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PACIFIC CATASTROPHE RISK ASSESSMENT & FINANCING INITIATIVE

VANUATU



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Country Note

VANUATU

February 2015

Disaster Risk Financing and Insurance

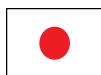
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Acronyms and Abbreviations

DoFT	Department of Finance and Treasury
DRFI	Disaster risk financing and insurance
DRM	Disaster risk management
GDP	Gross domestic product
HFA	Hyogo Framework for Action
MFEM	Ministry of Finance and Economic Management
NAB	National Advisory Board
NAP	National Action Plan
NDMO	National Disaster Management Office
PAA	Priorities and Action Agenda
PCRAFI	Pacific Catastrophe Risk Assessment and Financing Initiative
PFEM	Public Finance and Economic Management
PIC	Pacific Island Country
RBV	Reserve Bank of Vanuatu
RFA	Regional Framework for Action
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 Risk Reduction
URA	Utilities Regulatory Authority
VUI	Vanuatu Utilities and Infrastructure

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Section

01

Executive Summary

Vanuatu is susceptible to a variety of both hydrometeorological and geophysical disasters due to its location in the South Pacific tropical cyclone basin and the Pacific Ring of Fire. Hydrometeorological hazards include tropical cyclones, floods, and droughts, whereas geophysical hazards include volcanoes, earthquakes, and resulting tsunamis and landslides.

Sixty-three percent of recorded disasters in Vanuatu have occurred in the provinces of Malampa and Torba, where over a quarter of the population resides (SPC-SOPAC 2011). The rural population is largely dependent on subsistence agriculture, which is adversely affected by natural disasters. According to the latest national census, the population of Vanuatu is estimated to be 234,023, with 80 percent of residents living in rural areas that are spread across 80 islands in six provinces—Malampa, Penama, Sanma, Shefa, Tafea, and Torba (Vanuatu NSO 2009).

In 2010 the government of Vanuatu established a budgetary provision of US\$265,000 for natural and financial disasters. This continues to be appropriated annually, but does not accrue and becomes expendable at the end of the financial year. The provision is held by the Department of Finance and Treasury (DoFT) and is released upon the approval of the National Disaster Council and a subsequent request from the National Disaster Management Office (NDMO) for immediate disbursement.

In 2010 Tropical Cyclone Vania, a category 1 cyclone, quickly depleted Vanuatu's disaster provision, and supplementary finance of VT 95 million (US\$1 million) was required. There has been some discussion within DoFT about converting the disaster provision into a fund that would accrue over time, but doing so would require analysis to establish an optimal level of reserves

and potentially an amendment to the Public Finance and Economic Management Act. While this change might take some time to implement, it could provide a much-needed boost to the current limited response funds.

Vanuatu has a maximum of VT 1.6 billion (US\$16.6 million) available in ex-ante instruments for financing disaster-related losses. This is equivalent to more than five times the supplementary budget. There is a 21.5 percent chance that disaster losses will exceed this amount in any given year. In comparison, there is a 91 percent chance that disaster losses will exceed the disaster provision of VT 25 million (US\$260,000) in any given year.

Vanuatu uses a variety of disaster risk financing and insurance (DRFI) tools, but its available funds are limited. The ex-ante instruments provide access to limited amounts of cash, and the ex-post tools can take several weeks to mobilize. Some procedures, such as the waiving of normal tendering procedures, are not embedded within the financial legislature, an omission that could significantly delay future response efforts.

A number of options to improve DRFI in the future are presented for consideration in this note:

- (a) develop an integrated disaster risk financing and insurance strategy;
- (b) develop a post-disaster budget execution manual to minimize the loss of institutional knowledge should personnel leave DoFT; and
- (c) explore the use of contingent credit to access additional liquidity post-disaster.

Introduction

Vanuatu is susceptible to a variety of both hydrometeorological and geophysical disasters due to its location in the South Pacific tropical cyclone basin and the Pacific Ring of Fire. Hydrometeorological hazards include tropical cyclones, floods, and droughts, whereas geophysical hazards include volcanoes, earthquakes, and resulting tsunamis and landslides.

Disaster risk management (DRM) is integrated in the national Priorities and Action Agenda (PAA), and in 2012 Vanuatu established the National Advisory Board (NAB) for Disaster Risk Management and Climate Change.

Vanuatu was one of the first Pacific Island Countries (PICs) to mainstream DRM into national planning. This step demonstrates its commitment to improved DRM, which can also be seen in ongoing work to enhance community preparedness and resilience to natural disasters via the National Disaster Management Office (NDMO), and in the establishment of the NAB, which created staff positions responsible for continued improvement in this area.

The government of Vanuatu, in conjunction with the Secretariat of the Pacific Community Applied Geoscience Division (SPC-SOPAC), Secretariat of the Pacific Regional Environment Programme (SPREP), United Nations Development Programme (UNDP) Pacific Centre, the United Nations International Strategy for Disaster Risk Reduction (UNISDR), and other partners, has adopted

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
- Priorities and Action Agenda (PAA) 2006–2015
- National Action Plan (NAP) for Disaster Risk Management, 2006–2016
- National Adaptation Programme of Action, 2004

Disaster risk financing and insurance (DRFI) is a key activity of the HFA Priorities for Action 4 and 5.¹

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 disaster risk financing and insurance 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.

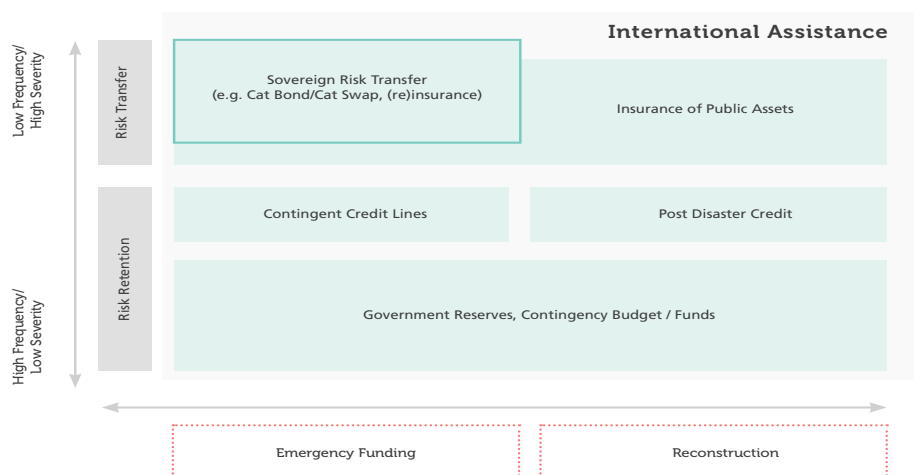
Goal 2 of the NAP seeks to “mainstream DRM into all national planning, decision-making and budgetary processes at the national and local levels,” which includes establishing a sustainable fund for DRM. The NAP also aims to encourage public-private partnerships as a way of developing financing schemes for risk management, particularly insurance, reinsurance, and other financial modalities against disasters; this approach is in keeping with its commitments to key regional and global agreements (Government of Vanuatu 2006). The NAP was endorsed by Vanuatu’s Council of Ministers in 2006 and has received support from the highest level of government.

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

This note aims to build understanding of the existing DRFI tools in use in Vanuatu and to identify gaps where engagement could further develop financial resilience. In addition, it aims to encourage peer exchange of regional knowledge, specifically by encouraging dialogue on past experiences, lessons learned, optimal use of these financial tools, and their effect on the execution of post-disaster funds, including any areas of regulation or legislation that need to be addressed to better complement the flow of post-disaster funds.

Figure 1 — Three-Tiered Disaster Risk Financing Strategy



Source: World Bank 2010.

Economic Impact of Natural Disasters

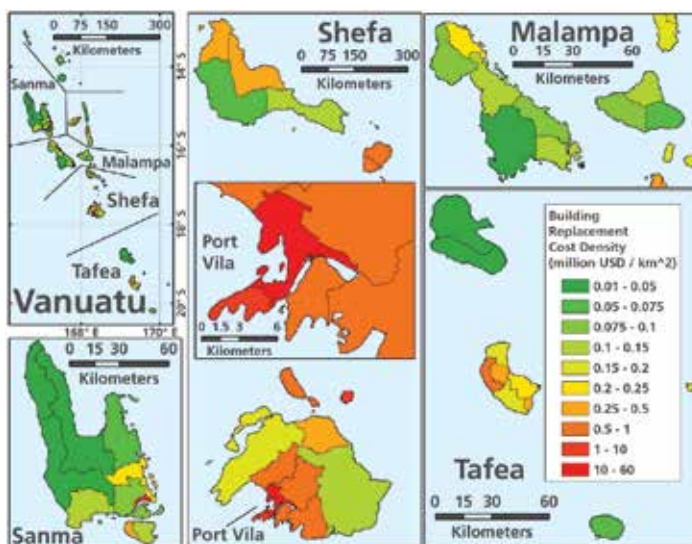
During the period 1980 to 2012, Vanuatu experienced approximately 53 disaster events. Earthquakes account for 46 percent of these events, and tropical cyclones account for a further 35 percent. Floods, volcanic activity, and storm surges account for the rest. It is estimated that these events affected around 300,000 people during the period examined (PDN 2013).

Approximately 63 percent of recorded disasters occurred in the provinces of Malampa and Torba, where over a quarter of the population resides (SPC-SOPAC 2011).

This rural population is largely dependent on subsistence agriculture, which is adversely affected by natural disasters. According to the latest national census, the population of Vanuatu is estimated to be 234,023, with 80 percent of residents living in rural areas that are spread across 80 islands in six provinces—Malampa, Penama, Sanma, Shefa, Tafea, and Torba (Vanuatu NSO 2009).

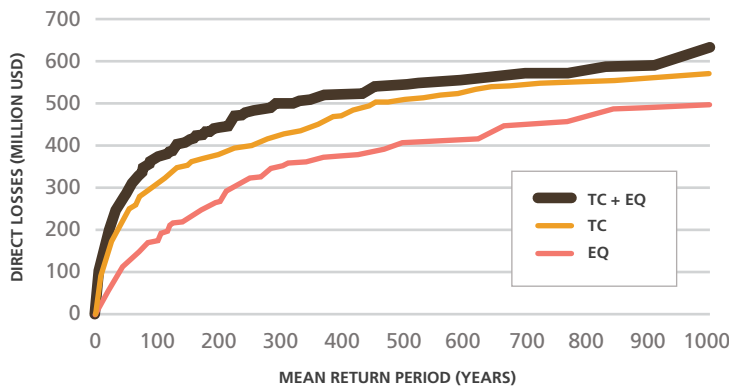
In February 1987, Vanuatu was struck by Tropical Cyclone (TC) Uma, a category 4 cyclone that subjected Port Vila to high winds

Figure 2 — Building Replacement Cost Density by Village



Source: PCRAFI 2011.

Figure 3 — Direct Losses by Return Period



Source: PCRAFI 2011

Note: TC = tropical cyclone; EQ = earthquake.

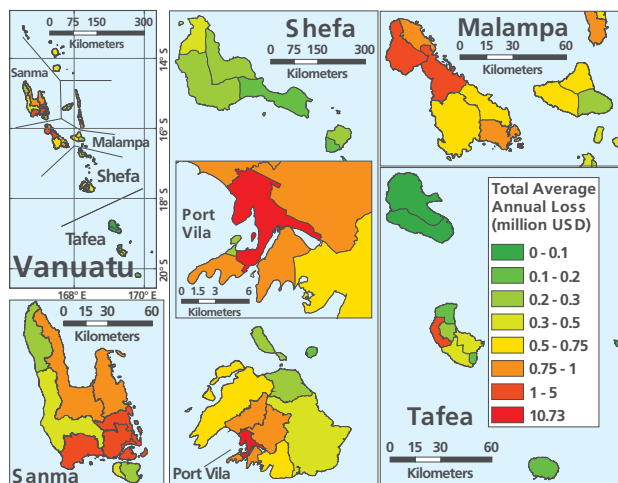
for a period of seven hours and that caused damage of VT 14.4 billion (US\$150 million) (VMS 1994). It is estimated that 95 percent of the building stock was damaged, although insured losses were valued at only VT 1.9 billion (US\$20 million).

The economy of Vanuatu is largely driven by tourism, agriculture, and construction—industries that are susceptible to tropical cyclones and earthquakes, the major perils in Vanuatu. The expansion of the tourism industry has seen an increase in assets along the coastline of the main island of Efate, where the main air

and cruise ship terminals are located. Figure 2 shows the estimated building replacement cost for Vanuatu. Red indicates areas with the highest building replacement cost, those with estimated values of US\$10–60 million per km². Port Vila, the main economic center, falls into this category.

In January 2011, TC Vania caused damage of VT 71 million (US\$742,000) in Vanuatu and affected over 10,000 households (NDMO 2011). TC Vania caused considerable damage to several staple and cash crops, destroyed livelihoods, and damaged houses, water system infrastructure, roads, and schools. The main cash

Figure 4 — Average Annual Losses for Tropical Cyclone and Earthquake (ground shaking and tsunami)



Source: PCRAFI 2011

crops affected were sandalwood and kava, which take years to recover. An immediate supply of food was required for the three months following the event to compensate for the loss of staple crops. This situation demonstrates the islands' high dependence on natural resources and the potential post-disaster economic cost an event imposes. It also argues for a substantial disaster fund to cater for such losses.

Inter-island and intra-island travel and communication were difficult and expensive following TC Vania. Located as they are on large volcanic islands with rugged terrain and dense tropical forest, Vanuatu villages tend to be scattered over large distances. This poses difficulty for facilitating initial damage assessments and quantifying how much funding is required for initial response.

Vanuatu is expected to incur, on average over the long term, annual losses of VT 4.6 billion (US\$48 million) due to earthquakes and tropical cyclones. In the next 50 years, Vanuatu has a 50 percent chance of experiencing a loss exceeding VT 31.6 billion (US\$330 million) from a single event, and has a 10 percent chance of experiencing a loss exceeding VT 51.8 billion (US\$540 million) (see figure 3).

Figure 4 indicates the average annual loss in Vanuatu by area; those areas highlighted in red are likely to experience the highest level of loss, VT 1 billion (US\$10.73 million) per year. The full country risk profile can be found in annex 4.

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Public Financial Management of Natural Disasters

Since 2010, the NDMO budget allocation has almost tripled, from around VT 11 million (US\$115,000) in 2005 to VT 32 million (US\$335,000) (Government of Vanuatu 2010).

This increase was the direct result of a successful New Policy Proposal drafted in 2009 following the attendance of NDMO officials at a New Policy Proposal training given by the Ministry of Finance and Economic Management (MFEM). The increase demonstrates the increased priority of disaster risk within central government.

Effective post-disaster financial response relies on two fundamental capabilities:

- (a) The ability to rapidly mobilize funds post-disaster; and
- (b) 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.

▼ **Photo Credit**
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Post-Disaster Budget Mobilization

The Department of Finance and Treasury (DoFT) and the NDMO together play a significant role in mobilizing funds in the wake of an event. When a disaster occurs, both agencies act to ensure that payments are executed rapidly. This simple process requires the NDMO to provide an initial disaster report and to prioritize its essential needs and the associated costs. In addition, it must submit a formal letter requesting the release of the disaster relief fund. Upon receipt of these, the DoFT must verify all submitted documents, release the requested funds, commit a local purchase order to facilitate immediate payment, and subsequently issue the check.

Vanuatu uses a combination of ex-ante and ex-post financial tools to facilitate initial response, and these take significantly different lengths of time to mobilize and execute. Building on the World Bank’s disaster risk financing and insurance framework (see annex 1), table 1 shows the ex-ante and ex-post financial tools available, indicates those used by Vanuatu, and gives indicative timings. The tools utilized by the Vanuatu are highlighted in blue. Those sections highlighted in gray are for generic instruments that to date have not been used in Vanuatu.

The sections below discuss the financing tools available to the Vanuatu government, including information on the time it takes to mobilize funds and the amount of funds available.

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			
Flash Appeal			
<i>Ex-ante Financing</i>			
Emergency Fund			
Contingency Budget			
Contingent Credit			
Sovereign (parametric) Catastrophe Risk Insurance			
Traditional Disaster Insurance			

Source: Government of Vanuatu; World Bank.

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.

Ex-Ante Practices and Arrangements

The uncertainty surrounding international assistance has put pressure on countries to establish domestic sources of finance for post-disaster relief, such as the establishment of national reserves or the transfer of risk to the international insurance market. Vanuatu's ex-ante practices and arrangements include a disaster provision, sovereign catastrophe risk insurance, and external debt.

Disaster provision

In 2010 the government of Vanuatu established a budgetary provision of VT 25 million (US\$260,000) for natural and financial disasters. This continues to be appropriated annually, but does not accrue and becomes expendable at the end of the financial year. The provision is held by the DoFT and is released upon the approval of the National Disaster Council and a subsequent request from the NDMO for immediate disbursement.

In 2010 TC Vania depleted the disaster provision, and supplementary finance of VT 95 million (US\$989,000 million) was required.

There is a 91 percent chance that disaster losses will exceed the disaster provision in any given year. TC Vania, a category 1 cyclone, exhausted the disaster provision quickly, demonstrating that one event may deplete the fund in full. There has been some discussion within DoFT about converting the disaster provision into a fund that would accrue over time, but this step would require analysis to establish an optimal level of reserves and potentially an amendment to the Public Finance and Economic Management (PFEM) Act. While this might take some time to implement, it could provide a much-needed boost to the limited response funds currently available.

Sovereign catastrophe risk insurance

The coverage selected by Vanuatu could provide an aggregate injection of liquidity equivalent to almost five times the estimated supplementary budget of 2013. Table 2 shows that the selected coverage is designed to pay out for cyclone and earthquake/tsunami events of such

severity that a triggering event would be expected to occur once every 20 years on average, over the long term. The coverage is in effect from November 1, 2014, to October 31, 2015.

External Debt

While Vanuatu's stock of total public debt has remained generally low, it nevertheless increased from 19.4 percent of GDP in 2010 to 21.6 percent of GDP in 2012 (IMF 2013). Within the total public debt, external borrowing was equivalent to only 14 percent of GDP in 2012.

However, contingent liabilities are estimated to be equivalent to 30 percent of GDP, and this share is expected to increase in light of government plans to increase borrowing to finance key public investment projects.

Overall, therefore, Vanuatu's public debt level is low, and it should remain manageable despite a significant increase in debt (by an estimated 4.5 percent of GDP) expected by 2017 (IMF 2013). This is in line with the government's cautious approach to borrowing and assumes strict public expenditure restraint and constant revenues. Given this prudent approach to debt, the government may wish to consider the use of contingent credit to establish an injection of liquidity following a natural disaster. This step

would require examination of the costs of using a contingent credit facility (including any potential opportunity costs) and balance them against the benefit of the additional contingent liquidity.

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. 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 Vanuatu.

Budget reallocation

Transfers (or virements) within ministries require authorization from both the minister responsible and the minister of finance and are processed within a maximum of three working days. These virements are managed under strict conditions stipulated in the PFEM Act, Section 34(A) and (B): funds may be transferred

Table 2— Selected Insurance Coverage, 2014–2015 Pilot Season

	TROPICAL CYCLONE	EARTHQUAKE
Policy period	November 1, 2014–October 31, 2015	
Peril selected	Tropical cyclone	Earthquake
Layer of coverage selected	1 in 20 years	1 in 20 years
Coverage limit as a percentage of contingency budget	>300 percent	>300 percent
Reporting agencies	Joint Typhoon Warning Center	United States Geological Survey

Source: World Bank and PCRAFI 2013.

Table 3— 2013 Budget Appropriation

	FISCAL YEAR 2013 [VT MILLION]	FISCAL YEAR 2013 [US\$ MILLION]	% OF TOTAL BUDGET
Personnel emoluments	900.1	9.4	60
Other goods and services	516.5	5.4	34
Capital expenditure	9	0.94	6
Total budget	1,425.60	15.74	100

Source: Government of Vanuatu 2013.

only within the agency and must come from the operational budget for other goods and services. Payroll and transfers across ministries are not permitted through a virement (Government of Vanuatu 1998).

Approximately 34 percent of Vanuatu’s total budget could potentially be transferred via virements. The budget is classified into three core categories— personnel emoluments, other goods and services, and capital expenditure. Of the three categories, only funds under goods and services are considered operational funds and can be reallocated in the wake of a disaster. In 2013 these funds amounted to VT 516.5 million (US\$5.4 million), or 55.6 percent of the total budget that could potentially be reallocated for the fiscal year (see table 3).

Supplementary

Following a declared state of emergency or a financial emergency, the PFEM Act, Section 34C (1)–(2), allows for a supplementary allocation² of up to 1.5 percent of the total appropriation for that fiscal year (Government of Vanuatu 1998). The definitions

of “emergency” are clearly stipulated under Article 69 of the Constitution,³ and declaration of a state of emergency requires authorization from the Council of Ministers⁴ and Parliament prior to the disbursement of funds. The need for parliamentary approval can result in significant delays for post-disaster response.

Supplementary funding of approximately VT 95 million (US\$1 million) was released following TC Vania. This funding allowed school fees for the children of Tafea Province to be waived and made possible the provision of general relief supplies.⁵

Donor funds for relief and reconstruction

While donor funds will always be required after a disaster, 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 can 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 these goods.

According to information compiled by the Financial Tracking Service of the United Nations Office for the Coordination of Humanitarian Affairs, the government of Vanuatu received VT 18.7 million (US\$195,000) in donations following TC Vania (OCHA FTS 2011). This is equivalent to approximately 13 percent of the funds provided by the government. After TC Vania, many international partners came to assist with the post-disaster assessment, but little finance arrived on the back of this, leaving

the government to meet a large portion of the total costs. This experience suggests how much uncertainty governments face where donor funding is concerned.

Total Response Funds Available

Vanuatu has a maximum of VT 1.2 billion (US\$12.5 million) available in DRFI instruments. This is equivalent to seven times the supplementary budget. Figure 5 shows the three-tiered DRFI strategy alongside the sources of funds and the maximum amounts of funding available to Vanuatu following an event, made up of the combined resources of the disaster provision, the supplementary funding, and the maximum aggregate payout under the catastrophe risk insurance pilot.

Section

03

It is estimated that there is a 21.5 percent chance in any year that disaster losses will exceed the VT 1.2 billion (US\$13.5 million) ex-ante provision. The probability of exceeding ex-ante funds may actually be higher, however, given that the supplementary funding is not exclusively for disaster response and that the full amount is unlikely to be available for disaster response. In comparison, there is as stated earlier a 91 percent chance that disaster losses could exceed the dedicated disaster provision of VT 25 million (US\$260,000) in any given year.

Figure 5 — 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 NZ\$3.4m (US\$2.8m)</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: NZ\$1.7m (US\$1.4m) ERTF: NZ\$0.5m (US\$0.4m)</p>

Source: World Bank.

Post-Disaster Budget Execution

Following TC Vania the disaster provision was drained, and supplementary funds of VT 37 million (US\$383,400) were also used to meet response costs. Over half of this funding was used to cover transportation costs, and 22 percent was used to cover the cost of food. The remainder was used for communications and on-the-ground logistics to facilitate distribution of goods. In addition, a further supplementary amount of VT 66 million (US\$680,000) was approved to cover the cost of school fees within the Tafea Province.

Anecdotal evidence revealed that the endorsement of the supplementary budget took several weeks, largely because Parliament had yet to meet. As a result, there were temporary budget reallocations from other programs to continue response and relief efforts. The diverted budgets were replenished to their respective

programs immediately after the supplementary budget was published.

While it is commonly accepted that following a Statement of Emergency normal tendering procedures are waived, this practice has yet to be formally documented. In the past, this omission has caused significant delays to the purchase of necessary relief supplies. If this procedure remains undocumented or unlegislated, problems may arise in the future.

Overall, the post-disaster budget execution process works well in Vanuatu, although there is limited access to immediate cash.

Vanuatu uses a mix of ex-ante and ex-post financial tools; the ex-ante instruments provide access to limited amounts of cash and the ex-post tools can take several weeks to mobilize. Not all post-disaster procedures, such as the waiving of normal tendering procedures, are embedded within the financial legislature, an omission that could significantly delay future response efforts.



Insurance of Public Assets

In 2012, all classes of non-life insurance premiums in Vanuatu were estimated to total VT 1.5 billion (US\$15.6 million). Of this, VT 1.3 billion (US\$13.5 million) was placed with local insurers and VT 0.2 billion (US\$2.1 million) with offshore insurers. Vanuatu's non-life (general) insurance market is small and currently has two locally registered insurers, QBE Insurance (Vanuatu) Limited and Dominion Insurance Limited.

Non-life premium per capita is estimated at VT 6,400 (US\$67.00), which is lower than the rate in most other Pacific Island Countries.

There is legislation in place—the Insurance Act (2005) and regulations—that regulates the insurance industry. The Reserve Bank of Vanuatu (RBV) is the regulator. The RBV undertakes reviews to ensure that solvency margins

are met, that there is adequate reinsurance protection in place for large and catastrophe risks, and that property and other accumulations are monitored. Offshore insurance placements must be approved by RBV before coverage is placed overseas.

Insurance for catastrophe insurance perils of earthquake and cyclone is available in the market and can be included in property insurance products. Cyclone insurance is not automatically included in standard property coverage wordings, and is available by extension only. Property insurance rates for cyclone in Vanuatu are below average rates for PICs, while the earthquake insurance rates are higher than in other PICs due to the frequency of earthquake events in Vanuatu.

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The Vanuatu government does not have indemnity property insurance programs in place for its assets. It does have an asset register, however. This is in place for land, building, property, and infrastructure assets and is managed by the Ministry of Finance and Economic Management. The MFEM advised that a project has been proposed to identify and reconcile all land, building, and infrastructure assets and ensure that values in the register are correct.

At present there is no insurance of government key infrastructure assets, including major transportation assets such as wharves, roads, and bridges. This situation could result in delays in reconstruction following a catastrophic event.

Most statutory bodies and state-owned enterprises in Vanuatu that manage public assets have insurance programs in place; these include indemnity property insurance, although some programs do not include the cyclone extension. The utility (electricity and water) concession holders are not required by the Utilities Regulatory Authority to purchase indemnity property insurance for the assets they manage.

For the full insurance review that was undertaken in Vanuatu, please refer to annex 3.

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Options for Consideration

Vanuatu has developed some DRFI tools to mitigate its fiscal exposure to natural disasters. To further these developments, the following recommendations for future consideration have been made.

Recommendation 1: Develop an integrated DRFI strategy. This strategy would identify options for the provision of quick liquidity. It could also consider transforming the existing disaster provision into a fund that could accrue over time, subject to estimation of opportunity costs and benefits of such an accrual; an optimal amount of finance would need to be established and the fund maintained at this level. The establishment of such a fund would also require amendments to the PFEM Act and the financial regulations of Vanuatu to provide clear guidelines on access and expenditures to avoid misuse.

Recommendation 2: Develop a post-disaster budget execution manual to minimize the loss of institutional knowledge should personnel leave DoFT. This document would build on the policies and procedures already in existence and collate them into a single document. This would provide staff with a step-by-step procedural guide to facilitate swift budget mobilization and execution. The guide would help to reduce the loss of institutional knowledge should key staff leave DoFT.

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 this approach is that countries would receive a pre-agreed upon amount of finance shortly after the event. This would act as a form of budget support and could be spent on previously agreed upon options or at the discretion of the government.

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End Notes

1 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).

2 This is equivalent to a contingency budget in many other countries.

3 The Vanuatu Constitution is available at http://www.paclii.org/vu/legis/consol_act/cotrov406/.

4 This is equivalent to the cabinet in many other countries.

5 Information was provided anecdotally during the research for this report, so the figures may vary.

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.
- Government of Vanuatu. 1998. *Public Finance and Economic Management Act 1998*. Government of the Republic of Vanuatu.
- . 2006. “National Action Plan for Disaster Risk Management (2006–2016).” Government of the Republic of Vanuatu and Pacific Islands Applied Geoscience Commission (SOPAC), Suva, Fiji.
- . 2013. “Budget Books 2013: Volume 1 & 2.” Government of the Republic of Vanuatu.
- IMF (International Monetary Fund). 2013. “Republic of Vanuatu 2013 Article IV Consultation.” IMF, Washington, DC.
- NDMO (National Disaster Management Office). 2011. “Tropical Cyclone Vania Narrative Food Distribution Report and Financial Acquittal.” Government of Vanuatu.
- OCHA FTS (Office for the Coordination of Humanitarian Affairs Financial Tracking Service). 2011. “Natural Disasters 2011 Summary of Contributions (per disaster) as of 27th February, 2014.” http://fts.unocha.org/reports/daily/ocha_R12_Y2011_1402270303.pdf.
- PDN (Pacific Disaster Net). 2013. www.pacificdisaster.net.
- PCRAFI (Pacific Catastrophe Risk Assessment and Financing Initiative). 2011. “Country Risk Profile: Republic of Vanuatu.” September. www.pacris.sopac.org.
- 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.
- SPC-SOPAC (Secretariat of the Pacific Community Applied Geoscience and Technology Division). 2011. “Vanuatu Investment in Disaster Risk Management 2011.” SPC, Suva, Fiji.
- SPC-SOPAC (Secretariat of the Pacific Community, Applied Geoscience and Technology Division). 2011. “Investment in DRM—Cook Islands.” Secretariat of the Pacific Community, 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
- SPC 2012 “Investment in DRM—Cook Islands.” Secretariat of the Pacific Community, Suva, Fiji.
- 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.
- Vanuatu NSO (National Statistics Office). 2009. “2009 National Census of Population and Housing Summary Release.” Ministry of Finance and Economic Management, Government of the Republic of Vanuatu, Port Vila, Vanuatu.
- VMS (Vanuatu Meteorological Service). 1994. “Tropical Cyclones in Vanuatu 1847–1994.” Government of the Republic of Vanuatu, Port Vila, Vanuatu.
- 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.

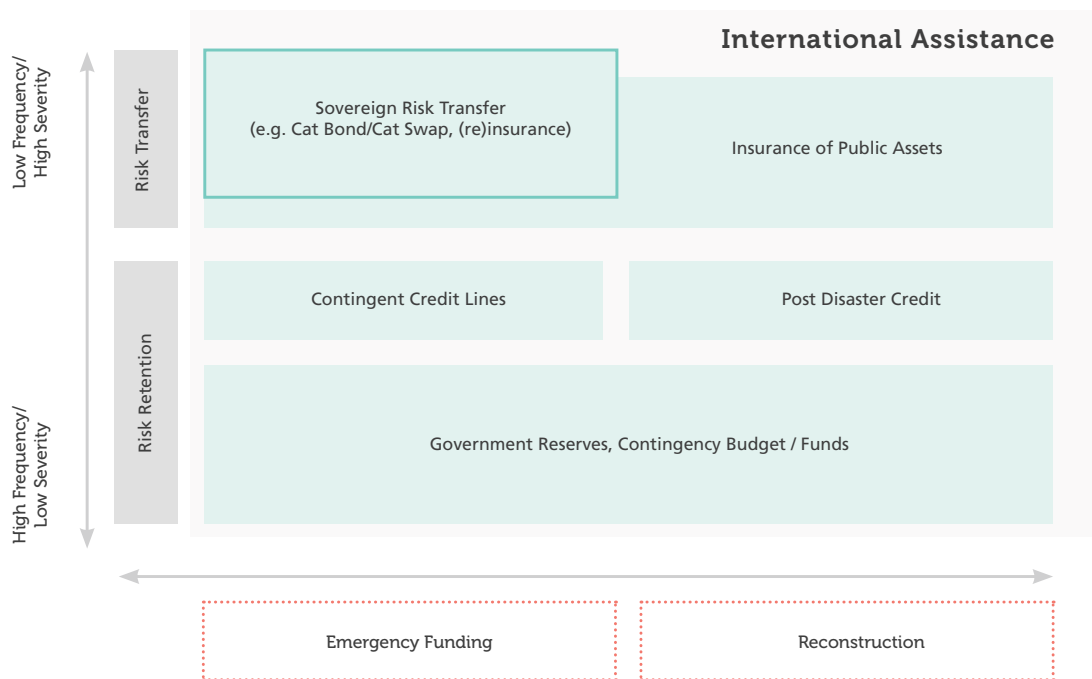
The third layer, disaster risk transfer (such as insurance), focuses on mobilizing large volumes of funds for large but infrequent natural disasters. For events of this type, risk transfer instruments—such as insurance or catastrophe swaps and bonds—become cost-effective in averting a liquidity crunch.

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



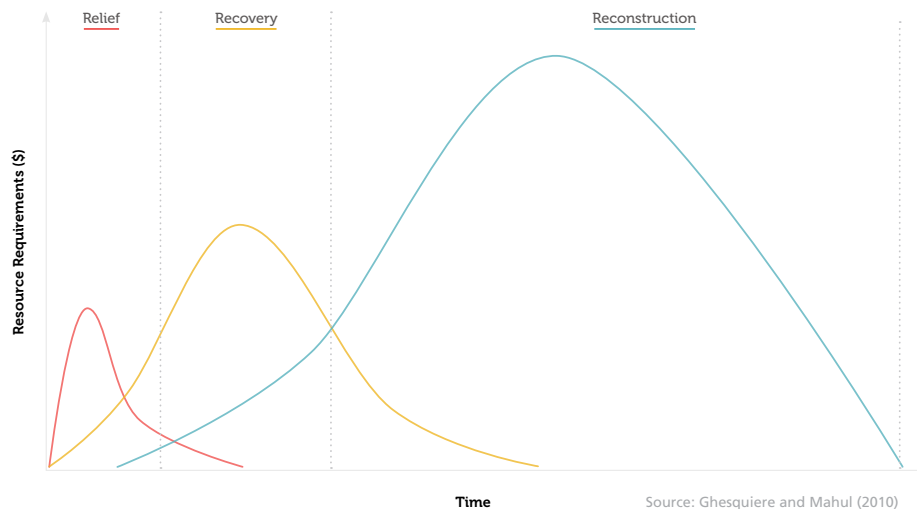
The initial relief phase requires a quick injection of liquidity from day 0 but does not need to be sustained for a long period of time (see figure A.3). Rapid budget mobilization and execution are key for financing initial disaster response, and governments should develop appropriate policies and procedures 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-ante Financing</i>			
Donor Assistance (relief)			
Budget Reallocation			
Domestic Credit			
External Credit			
Capital Budget Realignment			
Donor Assistance (reconstruction)			
Tax Increase			
Flash Appeal			
<i>Ex-post 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

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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, March 2014

Executive Summary

Total non-life insurance premium, all classes, was VT 1.5 billion (US\$15.6 million) in Vanuatu in 2012. Of this premium, VT 1.3 billion (US\$13.5 million) was placed with local insurers and VT 0.2 billion (US\$2.1 million) with offshore insurers.

The Vanuatu non-life (general) insurance market is small and currently has two locally registered insurers, QBE Insurance (Vanuatu) Limited (QBE) and Dominion Insurance Limited (Dominion).

Non-life premium per capita is estimated at VT 6,400 (US\$67.00), which is lower than the rate in most other Pacific Island Countries (PICs).

There is legislation in place—the Insurance Act (2005) and regulations—that regulates Vanuatu’s insurance industry. The Reserve Bank of Vanuatu (RBV) is the regulator. The RBV undertakes reviews to ensure that solvency margins are met, that there is adequate reinsurance protection in place for large and catastrophe risks, and that property and other accumulations are monitored. Offshore insurance placements must be approved by RBV before coverage is placed overseas.

Insurance for catastrophe insurance perils of earthquake and cyclone is available in the market and can be included in property insurance

products. Cyclone insurance is not automatically included in standard property coverage wordings and is available by extension only. Property insurance rates for cyclone in Vanuatu are below average rates for PICs, at 0.17 percent of the sum insured, while the earthquake insurance rates are higher than in other PICs, at 0.30 percent, due to the frequency of recent earthquake events in Vanuatu.

The Vanuatu government does not have indemnity property insurance programs in place for its assets.

The government does have an asset register in place for land, building, property, and infrastructure assets. This is managed by the Ministry of Finance and Economic Management (MFEM). The MFEM advised that a project has been proposed to identify and reconcile all land, building, and infrastructure assets and ensure that values are correct in the register.

At present there is no insurance of government key infrastructure assets, including major transportation assets such as wharves, roads, and bridges. This situation could result in delays in reconstruction following a catastrophic event.

Most statutory bodies and state-owned enterprises in Vanuatu that manage public assets have insurance programs in place that include indemnity property insurance,

although some programs do not include the cyclone extension.

The utility (electricity and water) concession holders are not required by the Utilities Regulatory Authority to purchase indemnity property insurance for the assets managed by them.

Insurance Market Overview

Total non-life insurance premium, all classes, in 2012 was VT 1.5 billion (US\$15.6 million). Of this premium, VT 1.3 billion (US\$13.5 million) was placed with local insurers and VT 0.2 billion (US\$2.1 million) (13 percent) with offshore insurers.

The Vanuatu non-life (general) insurance market is small and currently has two locally registered insurers, Dominion Insurance Limited (Dominion) and QBE Insurance (Vanuatu) Limited (QBE). Dominion has no additional financial security in place beyond that provided by the solvency requirements of the Insurance Act (2005). Dominion does not have an independent security rating. QBE Insurance (Vanuatu) Limited is a wholly owned subsidiary of QBE Insurance Group Limited, an Australian company listed on the Australian stock exchange.

As a subsidiary, QBE (Vanuatu) has no additional financial security in place beyond that provided under the solvency requirements of the Insurance Act (2005). QBE (Vanuatu) does not have its own financial security rating. The ultimate parent, QBE Insurance Group Limited, has a security rating of A- from Standard & Poor's (dated May 22, 2013) and an A+ rating for core operating entities.

The Insurance Act (2005) and regulations restrict the placement of insurance offshore, and all offshore placements must be approved by the Reserve Bank of Vanuatu (RBV).

Insurance industry sources suggested that most of these offshore placements are for specialist marine and aviation insurance and are placed with the London market (including Lloyd's), the major international insurance market. As part of the approval process for offshore placements, the RBV checks the financial status of the offshore insurer.

The non-life premium per capita in Vanuatu, at VT 6,400 (US\$67.00), is lower than the rate in most other Pacific Island Countries (PICs) and equates to 2.11 percent of gross domestic product (GDP) (see table 1). This low premium per capita is likely the result of low market penetration by non-life insurers and a concentration of insurance channels in the main cities of Port Vila

Table A.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 2014



and Luganville, as well as the lack of an insurance program for government assets.

Distribution channels

Agents and bancassurance

RBV advises that Vanuatu has four licensed general insurance agents, Surata Tomaso Travel Limited., John Lum and Associates, ANZ Bank (Vanuatu) Limited., and National Bank of Vanuatu. All four have agency arrangements with QBE.

Brokers

Vanuatu has four licensed insurance brokers, Aon (Vanuatu) Limited. (Aon), Marsh Limited., Willis New Zealand Limited, and a local broker, Chartered Pacific Insurance Brokers Limited (CPIB). Only Aon and CPIB have local offices; Marsh and Willis service clients from Fiji and New Zealand respectively.

Direct


Both of the non-life insurers in Vanuatu offer domestic household, medical, and motor vehicle insurance products on a direct basis. No insurance services are available via the Internet in Vanuatu.

There is a wide range of distribution channels available in the marketing of general insurance products in Vanuatu.

Catastrophe Risk Exposure and Capacity

Catastrophe risk insurance represents 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 portfolios to ensure



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Box 1— Reinsurance Programs

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

Reinsurance arrangements for Dominion were not available for review. It is known, however, that Dominion is regulated by the Reserve Bank of Fiji, which undertakes annual reviews of all Fijian insurers and publishes a comprehensive insurance annual report (Reserve Bank of Fiji 2012).

that they can withstand large disaster shock losses without threatening their solvency.

There are two major catastrophe hazards in Vanuatu, tropical cyclones and earthquakes. Insurers advised that they were aware of the potential cyclone exposure and insured only those properties that had an engineer's certification of compliance with the cyclone (wind load) standard. Around 80 percent of their accumulation exposure was in Port Vila and the island of Efate; 15 percent was in Luganville on Santo; and the balance was spread throughout the islands.

The market is constrained by its small size. Although additional capacity is available offshore from the London market, restrictions on offshore placement and the often higher premium costs involved have discouraged use of this option. New Zealand-based insurers have shown limited willingness to provide such capacity to Vanuatu in the past, as evidenced by the withdrawal in 1987, following Cyclone Uma, of Pan Pacific Underwriters Limited. (Croccombe 1992) and Tower Insurance Limited.

All insurers with catastrophe exposures need to obtain reinsurance to increase their capacity. Reinsurance 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 insurers having sufficient capital and a good solvency margin to protect their interests from catastrophic events, they are requiring adequate reinsurance programs, placed with robust reinsurers.

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 (Reserve Bank of Fiji 2012) and estimated insured losses of SAT 3 million in Samoa in December 2012.


Insurers throughout the Pacific have expressed concern at recent increases in reinsurance premiums, especially 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.

Products

There are no specific catastrophe insurance products available in the Vanuatu market. The property and engineering insurance products include the catastrophe perils of earthquake and tsunami. Cyclone insurance is not automatically available and is included only as an extension to property policies once an engineer's cyclone certification has been received.

QBE uses Industrial Special Risks (ISR) wordings for major commercial, public authority, and state-owned enterprise property insurance. The ISR wording, which is based on the Australian Mark IV insurance industry standard wording, is for material damage and includes natural perils such as earthquake and tsunami; it does not automatically include cyclone. Dominion uses a Commercial Package policy with defined perils; it



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Section

08

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
Solomon Islands	0.17%	1% or 5% of sum insured	0.13%	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: Tables shows average market rate percentage of value based on insurance industry sources.

makes cyclone/earthquake available by extension only.

A major limitation of the ISR wording for governments is that infrastructure assets such as roads, bridges, and wharves are specifically excluded. Insurance brokers advised that it was common practice for major commercial accounts to include smaller infrastructure items in an ISR schedule and waive the exclusion. Major infrastructure items, however, would need to be insured under a Completed Civil Works policy.

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

Cyclone insurance is available by extension only from local insurers and is limited to those buildings with an engineering cyclone certificate confirming that the building meets the building code for cyclone. The certificates are valid for seven years.

Completed Civil Works insurance for infrastructure assets is available from QBE, and local insurance brokers advised that a number of major resorts had such insurance in place for their infrastructure assets.

Market capacity

The local market does not appear to have any major capacity limitations for property insurance. Insurance intermediaries advised that QBE is the only local insurer with reasonable capacity for large property risks and accumulations. If additional capacity is necessary, it is available by way of offshore placements, but these need to be approved by RBV. According to insurance industry sources, only a small number of property insurance

Box 2— Past Catastrophe Events

Cyclones

The most destructive cyclones within Vanuatu occurred in 1959 (Amanda), 1985 (Eric, Nigel, and Odette), 1987 (Uma), and 1999 (Dani) (VMS 1994). Of these, Cyclone Uma was the most destructive, with estimated damage and economic losses at over VT 1.4 billion (US\$150 million) in 1987 values. The government expended over VT 87 million (US\$9 million) for initial emergency relief in the two months following the cyclone (Government of Vanuatu 1987). Insurance sources advised that over 750 claims were lodged following Cyclone Uma, with damage valued at over VT 460 million (US\$4.7 million). There was significant property damage in the capital city, Port Vila, with some estimates suggesting that 90 percent of properties suffered extensive or major damage. There was also a loss of over 40 vessels throughout the islands.

Earthquakes

On January 3, 2002, Vanuatu experienced a 7.4 magnitude earthquake, with an epicenter approximately 30km to the west of Efate island and Port Vila. According to a report by SOPAC (2003), the earthquake caused damage estimated at over VT 880 million (US\$8.8 million). The report indicated that insured losses totaled A\$8.4 million (US\$7.11 million), and damage from uninsured government buildings and infrastructure losses came to a further A\$2 million (US\$1.69 million). The report did not analyze any uninsured private properties but did estimate the total cost of damage at A\$15 million (US\$12.675 million), which indicates a high level of insurance market penetration. Analysis by engineers undertaken after the

event indicated that some older commercial buildings were constructed to only 40 percent of the earthquake code (NZS4203).

In 2010 and 2011, there were three earthquakes with a magnitude of between 7.0 and 7.1; the epicenters were 40–60km from Port Vila. Insurance industry sources advised that these earthquakes caused insured damage estimated at VT 100 million (US\$1 million).

Insurance consequences of catastrophe events

Cyclone Uma was a major catastrophe for the insurance industry in Vanuatu. Industry sources advise that while there were eight insurers operating in the market in 1987, within two years only three insurers remained. These remaining insurers were unable to provide cyclone insurance following the event because their reinsurance coverage had been exhausted and they were unable to access alternative reinsurance capacity for windstorm.

The 2002 earthquake had a similar impact. Five insurers were operating prior to the event, and within two years there were only three. There was no limitation of earthquake insurance coverage following this event, but prices for earthquake insurance coverage did increase due to reduction of global reinsurance capacity that year and the consequential increase in reinsurance premium costs.

There were no actual insurer financial failures in either event, although there were reportedly some significant delays in claim settlements after Cyclone Uma and some settlement delays after the 2002 earthquake.

offshore placements are made into corporate global programs. The absence of significant capacity issues notwithstanding, insurance intermediaries were concerned about possible competition issues arising from the dominant market position of QBE (estimated at over 90 percent for the commercial property class).

Property insurance rates for cyclone in Vanuatu are below average for PICs, although earthquake rates are higher, as detailed in table 2. These high

earthquake rates are due to the frequency of major earthquake events in recent years.

There are a number of limitations with this comparison related to 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 policies. It is not possible to use average rating data as an exact basis for a specific company or individual risk. It is possible,

Box 3— Unelco Suez

The supply of electricity and water within Port Vila, Malekula, and Tanna is the responsibility of concession holder, Unelco Suez. The utility assets are managed by Unelco during the periods of the concession agreements and revert to the government of Vanuatu, in good order and condition, at the end of those concessions. The concession agreements require that a replacement fund for assets be set up and that any damage caused by force majeure events be repaired out of that fund or from operating expenses if the replacement fund is exhausted. There is no requirement in the concession agreements for the assets to be insured (Government of Vanuatu and Unelco Suez 1975).

Vanuatu Utilities and Infrastructure

The supply of electricity to Luganville town on the island of Espiritu Santo is the responsibility of the concession holder, VUI. The concession agreement was not available for review, but URA advised that it had investigated property insurance with VUI when the concession was first granted in 2011 and concluded that it was an unnecessary additional cost to consumers. Insurance industry sources advised that VUI has a property insurance program, including earthquake, for some of the concession assets.

however, to offer a general comparison of the property insurance rates in respective markets.

Insurance Law and Regulation

In Vanuatu, insurance companies, agents, brokers, and loss adjusters are all required to be licensed under the Insurance Act (2005) and are regulated by the Insurance Regulations (2006). The RBV is the current regulator; it requires quarterly and annual returns from insurers and brokers and also undertakes biannual on-site reviews of licensed entities. In addition to the 2005 law and 2006 regulations that govern the insurance industry, there are a number of guidance notes on relevant issues that the RBV provides.

Local insurers must provide a quarterly update of their solvency to the RBV. RBV requires insurers to annually submit a reinsurance management strategy with their insurance license renewal application. During the on-site reviews, RBV checks the reinsurance arrangements and the financial security of insurers. These reviews ensure that reasonable financial protection is in place for consumers of insurance products within Vanuatu.

Building Control and Standards

Vanuatu does not have a building act in place as at March 2014. A bill for the National Building Code Act was presented to Parliament in 1999, but was never enacted. A further bill for a National Building Code Act was presented and passed by Parliament in January 2014, and government sources advised in March 2014 that the act was awaiting gazetting before becoming law.

A Vanuatu draft National Building Code was distributed in 1990. It used the New Zealand earthquake code (NZS4203) and Australian wind loads (AS1170.2) for cyclone code. Local engineers advised that major commercial and public buildings, as well as the more substantial residential buildings, are constructed in accordance with these codes. Prior to building construction, plans for all buildings in the Port Vila and Luganville municipalities are submitted to the municipalities for approval, and these plans are also checked by the Public Works Department.

In the absence of a legally enforceable building code, insurers have taken proactive steps to ensure building cyclone standard compliance by requiring engineering certificates for insured properties.

Insurance of Public Assets

Government assets

The Ministry of Finance and Economic Management (MFEM) advised that there is no property insurance program in place for government building or infrastructure assets in Vanuatu. According to insurance industry sources, some individual ministries have property insurance in place for specific assets. In the 1990s a comprehensive risk management program was developed for the Vanuatu government, one including risk financing and insurance. This risk management program is no longer in place.

The government does have an asset register in place for land, building, property, and infrastructure assets, managed by MFEM. MFEM advised that a project has been proposed that would identify and reconcile all government land, building, and infrastructure assets and ensure that these are recorded correctly in the register. The existing asset register could be used to identify key government assets for any risk financing or insurance program.

Statutory bodies and state-owned enterprises

MFEM is responsible for the overall supervision of all statutory bodies and state-owned enterprises. The ministry advised that it does not require statutory bodies and state-owned enterprises to have property insurance programs in place for public assets. Because of notes in annual reports, the MFEM is aware that a number of these entities have insurance programs, but the ministry does not keep a record of those programs, leaving it to the individual statutory bodies and state-owned enterprises to report to their respective boards on insurance arrangements.

Insurance industry sources advised that some statutory bodies and most state-owned enterprises that held major public assets had property insurance programs that included earthquake and cyclone perils. Among these entities are Air Vanuatu (Operations) Limited, National Bank of Vanuatu Limited., Reserve Bank of Vanuatu, Vanuatu Financial Services Commission, and Vanuatu Post Limited. Airports Vanuatu Limited has a property insurance program but does not include the cyclone peril for buildings, and the airport runways are not insured (SOPAC 2003).

▼ **Photo Credit**
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The government keeps no centralized register of insurance arrangements made by individual statutory bodies or state-owned enterprises.

A register of this type would allow a more coordinated approach to property insurance management and purchasing, which could in turn generate premium cost benefits.

Public assets managed under concession agreements

The Utilities Regulatory Authority (URA) advised that it did not require concession holders to insure the assets under their management. There are two concession holders, Unelco Suez and Vanuatu Utilities and Infrastructure (VUI).

Options for Consideration

Recommendation 1: The government should develop a broad disaster risk financing and insurance strategy that includes an insurance program for key public assets. This approach would use the existing asset register to identify key assets, would assess probable losses, and would carry out a costing of indemnity insurance for the major catastrophe perils of earthquake/tsunami and cyclone/sea surge.

Recommendation 2: The government should include the current replacement value of key public assets in the asset register held by the Ministry of Finance and Economic Development.

Recommendation 3: The government should set up a central insurance register, for all government departments, statutory bodies, or state-owned enterprises as part of the disaster risk financing and insurance strategy and update the register as insurance contracts fall due.

References

- Crocombe, R. G. 1992. *Pacific Neighbours: New Zealand's Relations with other Pacific Countries*. Christchurch, New Zealand: MacMillan Brown Centre for Pacific Studies and Institute for Pacific Studies.
- Government of Vanuatu. 1987. "National Disaster Co-ordinating Committee, Cyclone Uma February 1987." Government of Vanuatu, Port Vila, Vanuatu. March.
- Government of Vanuatu and Unelco Suez. 1975. "Convention Relating to the Concession for the Generation and Public Supply of Electrical Power in Port Vila."
- IAIS (International Association of Insurance Supervisors). 2012. *Global Insurance Market Report*. 2012 edition. <http://iaisweb.org/index.cfm?event=getPage&nodid=25308>.
- QBE Insurance Group Limited. 2012. *Annual Report 2012*. <http://www.group.qbe.com/>.
- Republic of Vanuatu. 2005. *Insurance Act No. 54 of 2005*. <http://www.vfsc.vu/Download/laws/insuranceactno54of2005.pdf>.
- . 2006. *Insurance Regulations Order No. 16 of 2006*. <http://www.vfsc.vu/Download/regulations/insuranceregulationorderno16of2006.pdf>.
- Reserve Bank of Fiji. 2012. *Insurance Annual Report 2012*. Suva, Fiji. <http://www.rbf.gov.fj/Publications/Publications/Insurance-Annual-Reports.aspx>.
- SOPAC (Pacific Islands Applied Geoscience Commission). 2003. "Catastrophe Insurance Pilot Study, Port Vila, Vanuatu." SOPAC Joint Contribution Report 147, vols. 1 and 2. December.
- 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/>.
- VMS (Vanuatu Meteorological Service). 1994. "Tropical Cyclones in Vanuatu 1847 to 1994." Publication no. VMS/C/01/9.3. May 19.

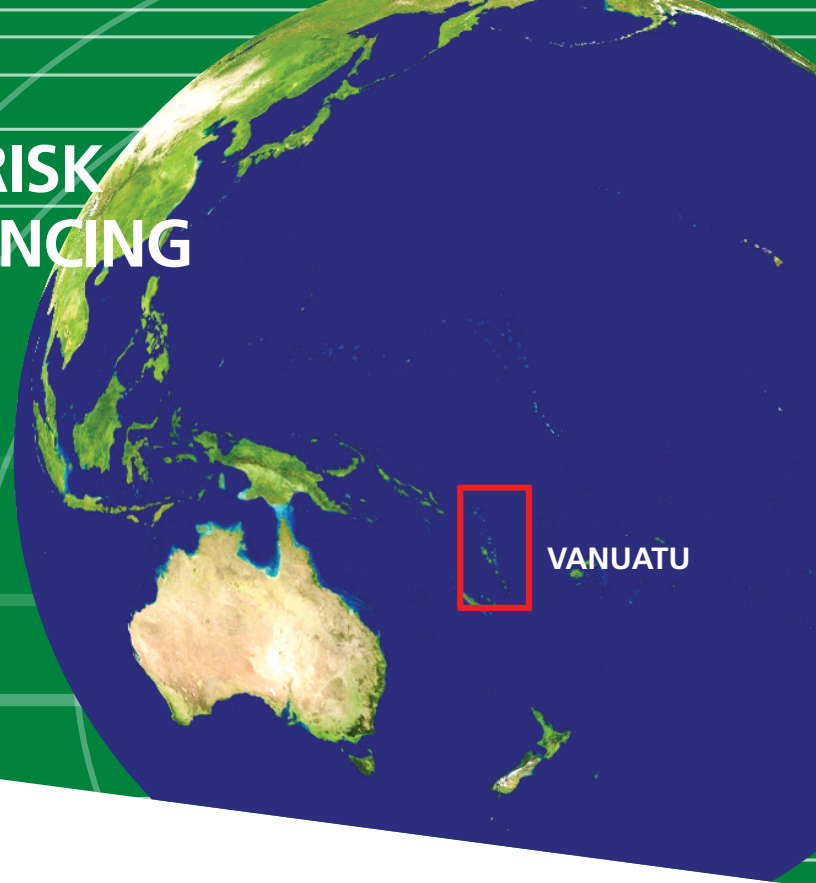
Glossary

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



SEPTEMBER 2011

COUNTRY RISK PROFILE: VANUATU

Vanuatu is expected to incur, on average, 48 million USD per year in losses due to earthquakes and tropical cyclones. In the next 50 years, Vanuatu has a 50% chance of experiencing a loss exceeding 330 million USD and casualties larger than 725 people, and a 10% chance of experiencing a loss exceeding 540 million USD and casualties larger than 2,150 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, vanilla and many others.

TABLE 1: Summary of Exposure in Vanuatu (2010)	
General Information:	
Total Population:	246,000
GDP Per Capita (USD):	2,960
Total GDP (million USD):	729.0
Asset Counts:	
Residential Buildings:	90,699
Public Buildings:	3,280
Commercial, Industrial, and Other Buildings:	6,767
All Buildings:	100,746
Hectares of Major Crops:	78,434
Cost of Replacing Assets (million USD):	
Buildings:	2,858
Infrastructure:	420
Crops:	25
Total:	3,303
Government Revenue and Expenditure:	
Total Government Revenue	
(Million USD):	173.7
(% GDP):	23.8%
Total Government Expenditure	
(Million USD):	178.8
(% GDP):	24.5%

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 Vanuatu. It is estimated that the **replacement value of all the assets in Vanuatu is 3.3 billion USD**, of which about 86.5% represents buildings and 12.5% represents infrastructure.

Figures 1 and 2 illustrate the building exposure location and replacement cost distribution, respectively. The footprints of about 32,500 of the approximately 101,000 buildings shown in Figure 1 were digitized from high-resolution satellite imagery. More than 10,600 of such buildings, including about 7,500 near the nation's capital of Port Vila, were also field surveyed and photographed by a team of inspectors deployed for this purpose. Figure 3 displays the land cover/land use map

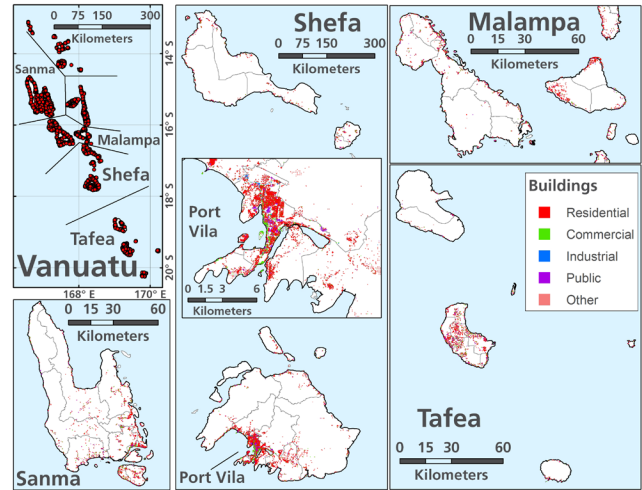


Figure 1: Building locations.

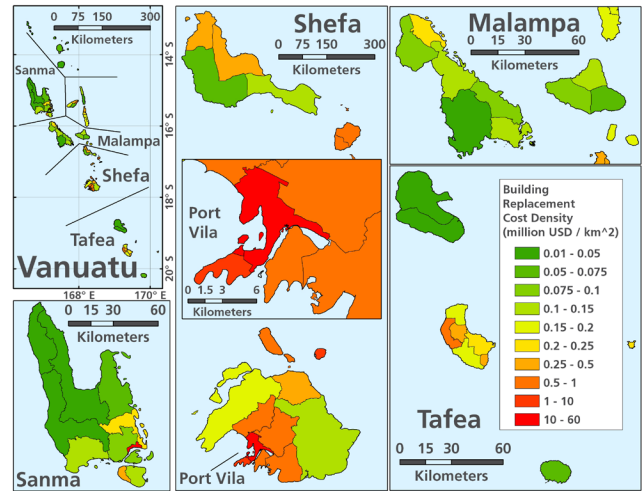


Figure 2: Building replacement cost density by village.

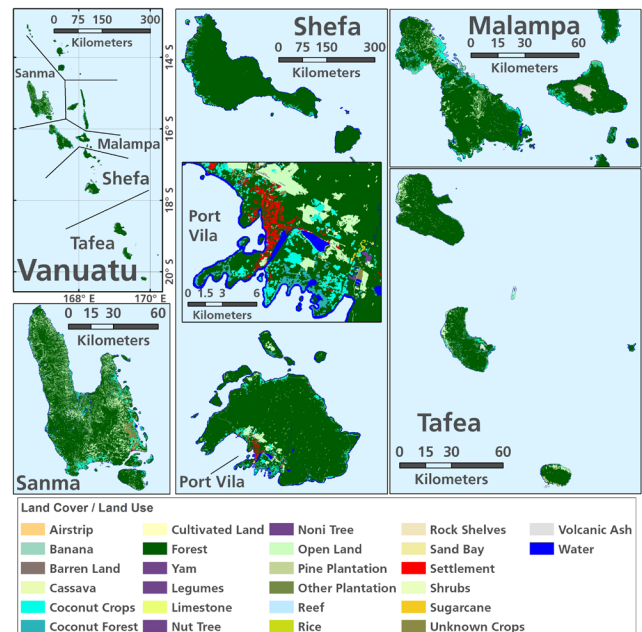


Figure 3: Land cover/land use map.

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 VANUATU

The Pacific islands region is prone to natural hazards. Vanuatu is located south of the equator in 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 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. Vanuatu was affected by devastating cyclones several times in the last few decades. For example, since 1990, Vanuatu has been subject to at least 20 damaging tropical cyclones. The most significant cyclones in recent years were Uma in 1987 and Ivy in 2004, each affecting nearly 50,000 people and causing destruction that amounted to losses in the tens to hundreds of million USD. Figure 4 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 severe damage to buildings, infrastructure and crops with consequent large economic losses.

Vanuatu is situated along one segment of the Pacific “ring of fire,” which aligns with the boundaries of the tectonic plates. These tectonic plate boundaries are extremely active seismic zones capable of generating large earthquakes and, in some cases, major tsunamis that can travel great distances. Vanuatu was affected by devastating earthquakes and tsunamis several times in the last few decades. In 1999, a magnitude 7.5 earthquake caused extensive damage to Pentecost Island, leaving more than 10 dead, over 100 injured, and millions of USD in losses. The earthquake generated a large tsunami, including a six meter wave that completely destroyed the village of Baie Martelli. In 2002, a magnitude 7.3 earthquake struck near the national capital of Port Vila, causing millions of USD in damage to buildings and infrastructure. Figure 5 shows that Vanuatu has 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 significant damage to structures built with less stringent criteria.

RISK ANALYSIS RESULTS

To estimate the risk profile for Vanuatu 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

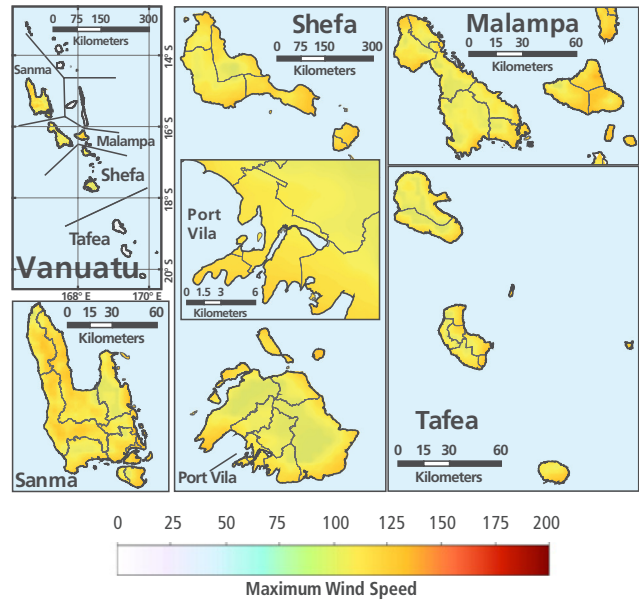
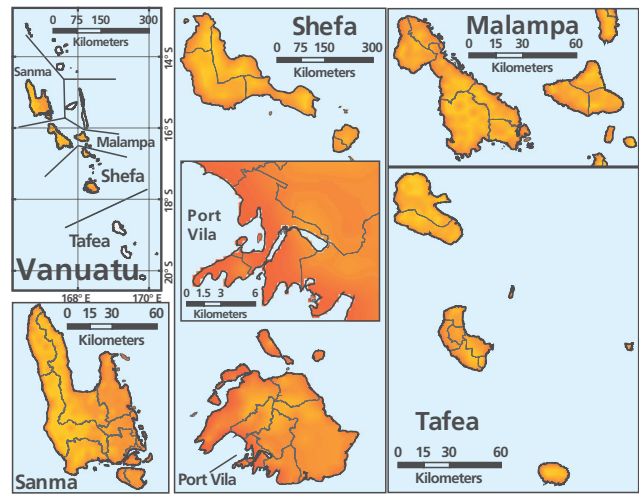


Figure 4: Maximum 1-minute sustained wind speed (in miles per hour) with a 40% chance to be exceeded at least once in the next 50 years (100 year mean return period).



Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
Potential Damage	none	none	none	Very light	light	Moderate	Moderate/Heavy	Heavy	Very Heavy
Peak ACC. (%g)	<0.17	0.17-1.4	1.4-4.0	4.0-9	9-17	17-32	32-61	61-114	>114
Peak Vel. (cm/s)	<0.12	0.12-1.1	1.1-3.4	3.4-8	8-16	16-31	31-59	59-115	>115
Instrumental Intensity	I	II-III	IV	V	VI	VII	VIII	IX	X

Scale based upon Wald, et al: 1999

Figure 5: 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 (100-year mean return period).

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 Vanuatu's 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 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 becomes possible to estimate in a probabilistic sense the severity of losses for future catastrophes.

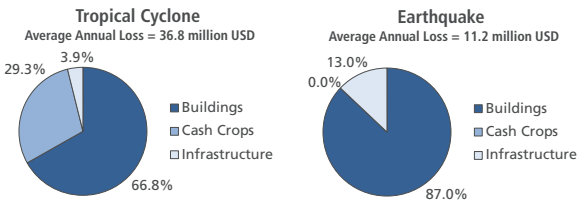


Figure 6: Average annual loss due to tropical cyclones and earthquakes (ground shaking and tsunami) and its contribution from the three types of assets.

The simulations of possible next-year tropical cyclone and earthquake activity show that some years will see no storms or earthquakes affecting Vanuatu, 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 area councils are displayed in absolute terms in Figure 7 and normalized by the total asset values in each area council in Figure 8. Figure 8 shows how the relative risk varies by area council across the country.

The same risk assessment carried out for Vanuatu was also performed for the 14 other Pacific Island Countries. The values of the average annual loss of Vanuatu and of the other 14 countries are compared in Figure 9.

In addition to 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 Vanuatu in terms of both direct losses and emergency losses.

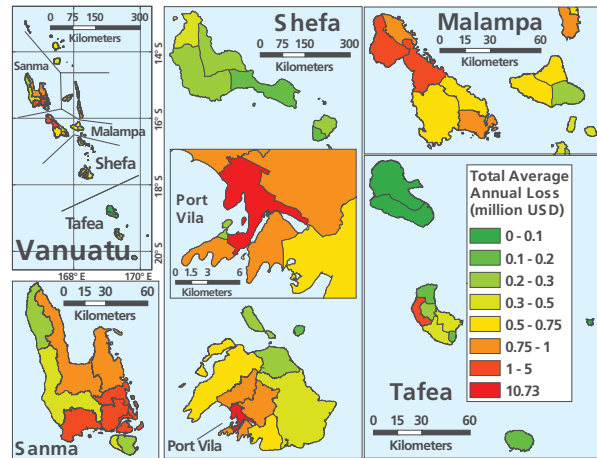


Figure 7: Contribution from the different villages to the average annual loss for tropical cyclone and earthquake (ground shaking and tsunami).

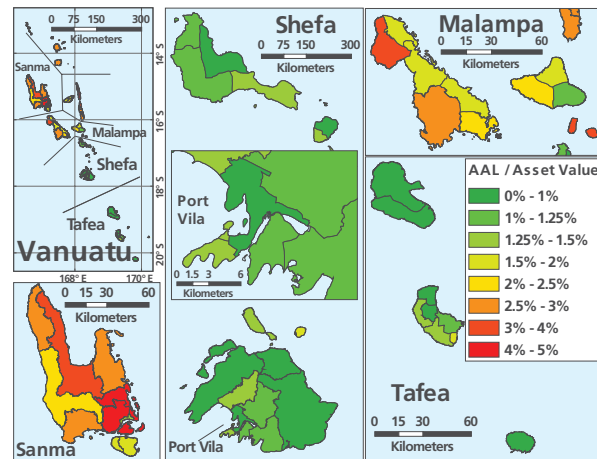


Figure 8: Contribution from the different islands to the tropical cyclone and earthquake (ground shaking and tsunami) average annual loss divided by the replacement cost of the assets in each island.

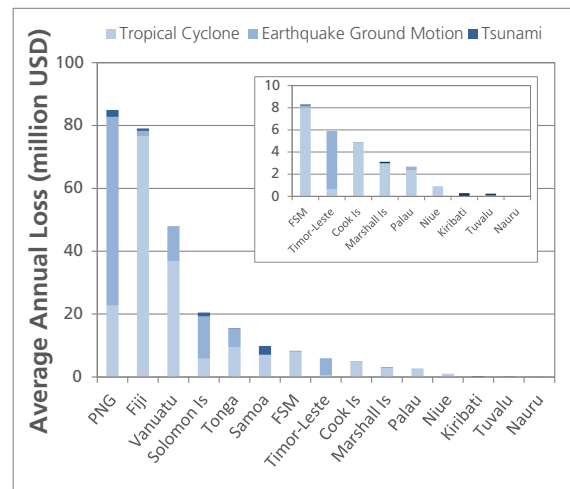


Figure 9: Average annual loss for all the 15 Pacific Island Countries considered in this study.

The former are the expenditures needed to repair or replace the damaged assets while the latter are the expenditures that the Vanuatuan 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.

Table 2 includes the losses that are expected to be exceeded, on average, once every 50, 100, and 250 years. For example, a tropical cyclone loss exceeding 312 million USD, which is equivalent to about 43% of Vanuatu's GDP, is to be expected, on average, once every 100 years. In Vanuatu, tropical cyclone losses are expected to be more frequent and severe than losses due to earthquake ground shaking and tsunami. 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.

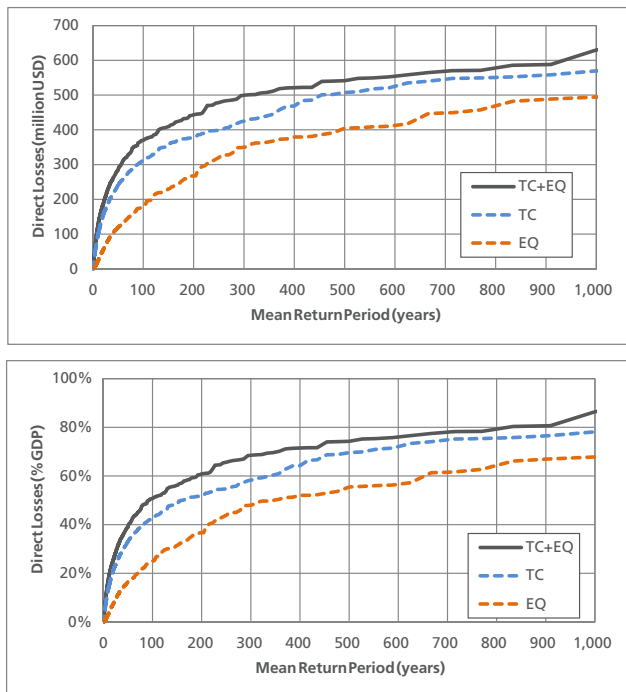


Figure 10: Direct losses caused by either tropical storms or earthquakes that are expected to be equaled or exceeded, on average, once in the time period indicated. Losses represented in absolute terms and normalized by GDP.

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 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 900 people in Vanuatu.** Events causing 2,000 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)	36.8	240.6	311.8	398.8
(% GDP)	5.0%	33.0%	42.8%	54.7%
Emergency Losses				
(Million USD)	8.5	55.3	71.7	91.7
(% of total government expenditures)	4.7%	30.9%	40.1%	51.3%
Casualties	41	260	333	415
Risk Profile: Earthquake and Tsunami				
Direct Losses				
(Million USD)	11.2	119.6	182.6	319.7
(% GDP)	1.5%	16.4%	25.0%	43.9%
Emergency Losses				
(Million USD)	0.0	19.2	29.3	51.7
(% of total government expenditures)	0.0%	10.8%	16.4%	28.9%
Casualties	45	471	877	1,627
Risk Profile: Tropical Cyclone, Earthquake, and Tsunami				
Direct Losses				
(Million USD)	47.9	284.9	370.1	478.5
(% GDP)	6.6%	39.1%	50.8%	65.6%
Emergency Losses				
(Million USD)	10.3	61.4	77.9	97.5
(% of total government expenditures)	5.7%	34.3%	43.6%	54.5%
Casualties	86	577	901	1,675

¹Casualties include fatalities and injuries.



Country Note

VANUATU

This note on Vanuatu 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.