insurance market is still recovering from the political unrest of the past decade. The non-life insurance market premium prior to 1999 was estimated by insurance industry sources at over US\$25 million (1999 value).

Insurance for catastrophe insurance perils of earthquake and cyclone is available in the market and is automatically included in property insurance products. Property insurance rates for cyclone in the Solomon Islands are 0.13 percent, below average rates for PICs, due to the lower frequency of cyclones. The earthquake insurance rates in the Solomon Islands, at 0.17 percent, are higher than average rates for other PICs because of recent major earthquake events.

The Solomon Islands government does not have indemnity property insurance programs in place for its public assets, including major transportation assets such as wharves, roads, and bridges. This could result in delays in reconstruction following a catastrophic event.

Table 1— Pacific Non-life Insurance Premium per Capita 2012 (US\$)

MARKET	GDP MILLIONS	POPULATION	GDP PER CAPITA	MARKET PREMIUM	PREMIUM PER CAPITA
Cook Islands	\$305	19,300	\$15,823	\$6,600,000	\$342
Fiji	\$3,908	874,700	\$4,467	\$97,500,000	\$111
Marshall Islands	\$182	52,560	\$3,470	\$3,000,000	\$57
Samoa	\$683	188,900	\$3,619	\$17,000,000	\$90
Solomon Islands	\$1,008	549,600	\$1,130	\$13,000,000	\$24
Tonga	\$471	104,900	\$4,495	\$4,400,000	\$42
Vanuatu	\$781	247,300	\$3,182	\$16,500,000	\$67

Source: World Bank

Since 2012, the government has had a property asset register, managed by the Ministry of Finance and Treasury (MoFT).

The MoFT advised that individual ministries have their own existing asset registers and that these are not integrated or updated with the MoFT asset register.

According to insurance industry sources, some Solomon Islands statutory bodies and state-owned enterprises that manage public assets have insurance programs in place that include indemnity property insurance for catastrophe perils. Some statutory bodies do not have property insurance.

Insurance Market Overview

Total non-life (general) insurance premium, all classes, was SI\$95.6 million (US\$13 million) in 2012. Local insurers underwrite SI\$48.7 million (US\$6.6 million) of the business and the balance of SI\$46.9 million (US\$6.3 million) is placed with offshore insurers.

The Solomon Islands non-life insurance market is small and currently has three locally registered insurers, QBE Insurance (International)

Limited (QBE), Tower Insurance Limited (Tower), and a new entrant, Pacific Assurance Group (Solomon Islands) Limited, which joined the market in 2014.

The Insurance Act Cap. 82 (1985) restricts the placement of insurance offshore, and any offshore placements must be approved by the Central Bank of Solomon Islands (CBSI).

Insurance industry sources advised that most offshore placements are for specialist and global corporate insurance risks, such as Gold Ridge mine and Solomon Breweries. Aviation risks are also placed offshore, as there is no capacity for this class of business in the Solomon Islands.

The non-life premium per capita in the Solomon Islands is US\$24, lower than rates in other Pacific Island Countries (PICs) (table 1).

Insurance industry sources advised that the non-life insurance market premium in 1999 was an estimated US\$25 million. The current low insurance market premium suggests that the insurance industry is still recovering from the ethnic tension and unrest of the past decade.

Distribution channels

Table A.2— Pacific Commercial Property Insurance Rate and Deductible Comparison

MARKET	AVERAGE EARTHQUAKE RATE	GENERAL EARTHQUAKE DEDUCTIBLES	AVERAGE CYCLONE RATE	GENERAL CYCLONE DEDUCTIBLE
Cook Islands	0.12%	2% of sum insured	0.45%	20% of sum insured
Fiji	0.08%	10% of sum Insured	0.30%	20% of loss
Samoa	0.12%	2% of sum insured, or 5% of loss	0.20%	2% of sum insured, or 5% of loss
Tonga	0.15%	5% of sum insured	0.25%	5% of sum insured
Vanuatu	0.30%	5% of loss	0.17%	20% of loss

Source: World Bank 2013

Note: Average market rate percentage of value based on insurance industry sources.

According to CBSI, the Solomon Islands has two licensed insurance agents, Australia & New Zealand Banking Group Limited and Credit Corporation (Solomon Islands) Limited.

There are four licensed insurance brokers: United Risk Services Limited, MAT Insurance Brokers Limited, Pacific Insurance Broker Limited, and Marsh PTY Limited. Only Marsh does not have a servicing office in the Solomon Islands; its business is transacted from Australia or Papua New Guinea.

Both of the current non-life insurers in Solomon Islands offer insurance products on a direct basis for domestic household and motor vehicle insurance products. No insurance services are available by Internet in the Solomon Islands.

There is a range of distribution channels available in the marketing of general insurance products in Solomon Islands, all of which are focused in the capital, Honiara.

Property insurance rates for cyclone in the Solomon Islands are below average for PICs, although the earthquake rates are higher than average (see table 2). These high earthquake rates are due to the occurrence of major earthquake events in recent years. The low cyclone rates are due to the low

number of claims for these events in the Solomon Islands; while the events themselves are relatively frequent, the areas affected have limited assets and consequently very little insurance coverage.

There are a number of limitations with a comparison of this type because of the variables in property insurance rating, such as location of premises, construction, occupation, fire protection, frequency of expected losses, and the amount and type of deductible on the policies. It is not possible to use average rating data as an exact basis for a specific company or individual risk, but it is possible to offer a general comparison of the property insurance rates in respective markets.

The local market does not appear to have any major capacity limitations for property insurance. Insurance intermediaries' advised that both insurance providers have capacity for most property risks within the Solomon Islands. There is additional capacity available, by way of offshore placements, if necessary. The fact that 48 percent of the market premium is placed offshore suggests that the capacity is used by insurance brokers to place client business.

Catastrophe Risk Insurance

There are three major catastrophe hazards in the Solomon Islands: earthquakes, volcanic eruptions, and tropical cyclones. The major property accumulation exposure is in the capital (Honiara) and the island of Guadalcanal.

Catastrophe risk insurance presents a particular challenge to insurers' exposure management, since unlike other types of insurance, it presents the possibility of large correlated losses. Insurers need to use a combination of reinsurance, reserves, and diversification within their underwriting to ensure that their portfolios can withstand large disaster shocks without threatening their solvency. The Solomon Islands local domestic market has capacity available, with one international insurer and two regional insurers, and additional capacity is available offshore if needed.

All insurers with catastrophe exposures need to obtain reinsurance to increase their capacity. This is even more important when the insurer or the insurance market pool is small, such as in the Pacific. As regulators become increasingly vigilant about requiring insurers to have sufficient capital and a good solvency margin to protect their interests from catastrophic events, they are

requiring adequate reinsurance programs, placed with robust reinsurers.

Catastrophe Reinsurance

In 2011, natural catastrophe insured losses in the global reinsurance market were the second-largest ever, at over US\$110 billion (Swiss Re 2012). What made this year significant for insurers (and reinsurers) in the Pacific was the number of events that occurred in the Asia Pacific region: earthquakes in New Zealand and Japan, floods in Australia and Thailand, and a cyclone in Australia. According to the Global Insurance Market Report (IAIS 2012), these Asia Pacific events accounted for 61 percent of the insured losses from natural catastrophes in 2011, compared to a 30-year average of 18 percent. As a consequence, there were adjustments in reinsurance capacity and higher risk premiums. In 2012 the natural disaster losses dropped to US\$77 million (Swiss Re 2013), but this was still the third-highest year for natural catastrophe insured losses since 1970. In the Pacific, Tropical Cyclone Evan caused insured losses of F\$57 million in Fiji (RBF 2012) and estimated insured losses of SAT 3 million in Samoa in December 2012.

▼ Photo Credit

Australian Department of Foreign Affairs and Trade/Flickr 



QBE (Solomon Islands) is reinsured for catastrophe events under the QBE Group reinsurance program. QBE Group has a detailed risk management process (QBE Insurance Group Limited 2012) that includes monitoring of catastrophe claims concentration and reinsurance protection to mitigate the exposures.

Tower (Solomon Islands) is reinsured for catastrophe events under the Tower Insurance Limited Group reinsurance program. Tower has determined that its main exposure in the Solomon Islands is earthquake and that the main accumulation is in the capital, Honiara. Tower Insurance Limited (2011, 2012) acknowledges that property accumulations and exposure to natural perils represent a significant risk to its business. In order to mitigate this risk the company undertakes accumulation risk modeling and ensures that adequate reinsurance protection is in place. In its 2011 annual report, Tower Insurance Limited (2011) advised that its event excess had increased to NZ\$6.7 million and that it had protection for two catastrophe events within the program for the 2011/12 period. The reinsurance program is not detailed in the company's 2012 report, but it could be expected to follow the previous arrangements.

Insurers throughout the Pacific have expressed concern at the recent increase in reinsurance premiums, particularly premiums for catastrophe reinsurance. They have limited ability to pass on the full costs of these increases to insured clients due to the small size and economic constraints in those markets.

Market Property and Catastrophe Insurance Products

Cyclone insurance in the Solomon Islands differs from that in most other PICs in that it is available automatically, with no preconditions for acceptance such as an engineer's report. It can be assumed, however, that buildings do not meet any form of

building code, since a national building code has not been agreed upon or passed in the country. Should clients wish, they can provide an engineer's report to indicate that the building meets the building standards applied elsewhere, and this can be factored into the policy.

Industrial Special Risks (ISR) policies are used for property insurance on most major commercial, government, and government public bodies accounts. There is no agreed upon ISR within the market—that is, each property insurer has its own ISR. The wordings are generally based on the Australian Mark IV or Papua New Guinea market ISR wordings.

The QBE ISR wording is based on the Australian Mark IV insurance industry standard wording. Tower uses an ISR wording based on the Papua New Guinea insurance market wording. These wordings insure material damage (subject to specific exclusions) and include insurance for natural perils, such as volcanic eruption, earthquake, tsunami, and cyclone.

Commercial Package or Business Protection wordings are used for small and medium enterprises, and policies are taken as either Multi Risks (accidental damage including earthquake and cyclone by extension) or as Specified Risks (fire and extraneous perils). These policies generally follow the perils insured under the ISR, although coverage may be more restricted.

Regulatory Framework

Insurance Law and Regulation

Under the Insurance Act Cap. 82 (1985), all insurance companies, agents, and brokers must be licensed. The CBSI is the regulator and requires quarterly and annual returns from insurers. According to the CBSI (2012), the draft of a new



Insurance Bill was completed in 2008 with the assistance of the International Monetary Fund, although the bill is still pending at this time.

CBSI requires insurers to annually submit a reinsurance management strategy and program details with their insurance license renewal application. CBSI holds quarterly prudential consultative meetings with insurance companies and brokers to discuss market issues. It also undertakes biannual on-site reviews of local insurers, including cross-checks of accumulations against adequacy of insurance coverage.

Building Controls and Standards

The Solomon Islands does not have a building act in place. Insurance industry sources advised that a draft National Building Code was circulated in 1990, using the New Zealand earthquake code (NZS4203) and Australian wind loads (AS1170.2) as its basis. Under the Town and Country Planning Act

Cap. 154 (1980), any development plans must be lodged with local authorities prior to construction, but this legislation does not require compliance with any building code.

In the absence of a legally enforceable building code, insurers underwrite on the basis that premises do not meet code, unless proof by way of an engineer's report is provided to the contrary.

Financial Security of Onshore Insurers

The Solomon Islands has three onshore insurers, QBE (Solomon Islands), Tower (Solomon Islands), and Pacific Assurance Group (Solomon Islands) Limited,

QBE (Solomon Islands) is a branch of QBE Insurance (International) Limited, which is a wholly owned subsidiary of QBE Insurance Group Limited, an Australian company listed on the Australian stock exchange. QBE Insurance (International) Limited has a security rating of A+ (strong) from

▲ Photo Credit

Stefan
Krasowski/
Flickr 

Section

08

Standard & Poor's, dated May 22, 2013, as a core operating entity of QBE.

Tower (Solomon Islands) is a branch of Tower Insurance Limited, a New Zealand-registered company listed on the New Zealand and Australian stock exchanges. As a branch, Tower (Solomon Islands) holds the financial security rating of the parent company, Tower Insurance Limited, which has a security rating of A- (excellent) from A. M. Best dated July 26, 2013.

The new entrant, Pacific Assurance Group (Solomon Islands) Limited, is a subsidiary of a company registered in Papua New Guinea, Pacific Assurance Group Limited. No details of the company's financial security are available at this time.

Insurance of Public Assets

According to the Ministry of Finance and Treasury (MoFT), the Solomon Islands has no property insurance program in place for government buildings or infrastructure assets. Nor is there a current plan to insure public assets.

The government does have an asset register in place for property and infrastructure assets, managed since 2012 by MoFT. The existing asset register could be used to identify key government assets for any risk financing or insurance program.

Some state-owned enterprises that hold major public assets have property insurance programs that include earthquake and cyclone perils. These enterprises include Solomon Airlines Limited, Solomon Islands Electricity Authority, and Solomon Islands Ports Authority.

The government keeps no centralized register detailing the insurance arrangements made by individual state-owned enterprises. A register of this type would allow a coordinated approach to

property insurance management and purchasing, which could result in lower premiums.

Past Catastrophe Events

The most destructive cyclone within the Solomon Islands was Cyclone Namu in 1986 (Revell 1986). This event caused significant property damage in the capital city, Honiara, and in the surrounding islands of Guadalcanal and Malaita. Insurance industry sources reported that claims were estimated at SI\$14 million (1986 values), the largest of which was from Solomon Islands Plantations Limited at over SI\$7 million. The remaining SI\$7 million in claims was from flood and wind damage within Honiara township. The loss adjuster who attended to these claims advised that there were a number of roof failures due to incorrect or inadequate fixing of roofing iron.

On April 2, 2007, a magnitude 8.1 earthquake occurred in Western Province to the southwest of the regional town Gizo. As a result of damage from the earthquake and resulting tsunami, 35 insurance claims were lodged, and insured damage was estimated at SI\$9 million (US\$1.1 million). The claims and insured costs were lower than might have been expected due to the low penetration of insurance in remote islands.

Following Cyclone Namu, one insurer, Sun Alliance, withdrew from the underwriting of insurance business in the Solomon Islands market.

Options for Consideration

Recommendation 1: The government should develop an insurance program for key public assets and include this in a broader disaster risk financing and insurance strategy. This step would include use of the existing asset register to identify key assets and assessment of premium costs for property indemnity insurance on key public assets, in particular for the major catastrophe perils of earthquake/tsunami and cyclone/sea surge.

Recommendation 2: The government should update the asset register held by the MoFT to include the property assets currently listed in existing asset registers with other ministries. Where possible the asset register entries should include the current replacement value of public assets, in addition to the existing purchase value.

References

- CBSI (Central Bank of Solomon Islands). 2012. *2012 CBSI Annual Report*. <http://www.cbsi.com.sb/index.php?id=105>.
- IAIS (International Association of Insurance Supervisors). *Global Insurance Market Report*. 2012 edition. <http://iaisweb.org/index.cfm?event=getPage&nodeId=25308>.
- QBE Insurance Group Limited. 2012. *Annual Report 2012*. <http://www.group.qbe.com/>.
- RBF (Reserve Bank of Fiji). 2012. *Insurance Annual Report 2012*. Suva, Fiji. <http://www.rbf.gov.fj/Publications/Publications/Insurance-Annual-Reports.aspx>.
- Revell, C. G. 1986. "Tropical Cyclone Namu." *Weather and Climate* 6: 67–69.
- Solomon Islands Government. 1980., *Town and Country Planning Act Cap. 154, 1980*
- . 1985. *Insurance Act Cap. 82, 1985*.
- Standards Australia Limited, AS1170 Minimum design loads on structure, Part 2 Wind forces 1989, (superseded standard, replaced by AS/NZS 1170.2:2011)
- Standards New Zealand, NZS4203 1984, Code of practice for general structural design and design loadings for buildings, Part 3 Earthquake provisions, (superseded standard, replaced by NZS 1170.5:2011)
- Swiss Re. 2012. "Natural Catastrophes and Man-Made Disasters in 2011." *Sigma* 2/2012. <http://www.swissre.com/sigma/>.
- . 2013. "Natural Catastrophes and Man-Made Disasters in 2012." *Sigma* 2/2013. <http://www.swissre.com/sigma/>.
- Tower Insurance Limited. 2012. *_Annual Reports 2012_*. http://www.tower.co.nz/Investor-Centre/Reports/Documents/TOWER_Annual_Report_2012.pdf

Glossary

Agent	Someone who acts for the insurance company in arranging insurance contracts. There are two main types of agents: tied agents, who act for one insurer only, and general agents, who act for multiple insurance companies.
Broker	Someone who acts as an agent for the insured in arranging an insurance or reinsurance program with a provider of capacity.
Capacity	The ability of an insurance company to provide insurance protection to clients, which is limited by its own financial strength and the reinsurance protection it has in place.
Captive insurer	An insurance company wholly owned by a company or entity that insures the risks of the parent entity and subsidiaries.
Indemnity insurance	Insurance that reimburses individuals or entities for loss or damage to a financial position as close as possible to the position they were in prior to the event, in the context of the financial terms of the coverage (such as deductible/excess and limit).
Intermediaries	The general term given to insurance agents and brokers.
Net retention	The amount that an insurance company retains on a reinsurance contract and in particular an excess of loss of contract.
Parametric insurance	A type of insurance that is triggered by the occurrence of a specific measured hazard event, such as a certain magnitude of earthquake or category of cyclone.
Probable maximum loss (PML)	The maximum value of a claim from a large or catastrophe event. May also be called MPL.
Property insurance	The insurance of physical assets such as buildings, plant and equipment, stock, and machinery. The products used for this insurance are variously named as fire and perils, commercial or business package, industrial special risks, or material damage insurance.
Reinsurance	A risk transfer method used by insurance companies to transfer part of a single large risk or an accumulation of similar risks and so increase their capacity. Reinsurance helps to smooth the extreme results and effects of specific perils (such as catastrophe events) and therefore to reduce the volatility of an insurance portfolio.
Solvency margin	The extent by which an insurer's assets exceed its liabilities. Minimum statutory solvency requirements are normally included in insurance acts or regulations.

Annex 4

Country Risk Profile

PACIFIC CATASTROPHE RISK ASSESSMENT AND FINANCING INITIATIVE



SOLOMON ISLANDS

SEPTEMBER 2011

COUNTRY RISK PROFILE: SOLOMON ISLANDS

The Solomon Islands are expected to incur, on average, 20.5 million USD per year in losses due to earthquakes and tropical cyclones. In the next 50 years, the Solomon Islands have a 50% chance of experiencing a loss exceeding 240 million USD and casualties larger than 1,650 people, and a 10% chance of experiencing a loss exceeding 527 million USD and casualties larger than 4,600 people.

POPULATION, BUILDINGS, INFRASTRUCTURE AND CROPS EXPOSED TO NATURAL PERILS

An extensive study has been conducted to assemble a comprehensive inventory of population and properties at risk. Properties include residential, commercial, public and industrial buildings; infrastructure assets such as major ports, airports, power plants, bridges, and roads; and major crops, such as coconut, palm oil, taro, cocoa, rice and many others.

TABLE 1: Summary of Exposure in Solomon Islands (2010)	
General Information:	
Total Population:	547,500
GDP Per Capita (USD):	1,240
Total GDP (million USD):	678.6
Asset Counts:	
Residential Buildings:	157,035
Public Buildings:	4,615
Commercial, Industrial, and Other Buildings:	7,462
All Buildings:	169,112
Hectares of Major Crops:	83,955
Cost of Replacing Assets (million USD):	
Buildings:	3,059
Infrastructure:	420
Crops:	117
Total:	3,596
Government Revenue and Expenditure:	
Total Government Revenue	
(Million USD):	297.6
(% GDP):	43.9%
Total Government Expenditure	
(Million USD):	283.1
(% GDP):	41.7%

¹ Data assembled from various references including WB, ADB, IMF and The Secretariat of the Pacific Community (SPC).

² The projected 2010 population was trended from the 2006 census using estimated growth rates provided by SPC.

Table 1 summarizes population and the inventory of buildings, infrastructure assets, and major crops (or "exposure") at risk as well as key economic values for the Solomon Islands. It is estimated that the **replacement value of all the assets in the Solomon Islands is 3.6 billion USD**, of which about 86% represents buildings and 12% represents infrastructure.

Figures 1 and 2 illustrate the building exposure location and replacement cost distribution, respectively. The footprints of about 35,000 of the approximately 169,000 buildings shown in Figure 1 were digitized from high-resolution satellite imagery. More than 12,000 of such buildings, including more than 7,000 near the national capital of Honiara, were also

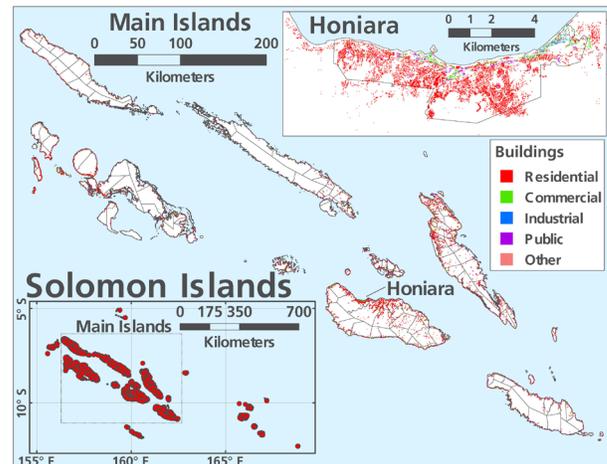


Figure 1: Building locations.

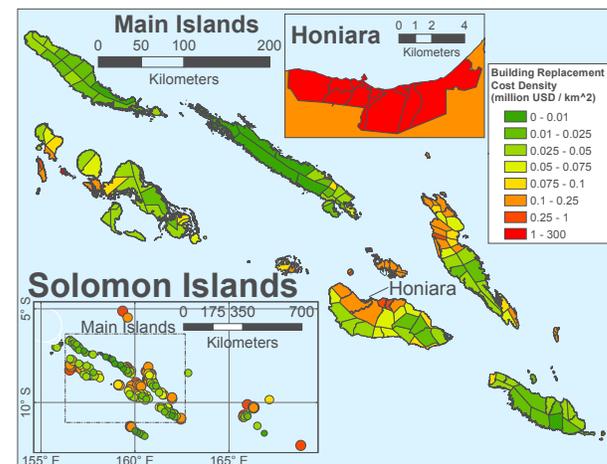


Figure 2: Building replacement cost density by ward.

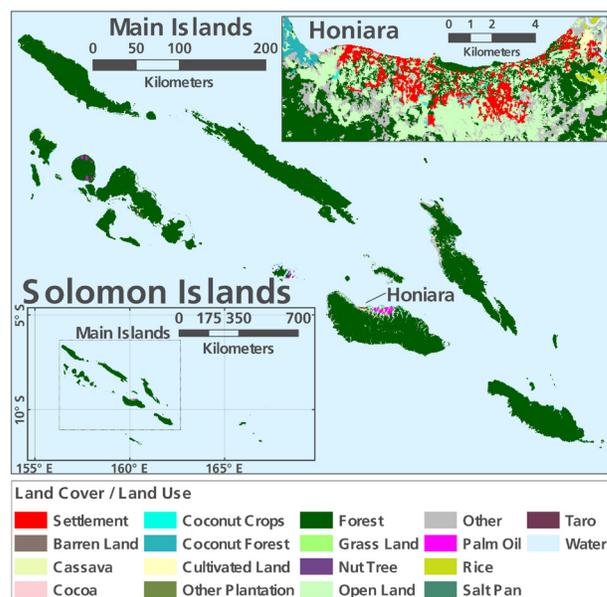


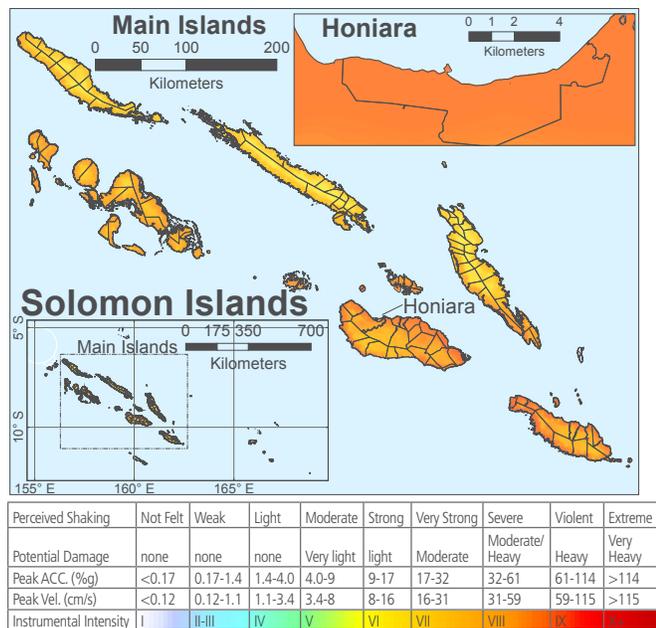
Figure 3: Land cover/land use map.

field surveyed and photographed by a team of inspectors deployed for this purpose. Figure 3 displays the land cover/land use map that includes the location of major crops. The data utilized for these exhibits was assembled, organized and, when unavailable, produced in this study.

TROPICAL CYCLONE AND EARTHQUAKE HAZARDS IN SOLOMON ISLANDS

The Pacific islands region is prone to natural hazards. The Solomon Islands are situated along one segment of the Pacific “ring of fire,” which aligns with the boundaries of the tectonic plates. These boundaries are extremely active seismic zones capable of generating large earthquakes and, in some cases, major tsunamis that can travel great distances. A recent and tragic example is the 2007 magnitude 8.1 earthquake, which struck the islands of the Western and Choiseul Provinces of the Solomon Islands. The earthquake generated a tsunami that killed 52 people and caused widespread damage to housing, infrastructure, schools, and medical facilities, resulting in about 100 million USD in losses. Figure 4 shows that the Solomon Islands have a 40% chance in the next 50 years of experiencing, at least once, very strong to severe levels of ground shaking. These levels of shaking are expected to cause damage ranging from moderate to heavy to well-engineered buildings and even more severe damage to structures built with less stringent criteria.

The Solomon Islands are located south of the equator at the northern extremity of an area known for the frequent occurrence of tropical cyclones with damaging winds, rains and storm surge between the months of October and May. In the South Pacific region from the equator to New Zealand in latitude and from Indonesia to east of Hawaii in longitude,



Scale based upon Wald, et al: 1999

Figure 4: Peak horizontal acceleration of the ground (Note: 1g is equal to the acceleration of gravity) that has about a 40% chance to be exceeded at least once in the next 50 years.

almost 1,000 tropical cyclones with hurricane-force winds spawned in the last 60 years, with an average of about 16 tropical storms per year. The Solomon Islands were affected by devastating cyclones multiple times in the last few decades. For example, tropical cyclone Namu in 1986 claimed more than 100 lives and tens of thousands were left homeless. The storm caused massive landslides and flooding with severe damage to the building stock, infrastructure and crops, incurring losses between 30 and 60 million USD that considerably set back the country’s development. Figure 5 shows the levels of wind speed due to tropical cyclones that have about a 40% chance to be exceeded at least once in the next 50 years (100-year mean return period). These wind speeds, if they were to occur, are capable of generating moderate to severe damage to buildings, infrastructure and crops with consequent significant economic losses.

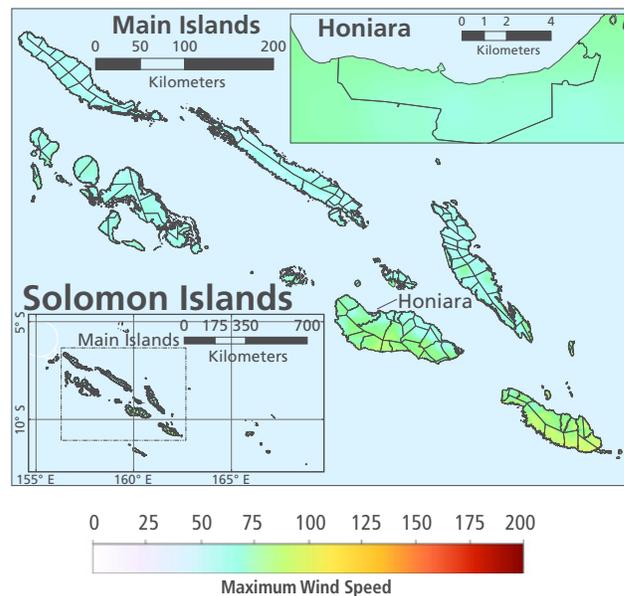


Figure 5: Maximum 1-minute sustained wind speed (in miles per hour) with a 40% chance to be exceeded at least once in the next 50 years.

RISK ANALYSIS RESULTS

To estimate the risk profile for the Solomon Islands posed by tropical cyclones and earthquakes, a simulation model of potential storms and earthquakes that may affect the country in the future was constructed. This model, based on historical data, simulates more than 400,000 tropical cyclones and about 7.6 million earthquakes, grouped in 10,000 potential realizations of the next year’s activity in the entire Pacific Basin. The catalog of simulated earthquakes also includes large magnitude events in South and North America, Japan and the Philippines, which could generate tsunamis that may affect the Solomon Islands’ shores.

The country’s earthquake and tropical cyclone risk profiles are derived from an estimation of the direct losses to buildings, infrastructure assets and major crops that are caused by all the

simulated potential future events. The direct losses include the cost of repairing or replacing the damaged assets, but do not include other losses such as contents losses, business interruption losses and losses to primary industries other than agriculture. The direct losses for tropical cyclones are caused by wind and flooding due to rain and storm surge, while for earthquakes they are caused by ground shaking and tsunami inundation. After assessing the cost of repairing or rebuilding the damaged assets due to the impact of all the simulated potential future events, it is possible to estimate in a probabilistic sense the severity of losses for future catastrophes.

The simulations of possible next-year tropical cyclone and earthquake activity show that some years will see no storms or earthquakes affecting the Solomon Islands, while other years may see one or more events affecting the islands, similar to what has happened historically. The annual losses averaged over the many realizations of next-year activity are shown in Figure 6 separately for tropical cyclone and for earthquake and tsunami, while the contributions to the average annual loss from the different wards are displayed in absolute terms in Figure 7 and normalized by the total asset values in each ward in Figure 8. Figure 8 shows how the relative risk varies by ward across the country.

The same risk assessment carried out for the Solomon Islands was also performed for the 14 other Pacific Island Countries.

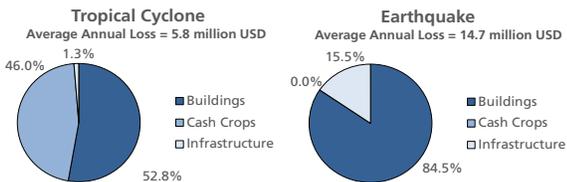


Figure 6: Average annual loss due to tropical cyclones and earthquakes (ground shaking and tsunami) and its contribution from the three types of assets.

The values of the average annual loss of the Solomon Islands and of the other 14 countries are compared in Figure 9.

In addition estimating average risk per calendar year, another way of assessing risk is to examine large and rather infrequent, but possible, future tropical cyclone and earthquake losses. Table 2 summarizes the risk profile for the Solomon Islands in terms of both direct losses and emergency losses. The former are the expenditures needed to repair or replace the damaged assets while the latter are the expenditures that the Solomon Islands government may need to incur in the aftermath of a natural catastrophe to provide necessary relief and conduct activities such as debris removal, setting up shelters for homeless or supplying medicine and food. The emergency losses are estimated as a percentage of the direct losses.

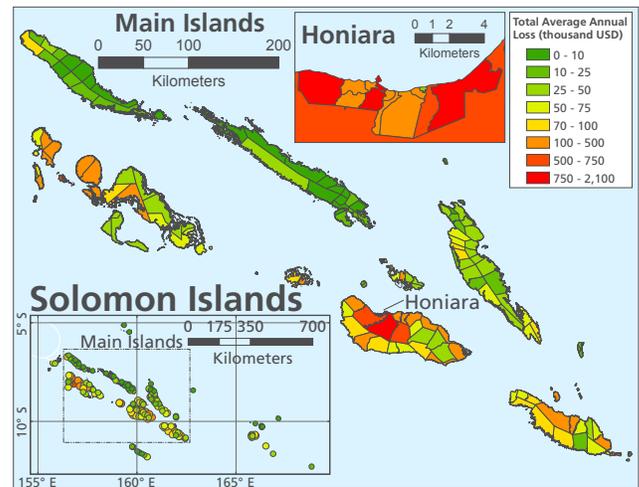


Figure 7: Contribution from the different wards to the average annual loss for tropical cyclone and earthquake (ground shaking and tsunami).

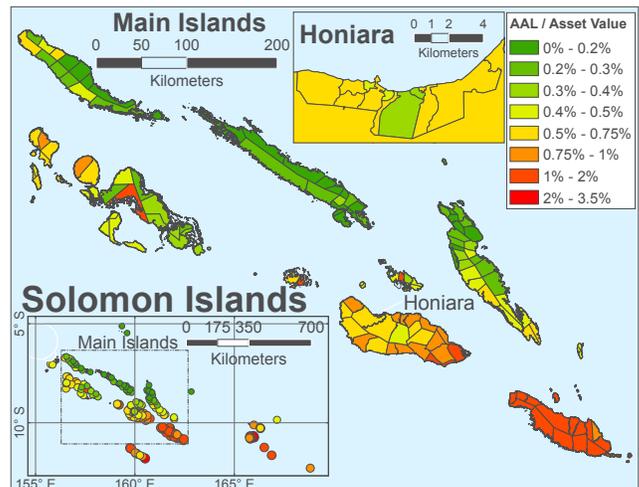


Figure 8: Contribution from the different wards to the tropical cyclone and earthquake (ground shaking and tsunami) average annual loss divided by the replacement cost of the assets in each ward.

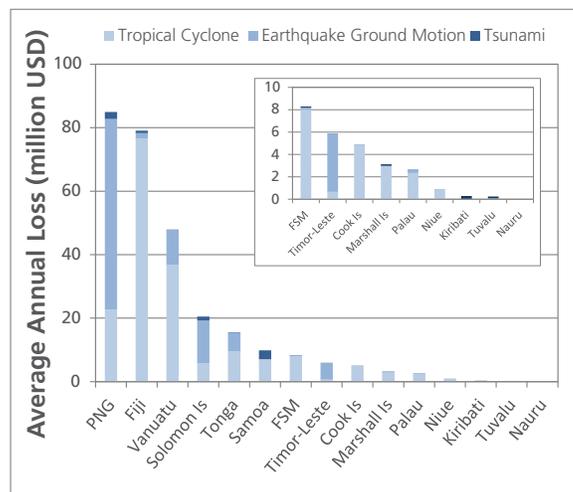


Figure 9: Average annual loss for all the 15 Pacific Island Countries considered in this study.

Table 2 includes the losses that are expected to be exceeded, on average, once every 50, 100, and 250 years. For example, **an earthquake loss exceeding 270 million USD, which is equivalent to about 40% of the Solomon Islands' GDP, is to be expected, on average, once every 100 years.** In the Solomon Islands, earthquake losses are expected to be substantially more frequent and severe than losses due to tropical cyclones. The latter, however, remain potentially catastrophic events.

A more complete picture of the risk can be found in Figure 10, which shows the mean return period of direct losses in million USD generated by earthquake, tsunami and tropical cyclones combined. The 50-, 100-, and 250-year mean return period losses in Table 2 can also be determined from the curves in this figure. The direct losses are expressed both in absolute terms and as a percent of the national GDP.

In addition to causing damage and losses to the built environment and crops, future earthquakes and tropical cyclones will also have an impact on population. The same probabilistic procedure described above for losses has been

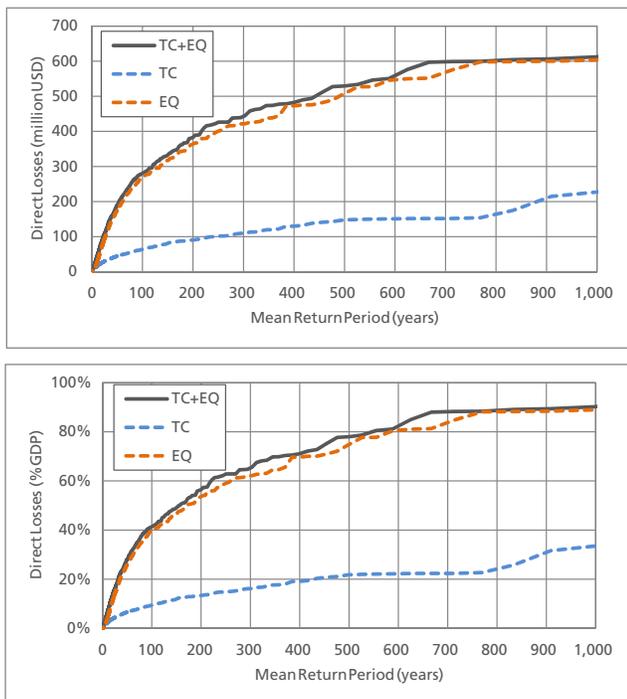


Figure 10: Direct losses (in absolute terms and normalized by GDP) caused by either tropical storms or earthquakes that are expected to be exceeded, on average, once in the time period indicated.

adopted to estimate the likelihood that different levels of casualties (i.e., fatalities and injuries) may result from the future occurrence of these events. As shown in Table 2, our model estimates, for example, that there is a **40% chance in the next fifty years (100 year mean return period) that one or more events in a calendar year will cause casualties exceeding 1,900 people in the Solomon Islands.** Events causing 3,000 or more casualties are also possible but have much lower likelihood of occurring.

TABLE 2: Estimated Losses and Casualties Caused by Natural Perils				
Mean Return Period (years)	AAL	50	100	250
Risk Profile: Tropical Cyclone				
Direct Losses				
(Million USD)	5.8	44.5	63.9	101.5
(% GDP)	0.9%	6.6%	9.4%	15.0%
Emergency Losses				
(Million USD)	1.3	10.2	14.7	23.4
(% of total government expenditures)	0.5%	3.6%	5.2%	8.2%
Casualties	63	489	691	1,019
Risk Profile: Earthquake and Tsunami				
Direct Losses				
(Million USD)	14.7	175.3	268.7	400.8
(% GDP)	2.2%	25.8%	39.6%	59.1%
Emergency Losses				
(Million USD)	0.0	28.2	43.7	65.3
(% of total government expenditures)	0.0%	10.0%	15.4%	23.1%
Casualties	96	1,043	1,780	3,106
Risk Profile: Tropical Cyclone, Earthquake, and Tsunami				
Direct Losses				
(Million USD)	20.5	189.6	280.6	426.2
(% GDP)	3.0%	27.9%	41.4%	62.8%
Emergency Losses				
(Million USD)	3.8	32.8	46.6	68.6
(% of total government expenditures)	1.3%	11.6%	16.4%	24.2%
Casualties	159	1,234	1,914	3,246

¹Casualties include fatalities and injuries.



Country Note

SOLOMON ISLANDS

This note on the Solomon Islands forms part of a series of country Disaster Risk Finance and Insurance (DRFI) notes that were developed to build understanding of the existing DRFI tools in use in each country and to identify gaps future engagements in DRFI that could further improve financial resilience. These notes were developed as part of the technical assistance provided to countries under the Pacific DRFI program jointly implemented by the World Bank and the Secretariat of the Pacific Community financed by the Government of Japan. The technical assistance builds on the underlying principles of the three-tiered disaster risk financing strategy and focuses on three core aspects: (i) the development of a public financial management strategy for natural disasters, recognizing the need for ex-ante and ex-post financial tools; (ii) the post-disaster budget execution process, to ensure that funds can be accessed and disbursed easily post-disaster; and (iii) the insurance of key public assets, to resource the much larger funding requirements of recovery and reconstruction needs. The Pacific DRFI Program is one of the many applications of PCRAFI. It is designed to increase the financial resilience of PICs by improving their capacity to meet post-disaster financing needs without compromising their fiscal balance.

The Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) is a joint initiative of SOPAC/SPC, World Bank, and the Asian Development Bank with the financial support of the Government of Japan, the Global Facility for Disaster Reduction and Recovery (GFDRR) and the ACP-EU Natural Disaster Risk Reduction Programme, and technical support from AIR Worldwide, New Zealand GNS Science, Geoscience Australia, Pacific Disaster Center (PDC), OpenGeo and GFDRR Labs.