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FINANCIAL PROTECTION AGAINST NATURAL DISASTERS

An Operational Framework for Disaster Risk Financing and Insurance



 Schweizerische Eidgenossenschaft
Confédération suisse
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Federal Department of Economic Affairs,
Education and Research EAER
State Secretariat for Economic Affairs SECO

FINANCIAL PROTECTION AGAINST NATURAL DISASTERS:

FROM PRODUCTS TO COMPREHENSIVE STRATEGIES

An Operational Framework for Disaster Risk Financing and Insurance



GFDRR



WORLD BANK GROUP



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Development / International Development Association or
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Acknowledgments

This report was originally written in response to a request by the United Nations Office for Disaster Risk Reduction (UNISDR), as the coordinating author of the Global Assessment Report on Disaster Risk Reduction 2015 (GAR15). The primary objective of this report is to take stock of the global progress on financial protection against natural disasters over the last decade and bring together the latest thinking on disaster risk financing and insurance. This discussion will contribute to the drafting of the GAR15 and, importantly, will help inform the deliberations for the successor agreement to the Hyogo Framework for Action, to be agreed upon at the 3rd World Conference on Disaster Risk Reduction in March 2015.

The report was authored by Olivier Mahul and Benedikt Signer, with contributions from Laura Boudreau in addition to Hannah Yi, Sevara Atamuratova, Daniel Clarke, and Emily White (all from the World Bank-GFDRR Disaster Risk Financing and Insurance Program).

The report benefitted greatly from the contributions and review of the Working Group on Financial Protection against Natural Disasters, bringing together representatives from the public and private sector with many years of experience in supporting countries vulnerable to natural disasters to implement financial protection solutions. The working group includes:

- Paolo Bazzuro, University Institute for Superior Studies Pavia
- Charlotte Benson, Asian Development Bank
- Tim Bishop, Organisation for Economic Co-operation and Development
- Rowan Douglas, Willis Re
- Juan Jose Durante, Inter-American Development Bank
- Nick Harvey, Department for International Development, United Kingdom
- Michael Roth, Munich Reinsurance Company
- Monica Rubiolo, State Secretariat for Economic Affairs of Switzerland (SECO)
- David Satterthwaite, Oxfam
- Michael Schwarz, Swiss Reinsurance Company
- Simon Young, Africa Risk Capacity

Inputs and reviews from Bianca Adam, Cinthya Aramayo, Sofia Bettencourt, Jack Campbell, Samantha Cook, Julie Dana, Marc Forni, Robert Reid, Benjamin Fox, Hector Ibarra, Felix Lung, Barry Maher, Niels Holm-Nielsen, Rachel Sberro, Joaquin Toro, Ana Maria Torres, and Jose Angel Villalobos greatly enhanced the final report. Megan Cossey's thorough editing ensured the final report remained readable. Design and Layout by Bivee LLC.

The report has been prepared under the overall guidance of Francis Ghesquiere, Manager of the Global Facility for Disaster Reduction and Recovery (GFDRR), and Michel Noel, Practice Manager, Global Practice Finance and Markets. The team gratefully acknowledges funding support from GFDRR.

The DRFIP is grateful to the Swiss State Secretariat for Economic Affairs (SECO) for support which enables deep engagements with selected middle-income countries around the world. This work has informed and shaped much of the operational framework presented in this document.



Policy Messages

1. *Disaster risk financing and insurance helps minimize the cost and optimize the timing of meeting post-disaster funding needs without compromising development goals, fiscal stability, or wellbeing.* It promotes comprehensive financial protection strategies to ensure that governments, homeowners, small and medium-sized enterprises, agricultural producers, and the most vulnerable populations can meet post-disaster funding needs as they arrive.
2. *Disaster risk financing and insurance is an integral part of disaster and climate risk management.* The financial impact of disasters is best managed when integrated into holistic risk management practices. It complements disaster risk management activities by securing adequate financial resources to cover residual risks that cannot be mitigated and by creating the right financial incentives to invest in risk reduction and prevention. By quantifying the financial and fiscal impact of risk, it elevates risk management within the ministries that control public investment.
3. *Financial protection requires strong leadership by a country's ministry of finance.* Disaster risk financing and insurance brings together disaster risk management, fiscal risk and budget management, public finance, private sector development, and social protection. Strong stewardship by the ministry of finance in coordination with other public agencies is crucial to successfully advance this agenda.
4. *The private sector is an essential partner.* The private sector can bring capital, technical expertise, and innovative financial solutions to better protect the government and society against natural disasters.
5. *Disaster risk financing and insurance is a long-term agenda that requires political will, technical expertise, and time.* While simple measures can quickly support improved financial protection, more complex financial solutions and institutional change require technical expertise and political will. Partnerships can support governments on this path.





PART

01



Section I: The Developmental and Financial Cost of Natural Disasters

When record floods inundated large swaths of Thailand, including its capital Bangkok, in the fall of 2011, total damage and loss amounted to THB 1.43 trillion (US\$46.5 billion¹), more than 13 percent of that year's gross domestic product (GDP). But the financial impact on the government continued long after the water finally receded. The floods were estimated to reduce real GDP growth in 2011 by 1.1 percent from pre-flood projections, reduced Thailand's current account to US\$11.9 billion from a projected \$20.6 billion, and caused a 3.7 percent loss in tax revenue from estimated pre-flood revenues (World Bank and Government of Thailand 2012).

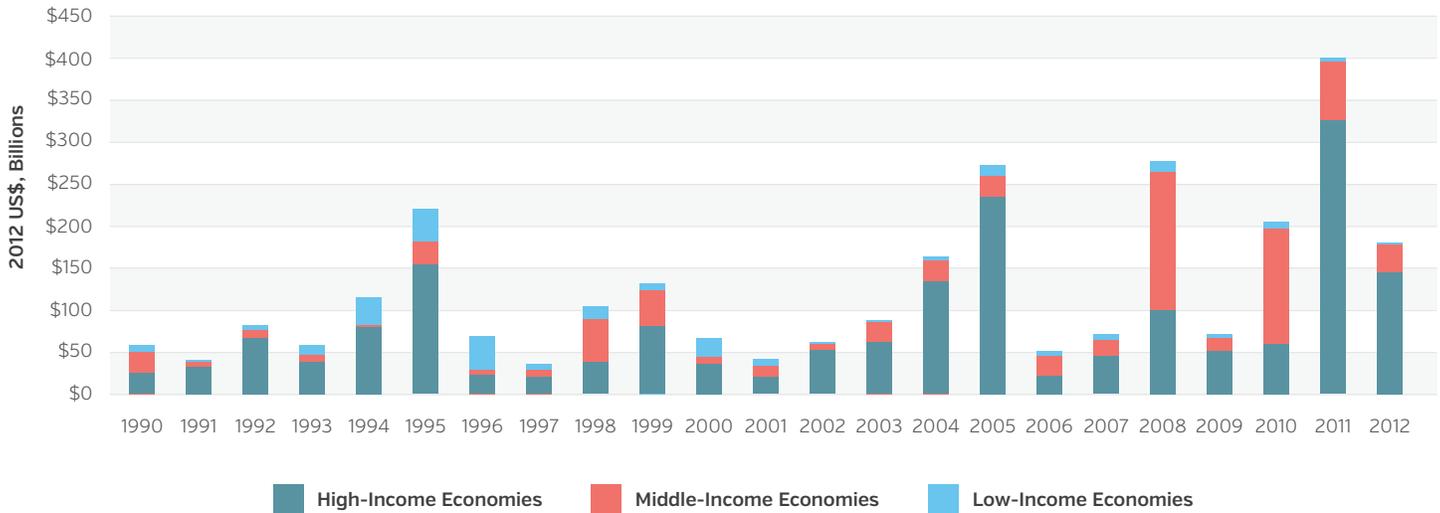
Financial losses from natural disasters continue to rise, with developing countries and their low-income populations feeling the greatest effects. Direct financial loss² reached an average of \$165 billion per year during the last 10 years, with loss exceeding \$100 billion in six of those years (see [Figure 1](#)). This compares to about \$130 billion of official development assistance in 2012. Yet the 2013

Global Assessment Report estimates that the actual losses are at least 50 percent higher, once smaller disasters are included (UNISDR 2013). The true impact of disasters is of course much higher still. These financial loss figures only account for direct loss, excluding indirect³ loss and the wider economic and human effects of disasters.

The trends in losses hide a wide range of impact. Events that are comparable in terms of physical parameters, total loss, or affected population, have a vastly different macroeconomic impact depending on a country's level of development, size (geographic and population), and degree of insurance penetration. The relative share of this loss occurring in middle-income countries has seen a steady upward trend over the past 30 years (in 2012 U.S. dollar; see [Figure 2](#)). The rapid growth of assets exposed to hazards in middle-income countries—for example through urbanization and new infrastructure—is likely responsible for much of this increase.

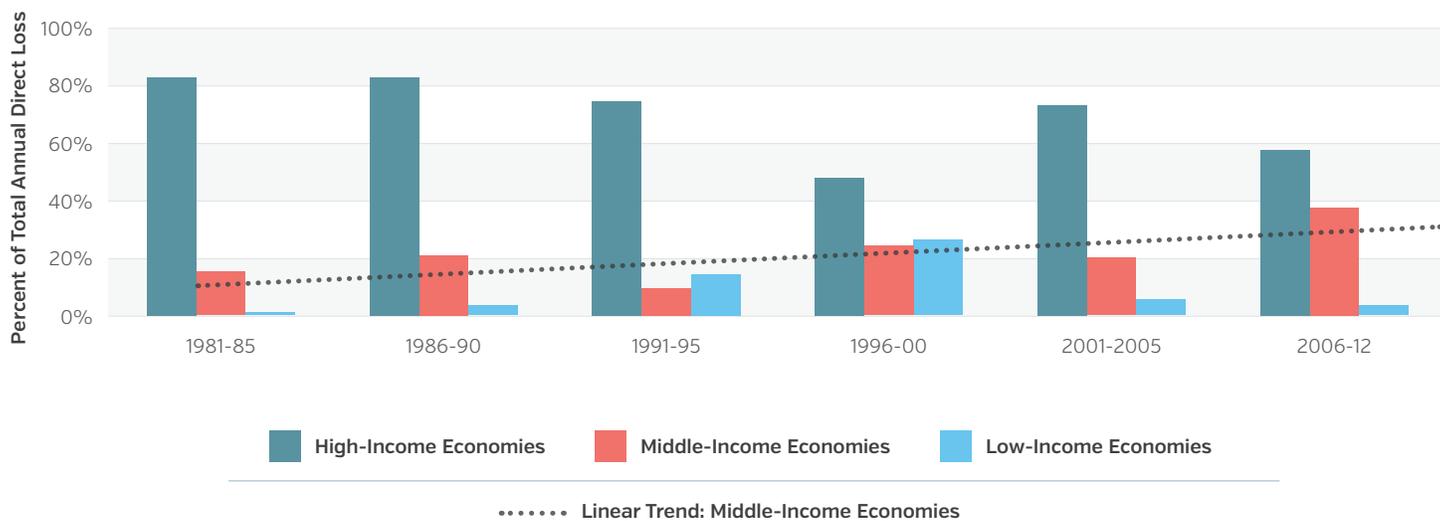


Figure 1 Direct disaster loss by income group



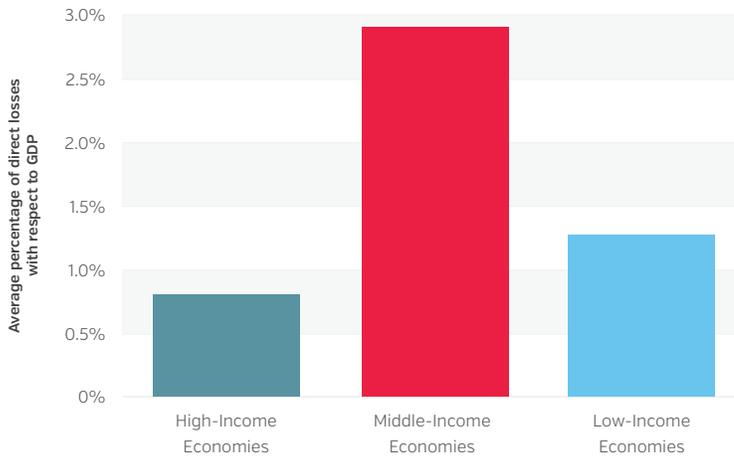
Source: Authors, with data from Swiss Reinsurance Corporation, country income groups according to World Bank definitions

Figure 2 Relative distributions of direct loss between high-, middle-, and low-income countries across time (as percent of total annual direct loss)



Source: Authors with data from Swiss Reinsurance Corporation

Figure 3 Distribution of direct losses (1980–2012) on country income groups as % of GDP



Note: Loss figures from MunichRe NatCat Service; county groups according to World Bank 2012 classification.

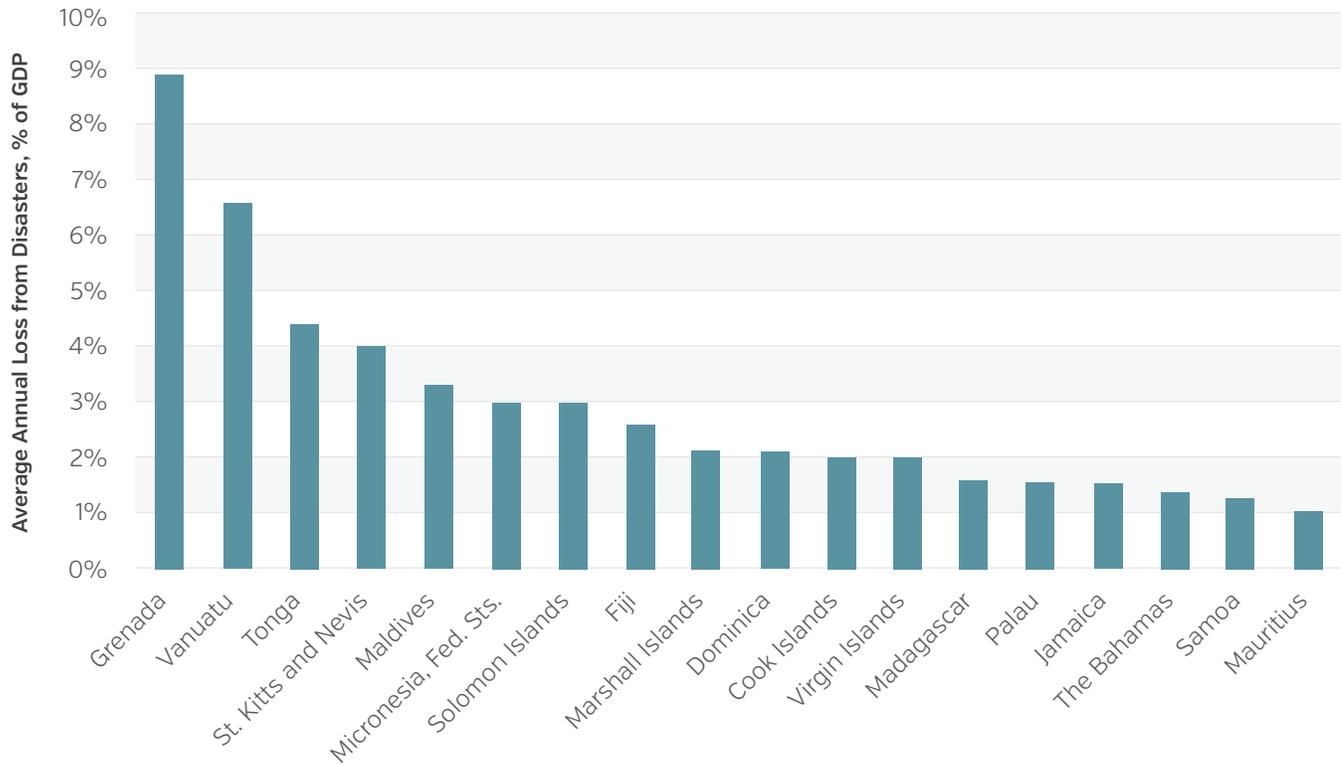
Source: MunichRe, 2013a

As a percentage of GDP, fast-growing middle-income countries suffer the most, with average annual direct loss at 2.9 percent of GDP, followed by low-income countries (1.3 percent of GDP) and high-income countries (0.8 percent of GDP) (Munich Re 2013; *see Figure 3*). Much of this trend is due to the rapid increase of assets in developing countries that do not take disaster risk into account during construction, leaving them vulnerable to natural hazards. Although average direct loss relative to GDP is less for low-income countries, this does not consider the most important impact—the loss of lives, livelihoods and negative effects on human capital.

The concentration of loss in small countries, and particularly in small island developing states, leads to even more severe macroeconomic effects. The



Figure 4 Average annual loss from disasters as percentage of GDP in small islands developing states



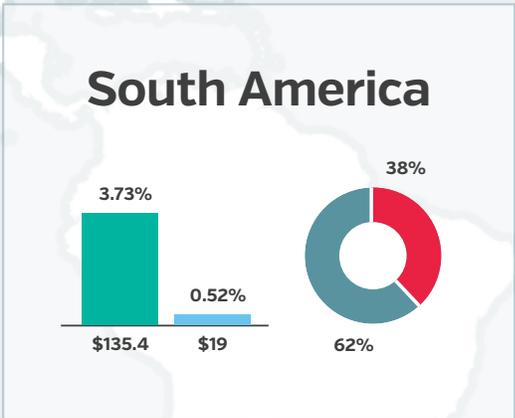
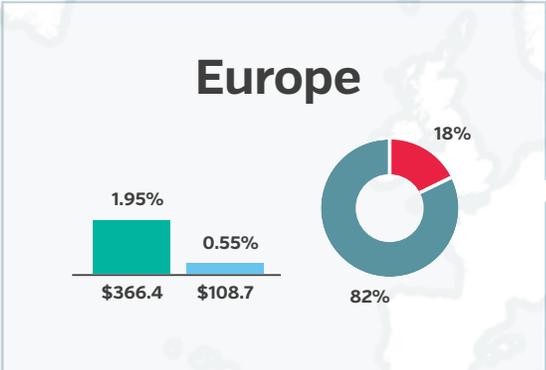
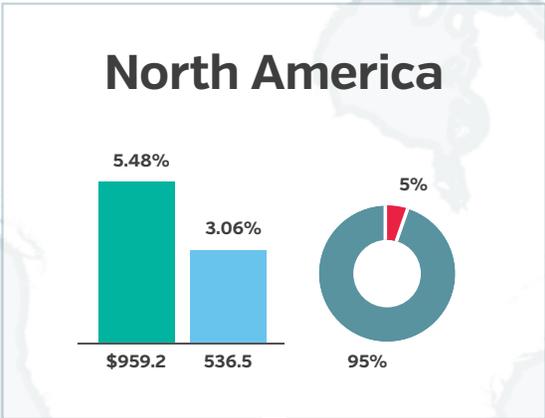
Source: Prepared by World Bank, based on historical disaster damage reported in the EM-DAT Disaster Database (www.emdat.be), and for Pacific Islands on modeled annual losses from cyclones, earthquakes and tsunamis.

devastation wrought by 2004's Hurricane Ivan in the Caribbean caused economic loss almost double the annual GDP of both Grenada and the Cayman Islands as well as significant damage in Jamaica, a stark reminder of the catastrophic devastation disasters can inflict (Young and Pearson 2008). Small island states across the Caribbean and Pacific bear average losses exceeding over 3 percent of their respective GDP every year (World Bank and United Nations 2010; Pacific Catastrophe Risk Assessment and Financing Initiative [PCRAFI] 2011; see Figure 4). Recent analysis has found that, on average, in a small country the occurrence of a major disaster reduces GDP growth by 1.2 percent, with a cumulative permanent⁴ loss of 3.7 percent of GDP

(von Peter, et al. 2012).⁵ This compares to an average for all countries of 0.8 percent decline in GDP growth per disaster occurrence and a cumulative, permanent loss of 2.4 percent, emphasizing the heightened vulnerability of these countries.

The Policy Maker's Burden: Financial Impact across Society

In mitigating the financial impact of disasters, experience shows that policy makers are primarily concerned with its effect on the government, homeowners and small and medium-sized enterprises (SMEs), farmers,⁶ and the poorest.⁷ This segmentation is largely the result of the type



Disaster Loss 1990-2012

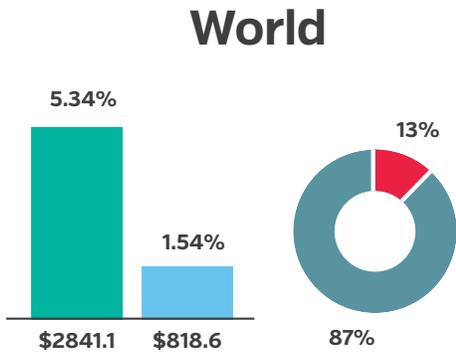
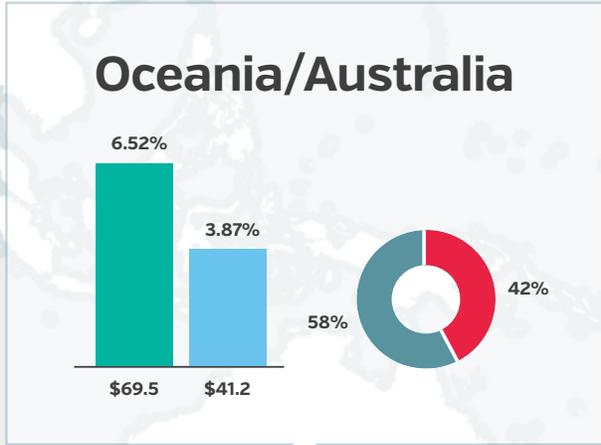
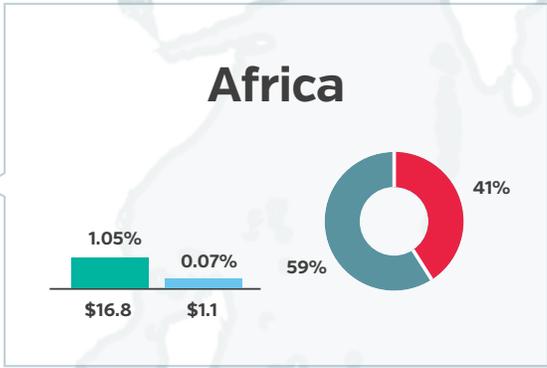
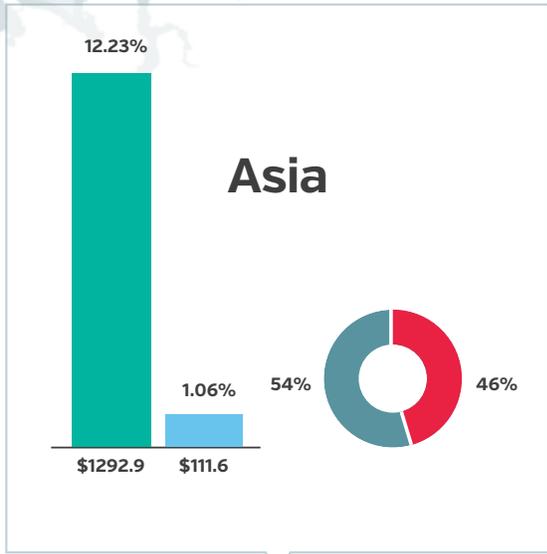
AS % OF 2010 GDP, BY CONTINENT

Percentage of 2010 GDP
in US\$ Billion

■ Total Losses
■ Insured Losses

Weather-Related Losses
by Percentage

■ Total Weather-Related Losses
■ Earthquake Losses



Central America and the Caribbean are included in South America.

All amounts in constant 2012 dollar.

Source for loss figures is SwissRe, total loss is the financial loss directly attributable to a disaster, but it does not include indirect losses. GDP data from World Bank. Underlying loss data in the annex.

of cost associated with a disaster—for example both homeowners and SMEs are concerned with building damage. *Table 1* summarizes some of the ways that natural disasters directly and indirectly affect the financial and developmental stability of these groups. These are then discussed in turn.

Direct financial impact on the government

The government's central role in natural disaster emergency relief, recovery, and reconstruction implies a large and direct financial burden. While this burden varies greatly across countries depending on the definition of the government's contingent liability to natural disasters,⁸ there are many universal features.

During and directly after an event, the government is required to provide emergency relief to the affected population. These costs tend to be small in terms of the event's overall costs, but require immediate mobilization of funds. Emergency relief for the 2011 Great East Japan Earthquake represented less than 1 percent of total government expenditures related to the event, but importantly was first mobilized within just three days (Sato and Boudreau, 2012). Such speed is essential for a successful government response.

Reconstruction of uninsured or underinsured public infrastructure—including low-income housing—typically accounts for the majority of public spending following disasters. In some cases, middle- and high-income residents and SMEs exert pressure for public support of reconstruction. The 1999 Marmara/Izmit Earthquake in Turkey generated fiscal costs in the range of \$2.4 to \$2.9 billion (2010 US\$), with the largest direct cost (estimated between \$970 million and \$1.6 billion) coming from the reconstruction and repair of housing stock, much of which was owned by middle- and high-income residents (World Bank 1999). While in many cases the government is not legally required

to provide this support, social and political pressure can make such support an implicit contingent liability. These types of contingent liabilities are often the most difficult for the government to assess and can pose major fiscal risk.

Even in years without exceptional disasters, costs can be significant. Between 1999 and 2011, the government of Mexico spent on average \$1.46 billion annually (2011 US\$) on the reconstruction of public assets like roads and bridges and low-income housing following more frequent but less severe disasters (Government of Mexico and World Bank 2012). In addition to replacement of the damaged assets, governments' should consider higher costs for improvement so they do not build back the risk. For example, about 25 percent of post-disaster resources approved by Mexico's natural disaster fund FONDEN are generally allocated for the improvement of public assets, to strengthen their resilience to future disasters.

Government-sponsored social and economic support programs for individuals, SMEs, and farmers can also be significant and even exceed the costs of reconstruction. This was the case in Japan after the 2011 earthquake, where economic and social support programs (such as employment programs, measures to support SMEs, housing grants, and education assistance) cost more than direct repair and reconstruction (Sato and Boudreau, 2012).

Finally, major natural disasters can trigger public contingent liabilities arising from state-owned enterprises and firms that are critical for economic recovery from the event. Following the 2011 Canterbury Earthquake, New Zealand's then second-largest residential insurer, AMI Insurance, found itself unable to meet the total value of claims resulting from the event. To ensure Canterbury's recovery, the government decided to bail out and subsequently resell AMI, as well as to take

Table 1 Direct and indirect financial impact of natural disasters on different groups across society

<h2>Government</h2> <p>Direct</p> <ul style="list-style-type: none"> • Emergency response and recovery expenditures; • Reconstruction expenditures for uninsured/underinsured public infrastructure, public buildings, and often low-income housing; • Costs for improvements of reconstructed infrastructure, as well as for relocation of at-risk population; • Expenditure on social and economic recovery support programs; • Realization of contingent liabilities to state-owned enterprises, to firms that are critical to economic recovery, etc. <p>Indirect</p> <ul style="list-style-type: none"> • Decreased tax revenue due to economic disruption and declines in GDP growth; • Opportunity cost of diverting funds from development and social programs to disaster response and reconstruction; • Increased domestic/international borrowing costs; • Potential negative impact on sovereign credit rating; • Increased expenditures for social support programs (safety nets); • Migration due to disaster impact (loss of livelihoods). 	<h2>Homeowners and SMEs</h2> <p>Direct</p> <ul style="list-style-type: none"> • Reconstruction costs due to damage of often uninsured or underinsured assets; • Health and other financial costs associated with human fatalities, injuries, and disabilities. <p>Indirect</p> <ul style="list-style-type: none"> • Loss of income/livelihood due to business interruption/unemployment or loss of wage earner; • Loss of income/livelihood due to economic decline; • Increased borrowing costs; • Additional expenses such as health care and paying for alternative accommodation during reconstruction.
<h2>Farmers</h2> <p>Direct</p> <ul style="list-style-type: none"> • Reconstruction costs for often uninsured or underinsured assets; • Restocking/replanting/rehabilitation of productive assets such as livestock or crops. <p>Indirect</p> <ul style="list-style-type: none"> • Loss of income for farmers and other supply chain actors due to interruption of crop/livestock/fish stock production; • Loss of income for farmers and other supply chain actors due to economic decline and/or lack of access to markets; • Increased borrowing costs; • Increased risk aversion to new and innovative investments, leading to adoption of low-yield but safer seed varieties. 	<h2>The Poorest</h2> <p>Direct</p> <ul style="list-style-type: none"> • Reconstruction costs for damaged assets; • Replacement of livestock. <p>Indirect</p> <ul style="list-style-type: none"> • Decreases in expenditure on food, accommodation, and human capital (possibly combined with higher costs for healthcare, education, etc); • Loss of social support due to breakdown in informal safety net systems such as family and community support; • Loss of income and unemployment; • Increased borrowing costs.

responsibility for all of its outstanding claims (Benson and Mahul 2013).

Indirect financial impact on the government

The macroeconomic costs of natural disasters, including the immediate decline in GDP growth and the cumulative, permanent GDP loss during the years following a major disaster, affect the government's budget. The 2011 floods in Thailand reduced government revenues in 2011 and 2012 by 3.6 percent and 2.8 percent, respectively, based on pre- and post-flood projections (World Bank and Government of Thailand 2012a). The impact on exports and imports of two droughts reduced government revenues in Malawi by 9 percent in fiscal year 1992/93 and by 11 percent in 1993/94. At the same time, public expenditure rose by 30 percent,⁹ resulting in an increase in the fiscal deficit of over 23 percent over these two years (Benson and Clay 2004).

Natural disasters can also escalate borrowing costs, especially for already highly indebted nations. For example, nearly all countries in the Caribbean are highly indebted, facing high borrowing costs from 6 to 8 percent for 10-year bonds. Natural disasters raise the costs of borrowing for affected

governments, increasing sovereign bond spreads by 1 to 2 percent on average for up to nine months following an event (World Bank 2012c).

Following Hurricane Ivan in 2004, Grenada had to approach its creditors for a voluntary restructuring of public debt, extending its debt service payments by 20 years and adding significantly to its overall cost of funds (ibid).

Financial impacts on the population often increase demand on pre-existing social programs, with a related increase in public spending on safety nets and other social programs such as unemployment benefits for those who lost their job. The 2010 earthquake in Chile caused a 3 percent (500,000 person) rise in the national poverty index to 19.4 percent (exacerbating an existing trend), and an increase in the number of people considered destitute by 80,000 to 700,000 (Muir-Wood 2011).

Together, the direct and indirect financial effects of disasters can seriously hurt public finances. The government's fiscal balance weakens as expenditures rise and the tax base shrinks, potentially generating or worsening fiscal deficits. The country's balance of payments deteriorates as exports decrease and imports increase. Finally, long-term development prospects suffer as the government diverts public

Photo Credit:
NASA/NOAA GOES Project
Hurricane Irene, 2011



funding from social and economic development programs to fill these gaps.

Direct financial impact on homeowners and SMEs

The middle class is projected to more than double globally from nearly 2 billion people today to 4.9 billion by 2030 (Kharas 2010). The middle class is an essential driver of countries' economic growth, and this group tends to have a significant portion of wealth invested in property—specifically the family home. In the United States, the primary residence represents on average at least 58 percent of a family's total assets for middle-class adults (Trawinski 2013).

A natural disaster shock to an uninsured middle class homeowner can thus easily destroy much of a family's wealth, up to nearly 60 percent in the United States. Disasters affecting a large, uninsured portion of a country's middle class can have a devastating social and economic impact on the country as a whole. Additionally, most homeowners go uninsured against natural disasters. In the United States, the National Flood Insurance Program provides highly subsidized rates for existing homes in flood prone areas.¹⁰ Yet the percentage of homeowners in Louisiana with flood insurance at the time of Hurricane Katrina ranged from only 7.3 percent to 57.7 percent in affected counties (Kunreuther and Pauly 2006). Loss due to direct damages to homes accounted for 69.1 percent of economic loss from Katrina (Property Casualty Insurers Association of America 2010).

The adverse effects of disasters on the middle class go far beyond the destruction of a family's home, however. SMEs—another key indicator of a thriving middle class—often go uninsured as well. In Chile, 70 percent of small businesses with property damages from the 2010 earthquake had no insurance, generating losses of up to \$500 million (2010 figures) that had to be shouldered by these SMEs. Indeed, the Organisation for Economic Co-operation and Development (OECD) observed that

the increased poverty rates in Chile, as discussed previously, were partly driven by the closure of small businesses following the earthquake (Muir-Wood 2011).

Indirect financial impact on homeowners and SMEs

Like the government, SMEs can suffer significant economic loss from the indirect effects of disaster, usually totaling more than their losses from direct damages. Interruptions to business can arise from direct damage to the business' property, or from damage to infrastructure or other business operations along the supply chain. Following the 1999 Marmara/Ismit earthquake in Turkey, for example, businesses in the affected area reported being unable to resume production operations for 35 days on average. In addition, these facilities did not return to operating at roughly pre-disaster capacity levels until 18 months after the earthquake (Munich Re 2013a). Business interruption decreases GDP growth, stalls recovery, and hurts the local economy.¹¹

Natural disasters can also cause significant reductions in household income and investment in human capital. A recent study found that average household incomes in the Philippines declined by 6.6 percent in the year following a typhoon across all households exposed to average typhoon wind speeds (Anttila-Hughes and Hsiang 2013).¹² The same study identified reductions in household spending and found particularly severe reductions in critical human capital investments such as education (13.3 percent) and health care (14.3 percent).

Direct financial impact on farmers

The agricultural sector is a socially and economically important sector in many countries, particularly in low-income countries. In many African countries for example, the agriculture sector is a key contributor to the overall economy. In addition to being important for the balance of trade due to import and export of crops it is also a critical provider

of employment.¹³ Agricultural producers, such as farmers, herders, and fishermen, are highly exposed to multiple, often systemic risks to production, including natural perils, crop and livestock diseases, and insect invasions. Brazilian farmers reported that regularly occurring risks—those occurring once every few years—resulted in an average production loss of 20-40 percent¹⁴ (Tüller, M, et. al. 2009). In Kenya, the overall effect of the 2008-2011 drought was estimated at \$12.1 billion,¹⁵ with the majority (72 percent) of the losses falling on individuals, households, or businesses that owned livestock.

Recent events, such as the 2010 drought in Russia reinforced the severe impact that large-scale natural disasters can have on agricultural production, even affecting global food prices. The damage to wheat crops in Russia was so severe that the prime minister banned exports to curtail rising domestic food prices. This in turn placed upward pressure on wheat prices abroad as Russia represented 17 percent of the global grain trade (New York Times 2010). Additionally, a summer-long drought that affected much of the United States in 2012 cost the country around \$20 billion in crop loss in that year alone (Munich Re, 2013).

Natural disasters also destroy public infrastructure and assets essential for agricultural production. The Great East Japan Earthquake, for example, destroyed 90 percent of fishing vessels (25,000 vessels in total) in the three most affected prefectures, which alone accounted for 10 percent of the country's annual production. Luckily for Japanese fishermen, insurance for fishing vessels and fisheries helped to cover the damages and loss (World Bank, unpublished working note). Most fishermen in developing countries are not so lucky; the 2004 Indian Ocean Tsunami destroyed over 111,000 fishing boats and generated over \$520 million in damages to fishermen in affected countries.¹⁶ The insurance industry, however, reported

little to no loss in this sector (Risk Management Solutions 2005).

Indirect financial impact on farmers

Similar to other economic sectors, farmers typically also suffer indirect losses. Disasters can prohibit access to markets, making it difficult for producers to sell their crops. They may also lower demand for products with a corresponding decrease in the earnings of producers.

In addition, a combination of factors, including the inherent riskiness of agricultural production, means that agricultural credit can be unavailable or carry high interest rates for smallholder farmers. The occurrence of a natural disaster may exacerbate these credit constraints by destroying output, subsequently increasing default rates and reducing lenders' willingness to lend. In Peru, the 1998 El Niño created microfinance loan repayment problems that lasted for years. In the north of the country, the increased risk of default associated with such El Niño events increased interest rates by approximately three percentage points (Collier and Skees 2012). Finally, the additional risks that comes with investing in high-yield farming practices (such as investing in improved fertilizer) are often too great for vulnerable households to bear, resulting in the adoption of lower-risk, yet low-yield farming practices.

Direct financial impact on the poorest

The poorest may own few physical assets, but what they do have is often highly exposed. People living in low-income communities tend to live in more hazardous locations, have fewer savings, and lack insurance protection compared to those in higher-income communities. In Katmandu, Nepal, almost 25 percent of houses in rapidly growing squatter settlements are located on steep slopes along the banks of three rivers. They regularly fall victim to flooding during the monsoon season. Storm water drains and sewage networks operate at only 40 percent of their capacity, the result of blockages



from accumulated debris and solid waste. Thus, in addition to physical damage, residents are also susceptible to water-borne diseases (Baker 2012).

Finally, while in absolute terms the damage to poor households may be small following a disaster, they are often the most devastating relative to income. Subsistence farmers can be hit particularly hard with the destruction of crops or death of livestock often resulting in the complete loss of livelihoods.

Indirect financial impact on the poorest

The less visible financial impact on the poorest is often the most detrimental and persistent. The poorest households suffer more financially and for longer periods of time than any other demographic. In the Philippines, income loss following a typhoon persists for years in low-income populations,

whereas higher-income populations recover fully much faster (Anttila-Hughes and Hsiang 2013). This long-term income loss also prolongs decreases in household expenditures, including on education and healthcare.

The extremely poor are also exposed to breakdowns in local social safety nets. Community-based risk sharing mechanisms are burgeoning in the developing world, with the poor increasingly able to participate in local groups that provide loans or grants to households that have been exposed to a shock. While these mechanisms perform well for idiosyncratic shocks (such as the death of a breadwinner), they often break down after a systemic shock from a natural disaster. Formal government-subsidized social safety nets may also struggle with increased demand during disasters if they lack the capacity to expand support.

Section II: Disaster Risk Financing and Insurance - Tools for Financial Protection

Governments can take steps to reduce the negative financial effects of disasters in a way that protects both people and assets. The World Bank and the Global Facility for Disaster Reduction and Recovery (GFDRR) have developed a framework that guides governments through a practical and comprehensive approach to disaster risk management.

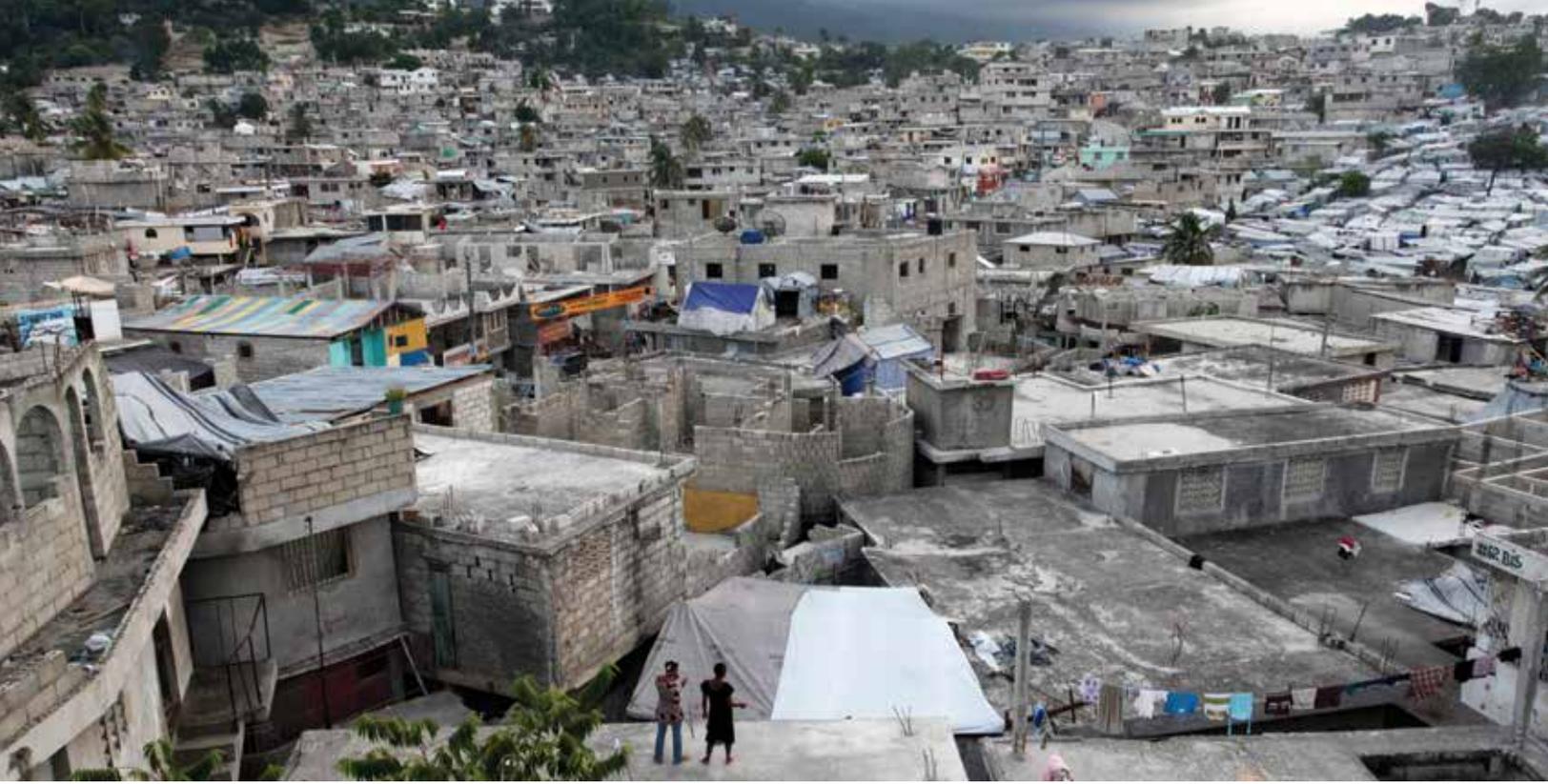
This disaster risk management framework brings together necessary actions for building resilience, including: risk identification; risk reduction; preparedness; financial protection; and planning for disaster recovery (See Figure 5). This framework is based on the fundamental principle of empowering citizens and governments to understand their risks and make informed choices about how best to address them.

To sustainably reduce the financial impact of disasters governments should always consider ways to reduce the underlying drivers of risk. Financial protection complements risk reduction by helping a government address residual risk, which is either not feasible or not cost effective to mitigate. Absent a sustainable risk financing strategy, as laid out under Pillar 4, a country with an otherwise robust disaster risk management approach can remain highly exposed to financial shocks, either to the government budget or to groups throughout society. Financial protection helps a government manage those shocks without compromising development progress, fiscal stability, and wellbeing.

Disaster risk financing and insurance can also help countries prepare for increased climate variability

Figure 5 World Bank-GFDRR Disaster Risk Management Framework





and extreme events associated with climate change. From a disaster risk financing perspective, while climate risks increase climate variability and uncertain extreme weather events, it does not fundamentally alter the underlying challenges. Just as financial protection is a critical component of any disaster risk management approach it also plays an important role in helping countries become more resilient to climate risks.

Definition and beneficiaries of disaster risk financing and insurance solutions

Historically, governments mostly addressed the financial effects of natural disasters on an ad-hoc basis following events. Countries are increasingly focusing on proactive planning before a disaster strikes, however. This began with a handful of industrialized countries, but is gradually being taken up by governments from around the world.

Disaster risk financing and insurance aims to increase the resilience of vulnerable countries against the financial impact of disasters. A

comprehensive strategy can secure access to post-disaster financing before an event strikes, ensuring rapid, cost-effective liquidity to finance recovery efforts.

Governments normally seek to strengthen the financial resilience of the four different groups identified using appropriate strategies for each. The main beneficiary groups of financial protection include national and local governments; homeowners and SMEs; farmers; and the poorest (see [Table 2](#)). The respective strategies include:

- *Sovereign disaster risk financing* aims to increase the capacity of national and subnational governments to provide immediate emergency funding as well as long-term funding for reconstruction and development. This policy area also works with governments to account for other contingent liabilities, such as government-supported agricultural insurance or social protection schemes that will require payouts following a disaster. Finally, it requires setting up systems for effectively allocating and disbursing the necessary funds.

Example: *Contingent credit* is a financial instrument that allows governments to secure funds in advance of a disaster to be available immediately in case of emergency. In 2008, the World Bank approved the first such loan, called a Catastrophe Deferred Drawdown Option (CAT-DDO). Contingent credit complements other instruments such as national reserves to finance high frequency, low severity events—for example Mexico’s natural disaster fund, called FONDEN—and catastrophe risk transfer solutions to finance low frequency, high severity events—such as sovereign insurance pools created by Caribbean and Pacific island states. To transfer risk to specialized risk carriers, the government of Colombia, for example, is building on international best practice in insuring public concessions for infrastructure worth \$38 billion.

- *Property catastrophe risk insurance* aims to protect homeowners and SMEs against loss arising from property damage.

Example: The Turkish Catastrophe Insurance Pool (TCIP), a public-private partnership between the government of Turkey and the domestic insurance industry, provides earthquake insurance to homeowners. TCIP increased catastrophe insurance coverage from less than 3 percent of residential buildings to 23 percent nationwide and over 40 percent in urban areas. Since its establishment in 2000, the TCIP has paid nearly 21,000 claims, totaling over \$70 million as of January 2014.

- *Agricultural insurance* aims to protect farmers, herders, and fishermen from loss arising from damage to their productive assets.

Example: The Indian government adopted risk financing and insurance principles to transition its National Crop Insurance Program from a social crop insurance scheme to a market-based

crop insurance program. As a result, farmers receive the claims payments much faster and have improved coverage of their assets.

- *Disaster-linked social protection* helps governments strengthen the resilience of the poorest and most vulnerable to the debilitating effects of natural disasters. It does this by applying insurance principles and tools to enable social protection programs such as social safety nets to scale up and scale out assistance to beneficiaries immediately following disaster shocks.

Example: The government of Ethiopia is integrating disaster risk contingency planning and financing into the Productive Safety Net Program, its food security safety net. Starting in 2006, the program began using disaster risk financing and insurance tools on a trial basis to expand its capacity during extreme events. A contingent financing window allowed Ethiopia to increase the number of beneficiaries of food assistance during the 2011 Horn of Africa drought from 6.5 to 9.6 million drought-affected people (World Bank 2013).

While a government may not need to pursue all four policy options, disaster risk financing and insurance strategies commonly build on some combination of them. Together, they help the government clarify, reduce, and manage its contingent liabilities to natural disasters.¹⁷ These options do so by using financial risk information to clarify the financial costs and benefits of disaster risk reduction, retention, and transfer; by enabling greater risk transfer to the private sector; and by providing strategies and tools for more responsible management of the remaining costs associated with natural disaster risk.

These interventions are not independent and can be aligned to bring about multiple wins. For example,

Table 2 Disaster risk financing and insurance policy areas and benefits

Sovereign Disaster Risk Financing

Beneficiaries: Governments

- Increases financial response and reconstruction capacity through improvements to:
 - Resource mobilization, allocation, and execution;
 - Insurance of public assets;
 - Social safety net financing.
- Smooth public expenditure across years by reducing the volatility of the cost of disasters, and hence protects the stability of public finances.
- Clarifies contingent liability arising through disaster exposure of public assets, the private sector and state-owned enterprises, and the poor.
- Provides incentives for investment in risk reduction.

Property Catastrophe Risk Insurance

Beneficiaries: Homeowners & SMEs

- Provides access to compensation for physical property damage and indirect losses arising from that damage.
- Increases awareness and understanding of financial vulnerability to natural disasters.
- Helps distribute risk and burden of recovery between public and private sectors.
- Can incentivize investment in risk reduction.

Agricultural Insurance

Beneficiaries: Farmers

- Provides access to compensation for production losses and damage to productive assets.
- Helps distribute risk and burden of recovery between public and private sectors.
- Increases awareness and understanding of financial vulnerability to agricultural risks.
- Can incentivize investment in risk reduction.
- Allows for the adoption of higher yielding – but riskier – farming methods.
- Increases access to financial services and markets for low-income households (insurance, banking, savings).

Disaster-Linked Social Protection

Beneficiaries: The Poorest

- Mitigates shocks by providing compensation for livelihood or asset losses through flexible social safety nets.
- Increases awareness and understanding of vulnerability to natural disasters.
- Can incentivize investment in risk reduction.
- Safeguards vulnerable people from falling into poverty.

if a government decides to establish a risk financing pool to retain some amount of agricultural risk—meaning this pool will cover certain pre-determined losses—this same entity could be used to absorb a layer of risk from a cash transfer program that will need to deliver significantly more payouts in case of a disaster. This allows the government to build on the initial investment in developing a risk financing entity for multiple uses.

The need for financial risk information and risk analysis to enable progress in disaster risk financing and insurance highlights a fifth, crosscutting policy area: financial disaster risk analytics. Financial risk analytics empowers governments to take more informed decisions by bridging the gap between raw risk data and information that is useful to policy makers. While this is not a type of disaster risk

financing per se, it is a prerequisite for effective use of disaster risk financing strategies and tools. Many governments have chosen to include improving the quality and availability of financial risk information and the adoption of financial risk analytical tools as policy objectives in their overall disaster risk financing and insurance strategies. For example, financial risk analytics helped policy makers in the Philippines to understand the all-important details when deciding between financial instruments for a sovereign risk transfer transaction. This helped the government identify the most appropriate and financially efficient strategies to fund disaster losses, based on the country's risk profile and political constraints faced (see also Clarke and Poulter 2014).

Disaster risk financing and insurance across policy fields

Disaster risk financing and insurance sits at the nexus of four major policy practices:

- Disaster risk management, in terms of how it contributes to building resilience;
- Public financial management, in terms of how it addresses the impact of shocks on public finances;
- Financial sector development, in terms of how it builds a strong financial sector for risk transfer; and
- Social protection, in terms of how it supports contingent financing to reach the poorest.

Thus, disaster risk financing and insurance strategies are best advanced when integrated into broader strategies in one or more of these fields. Indeed, strong public financial management of disaster risk is particularly important to support the execution of broader disaster risk management strategies. Specifically, disaster risk financing and insurance programs:

Figure 6 DRFI at the nexus of related fields

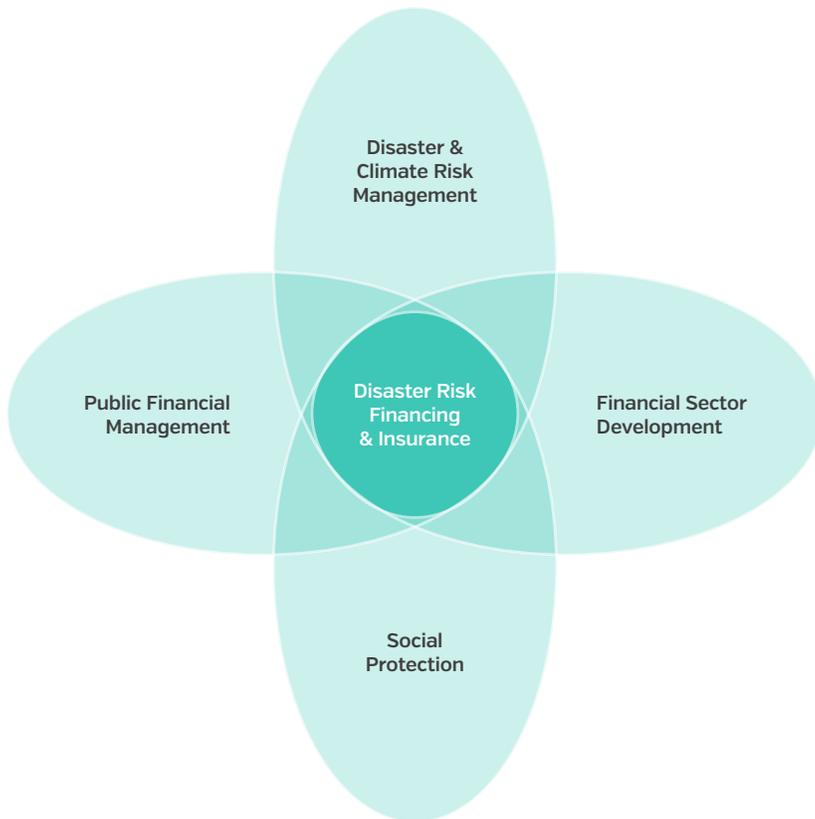


Figure 7 Five characteristics of cost-effective financial protection strategies that build resilience



- Brings about an awareness among financial authorities of the need to include disaster risk considerations in public investments;
- Puts a price tag on risk, clarifying the costs and benefits of investing in risk reduction, risk retention, and risk transfer initiatives; and
- Ensures that the government is financially prepared to enact a swift post-disaster response.

Characteristics that build financial resilience

Sovereign disaster risk financing benefits governments in many different ways. These include increased transparency and financial discipline, improved risk pricing through market signals, and greater access to capital at the time it is needed (Dana and von Dahlen 2014).

The World Bank has identified five characteristics that together build financial resilience across society which are improved through disaster risk financing and insurance. These characteristics are not outcomes of one specific project or intervention, but an integrated set of features which support each other towards strengthening financial resilience (see Figure 7; World Bank-GFDRR Disaster Risk Financing and Insurance Program Strategy 2015-2019).

Characteristic 1: Appropriate risk information.

Appropriate risk information allows public and private decision makers to assess the underlying price of risk, and clarify costs and benefits of investing in risk reduction or risk financing. A lack of knowledge about a country's exposure to risk—and about the 'cost' of this risk—can lead to sub-optimal investment decisions to protect welfare. Putting a price on risk is also crucial to elevate disaster risk management to the Ministry

of Finance and integrate risk considerations in public investments. Moreover, better information on the potential impact of disasters can help overcome behavioral biases, such as the reticence of businesses and households to buy catastrophe risk insurance. Disaster risk financing and insurance can also provide the short-term incentives for large scale investments in risk assessments that enable evidence-based decision making in disaster risk management beyond financial protection.

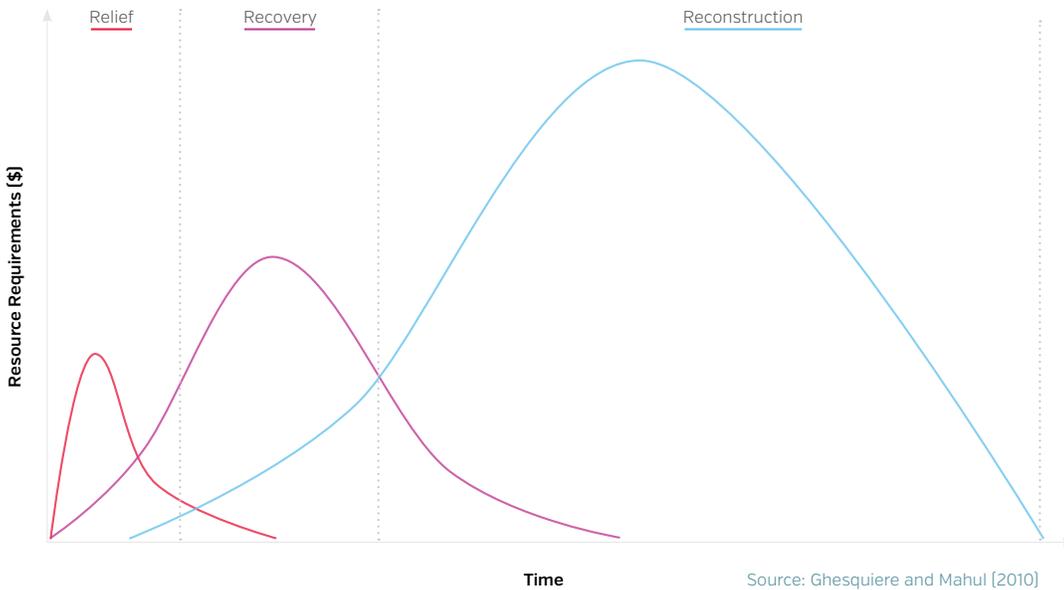
Characteristic 2: Ownership of risk. Clarifying who is responsible for risk—clearly establishing the contingent liability of the national and subnational government, donors, the private sector, and households—overcomes challenges such as the Samaritan’s Dilemma. The absence of clear rules regarding the share of costs for response and reconstruction assumed by the national government can turn into a disincentive for the businesses and households to invest in risk reduction or purchase catastrophe risk insurance, and can trigger delays in post-disaster response and recovery. Clearly established rules for the amount and timing of payouts under social protection programs give predictability to vulnerable households, enabling better planning and budgeting.

Characteristic 3: Cost of capital. Access to capital is necessary for effective emergency response and reconstruction as well as for investment in risk reduction and prevention. Yet different sources of money come with different costs. Disaster risk financing policies can secure access to disaster financing for governments, businesses and households before an event strikes and ensure timely and cost-effective financial resources to support post-disaster recovery and reconstruction activities while minimizing the cost of these funds through an optimal use of financial instruments such as reserves, contingent credit, risk transfer solutions, and post-disaster credit.

Characteristic 4: Timeliness of post-disaster financing. Different levels of post-disaster funds need to be available at the appropriate time following a disaster to cover relief, response, and reconstruction efforts. In the aftermath of a major disaster, for example, the government does not require money for the entire reconstruction program at once. The rapid mobilization of funds to support relief efforts is crucial to limit humanitarian costs. This rapid response can also save money; for example well-targeted early interventions in slow-onset disasters such as drought cost a fraction of emergency aid after a famine develops. While immediate liquidity is crucial to support relief and early recovery operations, the government has more time to mobilize the majority of resources for the reconstruction program. Likewise, businesses and households need to have access to timely financing following a disaster, for example through catastrophe risk insurance and/or post-disaster credit.

Characteristic 5: Discipline. Disaster risk financing helps governments, businesses, and households plan in advance of a disaster and agree ex ante on rules and processes for securing funds through their budget (budget mobilization) and spending this money (budget execution). This creates greater discipline, transparency, and accountability in post-disaster spending. Market-based financial mechanisms further contribute to this. For example, a government needs to have reliable and independent rules for payout in order to transfer risk to international financial markets; insured homeowners know precisely what they are eligible for through their contractual agreement with their insurer (insurance policy). Discipline is also important for a government to be able to credibly commit when it will not act and thus facilitate ownership of risk.

Figure 8 Timing of post-disaster funding needs



Key considerations for financial protection

A government can access many different sources of financing for post-disaster response and reconstruction. Some of these options can be mobilized by the government following a disaster, such as budget reallocations or credit. Others need to be established before a disaster hits, for example contingent credit lines or insurance. For some options the government mobilizes money at the sovereign level—including contingency funds—while other options transfer risk to international markets, like the use of reinsurance or catastrophe bonds.

These financing options all differ in terms of their cost of use, amount of money available when a disaster hits, and speed of access. Alternative instruments are not inherently better or worse,

they simply address different needs. For example, following a disaster a government could issue bonds or raise taxes in order to pay for reconstruction. Such measures provide access to very large sums of money but take a long time to become available. Insurance, on the other hand, can be much more expensive but can help governments manage the volatility of unplanned demands on budgets by spreading the cost of disaster across time. This presents governments with a trade-off in managing costs and risk.

To efficiently address the funding needs arising from disasters, a number of considerations are therefore important. First, understanding the timing of needs is essential. In the aftermath of a major disaster, the government will not require the money needed for the entire reconstruction program at once. While immediate liquidity is crucial to support relief and early recovery operations, the government has more

time to mobilize the majority of resources for the reconstruction program (see Figure 8). This has clear implications on the design of cost-effective, financial management of disasters.

A second consideration is the cost of different sources of money. Table 3 provides an indicative cost multiplier for different financial risk instruments. This multiplier is defined as the ratio between the cost of the financial product (such as the premium of an insurance product, or the expected net present value of a contingent debt facility) and the expected payout over its lifetime. A ratio of two indicates that the overall cost of the financial product is likely to be twice the amount of the expected payout made. These multipliers are only indicative and aim to illustrate the cost comparison of financial products. The speed at which funds can be obtained is also determined by the legal and administrative processes that drive their use (Ghesquiere and Mahul 2010).

For example, market-based risk transfer can be an effective but expensive proposition for governments that otherwise have access to sufficient sovereign financing. Yet, they can effectively reduce volatility of disaster impact on government accounts by spreading the cost over time, and therefore promote budget stability. In addition, the swiftness at which risk transfer instruments can provide liquidity without requiring access to credit makes them attractive to some governments. This is particularly the case for small states that generally do not have sufficient capacity to build reserves and are restricted in their access to credit due to already high debt ratios.

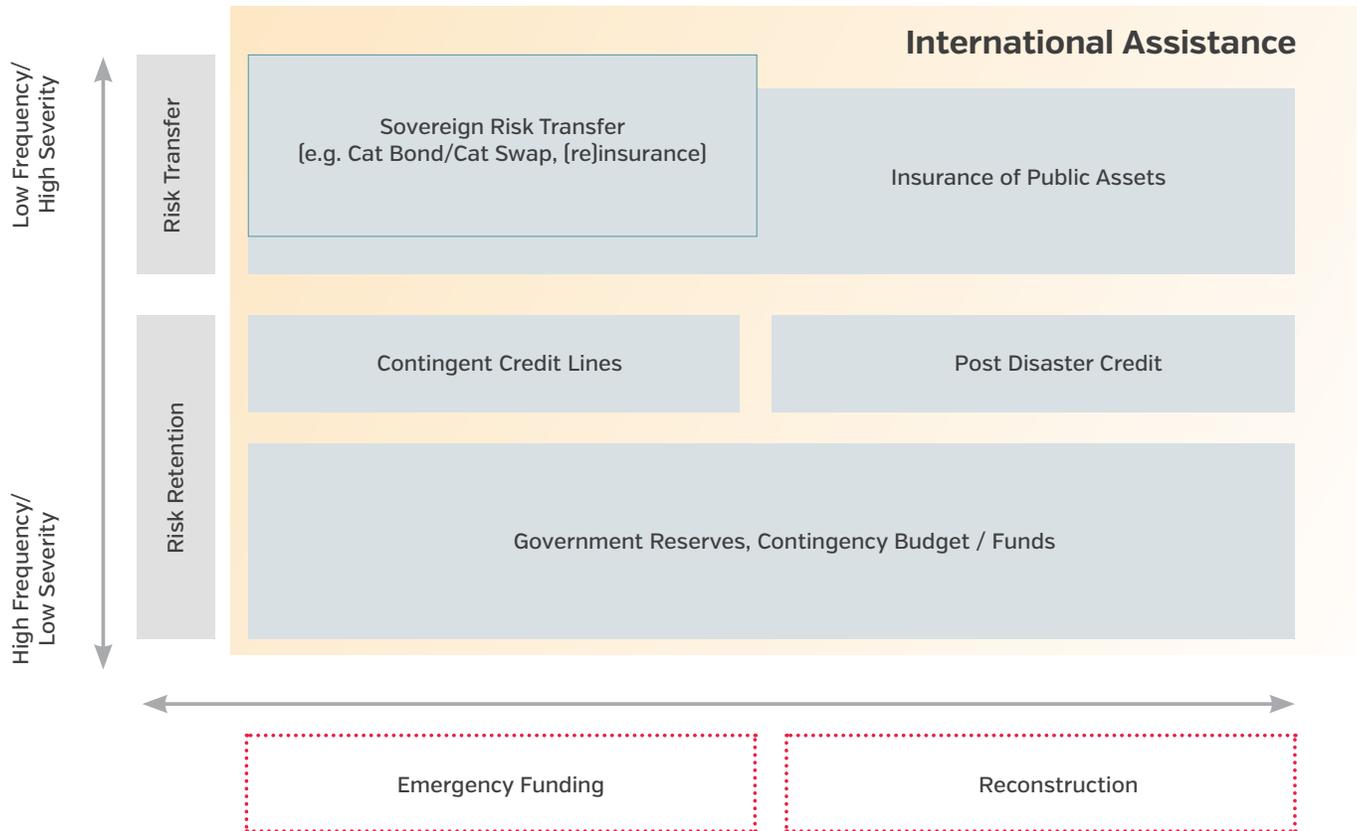
Taking these considerations into account, a government can combine different instruments to protect against events of different frequency and severity. Such risk layering ensures that cheaper sources of money are used first, with the most expensive instruments used only in exceptional circumstances. For example, insurance can provide

Table 3 Costs and benefits of different instruments for financing post-disaster expenditure

INSTRUMENTS	INDICATIVE COST (MULTIPLIER)	DISBURSEMENT (MONTHS)	AMOUNT OF FUNDS AVAILABLE
<i>EX-POST FINANCING</i>			
Donor support (humanitarian relief)	0-1	1-6	Uncertain
Donor support (recovery and reconstruction)	0-2	4-9	Uncertain
Budget reallocations	1-2	0-9	Small
Domestic credit (bond issue)	1-2	3-9	Medium
External credit (for example emergency loans, bond issue)	1-2	3-6	Large
<i>EX-ANTE FINANCING</i>			
Budget contingencies	1-2	0-2	Small
Reserves	1-2	0-1	Small
Contingent debt facility (for example CAT DDO)	1-2	0-1	Medium
Parametric insurance	1.5 and up	1-2	Large
Alternative Risk Transfer (for example CAT bonds, weather derivatives)	1.5 and up	1-2	Large
Traditional (indemnity-based) insurance	1.5 and up	2-6	Large

Source: Ghesquiere and Mahul (2010)

Figure 9 Three-tiered risk layering strategy for governments



Source: Authors, building on Ghesquiere and Mahul (2010)

cover against extreme events, but is not appropriate to protect against low intensity events that recur regularly. In such a case the government could consider setting up a dedicated contingency fund to retain this lowest layer of risk (see Figure 9).

A comprehensive financial protection strategy for the government generally brings together pre-and post-disaster financing instruments that address the evolving needs for funds—from emergency response to long-term reconstruction—and are

appropriate to the relative probability of events. For example, a government could decide to purchase more expensive risk transfer instruments—such as catastrophe bonds—to ensure immediate liquidity for emergency response to extreme events. But it will raise the much larger amounts needed for reconstruction through budget reallocations and from capital markets through bond issues.

Historically, many governments have relied on post-disaster (ex-post) funding sources. Governments

Box 1 Challenges and opportunities for public financial management of a successful disaster risk financing and insurance agenda

Section II detailed the financial strain that disasters place on governments' budgets. In principle, countries can take advantage of both pre- and post-disaster sources of financing for disasters, but the use of proactive financial protection instruments requires a certain level of experience for advance planning within the government.

Strong public financial management of natural disasters depends on the ministry of finance's capacity to develop financing solutions before a disaster hits. This requires strong public financial management experience and trained officials, including the ability to conduct complete fiscal forecasts that incorporate different disaster scenarios and that are then regularly monitored. This includes a comprehensive overview of the aggregate fiscal risk arising from various contingent liabilities, for example from natural disasters or from large state-guaranteed infrastructure projects. These elements for fiscal monitoring are, however, not found in most countries. An analysis of over 350 Public Expenditure and Financial Accountability (PEFA)¹⁹ assessments—international assessments reviewing the condition of national public financial management systems—show that most low- and middle-income countries either monitor the government's fiscal position only once a year, with a consolidated overview often missing or incomplete, or do not do any kind of regular monitoring at all.

Adopting a proactive risk financing approach also has multi-year budget implications. Multi-year forecasts for revenues, medium-term expenditure totals for mandatory expenditure, and potential debt financing would need to be in place. This medium-term budget framework is led by the ministry of finance, but requires other ministries to complete the budget plan with specific line items. Information from diagnostic tools such as the PEFA confirms, however, that most developing countries do not have good medium-term budget frameworks in place, which makes it more complicated to ensure that future expenditure is aligned with longer-term, strategic investment decisions.

While post-disaster financing mechanisms, such as increasing taxes and borrowing, do not require advance planning, they do rely on strong capacities in areas like tax administration and debt management. Here, too, evidence indicates that the challenges are significant. For example, increasing the tax burden in the wake of the kind of economic contraction often seen after a disaster can be almost impossible in countries without a well-organized system for defining tax policy and tax administration. Even where processes for budget mobilization are in place, officials may not be familiar with their use as they are only activated in exceptional circumstances.

Contribution by Monica Rubiolo, State Secretariat for Economic Affairs of Switzerland

can access these resources without previous financial arrangements that often require highly technical expertise and experience. However, even when such post-disaster arrangements are cheaper than pre-arranged financing sources, they can take a long time to negotiate (such as emergency loans), can be highly variable and unpredictable (like donor assistance), and can endanger development programs that often take many years of preparation (for example due to budget reallocation). On the other hand, risk financing instruments that the government establishes before a disaster hits (ex-ante) can avoid these drawbacks but they do require advanced planning, and can be more expensive and limited in their amount.

Nevertheless, promoting the use of private insurance in both the public and private sector is crucial to increasing financial resilience across society. Insuring public assets can help better manage the explicit contingent liability of governments and limit the volatility on government accounts. For example, some middle-income countries such as Colombia, Mexico, and Panama already require that public assets have property insurance coverage against natural disasters. Promoting competitive property insurance markets helps shift the burden of post-disaster recovery from households and SMEs to specialized risk carriers like insurance companies and contributes to increasing the economy's resilience. Governments can build an enabling environment for insurance markets and provide basic risk market infrastructure as public goods. This can include catastrophe risk assessments, supporting the growth and building the capacity of domestic insurers while supporting the sale of reliable, cost-efficient insurance products, as in the example of the South East Europe and Caucasus Catastrophe Risk Insurance Facility. This brings the additional benefit of building a deeper financial sector.



The essential role played by ministries of finance in disaster risk financing and insurance

In many countries, disaster risk management has traditionally been seen as an agenda belonging to specialized agencies such as the national disaster management agency, civil protection, or the ministry of environment. In this case the disaster risk financing and insurance agenda can be an entry point for the ministry of finance to engage in disaster risk management, which, in turn, can inform development that is resilient to disaster and climate risks through better integration of risk considerations in public investments.¹⁸

While risk financing cuts across different government agendas, successful disaster risk financing and insurance measures are almost always anchored in and driven by the country's ministry of finance. In a growing number of developing countries, the ministry of finance is adopting integrated approaches to risk management, including those addressing natural

hazards. Numerous countries, such as Colombia, Indonesia, Panama, and Peru, have established fiscal risk management divisions within the ministry of finance tasked with the identification, quantification, disclosure, and management of fiscal risks associated with natural disaster. These teams are often best placed for leading the disaster risk financing and insurance agenda, in partnership with other public entities for respective policy areas—for example, the ministry of agriculture for agricultural insurance programs or disaster risk management agencies for risk reduction and preparedness measures—as well as the private sector and the international community. (*Box 1* discusses some of the public financial management considerations that leadership by the ministry of finance can help overcome). Anchoring financial protection to disasters within the ministry of finance also supports comprehensive approaches to fiscal and debt risk management, and allows governments' to build on existing capacity in managing other contingent liabilities such as debt.

Even where dedicated risk management teams are not in place, the ministry of finance is typically best placed, and benefits the most from, implementing disaster risk financing. In this case other units within the ministry of finance, for example those dealing with budget management, asset and liability management, debt management, economic policy, or sometimes insurance divisions or insurance supervisors can make sensible homes for the agenda. Depending on the counterpart within the ministry of finance the focus of the disaster risk financing engagement is likely to differ.

The private sector's role in the disaster risk financing and insurance agenda

The private sector plays an essential role in the ongoing development of, and access to, disaster risk financing and insurance solutions. It does this primarily by providing capital and technical expertise, and by driving innovation. The private sector also plays a crucial role through public-private partnerships in insurance programs, for example in the delivery of payouts to beneficiaries as well as in the education of consumers.

Providers of risk capital

As a provider of risk capital, the private sector (including insurers, reinsurers, banks, and investors) is a crucial risk bearer. To guard against insolvencies from larger-than-expected losses—and to comply with regulatory requirements that maintain the financial stability of the industry—insurance companies must have sufficient capital. Capital in the reinsurance market alone is estimated at over \$500 billion.²⁰

In addition, convergence between insurance and reinsurance markets and capital markets through the emergence of alternative risk transfer solutions (such as catastrophe bonds and catastrophe swaps) has allowed the pool of catastrophe risk-bearing capital to increase flexibly over the past decade. For example, investors such as pension funds who typically would not have interacted with the world of catastrophe risk have had the opportunity to put their capital to work in instruments such as catastrophe bonds. Risk takers such as insurance and reinsurance companies have been able to increase their capacity to underwrite risk by passing excess risk on to new capital sources.



Box 2 Global Index Insurance Facility

Established in 2009, the Global Index Insurance Facility (GIIF) is a multi-donor trust fund, jointly operated by the IFC and the World Bank, supporting the development and growth of local markets for weather and disaster index-based insurance in developing countries, primarily Sub-Saharan Africa, Latin America and the Caribbean and Asia Pacific. GIIF's implementing partners have issued more than 600,000 policies to cover farmers, pastoralists and micro-entrepreneurs with US\$119 million in sums insured and reached over one million with information and access to index insurance. GIIF's objective is to expand the use of index insurance as a risk management tool in agriculture, food security, disaster risk reduction and access to finance.

Index insurance is a relatively new but innovative approach to insurance provision that pays out benefits on the basis of a pre-determined index (e.g. rainfall level, seismic activity, livestock mortality rates) for loss of assets and investments, primarily working capital, resulting from weather and catastrophic events, without requiring the traditional services of insurance claims assessors. It also allows for the claims settlement process to be quicker and more objective.

Source: <http://www.ifc.org/GIIF>

The availability of risk-bearing capital in the insurance and capital markets has allowed a number of developing country governments to transfer excess risk to private sector risk carriers such as international reinsurance companies. Furthermore, this pool of capital has shored up domestic insurance markets in developing countries by allowing accumulated catastrophe risk to be passed out of the country and into the international markets. It is notable, for example, that an estimated 95 percent of the \$8 billion of insured loss incurred in the aftermath of the devastating 2010 Chilean earthquake was passed out of the domestic market and onto international reinsurers.²¹

Access to international reinsurance can support the sustainable growth of a domestic insurance market.

Within domestic markets, private sector entities that provide risk-bearing capital help individuals, businesses, and the government manage shocks. At the business and household level, a developed domestic insurance market for property catastrophe risk can speed household and business recovery through provision of rapid financial liquidity following an event; use premiums to signal risk and promote risk reduction; and reduce the burden on the fiscal budget in the aftermath of a disaster by reducing the need for state compensation of businesses and individuals.

Providers of technical expertise and innovation

The private insurance sector also offers extensive technical expertise in quantifying and managing risk accumulations—the total combined risks that could be involved in a single loss event, designing products, underwriting catastrophe exposure, and settling claims. Drawing on this expertise can help overcome the challenges that impede the development of catastrophe insurance markets in developing countries. These challenges include a lack of data and trained people, the high cost of offering products, and a generally low level of awareness and understanding of catastrophe risk exposure. Private sector insurance companies and banks can improve catastrophe risk modeling, the collection of data on the cost of extreme events, and the promotion of risk awareness through educational programs. The Global Index Insurance Facility is one example of how the World Bank helps bring this private sector expertise to developing countries (Box 2).

Developed country insurance and reinsurance companies can transfer established tools, products, and methodologies to developing country insurance markets as a way to support their growth. For example, in 2009 the World Bank-supported

South-East Europe and the Caucasus Risk Insurance Facility resulted in the establishment of a specialized regional reinsurer, Europa Reinsurance Facility (Europa Re). The initiative is working to build a sustainable mass market for standardized catastrophe risk insurance products in participating countries in South-East Europe. It does this by offering options for reinsurance, standardized products, and web-based tools for underwriting and accumulation management through Europa Re. The facility is using expertise from private

sector insurance companies to develop the catastrophe risk models, underwriting platform, and design insurance products to stimulate market development.

Finally, the private sector has proven its ability to innovate to overcome market development challenges. This led to the design of new products and tools increasing the efficiency of product offerings and access to coverage for previously excluded groups.



Box 3 Examples of technical contributions from the private sector

Quantification of risk

Although catastrophe risk modelling has been undertaken in the academic, public, and private spheres, it is the private sector that has driven this discipline forward the most. High resolution probabilistic catastrophe risk modelling [detailed computer simulations to quantify loss that could be sustained from a particular disaster] was first developed in response to the needs of the private insurance industry, for pricing and accumulation management.²² These sophisticated modelling tools are now being used in less developed insurance markets around the world, and the improved understanding of risk they enable also informs disaster risk management beyond financial protection.

Risk-based pricing

One way the insurance industry has managed its catastrophe risk exposure is through risk-based pricing. Insurance companies calculate premiums on the basis of modelled expected loss. The cost of cover then serves as a signal of the risk customers are exposed to and provides an economic incentive to minimize this risk. This could include investing in disaster resistant construction and retrofitting, and settling outside of risk prone areas.

Introducing technical and transparency standards

Cooperation with the private sector can play an important role in instilling and strengthening technical and transparency standards in public financial management. To access insurance, governments need a solid damage assessment methodology and transparent handling of payouts. Through adopting terms and conditions based on international standards for the insurance contracts themselves, governments can also bring international best practice to domestic insurance markets. In Colombia, the government uses standardized terms and conditions from international insurance market best practices to purchase catastrophe insurance for its public buildings. The government of Mexico has in place an indemnity-based excess-of-loss insurance contract since 2011. In order to place the contract with the private markets, it was necessary for the government to develop transparent and robust processes for loss reporting. Such improvements will have applications well beyond the contract itself.²³

Product expansion

The private sector led the development of risk-transfer products that trigger—meaning they pay-out—based on predetermined parameters such as wind speed instead of loss estimates. The development of these parametric products has increased access to insurance to areas and consumers that could not have been reached effectively using a traditional claims-based model of insurance provision.

For example, the first weather insurance product in India, and indeed in the developing world, was a rainfall insurance contract underwritten and designed in 2003 by ICICI-Lombard General Insurance Company for groundnut and castor farmers (Clarke, et al., 2012). This pilot, supported by technical assistance from the World Bank, spurred rainfall insurance product offerings from other insurers, such as IFFCO-Tokio and the public insurer Agriculture Insurance Company of India, leading to a high rate of growth in the number of farmers insured between 2003 and 2007. As a result of this private sector-led pilot, the government of India launched a pilot of the Weather-Based Crop Insurance Scheme in 2007, now a largely compulsory, publicly-subsidized program that insures more than 10 million farmers for a range of crops. While the private sector plays a key role in the design of new products, experience has shown that the public sector is needed to reach the critical mass required to sustainably scale up such products and initiatives and hence encourage innovation by the private companies.

Similar innovations also supported sovereign risk transfer via parametric products for developing country governments. Sovereign risk transfer initiatives that have used parametric products include: the catastrophe bonds issued by the government of Mexico in 2006, 2009, and 2012 for earthquake and hurricane risk; the first-ever multi-country regional risk pool, established in 2007 as the Caribbean Catastrophe Risk Insurance Facility; the Pacific Catastrophe Risk Insurance Pilot in 2013; and the African Risk Capacity in 2014. Private sector partnerships can also unlock new delivery channels, for example by making agricultural insurance products available to farmers as a bundle with seed purchases.

Section III: Evaluation of Progress Made on Financial Protection

Governments have used public policy to mitigate the financial impacts of disasters for nearly a century. The U.S. Federal Crop Insurance Program was established in the 1930s to support farmers suffering from the combined effects of the Great Depression and the Dust Bowl, one of the worst ecological disasters in American history. Japan's Earthquake Reinsurance Scheme dates back to 1966. Governments established these and similar programs in recognition of the need for public financial support to better protect residents, SMEs, and agricultural producers against the economic impact of natural disasters and agricultural risk.

Initially, this kind of public policy was mostly limited to industrialized countries. But over the past two decades, interest in financial protection has surged around the world, receiving greater attention from developing country governments, the private sector, donors, and international organizations. As a result, over the past decade, developing countries have started to catch up—and even get ahead—in developing and implementing public policy for financial protection, mostly through learning-by-doing and with support from international partners.

This path, however, has not been linear. Progress often took place in steps and spurts of activities as countries experimented with new tools and approaches. Advances in different areas of disaster risk financing have often taken place at the same time in different countries as governments were looking to address their unique challenges, from their own starting point. For example, some countries began by looking to develop strong domestic insurance markets to absorb disaster risk, while others focused on protecting their budget

against disaster shocks or on increasing post-disaster liquidity.

But patterns have emerged in the kinds of challenges that countries encountered while innovation has taken place in waves, pushing the boundaries of disaster risk financing and insurance. This section provides a broad overview of progress and evolution in disaster risk financing in developing countries since the beginning of the millennium, when an increasing awareness of proactive financial protection against devastating natural disasters had started to take hold.²⁴ Too much has happened to capture here comprehensively, but key developments will highlight the lessons learned from this period (*see Figure 10* on the following page). Building on these lessons, this paper then presents an operational framework for financial protection.

Beginnings to 2005: Early experience in disaster risk financing at the international level

At the beginning of the 21st century, most governments relied primarily on ad-hoc financing secured after an event to respond to natural disasters. The limited public sector experience in disaster risk financing and insurance remained mainly confined to industrialized countries. Historically, the establishment of publicly-supported catastrophe and agricultural insurance programs followed in the wake of major natural disasters.

In 1966, the Japanese government established a public-private earthquake insurance program for homeowners. The scheme relied on the Japan Earthquake Reinsurance Company, an earthquake reinsurance pool backed by the government. In the

United States the government has been providing federally-administered residential flood insurance through the National Flood Insurance Program, set up in 1968 in response to a long history of flood loss and increasing challenges in finding private sector firms willing to insure flood risk. Similarly the California state government established the California Earthquake Authority as a public-private organization to provide earthquake insurance when California's insurance companies stopped writing earthquake coverage following the 1994 Northridge earthquake, the costliest earthquake in the history of the United States (OECD, 2013). In France, the Catastrophes Naturelles insurance system was established in 1982 to mitigate the effect of disasters on the local or national economy through insurance and by providing incentives for risk reduction and avoidance measures (Government of Mexico and World Bank, 2012).

For most developing countries, however, these types of policy options were neither available nor feasible. Underdeveloped insurance markets, low technical and financial capacity of governments, and a longstanding culture in many countries of dealing with disasters mainly as a humanitarian issue meant that financial management remained mostly impromptu. Governments often relied on limited and uncertain means such as disaster funds, budget reallocation, and on donor assistance. Yet in many countries with recurrent disasters donors have been unwilling to contribute to a pooled disaster fund when they did not trust the existing operational and fiduciary procedures. The role of the ministry of finance was confined to approval of expenditures and identification and mobilization of funding sources after an event.

Early adopters came mostly from upper middle-income countries where major natural disasters initiated change. For example, the 1985 Mexico City earthquake, which caused over 10,000 deaths, sparked a national dialogue on disaster risk

management that eventually led to the government establishing the Natural Disaster Fund (FONDEN) in 1996 as a mechanism to support post-disaster reconstruction of damaged public infrastructure. Since then, FONDEN has evolved into an inter-institutional vehicle that finances and plays a central role in all stages of the disaster risk management cycle. Similarly, following the 1999 Marmara earthquake, the Turkish government established the Turkish Catastrophe Insurance Pool as a compulsory earthquake insurance system for all residential buildings located on registered land in urban areas.

With few exceptions, agricultural insurance programs were in their infancy or performing poorly across developing countries. Following a period from 1950 onwards that saw major growth in public sector multi-peril crop insurance programs that ended up performing poorly, developing countries began to shift from public to market-based programs in the 1990s, often promoted under public-private partnerships (Mahul and Stutley, 2010). The most important changes in this new wave of catastrophe and agricultural insurance programs came about in the role played by the private sector. Newer models were often built around public-private partnerships, which take advantage of private sector insurance companies' established financial and technical capacity. This development was in part due to significant strides in the private sector's ability to quantify, price, and manage catastrophe risk, increasing its willingness to carry such risk.²⁵

The increased ability to analyze infrequent events and understand the uncertainty in that analysis led to a significant dampening in global reinsurance prices and enabled new risk transfer products. Nonetheless, many agricultural insurance pilots done by the private sector—usually implemented with support from donor partners and mainly for index-based crop insurance—still failed to scale up sustainably.

	1999	2000	2001	2002	2003	2004	2005	2006
Sovereign Disaster Risk Financing & Insurance	◀ 1996 Mexican Fund for Natural Disasters (FONDEN)							Mexico first-ever sovereign catastrophe bond (\$160 million)
Agricultural Insurance					India's first weather index insurance pilot by ICIC-Lombard General Insurance Co.			Mongolia index-based Livestock Insurance Program
Property Catastrophe Risk Insurance		Turkish Catastrophe Insurance Pool (TCIP)	Taiwan Residential Earthquake Insurance Program		Indonesian Earthquake Reinsurance Pool (MAIPARK) established			
Disaster-Linked Social Protection								
International Dialogue	UN Office for Disaster Risk Reduction (UNISDR) established							Hyogo Framework for Action I Munich Climate Insurance Initiative by Munich re-established

Figure 10 Historical evolution of disaster risk financing and insurance in developing countries since 2000²⁷

	2007	2008	2009	2010	2011	2012	2013	2014
	Caribbean Catastrophe Risk Insurance Facility (CCRIF)	World Bank launches contingent credit product for natural disasters Loan with a Catastrophe Deferred Drawdown Option - Cat DDO) Malawi index-based weather derivative Pacific Catastrophe Risk Assessment and Financing Initiative			Mexico indemnity-based excess-of-loss insurance for public assets	IDB launches contingent credit product for natural disasters	Pacific Catastrophe Risk Insurance Pilot JICA launches contingent credit product for natural disasters (SECURE) Weather derivative with Uruguay, intermediated by World Bank	Central American countries join CCRIF African Risk Capacity sells first policies for sovereign drought risk insurance
	India large-scale Weather-Based Crop Insurance Scheme		Launch of Global Index Insurance Facility by the World Bank, IFC, and private Sector Partners	Kenya and Ethiopia index-based livestock insurance	Vietnam agricultural insurance pilot Modified Area Yield Crop Insurance Scheme in India			Kenya crop and livestock insurance public-private partnership under development
		Romanian Catastrophe Insurance Scheme	Indonesia flood micro-insurance Manizales, Colombia earthquake property insurance		Micro-insurance Catastrophe Risk Organization (MICRO) established Philippines CLIMBS micro-insurance			South East Europe and Caucasus Catastrophe Risk Insurance Facility
	First disaster-linked contingent financing protection for Productive Safety Net Program (PSNP) in Ethiopia		HARITA pilot in Ethiopia with "insurance for work" option for farmers		HARITA in Ethiopia expands to R4, building on PSNP infrastructure			
	Global Facility for Disaster Reduction and Recovery established	AOSIS proposes "Multi-Window Mechanism to Address Loss and Damage from Climate Change Impacts"			World Economic Forum publishes report "A Vision for Managing Natural Disaster Risk"	Sendai Dialogue G20 adopts DRFI on agenda OECD/G20 Methodological Framework	Political Champions Group for Resilience Insurance Initiative set up by major develop partners and donors	World Development Report 2014 stresses role of DRFI

Mongolia is a notable example of successful activity in a low-income country during this time.²⁶ A combination of droughts and severe winters between 1999 and 2002 led to a loss of 35 percent of the country's total livestock. In the face of a significant negative impact on GDP and economic growth the government set up a public-private partnership with domestic insurance companies to provide affordable index-based livestock insurance to herders (Cummins and Mahul, 2009). As of 2014, the program covers approximately 16 percent of herders nationwide (19,500 herders out of approximately 120,000 herders), and has successfully scaled up from three pilot provinces to cover the entire country, reducing the impact of livestock mortality on herders' livelihoods, and providing the government with a vehicle to transfer part of its fiscal exposure to international reinsurance markets.

Challenges and lessons

During this period policy makers in developing countries began to recognize the benefits of proactive planning for the financial management of disasters. Early signs of success showed that setting up financial protection measures could help developing countries better manage the financial impact of natural disasters. The international

community began to support financial protection measures before disasters hit and at the same time the 2005 Hyogo Framework for Action (HFA) went into effect, promoting more proactive disaster risk management.

2005-2010: New approaches to financial protection under the Hyogo Framework

The Hyogo Framework for Action provided greater clarity and a holistic structure for putting into place disaster risk management measures by countries, donors, and international partners. While it did not emphasize financial protection as a priority action for governments, it took note of the growing realization of the need for disaster risk financing (*see Box 4*). Overall, the HFA provided an opportunity to encourage greater innovation in disaster risk financing and insurance within the framework of new approaches to disaster risk management.

New kinds of financial instruments to help address common problems in risk financing resulted in a string of market-based products for developing countries, including parametric catastrophe bonds and weather derivatives for national governments; disaster-dedicated contingent credit; and regional

Box 4 Disaster risk financing in the Hyogo Framework for Action

The Hyogo Framework for Action recognized a role for risk transfer and the need for some sort of financial tool or reserve to support effective response and recovery. HFA's Priority for Action #4 alludes to financial risk transfer as an important step to reducing underlying disaster risk factors. Paragraph 19 (k) calls for promoting "the development of financial risk-sharing mechanisms, particularly insurance and reinsurance against disasters."

The framework also states the need to set up "financial reserves and contingency mechanisms ... to support effective response and recovery when required." Disaster risk financing as a proactive agenda to manage and reduce financial risks is, however, not reflected in the monitoring questions for reducing the underlying risk factors.

The HFA did not explicitly discuss disaster risk financing as a priority agenda for governments, nor was it recognized as a core component of the disaster risk management agenda. At the time the framework was drafted, disaster risk financing was still not very well understood nor viewed as a priority. Countries, the international community, and others involved in thinking about financial protection were only just beginning to realize the extent to which it is a fundamental component of comprehensive disaster risk management.

Box 5 Regional risk pooling for Caribbean States

Caribbean countries have been at the forefront of developing new risk transfer tools to address some of the natural hazards they face, including hurricanes and earthquakes. The region has historically faced numerous challenges in absorbing the financial impact of natural disasters in the traditional insurance marketplace, including a limited ability to diversify risk, limited budgetary capacity, insufficient vulnerability reduction measures, limited reserves of domestic insurance capital, high insurance costs, and issues with underinsurance (existing but inadequate insurance coverage by policy holders).

In 2007, 16 Caribbean island countries came together to form a regional risk insurance pool, the Caribbean Catastrophe Risk Insurance Facility (CCRIF), with technical assistance from the World Bank and initial capitalization by the international donor community and the World Bank. CCRIF is a first-of-its-kind government risk-sharing platform, aimed at assisting members manage part of their catastrophe risk exposure through access to affordable and effective insurance coverage against natural disasters. For almost all Caribbean governments, a direct hit by a major hurricane or earthquake is the largest single risk it faces. Prior to CCRIF, the economic aspects of disasters had gone largely unmanaged by governments, which had mostly relied on post-disaster humanitarian assistance from donors.

With CCRIF, the member governments have developed a parametric insurance mechanism that enables them to share their risk between all participating countries and provides rapid payouts—similar to business interruption insurance—to finance an initial disaster response while maintaining basic government functions immediately following an event. By pooling their risks into a single diversified portfolio, member countries' insurance costs are significantly lowered, with pricing reduced by half or more of what it would cost if countries were to purchase the same coverage individually and directly from global markets. CCRIF retains a significant level of risk thanks to initial capitalization from the participating countries, bilateral donors, and the World Bank, and transfers part of its risk to the international reinsurance and capital markets.

CCRIF was the first ever multi-country risk pool and was well received by the reinsurance market. The success of CCRIF, which thus far has made eight payouts totaling more than \$32 million to seven member governments, brought about the development of a regional catastrophe risk pool in the Pacific and Africa as well as ongoing discussions on disaster risk financing solutions among the Indian Ocean island countries.

Contribution by Simon Young on behalf of CCRIF

risk pooling mechanisms. Product innovation remained the focus until the end of the decade.

Between 2005 and 2008 a number of new financial instruments emerged to help developing countries access international financial markets. In addition, private sector innovations from the 1980s and 1990s were increasingly being used by developing countries. In 2006, Mexico became the first middle- or low-income country to issue a sovereign catastrophe bond as part of its disaster risk financing strategy.²⁸ The \$160 million parametric²⁹ catastrophe bond, called CatMex, transferred earthquake risk to the international capital markets. This set the foundation for further multi-hazard (adding hurricane risk), multi-region (triggers in

multiple geographic regions in Mexico) catastrophe bonds issued by the Mexican government in 2009, worth \$290 million, and in 2012, worth \$315 million, under the World Bank's newly established MultiCat Program (World Bank, 2012a).

Launched in 2007, the Caribbean Catastrophe Risk Insurance Facility (CCRIF) was a groundbreaking government risk-sharing platform aimed at assisting member countries to manage part of their catastrophe risk exposure (*see Box 5*).

The last decade has also seen international organizations offering new financial instruments to support developing countries to access affordable funds. In 2008, the World Bank introduced a

Box 6 Providing contingent lines of credit for disaster risk financing

Contingent credit is one type of financial instrument to help governments secure funds in advance of a disaster.

Starting with the **World Bank's** first approval of a loan with a Catastrophe Deferred Drawdown Option (CAT-DDO) to Costa Rica in 2008, other international organizations have started offering contingent credit as a disaster risk financing product that not only increases financial resilience but helps incentivize better disaster risk management policies overall. To date, the World Bank has approved Cat-DDOs in nine countries for a total value of \$1.38 billion. These loans include: \$7 million to the Seychelles in 2014; \$102 million to Sri Lanka in 2014; \$250 million to Colombia in 2011; \$50 million to El Salvador in 2011; \$66 million to Panama in 2011; \$500 million to the Philippines in 2011; \$100 million to Peru in 2010; \$85 million to Guatemala in 2009; \$150 million to Colombia in 2008; and \$65 million to Costa Rica in 2008.

The Inter-American Development Bank (IDB) launched its Contingent Credit Line for Natural Disasters in 2012 to help countries cover urgent financing needs that arise immediately after a natural disaster. This complements the 2009 Contingent Credit Facility for Natural Disasters, a more restrictive facility created to help countries deal with catastrophic natural disasters.

In 2013, the **Japan International Cooperation Agency (JICA)** established a program called the Stand-by Emergency Credit for Urgent Recovery (SECURE). Similar to the other contingent credit lines, SECURE provides post-disaster financing of up to JPY10 billion or 0.25 percent of GDP, whichever is less, immediately following a natural disaster, based on prior agreement with JICA.

Contingent credit triggered by natural disasters has been successful in bringing about a dialogue on broader disaster risk management and has been instrumental in engaging the ministries of finance on the disaster risk management agenda. For example, in order to be eligible for a World Bank-provided contingent credit line, the borrowing country must implement a comprehensive disaster risk management program, which the Bank then monitors on a periodic basis. This is often the first time that finance ministry officials are brought to the table with other agencies dealing with disaster risk management. A contingent credit loan can also be the cornerstone of developing an integrated sovereign disaster risk financing and insurance strategy. As a concrete and fairly quick product to establish, a contingent line of credit can be an important deliverable for a government as it is building a comprehensive financial protection strategy.

contingent loan for disaster response, called the Development Policy Loan with Catastrophe Deferred Drawdown Option, or Cat DDO (*see Box 6*). Created first and foremost to encourage investment in risk reduction by governments and to engage ministries of finance in disaster risk management, the Cat DDO is a quick disbursing contingent line of credit that provides middle-income countries with immediate access to funds following a major natural disaster. An active national disaster risk management program is one prerequisite to qualifying for this financing.

Catastrophic risk insurance programs for property and agriculture were increasingly tested during this period and improved in developing countries with a continued emphasis on public-private partnerships. The government would take on the public role to jumpstart domestic insurance markets through policies that stimulated demand for catastrophe and agricultural insurance products and that increase disaster risk awareness among the population. The private sector, meanwhile, provided distribution channels, insurance expertise, and financial capacity. For instance, after setting up the Turkish Catastrophe Insurance Pool in 2000, the government of Turkey legally abolished its obligation to fund the reconstruction of residential dwellings in the aftermath of an earthquake, strengthened its building construction codes, and improved supervision of these new construction standards. By 2013, the pool had sold more than 6 million policies, compared to the only 600,000 covered households when it was first set up.³⁰

Partnerships between governments, the private sector, and international organizations contributed to overall improved performance of agriculture insurance programs. In 2005, the government of India started to explore ways to improve its National Agriculture Insurance Scheme. Building on international best practice and in-country experience, the government of India has since been

at the forefront in driving innovation in agriculture insurance. With technical support from the World Bank, this included the use of mobile phone and satellite technology to improve the quality, timeliness and reliability of yield data gathered through crop-cutting experiments—increasing the accuracy of crop yield estimates; and improved index and product design for weather index insurance products.

Innovative disaster risk financing and insurance products and partnerships help micro-insurance or disaster-linked social safety net programs to benefit the poor. In 2005, Ethiopia established the Productive Safety Net Program, now one of the largest disaster-linked food security programs in Sub-Saharan Africa, to provide cash and food transfers to its chronically food-insecure population. Since 2006, several disaster risk financing and insurance tools have been piloted and implemented to support Ethiopia's safety net program. For example, the program includes a 20 percent subnational-level contingency budget to scale up coverage beyond the capacity of the core program during harsher droughts. In 2010, a federal-level contingent financing window became a permanent feature of the program.

In 2007, Oxfam, together with a group of partners including the reinsurer Swiss Re, launched the Horn of Africa Risk Transfer for Adaptation (HARITA) project in Ethiopia. A pilot program to address the needs of small-scale farmers through drought insurance, credit, and risk reduction, HARITA allowed farmers to pay for insurance through labor, an idea based on “food-for-work” programs.³¹ In 2009, Indonesian insurer Wahana Tata piloted the first-ever flood micro-insurance product in Jakarta in partnership with reinsurer Munich Re and Germany's development agency.³² Designed as livelihood coverage against floods, the aim of the product was to provide immediate cash to insured

households when flooding in Jakarta reached a predefined level.

New developments during this period, in particular index-based insurance products, were embraced enthusiastically, yet despite the initial enthusiasm the experience yielded mixed results. In agriculture insurance, for example, index-based insurance pilots have faced challenges to reach large scale outreach. Key reasons included underinvestment in the data market infrastructure and lack of government involvement.³³ In Malawi, a rainfall index-based crop insurance pilot was initially offered directly to groundnut farmers in 2005 but was subsequently redesigned to be bundled with loans due to low uptake. Still, the product was not able to scale up beyond the pilot phases.³⁴ The same rainfall index was used to structure a weather derivative contract for Malawi in 2008, yet the contract was not renewed beyond 2012. Other examples include a flood micro-insurance product in Indonesia that was not renewed in 2010 after a one-year pilot. Limited uptake has stunted the performance of the Romanian Catastrophe Insurance Scheme—closely modeled after Turkey's—that was launched in 2008 in partnership with insurance companies Aon Benfield, Guy Carpenter, Stellar Re, and Willis Re to provide property insurance for homes against earthquakes, landslides, and floods.³⁵

Challenges and lessons

Increasingly, tailored financial products opened new opportunities for thinking about proactive financial protection in developing countries. Experiences, however, showed that stand-alone financial instruments are not silver bullets; they cannot solve all the challenges associated with the impact of disasters and must be integrated into a comprehensive disaster risk management strategy. A greater understanding of the need for more strategic risk management began to emerge towards the end of the decade. Efforts at better integrating the

disaster risk financing and insurance agenda into the greater disaster risk management agenda was a turning point for the development of comprehensive financial protection against natural disasters in developing countries (Ghesquiere and Mahul, 2010). Yet, this understanding of disaster risk financing as a broader strategic agenda, and as a core component of disaster risk management, was still at its early stages. To move toward comprehensive financial protection programs, political and institutional challenges, such as political resistance to financial risk management policies with perceived uncertain payoffs, had to be overcome. But the political support needed for sustained government commitment usually only materialized in the aftermath of a disaster and often remained focused on specific, politically-attractive financial products.

While stand-alone products may not be ideal from a purely financial perspective, the traction and interest they tend to create at a high level amongst policy makers can enable more strategic discussions on disaster risk management and financial protection more broadly. For example, under the larger umbrella of the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI), the prospect of participating in a regional risk pool provided incentives for Pacific island countries to participate in long-term initiatives to improve the financial resilience of their budget. Such initiatives included technical assistance to improve budget execution following shock events, the development of emergency procurement procedures to enable disaster response agencies to respond rapidly, and a long-term risk assessment program.

In many cases, a limited understanding of countries' disaster risk restrained governments that were looking towards more comprehensive approaches. Here a clear role emerged for the international community to support countries in better understanding their disaster risks and supporting policy makers in dealing with the uncertainty inherent in risk management. It also became clear that accurate financial risk information—which

reveals the full potential financial impact faced by the government—is crucial for disaster risk financing and insurance.

2010-Present: From products to strategies for financial protection

By 2010, disaster risk financing and insurance practitioners had started working with a number of governments to design comprehensive disaster risk financing strategies rather than focusing on individual products (Mahul & Ghesquiere, 2010).

Increasingly, the international community has recognized the disaster risk financing and insurance agenda's importance in disaster risk management, public financial management, and financial sector development agendas. Development banks, such as the Asian Development Bank, the Inter-American Development Bank, and the World Bank, began integrating financial protection into their disaster risk management frameworks. The G20 discussed risk financing on their agenda under the Mexican Presidency in 2012, supported by the World Bank and the OECD. The Sendai Dialogue at the 2012 International Monetary Fund (IMF) and World Bank Group Annual Meetings demonstrated a commitment by development partners at the highest levels. In addition, the 2014 World Development Report: Managing Risk for Development, emphasized the role of risk management, including disaster risk financing and insurance, as a powerful instrument for the international development agenda.

Moreover, the international community began to consider disaster risk financing and insurance, especially market-based risk transfer mechanisms, as an effective part of climate change adaptation strategies. This built on earlier initiatives such as the 2005 Munich Climate Insurance Initiative launched by MunichRe, and a proposal in 2008 by the Alliance of Small Island States for an insurance mechanism to address damages from climate change. In 2013, the UN established an international mechanism

Box 7 Post-disaster budget execution

Sustainable and effective disaster risk financing and insurance strategies can help governments raise funds to address potential financial needs and manage fiscal volatility after a disaster hits. Equally important are the administrative and legal procedures to ensure that the available resources are used effectively in the aftermath of a natural disaster, including a legal framework for declaring emergencies, a clear process for budget appropriation and execution, as well as fiduciary control and management of funding channels during an emergency.

In Mexico, the Natural Disaster Fund (FONDEN) is the centerpiece and operator of the government's disaster risk financing and insurance strategy, combining several financial instruments for various sources of funding, depending on the timing and amount of funding needs as well as the cost of securing said funds. The main role of FONDEN, however, is to ensure coordination between federal, state, and municipal governments and the private sector. For example, following a disaster, FONDEN's coordination and budget execution role includes collecting information on affected public infrastructure and services; managing and allocating disparate requests for funds based on a transparent damage and loss assessment methodology; coordinating administrative capacities across geographical locations; and monitoring the use of funds and reconstruction progress.

to promote a comprehensive approach to address loss and damage associated with the effects of climate change. At the same time, the European Commission produced a discussion paper (Green Paper) on insuring against natural and man-made disasters.

The same year, the Political Champions Group for Disaster Resilience—a collaboration between major donor countries to strengthen resilience in development planning—introduced a new initiative to develop stronger partnerships between governments and the private sector to use market-mediated insurance solutions as a way to increase the resilience of vulnerable populations to the economic effects of natural disasters. The expert groups supporting this initiative includes representatives from the U.K. Department for International Development, the U.S. Agency for International Development, the World Bank, the International Labor Organization, the German Agency for International Cooperation (GIZ), the Swiss State Secretariat for Economic Affairs, the European Commission, and insurance companies Swiss Reinsurance Corporation, Munich Re Group, Willis, and Allianz. So far the group has identified opportunities to stimulate disaster risk insurance in Bangladesh, Haiti, Kenya, the Philippines, and Senegal.

Strong developments in sovereign disaster risk financing also reflect increasing engagement by ministries of finance. Colombia, along with Panama and the Philippines, was among the first countries to develop a national disaster risk financing and insurance strategy, which integrates disaster-related contingent liabilities into existing disaster risk and fiscal risk management agendas (World Bank and Government of Colombia, 2013). Colombia's strategy focuses on improving financial risk information and quantification; improving budget management of disaster risk through multiple financial instruments (including a disaster risk management fund, a contingent line of credit from the World Bank, and possibly a market-based earthquake risk transfer solution); and scaling up the insurance of public assets. For the latter, the strategy paved the way for a group approach to insuring central government buildings in addition to increasing insurance requirements for government concessions in transport infrastructure such as roads and ports.³⁶ The public financial management aspects of disaster risk financing are becoming increasingly important as countries realize the need for effective post-disaster budget execution (*see Box 7*).

Governments across South and Central America have maintained the region's strong pace of innovation. In Peru, the Ministry of Finance has begun to develop a national disaster risk financing

strategy, which includes a strong focus on the insurance of public assets and improving domestic insurers' earthquake risk-carrying capacity. The countries of Central America committed to join the CCRIF risk pool. This initiative is complementing already ongoing disaster risk financing efforts in the region. For example, when Panama established a sovereign wealth fund in 2012, it designated disaster losses larger than 0.5 percent of GDP (excluding insurance coverage and the amount of contingent credit lines) as one of three reasons for a payout.

This shift in Latin America reflected a wider trend of governments looking to their neighbors to share experience, access expertise, and in some cases establish joint risk financing mechanisms. The Pacific Catastrophe Risk Insurance Pilot launched in 2013, building on work started in 2007. The pilot allows the six participating countries³⁷ to pool risk and access earthquake and tropical cyclone parametric risk coverage from reinsurance companies, providing governments with immediate liquidity in the aftermath of a severe natural disaster.

In January 2014, Tonga received the first payout of US\$1.27 million within two weeks of cyclone Ian reaching landfall. The speed of the payout proved important in supporting the government of Tonga to effectively launch initial relief efforts.

In 2013, Indian Ocean island states started exploring a similar scheme. In Sub-Saharan Africa, the African Risk Capacity was set up as a specialized agency of the African Union states as an extreme weather insurance scheme to estimate and disburse immediate funds to countries hit by severe drought. Following the example of the CCRIF, the African Risk Capacity, a pan-African risk pool to manage drought risk, launched in spring 2014. In addition to looking outward, governments have also begun to focus on applying disaster risk financing and insurance strategies at the subnational level (*see Box 8*).

Significant developments are also taking place in insurance programs focused on the most vulnerable groups of society. In 2011 Oxfam partnered with

Box 8 Strengthening subnational disaster risk financing capabilities

A significant share of the public cost of disaster recovery and reconstruction ultimately falls on local governments. For example, they often must pay for the repair of provincial, district, and community roads, schools, health clinics and other infrastructure within their remit. Local governments may face additional pressures to support the recovery of local businesses and livelihoods, speeding the restoration of local economies. While local governments in developing countries are often required by law to make budgetary provisions for post-disaster needs, they typically have limited discretionary financing, and what little funds they do have are quickly spent in the event of a disaster. As a consequence, reconstruction efforts can extend over a number of years, exacerbating the indirect economic and social costs of a disaster. State-owned enterprises can face similar challenges and pose additional contingent liabilities to national governments.

Over the past decade, there has been an increasing recognition of the need to address this issue by strengthening local, as well as national, disaster risk financing capabilities. National governments can help stimulate this growth at the local level by providing explicit incentives for uptake and through regulatory and legislative reforms supporting the growth of financially sustainable risk transfer solutions tuned to the needs of local government. For instance, in addition to limiting the availability of post-disaster federal funds for states that continuously do not insure their assets, Mexico also incentivizes states to build reserve funds, similar to its national-level program FONDEN by providing seed funding.

Colombia has begun to improve guidelines on insurance requirements for concessions at the subnational level, modeled after the 2013 reform of insurance requirements of national government concessions. In Indonesia, provincial and municipal governments voluntarily insure critical public assets (World Bank, 2011). International Financial Institutions are supporting the development of disaster risk financing and insurance strategies and risk transfer schemes tailored to the subnational level. The Asian Development Bank, for example, has been focusing on climate risk adaptation in megacities and is currently developing disaster risk financing and insurance instruments at the city level in Indonesia, the Philippines, and Vietnam.

Contribution by Charlotte Benson, Asian Development Bank

Box 9 How risk modeling and analytics are informing disaster risk financing in Mexico

The government of Mexico developed the probabilistic catastrophe risk modelling software R-FONDEN to improve the effectiveness of Mexico's disaster risk management system. Combined with actuarial analysis of historical loss data, this tool helps inform decision making about the government's risk financing and insurance strategy, and provides risk visualization. An in-depth understanding of its risks allowed the Mexican government to develop a comprehensive financial protection strategy relying on risk retention and transfer mechanisms, including successfully accessing international reinsurance and capital markets. To identify assets exposed to natural disasters—including roads and bridges, hospitals, schools, hydraulic infrastructure, and low-income housing—and the potential financial impact of their destruction, R-FONDEN was developed in three steps:

- 1) **Data Gathering:** The required database was prepared, including hazard information, an asset inventory with the key variables such as building characteristics required for evaluation of vulnerability and loss of infrastructure, and the integration of historical loss data to complement simulated data.
- 2) **Catastrophe Risk Modeling:** The government, together with the Universidad Nacional Autónoma de México (UNAM), developed hazard models for earthquakes, tropical cyclones, and floods, and vulnerability functions for all types of infrastructure. Together with the exposure database this enabled the government of Mexico to carry out deterministic and probabilistic risk modeling used to inform financial analysis of probable disaster loss.
- 3) **Financial Analysis:** Finally, the government carried out actuarial analysis of the simulated risk data and historical losses to develop and fine tune the federal disaster risk financing strategy for public infrastructure—including both risk retention and risk transfer. This also includes the development of a decision support tool to facilitate this process in the future.

As a result, R-FONDEN has informed the development of the federal disaster risk financing strategy and helped improve individual insurance policies for federal agencies. For instance, it enabled the design of an insurance program for the Ministry of Transport in charge of federal roads and bridges, a scheme that previously was difficult to insure due to insufficient asset information.

the World Food Program to build on the HARITA insurance project in Ethiopia, designing the Rural Resilience Initiative, or R4, a large-scale initiative that has expanded coverage to Senegal. The initiative focuses on developing tools to help the most vulnerable people build livelihoods resilient to the effects of natural disaster, such as 'insurance for work', and will soon roll out in two more countries in the region.³⁸ Similarly, the government of Kenya is looking to complement its Hunger Safety Net Program—which currently provides cash transfers to the 100,000 most vulnerable households in four northern counties—with a mechanism to rapidly scale up payments to the affected area immediately following shock events such as drought.

In 2011, MiCRO (Microinsurance Catastrophe Risk Organization) was established to provide micro-insurance coverage to women-owned micro-enterprises in Haiti.³⁹ MiCRO's coverage was bundled with loans from Fonkoze, Haiti's largest microfinance institution. If triggered by a natural disaster, its payouts can be used to repair homes or businesses and replace inventory that has been destroyed or damaged. Set up as a donor-capitalized

public-private partnership, MiCRO includes Swiss Re, Guy Carpenter, Mercy Corps, CaribRM (a Caribbean specialist consultancy), and Fonkoze. In 2013, CCRIF began broadening its reach into micro-insurance territory by supporting a trial of a parametric personal weather-insurance product in Grenada, Jamaica, and St. Lucia, supported by Munich Re under the Munich Climate Insurance Initiative.⁴⁰

Increasingly, the use of financial decision making tools empowers governments to make more informed decisions. For example, financial decision tools can be used to evaluate potential fiscal risk caused by an earthquake risk transfer options to protect public debt portfolio. Or they allow governments to analyze the costs and benefits of different financial product and their potential impact on its medium-term budget. A coherent methodology has started to emerge to help governments assess the economic costs and benefits of alternative risk financing strategies (Clarke and Poulter, 2014). *See Box 9* for an example of how risk information is helping financial decision making in Mexico. The development of many of these new

tools is being spearheaded by the World Bank's Disaster Risk Financing and Insurance Program.

Meanwhile, it has also become clear that in order to develop sustainable large scale agricultural insurance markets the public and the private sector need to work closely together, with each playing key, differentiated roles. The past decade saw numerous private sector agricultural insurance pilots implemented in developing countries, usually with support from donor partners and mainly for index-based crop insurance (World Bank, 2005). However, only a few, notably the crop insurance programs in India and the index-based livestock insurance program in Mongolia have scaled up to sustainable programs, due to close involvement by the government. In contrast, the private sector-led weather index-based insurance pilot in Malawi did not successfully address all challenges such as low demand from farmers, and the pilot failed to achieve scale.

Experience suggests that sustainable, scaled up agricultural insurance should be based on an equal partnership between the public and private sectors. The public sector is essential in the provision of public goods, such as agriculture data and risk financing structures, which allow national insurance companies pass on agriculture risk to international reinsurance markets. Government should also foster an enabling legal and regulatory environment to unlock the innovative potential of the private sector, work to improve the technical capacity building of local insurance companies, and ensure products developed for farmers are of high quality. Finally, the public sector can implement policies to support the wide scale outreach of agriculture insurance, which is essential to achieving the market size required for sustainability (*see Box 10*).

Building on lessons learned from more than 20 years of experience in supporting agricultural insurance, in 2013 the World Bank launched a new initiative on Agricultural Insurance as part of its Disaster Risk Financing and Insurance Program. This

initiative focuses on public-private partnerships and approaches agricultural insurance as one component of an overall integrated agricultural risk management strategy. It also looks to take advantage of investments made in developing the agriculture insurance markets to bring about multiple benefits. For example, investments in data and risk financing can be used to improve existing cash transfer programs by making it technically possible to automatically increase welfare payments to the poorest and most vulnerable rural households following a disaster.

Challenges and lessons

Overcoming institutional challenges to disaster risk financing and insurance requires well-defined institutional accountability and responsibility, together with a strong champion at the highest level of government. Over the past five years, ministries of finance have been increasingly taking the leadership in the development of disaster risk financing strategies, collaborating with other government entities such as disaster risk management agencies, insurance supervisors, and ministries of social welfare or agriculture. Additionally, the idea of a central government agency responsible for risk management has been proposed by international organizations and the private sector. For example, The World Development Report 2014 recommends setting up national risk boards, an institutional reform already in place in Singapore and under consideration in Jamaica, Morocco, and Rwanda. Yet there is still much work to do in bridging the gap between international recognition and actually implementing such an agenda in the countries that need it the most. While a number of developing countries are leading the way in this field, in many others progress remains extremely limited.

Awareness has been growing of the need for institutional arrangements and mechanisms to complement the financial instruments used to secure funds. Often overlooked, these administrative

Box 10 Munich Re's experience in agricultural insurance

Providing appropriate risk management tools for agriculture is a key challenge for development. Agricultural insurance can play a vital role in that process by providing cover against natural perils, serving as collateral for agricultural loans and providing a safety net for investments. While agricultural insurance systems have been successfully implemented in recent decades, this was mostly in industrialized countries.

One key requirement is the integration of insurance in the broader context of agricultural development and risk management. Sustainable agricultural production methods and use of the best available production techniques specific to each site are prerequisites of insurance.

Second, only systems based on public-private partnerships have proved to be successful and sustainable, whereas purely private or purely state-organized systems have often failed. In such public-private partnerships the government, farmers, and the insurance industry play complementary roles:

- The government provides the enabling legal and regulatory framework. It can also provide part of the financing for risk premiums and administrative costs, invest in creating, auditing, and managing the required data, and facilitate market penetration through premium subsidies and state reinsurance for catastrophe losses. This helps keep insurance terms affordable for farmers.
- Farmers finance part of the risk transfer through insurance premiums. They also retain part of the risk in the form of a deductible or as basis risk in the case of index products. Agricultural producers also have a crucial role in making such insurance programs sustainable through overall agricultural risk management.
- Insurance and reinsurance companies take on roles as risk carrier and take care of the marketing and administration of insurance policies. They also manage the portfolio, develop new products, and carry out loss adjustment. Especially in developing countries, where insurance companies are often short of risk capital, reinsurance arrangements are essential to maintain adequate solvency margins for insurance companies. Besides much-needed capital, global reinsurers also bring international expertise and experience to developing countries.

Insurance providers and risk carriers can also work together on joint market approaches, for example pooling all of the crop risks of one country—or even several smaller countries—and in that way achieve a better spread of risk. Building on uniform terms and conditions such an approach can be a good way to guarantee the sustainability of the system.

Contribution by Joachim Herbold, Senior Underwriter and Agricultural Risk Expert, Munich RE

and legal dimensions—such as a legal framework for declaring emergencies, a clear process for budget appropriation and execution, and fiduciary controls of post-disaster funding channels—are essential to an effective and timely response. For example, the government of Indonesia had to pass a new government regulation (PP 45/2013) in 2013 to explicitly allow its Ministry of Finance to purchase insurance with funds allocated in the national budget (World Bank, forthcoming).

Key lessons learned emerged during this period. Financial protection can help groups across society understand, price, and manage financial risk. The government and the private sector share roles and an interest in managing financial impacts faced by the government and in empowering homeowners, businesses, and agricultural producers to access risk transfer solutions. For the private

sector, investing in building insurance markets in developing countries helps unlock access to previously unavailable markets and allows further diversification of their current portfolios, which are highly concentrated in developed countries.

However, it also became clearer that financial protection needs to be complemented by prevention and risk reduction. The insurance industry has been warning that in some high-risk areas, such as parts of the United Kingdom and the U.S. state of Florida, climate change already threatens the insurability of catastrophe risk. Here the government plays a crucial role—such as through adequate government regulation of both insurance markets and land use planning—to avoid market failure (Geneva Association, 2013). For rapidly urbanizing developing countries this is an important reminder to integrate risk early in development and land use planning.

Section IV: Looking to the Future

Governments of developing countries have made significant progress in implementing disaster risk financing solutions. Much has been learned, and these lessons have informed the first operational disaster risk financing and insurance framework to help governments structure work on financial resilience, laid out in this document. But disaster risk financing and insurance is a sophisticated agenda with complex institutional and technical aspects. Many challenges that have emerged over the years remain unsolved while at the same time there has been a real growth in innovation and new opportunities.

Areas of focus for strengthening public financial management of disasters

Institutional

Legal environment: The legal environment varies significantly between countries and can either support or restrict the development of disaster risk financing and insurance solutions. For example, while some countries have a legal requirement to insure public assets, others prohibit the use of public funds to purchase insurance. Similarly, administrative and legal dimensions are crucial for post-disaster decisions such as declaring emergencies and budget appropriation and execution.

Cooperation in the public sector: Disaster risk financing and insurance cuts across numerous agendas, including those of disaster risk management, public financial management, financial sector development, and, increasingly, social protection. Often, numerous public agencies oversee different aspects of these policy agendas, emphasizing both the need for and challenge of coordinating between these players. While the

ministry of finance typically leads the disaster risk financing policy agenda, the expertise and collaboration of other public entities such as ministries of agriculture or public works is essential for implementation. Bringing together these different agencies is an important role for ministries of finance to play. Challenges can also arise if the legal liability for financing damages is not clear between national and subnational governments. Finally, the design of national financial protection strategies must be careful of the kind of incentives they may unwittingly generate; for example, a national-level program might discourage subnational governments from investing in risk reduction.

Disaster risk financing funds: A dedicated disaster fund can form the backbone of the government's ability to manage the financial impact of natural disaster risk. It provides not only financial resources solely dedicated to allowing risk retention but it can also anchor the development of a more comprehensive disaster risk financing and insurance strategy. However, the development of a dedicated fund requires discussion and agreement with the ministry of finance and, in many cases, with the legislative branch, bringing political considerations into play.

Technical

Risk information and risk analytics for evidence-based decision making: Even when governments are aware that they face a significant, often open-ended, contingent liability from disasters, they mostly lack the information, expertise, and tools to understand and quantify financial and fiscal disaster risk. The government may not know what kind of data is needed, such as historical records of how disasters affected public finances in the past and information for probabilistic financial and actuarial analysis such as modelled

Box 11 Challenges of assessing risk for risk financing and insurance

Successful financial protection solutions rely on underlying risk data. Yet appropriate risk modelling tools are still lacking in countries that need them the most.

Lack of appropriate solutions and tools for developing countries: Disaster risk financing requires sophisticated risk modelling tools generally unavailable for low- and often also middle-income countries. Their development requires substantial seed investment for example for the collection of the required data on exposed assets, even before there is a reasonable certainty that the government will use the tools once completed.

Where financial risk models do exist, they are usually not tailored to answer governments' specific disaster risk financing questions and needs, such as modelling for collapsed buildings, fatalities, impact on crops and food security, and taking into account the homeless population. Almost always developed for the insurance industry, these models often only assess the impact on "insurable" assets, excluding, for example, low-income housing. Exposure data may also rely heavily on official census data that often excludes infrastructure and public buildings and disregards unofficial settlements—such as shantytowns or squatter towns—that regularly suffer the most damage in a disaster.

Even where countries can access risk modelling tools, they go out of date quickly; some are even born obsolete or inaccurate. For example, many models rely on census data that can be 10 years old. Even if growth trends are used to update figures, using old census data to collect information on exposure in fast growing countries is potentially inaccurate.

Lack of disaster risk information in developing countries: Disaster risk financing solutions are only as reliable as the risk models that support them, and the latter are only as good as the data used to develop them. Unfortunately, developing countries often lack adequate data to build and validate risk assessment tools, not least because gathering the necessary data sets requires large investments.

If not already available, exposure data—such as information on public and private assets—are the hardest and most expensive to gather and organize. Use of satellite imagery is often the only way to gather up-to-date exposure data, but the cost of acquiring such images can be prohibitive for developing countries, unless companies such as Google provide information already in their possession free of charge for development purposes, including disaster risk financing.

Data on exposure may be scattered among different government ministries and other organizations, and may be kept in precarious conditions. For example, when the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) undertook a risk assessment in the region in 2012, some of the only existing maps about crops in the South Pacific were available in a single paper copy in the archive of the Secretariat of the Pacific Community in Suva, Fiji.

Data sharing is often not the norm: Even within the same government, different ministries may not share data, and are even more reluctant to share data with international organizations for the purpose of developing risk assessment models. Data are still seen in many countries as a source of power not to be relinquished lightly, often for security concerns. And when countries do share data, they often receive no reward for their efforts such as usable feedback or products based on the data.

Looking ahead: Developing countries are increasingly requesting support in managing the fiscal costs of natural disasters. New financial instruments and strategies are needed, however, to help governments increase post-disaster financial response capacity, and build domestic catastrophe insurance markets. Probabilistic risk assessment and catastrophe risk modelling are important tools that empower policy makers to take better-informed decisions in financial protection. Technical support helps countries collect the underlying data and build the required models. More work is also needed to bridge the gap between catastrophe risk data and informed decision making, establishing the link from technical outputs to financial analysis that is useful to nontechnical decision makers. Simplifying complex technical data and providing key financial figures ensures that policy makers have the information they need to make the best decisions about financing disaster risk.

Contribution by Paolo Bazzurro, Professor, University Institute for Superior Studies Pavia, Italy

disaster losses. It may also lack the expertise needed to quantify its contingent liability to disasters, which often requires heavy statistical and financial lifting as well as analytical tools that are only recently becoming available to governments as they are being developed for the public sector through institutions such as the World Bank. The private sector and international institutions have a critical role to play in training governments to use financial risk data and analytical tools. See *Box 10* for a more detailed discussion of these challenges.

Ability to comprehensively manage fiscal risk:

The ability of ministries of finance in developing countries to manage fiscal risk is often limited, if it exists at all. Without a proactive approach to managing fiscal risk in general, ministries may also lack the mindset, knowledge, and institutional support to integrate fiscal risks from natural disasters. Such a shift often requires technical and financial support from international organizations and donors. By building on ongoing government work in areas such as debt or commodity risk management that are already better known to

most ministries of finance, disaster risk financing can leverage existing capacity while contributing towards bringing together these different sources of risk for comprehensive fiscal risk management.

Increasing the evidence: In recent years, the number of developing country governments adopting pre-disaster financial protection measures has increased rapidly along with the number of available tools. Yet, actual evidence on impact, effectiveness, and efficiency is still limited. Initiatives such as the World Bank's Impact Appraisal Program are tackling this need for improved evidence. But monitoring and evaluation must be included as an essential component in all disaster risk financing and insurance programs to build the evidence base and to establish meaningful indicators.

Operational

Post-disaster budget execution of sovereign disaster risk financing: Many countries lack the dedicated mechanisms, experience, and expertise to effectively allocate, disburse, and monitor recovery



and reconstruction funds following disasters. For example, limited experience with and awareness of emergency procedures for public procurement can lead officials to apply business-as-usual procedures, leading to costly delays. Part of the challenge for countries that want to implement a sovereign disaster risk financing and insurance strategy, including setting up budget execution systems to address specific post-disaster challenges, is that it requires strong collaboration between the ministry of finance and the public entity tasked with spending the money, such as local governments or public infrastructure maintenance agencies. In addition, the system must balance policy makers' concerns for fast disbursement with the public's and donors' needs for transparency and accountability. For example the government of Mexico established a post-disaster loss reporting mechanism managed by its Natural Disaster Fund (FONDEN), which lets affected states access timely payments directly from FONDEN, reducing time-consuming coordination problems.

Opportunities to expand the impact of disaster risk financing and insurance

Social safety net programs and disaster risk financing: Few developing countries are currently supporting their social safety nets by disaster risk financing strategies to help governments manage the potential cost of scale up following disasters. One challenge to increasing this critical link is to forge the partnerships required—such as between ministries of finance and officials working in public welfare agencies—to financially and institutionally adapt safety nets to expand during and after disasters. Additionally, since it is low-income countries who would benefit the most from linking safety nets to disaster risk financing and insurance strategies, it is essential that the international community provide technical and financial support to make this happen.

Subnational disaster risk financing and insurance agendas: Expanding disaster risk financing and insurance to the subnational level will not only increase the financial resilience of regional or local governments, but it also reduces the potential financial burden on the central government. This often requires additional investments in building capacity and expertise, which tend to be weaker at the subnational level. Integrating disaster risk financing and disaster risk management into city-level planning has become particularly urgent in the face of rapid urbanization. In Asia, for example, unprecedented levels of economic and population growth have led to a rise in megacities—cities with over 10 million people—that tend to be located near coastlines and rivers, making them highly vulnerable to rising sea levels and other effects of climate change.

Financial protection against climate risk which is exacerbated through climate change: Disaster risk financing and insurance should be considered an integral part of comprehensive climate change risk management, in part because it provides tools to manage the financial impact of climate risks that cannot be prevented or reduced. Inherently designed for managing losses and damages caused by uncertain events, disaster risk financing and insurance can help countries prepare for increased climate variability and extreme events expected to increase with climate change. From a financial risk management perspective, while climate risks may lead to an increase in uncertain extreme weather events it does not fundamentally alter the underlying challenge of managing contingent liability from natural hazards. Just as it is a critical component of any disaster risk management approach, financial protection plays a crucial role in helping countries become more resilient to climate risks. Disaster risk financing instruments can also support measures to reduce vulnerability by quantifying risk and providing price signals to climate adaptation investments.

Disaster Risk Financing in the Next Hyogo Framework for Action

Signed in 2005, in the early stages of the field of disaster risk financing and insurance, the Hyogo Framework for Action acknowledged a role for risk financing in risk reduction as well as the importance of financing in the post-disaster phase (*see Box 3*).

Looking back, however, it is clear that Hyogo did not reflect the full scope and significance of disaster risk financing and insurance, and is no longer representative of the importance that governments and the international community give to this area. For example, since then, the Asian Development Bank, Inter-American Development Bank, and the World Bank have all incorporated disaster risk financing as core pillars of their disaster risk management frameworks for engagement with governments. Other global policy groups like the G20, Asia Pacific Economic Cooperation (APEC)

forum and OECD are taking it up as an important topic.

The successor to the Hyogo Framework for Action, to be agreed on in early 2015 after the original expires, provides an opportunity to recognize and integrate financial protection as a core priority for action in countries' disaster risk management agendas. Drawing on the experience captured in this background paper, four key activities emerge that governments could consider including under such a priority for action.

As already discussed, monitoring and evaluation tools and indicators for disaster risk financing and insurance programs and instruments are still largely lacking, but a concerted effort is underway to create and improve them. The results of these efforts could be reflected in the outcome and impact-level indicators selected for the second Hyogo framework.

Table 4 Recommended treatment of financial protection in HFA2

PRIORITY FOR ACTION:	REDUCE FINANCIAL IMPACT OF NATURAL DISASTERS ON THE GOVERNMENT AND SOCIETY
<i>KEY ACTIVITIES:</i>	
<i>I</i>	Improve understanding and assessment of public contingent liabilities related to natural disasters
<i>II</i>	Develop national financial protection strategies to be implemented through a dedicated Disaster Risk Management Fund.
<i>III</i>	Leverage private financial institutions to offer affordable, sustainable, cost-effective financial solutions, including insurance, to governments, homeowners, SMEs, and agricultural producers.
<i>IV</i>	Integrate disaster risk considerations into the design of social protection programs.

Table 5 Expanded recommendations for financial protection in the successor to the Hyogo Framework for Action

PRIORITY FOR ACTION:	REDUCE FINANCIAL IMPACT OF NATURAL DISASTERS ON THE GOVERNMENT AND SOCIETY
<i>KEY ACTIVITIES:</i>	
<i>I</i>	<p>Improve understanding and assessment of public contingent liabilities related to natural disasters.</p> <ul style="list-style-type: none"> (a) Promote the availability, quality, and consistency of risk data. (b) Develop and promote catastrophe risk pricing models such as probabilistic catastrophe risk and actuarial models. (c) Assess implicit and explicit contingent liabilities of the state to disasters and improve their integration in fiscal risk management. (d) Establish transparent, timely, and effective post-disaster loss reporting mechanisms. (e) Build the required capacity and technical expertise for disaster risk financing and insurance. (f) Strengthen the use of financial risk information to guide risk reduction activities.
<i>II</i>	<p>Develop national financial protection strategies to be implemented through a dedicated disaster risk management fund.</p> <ul style="list-style-type: none"> (a) Assess potential post-disaster (short-term and long-term) funding gaps. (b) Develop and use financial decision making tools to assess the costs and benefits of disaster risk financing options. (c) Develop a national strategy for financial protection to clarify contingent liability, secure immediate liquidity following disasters for the short-term, and ensure longer-term reconstruction financing. (d) Establish a national disaster fund with dedicated resources. (e) Adopt pre-disaster budget management and post-disaster budget execution mechanisms for natural disasters.
<i>III</i>	<p>Leverage private financial institutions to offer affordable, sustainable, cost-effective financial solutions, including insurance, to governments, homeowners, SMEs, and agricultural producers.</p> <ul style="list-style-type: none"> (a) Quantify potential property and agricultural disaster losses and identify losses incurred by public and private stakeholders. (b) Develop public market infrastructure (such as systems for collecting and managing data or modeling catastrophe risk) to better develop domestic catastrophe risk insurance and agricultural insurance markets. (c) Improve supervision and regulation of domestic catastrophe risk insurance markets.
<i>IV</i>	<p>Integrate disaster risk considerations into the design of social protection programs to protect the most vulnerable.</p> <ul style="list-style-type: none"> (a) Quantify potential disaster-related financial losses on the poorest and the fiscal impact that disasters pose for social protection programs. (b) Secure contingent funding by the government for social protection programs against disasters. (c) Complement social protection programs with insurance principles and private sector products. (d) Improve the process for identifying beneficiaries and assessing their eligibility for post-disaster payouts.

PART

02





An Operational Framework for Disaster Risk Financing and Insurance

Part two seeks to tie together the experience and collected knowledge from partners in the public and private sector in order to create a practical operational framework for governments looking to establish or improve disaster risk financing and insurance programs. As a framework for the development and implementation of cost-effective and sustainable solutions it aims to provide a practical approach and a comprehensive overview of policies for the public financial management of disasters by governments.

Years of sustained dialogue and working with governments and the private sector—in particular insurance and reinsurance companies—have created the structure of this framework. For the World Bank alone, it builds on more than 15 years of intensive partnerships with over 60 countries worldwide. It complements more conceptual work undertaken by partners such as the *OECD Methodological Framework on Disaster Risk Assessment and Risk Financing* and the *2014 World Bank World Development Report on Managing Risk for Development*.

This framework should serve as a practical guide supporting decision makers looking at disaster risk

financing and insurance to help solve the challenges of disaster and its impact. Some of these solutions for urgent, short-term problems can be implemented immediately while decision makers consider long-term and more comprehensive financial protection policies. For example, in many cases before the ministry of finance can use risk transfer, an existing law must first be revised or replaced, a goal that may take several years to accomplish. Eventually, the development of a strategy around ongoing activities can help the government build a comprehensive approach to the financial management of disasters. This could take place in an iterative manner, refining policy objectives—and actions to achieve these objectives—during the implementation of disaster risk financing and insurance activities, and complementing other disaster risk management investments.

The operational framework also introduces a common language to enable and strengthen the international cooperation often required between governments and their partners, as well as between governments themselves as they seek to exchange experiences and good practice. A structured, consistent way of approaching disaster risk

financing helps governments better identify and implement their priorities, and enables international development partners and the private sector to better support them in doing so.

The operational framework, however, is not a blueprint for action, and as such does not provide detailed guidance on how to carry out each step. Given the nuanced and specific challenges faced by countries, this requires a sustained commitment by countries and their partners that responds to a country's specific needs. For example, low-income countries constrained by a lack of capacity may not be able to use financial instruments in the same way as middle-income countries. Small island developing states subject to financial shocks where the loss can exceed their annual GDP face vastly different challenges than large middle-income countries trying to safeguard low-income populations against disasters.

While the overall goal of disaster risk financing and insurance—to increase the financial resilience of society to disasters—is common across all countries, experience has shown that governments become interested in disaster risk financing and insurance primarily for two different reasons. First, governments are often looking to address a particular problem through implementing a specific product or financial instrument such as risk transfer to international markets; the challenge is to help

policy makers situate this instrument in the larger context of financial protection and disaster risk management. Second, governments may also be seeking help in achieving a particular development goal, such as protecting smallholder farmers against drought or ensuring access to immediate post-disaster liquidity for central or subnational governments.

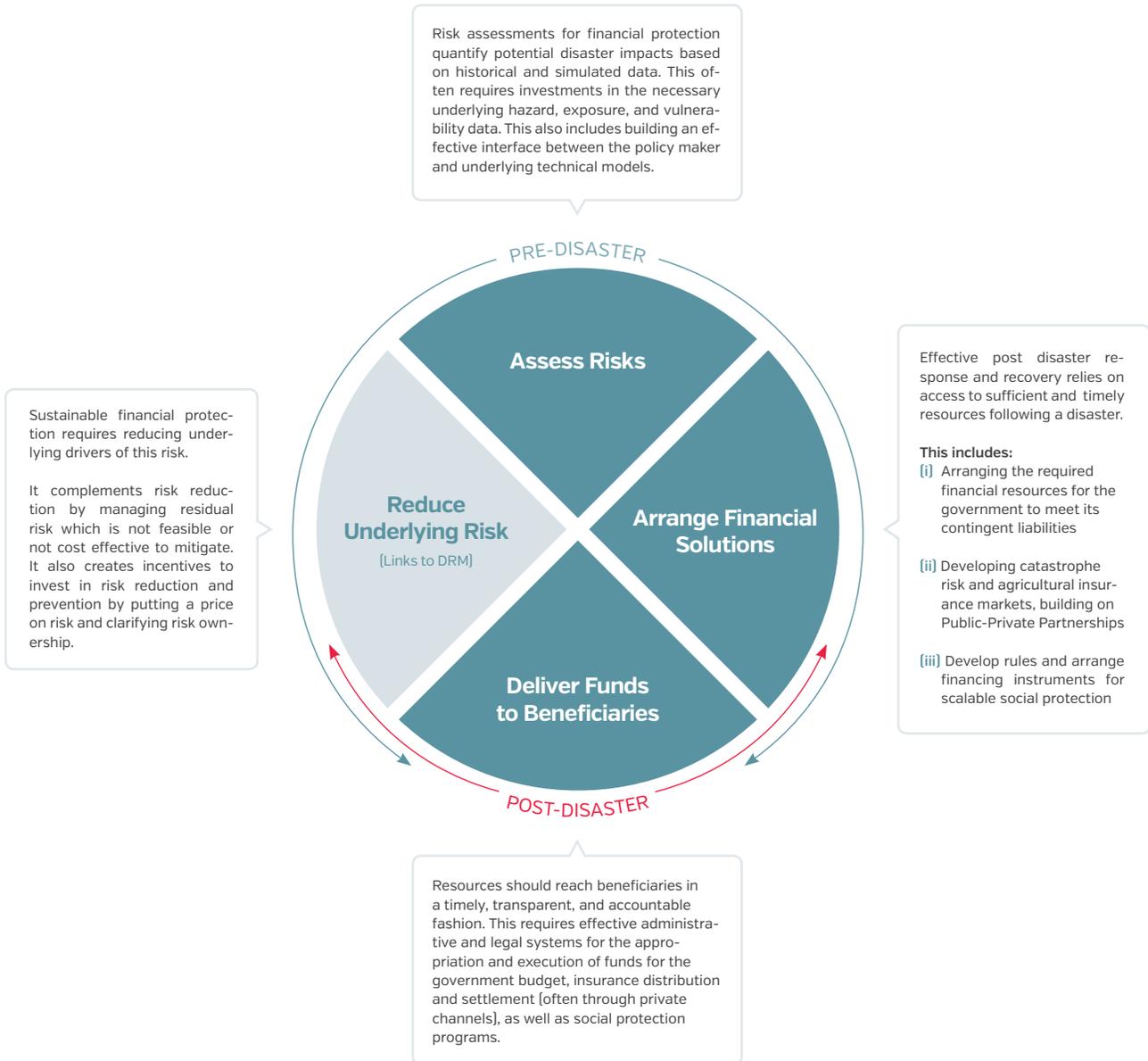
In both cases, this operational disaster risk financing and insurance framework provides decision makers with a practical guide for beginning relevant discussions with all stakeholders—from government agencies and taxpayers to donors and private insurance companies—and to gain an understanding of how the work might evolve over time. As a second step, it helps governments to identify and prioritize policy options and the necessary actions to implement these choices, depending on the particular situation and timeframe

The Operational Disaster Risk Financing and Insurance Framework is presented in three components: (i) an overview of the core technical steps in developing and implementing financial protection solutions (*see Figure 11*); (ii) a decision process for governments engaging in the disaster risk financing and insurance process, which brings together the technical steps with the guiding policy questions (*see Figure 12*); and, (iii) an overview of actions governments can consider for each of these steps

Photo Credit:
Nicholas Kingston,
Cairo, Egypt



Figure 11 Operational Disaster Risk Financing and Insurance Framework: Core technical steps



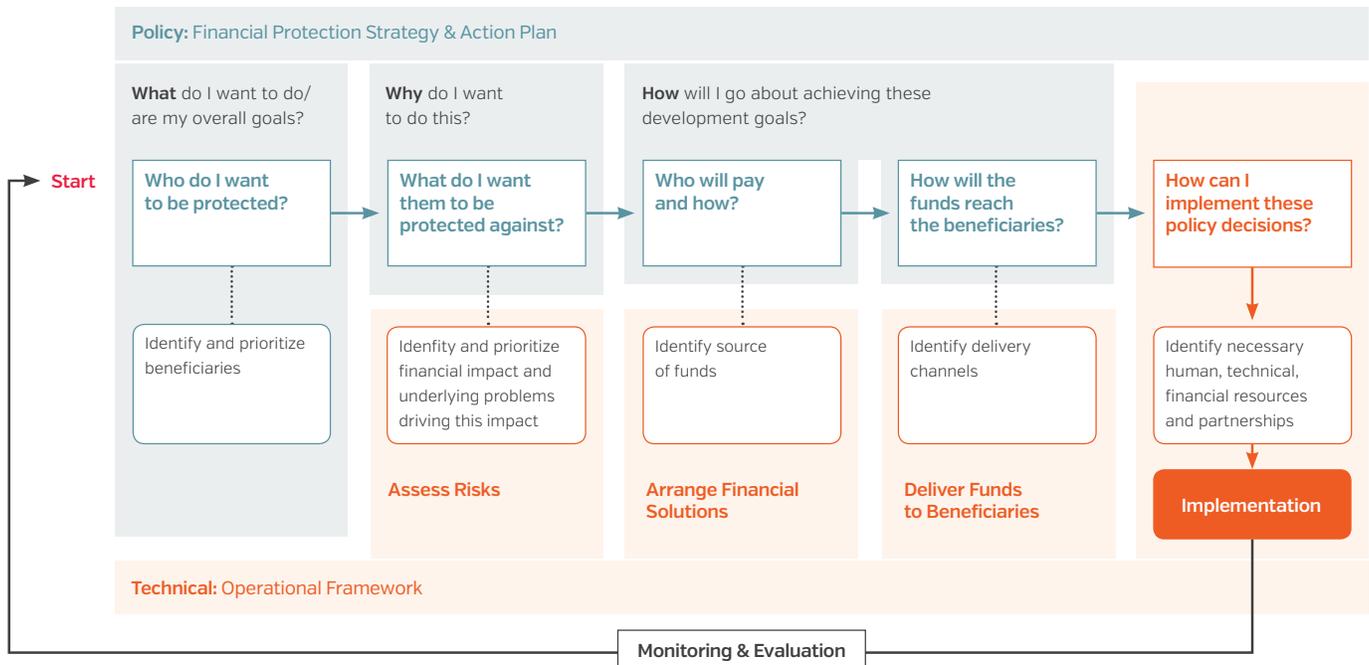
to increase the financial resilience of the four main groups of beneficiaries and illustrative examples from international experience (see Figure 13 and Figure 14).

The second component (see Figure 12) lays out a decision process for a government interested in financial protection, with decisions to be made on both the policy and the technical side. This process seeks to first identify and prioritize the key policy objectives of the government and subsequently develop the required actions to achieve them. This decision process guides policy makers through a set of fundamental questions that determine the shape and direction of the country’s disaster risk financing and insurance engagement, embedded within an

overall disaster risk management strategy. Annex I contains an extended decision tree to guide policy makers through this process.

As the first step in implementing disaster risk financing and insurance solutions, policy makers should clarify the overall development goals and identify the intended beneficiary of their risk financing policy. As discussed earlier, most often this is one or multiple of four main groups of beneficiaries of financial protection policies: the (national or subnational) government, homeowners and SMEs, farmers, and the poorest and most vulnerable in society. Second, historical information and risk assessments help identify the financial impact on these groups and the underlying causes

Figure 12 A decision process to guide governments in building financial resilience





driving these effects, for example recurring budget volatility caused by emergency spending following hurricanes and reconstruction of uninsured public assets.

Following this, officials will have to consider possible solutions. These include mechanisms to manage financial risk and mobilize the required resources, such as risk transfer to international markets or deciding to rely on post-disaster budget reallocations. Decision makers must also determine how these funds will reach the intended beneficiaries. Finally, they must establish the required resources and partnerships to implement these policies. Once these policy decisions are made and the government is addressing its immediate concerns, it can consolidate all of them into a

comprehensive financial protection strategy and action plan.

Bringing together the four main policy areas of disaster risk financing and insurance as discussed earlier in the operational framework provides a more detailed matrix of policy objectives that policy makers can consult (*see Figure 13*). This also places individual activities in the larger context, potentially leading to multiple wins. For example, scalable social protection and agricultural insurance can work hand in hand, often drawing on the same distribution systems and indexes to trigger payouts and protect different segments of the population.

Figure 14 presents illustrative examples of how governments are implementing disaster risk financing and insurance solutions. Annex

	GOVERNMENT ACTIONS FOR FINANCIAL PROTECTION OF THE STATE	GOVERNMENT ACTIONS FOR FINANCIAL PROTECTION OF SOCIETY
BENEFICIARIES	GOVERNMENT - NATIONAL AND SUBNATIONAL [SOVEREIGN DRFI]	HOMEOWNERS AND SMES [PROPERTY CATASTROPHE RISK INSURANCE]
ACTIONS		
<i>ASSESS RISKS</i>	<ul style="list-style-type: none"> • Collect and manage risk and loss data • Assess and legally establish the state's contingent liabilities to disasters • Quantify potential disaster-related loss from fiscal and budget perspective • Assess potential post-disaster (short-term and long-term) funding gaps • Situate financial protection in overall disaster risk management agenda 	<ul style="list-style-type: none"> • Collect and manage risk and loss data • Quantify potential disaster-related loss from property damage • Quantify potential disaster losses on low-income households (including farmers), in addition to the impact of losses on welfare and human development • Identify share of loss incurred by public and private stakeholders • Assess capacity and solvency of domestic insurance markets • Understand level of demand from target population for risk transfer products
<i>ARRANGE FINANCIAL SOLUTIONS</i>	<ul style="list-style-type: none"> • Develop financial decision-making tools • Develop a national strategy for financial protection within broader fiscal risk management <ul style="list-style-type: none"> - Secure immediate liquidity for budget support following disasters through risk layering using financial instruments such as reserves, contingent credit, and catastrophe risk transfer - Secure longer-term reconstruction financing, such as a public asset insurance program 	<ul style="list-style-type: none"> • Promote domestic demand for insurance through reducing cost to beneficiary <ul style="list-style-type: none"> - Public provision of risk market data and risk financing structures - Compulsory versus voluntary schemes - Awareness/education of consumers about insurance products - Financial incentives through premium subsidies or tax breaks • Develop domestic supply of insurance <ul style="list-style-type: none"> - Assess legal and regulatory environment and insurance supervision to allow private sector to develop private insurance solutions while also protecting consumers - Risk data collection, management, and sharing - Indemnity and Index-based product development - Insurance pools
<i>DELIVER FUNDS TO BENEFICIARIES</i>	<ul style="list-style-type: none"> • Establish a national disaster fund • Establish transparent, timely, and effective disaster declaration and post disaster loss reporting mechanisms • Establish post-disaster budget execution mechanisms to transfer funds from national to subnational level and from the Ministry of Finance to line ministries 	<ul style="list-style-type: none"> • Develop risk market infrastructure to support delivery channels <ul style="list-style-type: none"> - Underwriting and claims settlement process - Delivery channels through insurance intermediaries - Alternative delivery channels: Banks, micro-finance Intermediaries, nongovernmental organizations, etc.
<i>LINKAGES TO DISASTER RISK MANAGEMENT</i>		<ul style="list-style-type: none"> • Reduce Underlying Drivers of Risk

Figure 13 Operational DRFI Framework: Actions for governments to build financial resilience across society

FARMERS [AGRICULTURAL INSURANCE]	THE POOREST [DISASTER-LINKED SOCIAL PROTECTION]
<ul style="list-style-type: none"> • Collect and manage risk and loss data • Quantify potential disaster-related loss from property damage • Quantify potential disaster losses on low-income households (including farmers), in addition to the impact of losses on welfare and human development • Identify share of loss incurred by public and private stakeholders • Assess capacity and solvency of domestic insurance markets • Understand level of demand from target population for risk transfer products 	<ul style="list-style-type: none"> • Collect and manage disaster risk and loss data • Quantify potential disaster-related losses on the poor (welfare impact) • Quantify potential disaster-related loss through social protection on government budget (fiscal impact)
<ul style="list-style-type: none"> • Promote domestic demand for insurance through reducing cost to beneficiary <ul style="list-style-type: none"> - Public provision of risk market data and risk financing structures - Compulsory versus voluntary schemes - Awareness/education of consumers about insurance products - Financial incentives through premium subsidies or tax breaks • Develop domestic supply of insurance <ul style="list-style-type: none"> - Assess legal and regulatory environment and insurance supervision to allow private sector to develop private insurance solutions while also protecting consumers - Risk data collection, management, and sharing - Indemnity and Index-based product development - Insurance pools 	<ul style="list-style-type: none"> • Secure contingent funding for disaster linked social protection • Enhance cash transfer programs with insurance principles and scalability mechanism, including transparent rules for payout • Develop eligibility criteria for post-disaster component • Determine targeting mechanism for beneficiaries
<ul style="list-style-type: none"> • Develop risk market infrastructure to support delivery channels <ul style="list-style-type: none"> - Underwriting and claims settlement process - Delivery channels through insurance intermediaries - Alternative delivery channels: Banks, micro-finance Intermediaries, nongovernmental organizations, etc. 	<ul style="list-style-type: none"> • Develop systems and processes to enable effective execution of scalability component • Improve assessing eligibility of beneficiaries for post-disaster payouts and targeting of payouts
<ul style="list-style-type: none"> • Promote Improved Risk Information 	

BENEFICIARIES ACTIONS	GOVERNMENT - NATIONAL AND SUBNATIONAL [SOVEREIGN DRFI]	HOMEOWNERS AND SMEs [PROPERTY CATASTROPHE RISK INSURANCE]
<i>ASSESS RISKS</i>	<p>The government of Colombia included the assessment of contingent liabilities from disasters in the government's 2011 fiscal risk management strategy.</p> <p>In Mexico, R-FONDEN—a probabilistic catastrophe risk modeling tool—creates probabilistic simulations of potential material and human losses from disasters.</p> <p>Morocco developed a probabilistic catastrophe risk modeling tool to help the government prioritize risk reduction investments.</p> <p>The Philippines has developed a catastrophe risk model to evaluate options for risk transfers and insurance to reduce the fiscal burden of disasters.</p> <p>The Pacific Risk Information System, under the Pacific Catastrophe Risk Assessment and Financing Initiative, includes a database of over 3.5 million geo-referenced buildings and infrastructure in 15 Pacific island countries. It was used to develop the Pacific Catastrophe Risk Insurance Pilot.</p>	<p>In Taiwan, China, the Residential Earthquake Insurance Fund has developed an earthquake risk model to strengthen the independence and professionalism of earthquake risk assessments.</p> <p>The preparation of the Southeast Europe and Caucasus Regional Catastrophe Risk Insurance Facility includes extensive multi-hazard country risk assessments for climate and geological hazards.</p>
<i>ARRANGE FINANCIAL SOLUTIONS</i>	<p>Contingent lines of credit provide developing countries with funds immediately following disasters. Products are offered by the World Bank, IDB and JICA.</p> <p>The first multi-country risk pool, the Caribbean Catastrophe Risk Insurance Facility, established in 2007, offers 16 small island states countries over \$150 million in hurricane and earthquake coverage.</p> <p>In 2006, Mexico transferred \$450 million of earthquake risk to financial markets by combining the world's first government catastrophe [cat] bond [\$160 million] with parametric reinsurance [\$290 million].</p> <p>In Colombia, the government uses standardized terms and conditions informed by international best practices to purchase catastrophe insurance for its public buildings.</p>	<p>The Turkish Catastrophe Insurance Pool, a public-private partnership with the domestic insurance industry, provides compulsory, affordable earthquake insurance to homeowners, and has catastrophe insurance coverage from less than 3 percent to over 40 percent of residential buildings in urban areas.</p> <p>The Japanese public-private earthquake insurance program for homeowners relies on the Japan Earthquake Reinsurance Company, an earthquake reinsurance pool backed by the government.</p>
<i>DELIVER FUNDS TO BENEFICIARIES</i>	<p>The government of Mexico established a post-disaster loss reporting mechanism managed by the Natural Disaster Fund (FONDEN). Affected states can therefore access timely payments from FONDEN, reducing time-consuming coordination problems.</p> <p>In the Cook Islands, the establishment of the government's Disaster Emergency Trust Fund has served to reduce delays in emergency response.</p>	<p>A public-private partnership, the Turkish Catastrophe Insurance Pool relies on the domestic insurance market for the distribution and settlement of claims.</p> <p>MiCRO's coverage in Haiti is bundled with loans from Fonkoze, the country's largest microfinance institution.</p> <p>A collective voluntary insurance scheme against earthquakes in Manizales, Colombia uses the property tax system to collect insurance premiums.</p>
<i>LINKAGES TO DISASTER RISK MANAGEMENT</i>	<p>Mexico's natural disaster fund FONDEN has evolved to include financial accounts to finance investment in risk reduction. It promotes informed decision by requiring state governments to complete a risk assessment (including development of a risk atlas) before becoming eligible for risk reduction project financing.</p>	<p>After setting up the TCIP, the government of Turkey legally abolished its obligation to fund the reconstruction of residential dwellings following earthquakes. It also strengthened building construction codes and ensured they were adhered to.</p>

Figure 14 Operational DRFI Framework: Illustrative examples of financial protection

FARMERS [AGRICULTURAL INSURANCE]	THE POOREST [DISASTER-LINKED SOCIAL PROTECTION]
<p>India has developed detailed agricultural risk assessment tools to help policymakers better understand the economic consequences of drought, quantify its effects, and investigate the impact of risk coping strategies, at both the farm and state levels.</p> <p>In Mongolia, livestock census and surveys are used to inform the government about the economic and fiscal impact of adverse weather events, and in the design and pricing of index-based livestock insurance policies.</p>	<p>In the Philippines, a survey is mapping out the poorest communities, making it easier to deliver social welfare support, including assistance following a disaster, to those most in need.</p> <p>Kenya's Hunger Safety Net Program is investing in poverty mapping to understand levels of household vulnerability. The International Livestock Research Institute developed models to understand drought risk in northern Kenya</p> <p>Africa Risk View, the technical model underlying the African Risk Capacity risk pool, combines existing rainfall-based drought early warning models with data on vulnerable populations to form a standardized approach for estimating the cost of responding to food insecurity across the continent.</p>
<p>The Index-Based Livestock Insurance Pilot in Mongolia protects the livelihoods of 11,000 herders, or 22 percent of all herders in piloted provinces in 2012.</p> <p>India's weather-based crop insurance has been in place since 2007 for 11 growing seasons, with 11.6 million farmers and \$370 million covered in the most recent season. The national crop insurance program, operating since 2010, offers more than 1.1 million farmers a total of \$67 million coverage in yield crop insurance.</p> <p>In Morocco, the government and the agricultural mutual insurance company have established a crop insurance program for cereal crops that currently covers 700,000 hectares and will soon be extended to fruit trees.</p>	<p>The Productive Safety Net Programme (PSNP) in Ethiopia aims to help the rural poor facing chronic food insecurity to resist shocks and become food self-sufficient. The PSNP includes including continent grants with the World Bank for emergency scale up.</p> <p>Insurance products offered through the 'Center for Agriculture and Rural Development Mutual Benefit Association (CARD MBA)' in the Philippines are mandatory for members of a network of institutions including CARD NGO and CARD Bank, providing scale and preventing adverse selection.</p>
<p>Distribution of insurance policies in the Moroccan multi-peril crop insurance program takes place either by linkage to loans made by Crédit Agricole or by direct marketing of MAMDA, the sole provider of agriculture insurance in the country, structured as a mutual.</p> <p>The national crop insurance program in India uses GPS-enabled mobile phones and video recording technology to improve crop-cutting experiments and the accuracy of claims assessments, which also reduces fraudulent claims. Claims settlement takes place through direct payment to bank accounts.</p>	<p>HARITA, (since renamed to R4), was launched in Ethiopia in 2007 as a pilot program to address the needs of small-scale farmers through drought insurance, credit, and risk reduction, allowing farmers to pay for insurance through labor, an idea based on "food-for-work" programs.</p>
<p>Indian farmers' agricultural insurance premiums are now based on their individual risk profile after the national crop insurance program moved to a risk-based "actuarial regime". This allows farmers to see the riskiness of planting different crops and choose appropriately.</p>	<p>Members of PSNP households must participate in productive activities to build more resilient livelihoods, such as rehabilitating land and water resources and developing community infrastructure, such as rehabilitating rural road and building schools and clinics.</p>

VI contains links to additional information for these examples.

The government of Colombia, followed by Panama and the Philippines, was among the first governments to develop and publish a comprehensive disaster risk financing strategy. Engaged in identifying and managing the fiscal risk posed by natural disasters since the mid-2000s, the Risk Management Unit of the Ministry of Finance led the strategy's preparation (see Table 6).

In the Philippines, the National Treasury within the Department of Finance finalized a national financial protection strategy in 2014 (see Table 7).

Once a strategy has been developed, the government can formulate an action plan outlining specific steps it will take to implement its policy goals over the next two to three years. While the government's longer-term strategy is likely to remain in place for five to ten years, the action plan should be a living document; the government may want to regularly review and update it, reflecting changes and developments in implementation.

Monitoring and evaluation is crucial during the strategy's implementation to identify what works, what doesn't work, and why, and subsequently refine the policy goals and actions. This includes both monitoring progress as well as evaluating the impact thereof and results achieved. Continuous feedback

Table 6 Government of Colombia's policy strategy for public financial management of disaster risk

OVERARCHING GOAL:	The Ministry of Finance seeks to assess, to manage, and to reduce its contingent liability related to natural disasters to support achievement of macroeconomic stability and fiscal balance.
POLICY OBJECTIVES:	<ol style="list-style-type: none"> 1. Improve identification and understanding of fiscal risk due to natural disasters; 2. Strengthen financial management of disaster risk, including the implementation of innovative financial instruments; and 3. Enhance catastrophe risk insurance for public assets.
Example of longer-term actions to achieve Policy Objective 3:	<p>To achieve its objective of enhancing catastrophe risk insurance for public assets over the next five to ten years, the Ministry of Finance will:</p> <ol style="list-style-type: none"> 1. Build an information system on public buildings, including information on physical characteristics of buildings and insurance policies already in effect; 2. Partner with other public agencies and authorities to establish a centralized system for purchasing and managing insurance for government buildings, starting with the health and education sectors; 3. Improve insurance requirements for buildings and road infrastructure concessions, that align with international reinsurance market technical standards; and 4. Share the Ministry of Finance's experience by providing best practice insurance guidelines to subnational governments, in collaboration with the country's disaster risk management agency.

Source: Government of Colombia, 2013.

Table 7 The government of the Philippines' national strategy for disaster risk financing and insurance

OVERARCHING GOAL:	The Department of Finance seeks to (i) sustain economic growth and protect development gains from disaster shocks; and (ii) reduce the impact on the poorest and most vulnerable and prevent them from falling into a cycle of poverty.
POLICY OBJECTIVES:	<ol style="list-style-type: none"> 1. National Level: Improve the financing of post-disaster emergency response, recovery, and reconstruction needs. 2. Local Level: Provide local governments with funds for post-disaster recovery and reconstruction efforts. 3. Individual Level: Empower poor and vulnerable households and owners of small and medium-sized enterprises to quickly restore their livelihoods after a disaster. 4. Risk Analytics: Use disaster risk data to support decision making on financial protection.
Examples of actions to achieve Policy Objective 1:	<p>To achieve its objective of improving the financing of post-disaster funding needs at the national level, the Department of Finance will:</p> <ol style="list-style-type: none"> 1. Improve the financing of post-disaster emergency response, recovery, and reconstruction needs; 2. Build up multi-year reserves through annual contributions to a response contingency fund set aside for post-disaster response efforts; and 3. Use risk transfer to access international private reinsurance and capital markets

Source: Government of the Philippines, 2014.

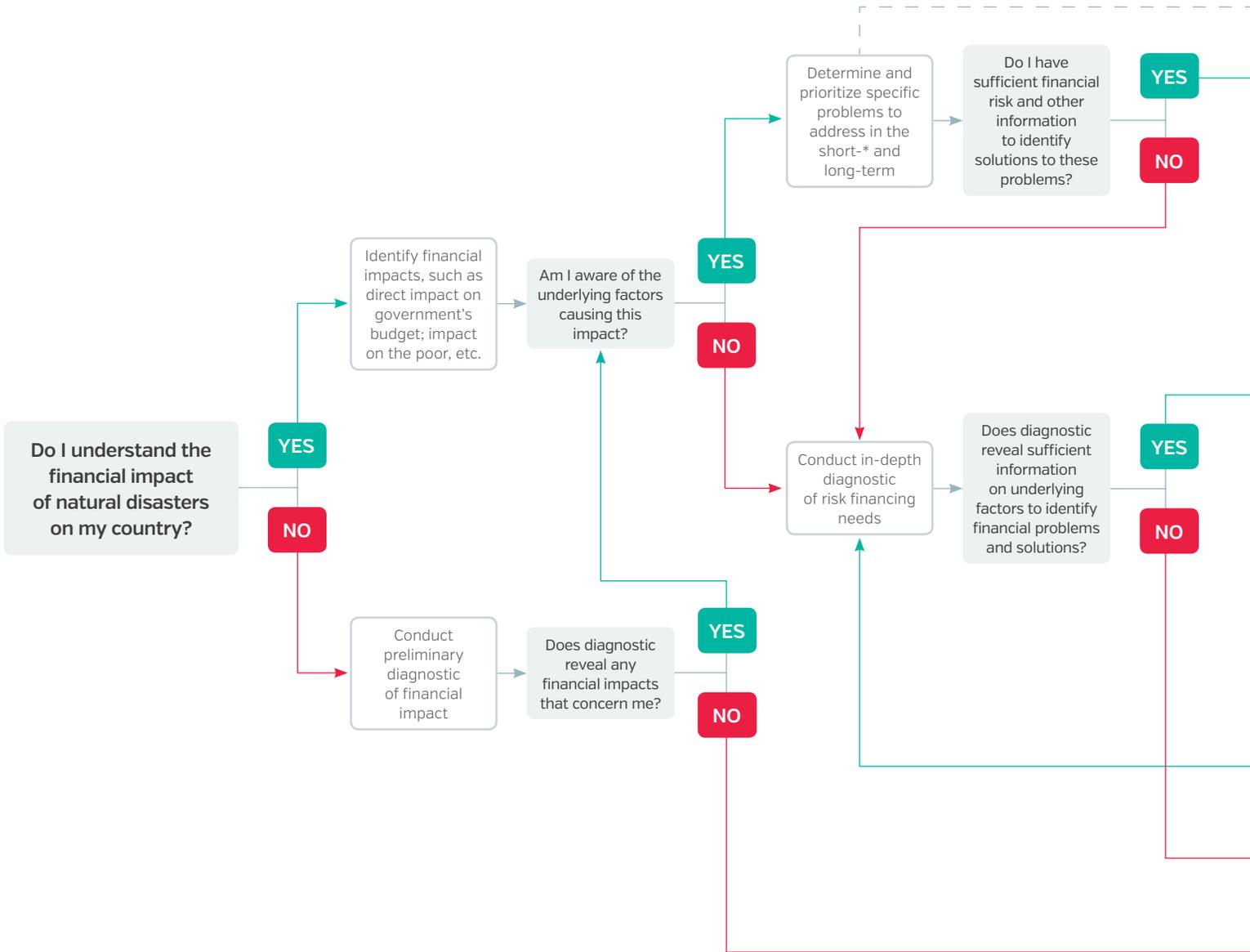
from monitoring and evaluation enables an iterative process with regular refinement and adjustments to both the strategy and action plan. This is important not only when directly looking at the benefits and cost of risk financing instruments. A better understanding of the public finance implications of risk financing instruments helps understand their true value. While a \$3.2 million payout by CCRIF to St. Lucia following a 2010 hurricane may have only represented 0.7 percent of total expenditure, this was an estimated 49.3 percent of the total contingency budget available (Bevan and Cook, 2014).

Disaster risk financing and insurance is only one aspect of comprehensive disaster risk management.

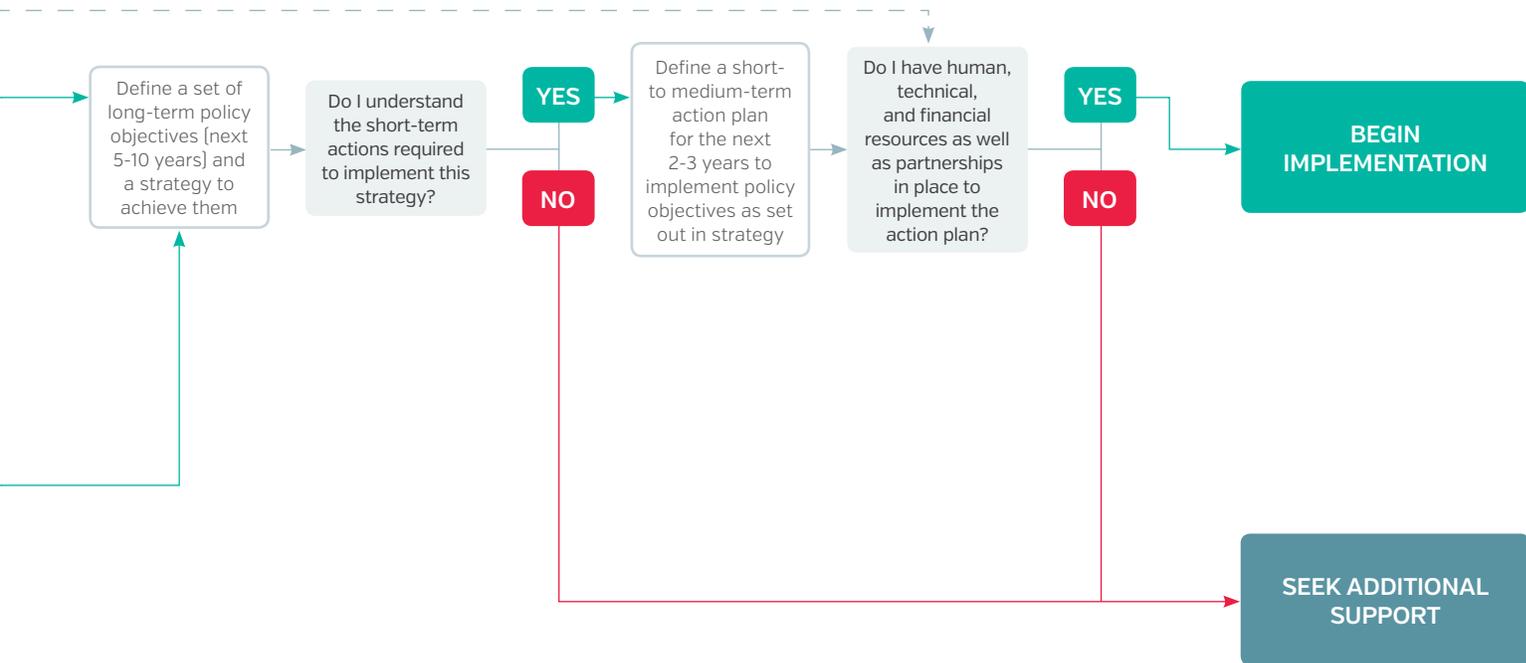
While it can offer countries many possibilities in addressing the financial impact from disasters, financial protection policies cannot be sustainable unless they are integrated into a larger framework of risk reduction activities. Once a government is addressing the most direct human suffering from disasters, financial protection can help protect society against many of the direct and indirect effects that cannot be reduced or prevented.

Improved evidence to better understand the benefit and costs of alternative risk financing activities helps governments develop more effective risk management strategies overall by deciding when it is prudent to invest in risk financing and when other options should be chosen first.

Annex I: Expanded Decision Tree for Disaster Risk Financing and Insurance Engagement by Governments



* If there are concrete actions that could reduce financial risk in the short-term, begin implementation of these actions in parallel.



Annex II: Some commonly asked questions when considering disaster risk financing and insurance

Why should the government invest in risk market infrastructure? (And what does that mean anyway?)

Risk market infrastructure is the public goods and institutions to align incentives of the private sector with those of the beneficiary. Specifically this requires building or improving systems for collection, auditing, financing, and managing data; product distribution, underwriting, and portfolio and claims management; as well as adapting the country's legal and regulatory framework to support catastrophe risk insurance markets. Public investment in this infrastructure can lower the cost of insurance for beneficiaries, enable the development of insurance markets, and encourage demand while avoiding the possible disadvantages and sustainability issues that direct premium subsidies can create. Often, government already possesses such data, but it is not accessible for the purpose of developing insurance solutions.

High quality data⁴¹ is indispensable for developing insurance markets, as it forms the basis for effective and sustainable insurance solutions for all segments of society. Agricultural insurance products for low-income farmers or herders, for example, are usually built on indices that use agricultural or climatic data.⁴² Only an index that accurately reflects conditions experienced by the farmer is likely to provide cost-effective, reliable protection with low basis risk (see also next question on index insurance). Policy makers play an important role in establishing a framework for data collection, auditing,⁴³ financing, and management, as well as equal access to this data by all market participants.

For example, the government can support investments in audited area average yield data—average crop yield in a given area, controlled for quality and accuracy, that indicates harvest size—enabling the construction of indexes that reliably protect farmers. Reliable data auditing and data management are also necessary for

governments if they hope to access international reinsurance markets, which require a high standard of data to develop and price insurance products. If these companies have concerns about how the data is audited, they will charge significantly higher premiums.

An enabling legal and regulatory framework for insurance market development is also crucial. Policy makers need to decide on the legal foundation for catastrophe risk insurance products and determine the capital and reinsurance requirements for insurance companies underwriting the risk. For example, the World Bank Global Index Insurance Facility assisted the Conférence Interafricaine des Marchés d'Assurances—the regional body of the insurance industry for 14 countries in francophone Africa—in drafting amendments to their current regulation to allow for micro-insurance, including agricultural index insurance. This has been ratified by all 14 ministers of finance.

Banking regulations may also be relevant, since linking agriculture insurance to loans to the rural sector is often an effective way of achieving large scale outreach of agriculture insurance. In India, for example, all loans to the rural sector must be accompanied with insurance. This protects rural banks against agricultural shocks; protects the farmer through insurance; and can increase rural lending, leading to increased productivity.

What is index insurance and should I consider it?

Unlike traditional insurance indemnity-based products that requires the assessment of individual losses following an insurable event, index-based (including parametric) insurance policies make payouts based on a predetermined trigger, such as crop yield estimates, in a given geographical area. Other triggers could be based on the location or intensity of a natural hazard, such as wind speed, rainfall levels, or ground acceleration

from earthquakes. The particular index used can be tailored to the availability of data, such as using a parametric index when only hazard data are available (which pays out on a given hazard event), but using a modeled loss index when exposure data are available (which pays out in line with loss modelled using actual exposure data and the parameters such as wind speed from the actual event). Parametric coverage demands improved accuracy of hazard risk data collection systems because of the heavy reliance on objective measurement of weather and hazard parameters.

Index insurance offers several advantages in relation to traditional or indemnity insurance, such as quicker payouts, lower administrative costs, and reduced moral hazard and adverse selection. For example, at the micro-level it allows domestic insurance companies to offer simple and transparent solutions to farmers to transfer weather risks such as drought, excess rainfall, or low temperatures.

But index insurance is not without its challenges. In particular *basis risk*, implicit in all index insurance, is the risk that the index measurement will not match individual losses. For example, an insured individual or asset may experience a loss from a disaster that does not reach the threshold of the set trigger and hence does not lead to a payout. Alternatively, a payout could be triggered without any damage and losses incurred. Improved accuracy of hazard data collection systems, increased openness and centralization of historical data, and better quality risk assessments could reduce basis risks, enabling a more efficient and effective use of parametric insurance. For any government it is crucial to understand basis risk given the proposed insurance options, and to carry out a cost-benefit analysis of different potential indexes with different levels of basis risk.

What role do premium subsidies play in disaster risk financing and insurance?

Achieving scale is fundamental to the sustainability of insurance programs at the country level, as this enables costs to be spread among numerous policyholders. Government policies play an important role in increasing outreach and

achieving this scale and can reduce the cost paid for insurance by beneficiaries in many different ways. As governments make policy decisions, they should limit public subsidy programs to those that minimize distortions of market price signals and keep in mind that premium subsidies are not always economically efficient.

Often practitioners focus on public subsidy programs as a way of making insurance more affordable and achieving scale. There are, however, several disadvantages to providing direct premium subsidies. For example, they can lead policyholders to underinvest in risk reduction activities—such as irrigation or diversifying crops—or to investing in nonviable crops as they are insured against crop failure. In addition, subsidies by the government are often not sufficiently targeted to reach the poorest in society and once put in place they are politically very difficult to phase out. Direct subsidies, however, could be justified as part of a social safety net program, where the government uses the insurance industry as a delivery system to distribute financial assistance to households in need. Rather than, or in addition to, providing direct premium subsidies, governments or donors can invest in overcoming market inefficiencies that in developing countries often cause underinvestment by insurance companies.

For example, the government could provide subsidies by paying for risk-related data; acting as a reinsurer of last resort; or enforce or encourage the buying of insurance. For instance, many large-scale agricultural insurance programs in low- and middle-income countries, such as in India or China, have achieved scale in part due to insurance being bundled with agricultural credit on a compulsory basis. Turkey's national catastrophe risk insurance program, which currently protects over six million households, achieved scale in part due to coverage being compulsory for homeowners.

The government of India significantly subsidizes the cost of providing data to the country's private agriculture insurance market. Similarly, the government of Mongolia pays for the collection of all data used in its Index-Based Livestock Insurance Scheme and provides it to accredited insurance companies. It also provides a fully-financed social

safety net to all farmers at no additional cost that kicks in when major losses exhaust insurance payouts. In addition, government extension workers provide education to herders about livestock insurance and how it can complement holistic herd risk management.

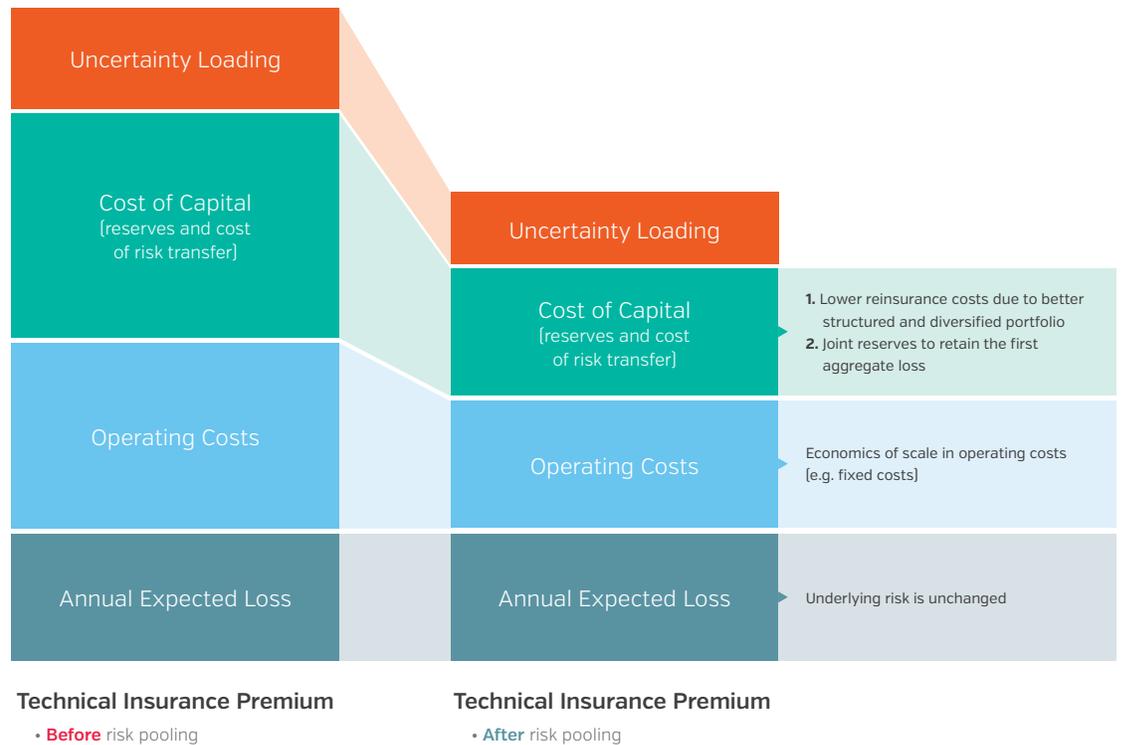
How can catastrophe risk pools benefit a disaster risk financing and insurance program?

By aggregating risk into larger, more diversified portfolios, catastrophe risk pooling at the national or regional level between countries can reduce the cost of accessing international insurance markets. Pooling risks generates diversification benefits that are reflected in reduced insurance premiums (see Figure 15 which illustrates a total premium and its components before and after risk pooling).

In addition to aggregation and scale, catastrophe risk pooling can accumulate financial reserves over time, allowing participants to self-insure or cover the first loss from these funds. By increasing risk retention—which reduces the probability of an insurance payout—participants can achieve a further reduction in insurance premiums (Cummins and Mahul, 2009).

The Pacific Catastrophe Risk Insurance Pilot, launched in 2013, illustrates how risk pooling can reduce premium costs. Country policies were placed on the international reinsurance market as a single, diversified portfolio, significantly reducing the cost of catastrophe coverage compared to the cost of individual governments maintaining reserves or independently purchasing insurance. The six participating Pacific island countries have obtained an estimated 50 percent reduction in premium payments compared to what they would pay if buying the same coverage individually.

Figure 15 How insurance premiums benefit from risk pooling and improved risk data



Source: World Bank-GFDRR Disaster Risk Financing and Insurance Program

Annex III: Natural Disaster Losses 1990-2012, in 2012 US\$ millions

	TOTAL LOSS		INSURED LOSS	
AFRICA	\$	16,821	\$	1,073
EARTHQUAKES	\$	6,895	\$	93
WEATHER-RELATED	\$	9,926	\$	981
ASIA	\$	1,292,907	\$	111,601
EARTHQUAKES	\$	596,857	\$	46,521
WEATHER-RELATED	\$	696,050	\$	65,080
EUROPE	\$	366,363	\$	108,682
EARTHQUAKES	\$	65,379	\$	4,502
WEATHER-RELATED	\$	300,984	\$	104,181
NORTH AMERICA	\$	959,159	\$	536,499
EARTHQUAKES	\$	48,746	\$	22,237
WEATHER-RELATED	\$	910,413	\$	514,263
OCEANIA/AUSTRALIA	\$	69,515	\$	41,243
EARTHQUAKES	\$	29,456	\$	22,690
WEATHER-RELATED	\$	40,059	\$	18,554
SOUTH AMERICA	\$	135,448	\$	18,988
EARTHQUAKES	\$	51,017	\$	9,747
WEATHER-RELATED	\$	84,431	\$	9,242
WORLD	\$	2,841,077	\$	818,554
EARTHQUAKES	\$	798,350	\$	105,788
WEATHER-RELATED	\$	2,042,728	\$	712,766

Source: Swiss Reinsurance Corporation; all figures rounded to nearest million

Annex IV: Insurance and the financial resilience of countries

The full story of disaster losses cannot be told without looking at the financial vulnerability of countries. For example, the macroeconomic cost of natural disasters is directly related to a country's development of property catastrophe insurance markets. Analysis has shown that following a major natural disaster, average decline in GDP growth (0.8 percent) and cumulative permanent loss (2.53 percent) are driven by uninsured losses, whereas the effects of insured losses are insignificant (von Peter, et. al., 2012). The pivotal role played by the private insurance sector is further highlighted by findings that show cumulative GDP loss becoming

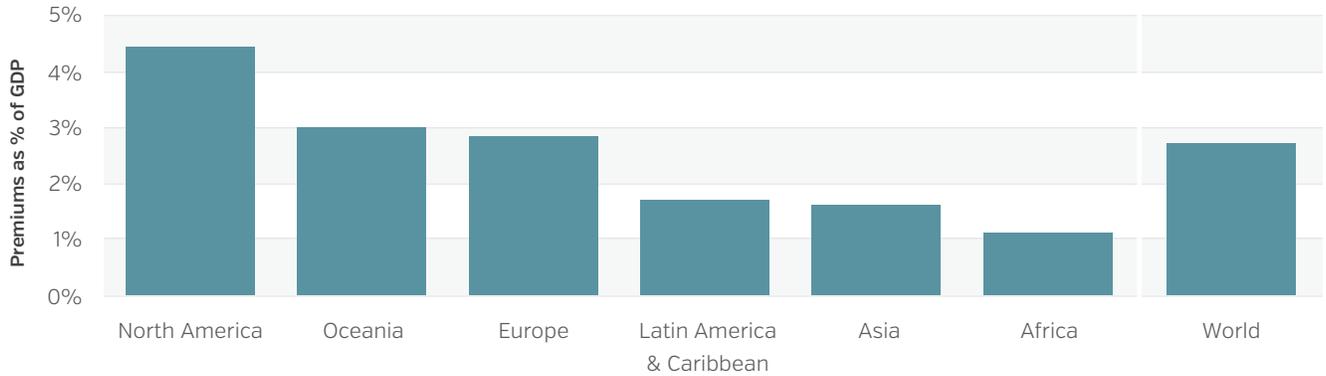
insignificant when insurance coverage reaches 60 percent of disaster losses.⁴⁵

In the absence of strong indicators on the financial vulnerability of countries, non-life insurance penetration can be seen as a proxy for this aspect of financial resilience. The level of non-life insurance penetration, however, varies widely around the world (*see Figure 16*).

A comparison of a number of recent catastrophic disasters highlights the low percentage of direct loss insured, especially in low- and middle-income countries (*see Figure 17*).

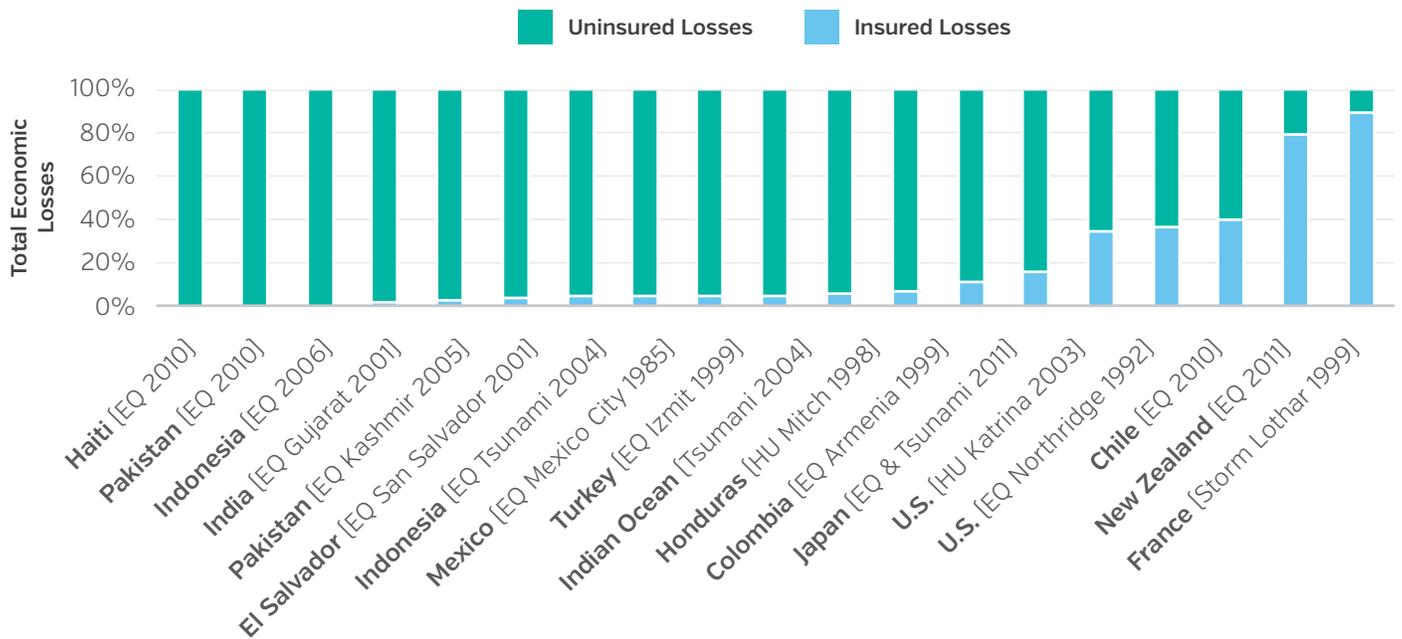


Figure 16 2012 Penetration of non-life insurance, premiums as percentage of GDP



Source: Authors with data from Swiss Reinsurance Corporation. While this gives an indication of the state of development of insurance markets, it is important to note that catastrophe risk insurance is a small fraction of overall non-life insurance.

Figure 17 Insured versus uninsured loss of selected events



Source: World Bank Disaster Risk Financing and Insurance Program.

Annex V: Further Information on Disaster Risk Financing and Insurance Initiatives Discussed

INITIATIVE	FURTHER INFORMATION
Index-based livestock insurance in Kenya and Ethiopia	http://livestockinsurance.wordpress.com/index/
Turkish Catastrophe Insurance Pool	http://www.gfdr.org/gfdr/sites/gfdr/files/Chapter_14-Turkey-Disaster_Risk_Management_in_Turkey.pdf
India National Agricultural Insurance Scheme	http://siteresources.worldbank.org/EXTDISASTER/Resources/India_mNAIS_Final.pdf
India Weather-Based Crop Insurance Scheme	http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-5985
Romanian Catastrophe Insurance Scheme	http://www.wfcatprogrammes.com/c/document_library/get_file?folderId=39377&name=DLFE-2517.pdf
Mongolia Index-Based Livestock Insurance Program	http://gfdr.org/sites/gfdr.org/files/DRFI_Mongolia%20IBLIP_Final.pdf
Pacific Catastrophe Risk Assessment and Financing Initiative	http://pcrafi.sopac.org/
Ethiopia Horn of Africa Risk Transfer for Adaptation (HARITA)	http://unfccc.int/files/adaptation/application/pdf/swiss_re.pdf
Philippines CLIMBS micro-insurance product	http://www.munichre.com/en/media-relations/publications/press-releases/2010/2010-10-11-press-release/index.html
African Risk Capacity	http://www.africanriskcapacity.org/
Malawi weather-based crop insurance	http://siteresources.worldbank.org/EXTDISASTER/Resources/MalawiDerivative_Final.pdf
MAIPARK	http://www.maipark.com/content/display/background
Malawi sovereign weather derivative	http://siteresources.worldbank.org/EXTDISASTER/Resources/Malawi_WeatherInsurance_Final.pdf
Munich Climate Insurance Initiative	http://www.climate-insurance.org/front_content.php?idcat=858
Jakarta flood micro-insurance product	https://www.gfdr.org/sites/gfdr.org/files/DRFI_WRC_Paper_FINAL_April11.pdf
Caribbean Catastrophe Risk Insurance Facility	http://ccrif.org/
Alliance of Small Island States proposal of a multi-window insurance mechanism	http://unfccc.int/files/kyoto_protocol/application/pdf/aosisinsurance061208.pdf
Government of Colombia disaster risk financing and insurance strategy policy note	http://siteresources.worldbank.org/EXTDISASTER/Resources/8308420-1342531265657/8764015-1392600612835/FINAL_Colombia_Policy_Strategy_for_Public_Financial_Management_of_Natural_Disaster_Risk.pdf
Mexico Natural Disaster Fund (FONDEN)	https://www.gfdr.org/fondenmexicosnaturaldisasterfundareview
Vietnam Agricultural Insurance Pilot	http://cgd.swissre.com/features/Agricultural_reinsurance_in_Vietnam.html
Southeast Europe and Caucasus Regional Catastrophe Risk Insurance Facility	http://www.worldbank.org/projects/P110910/south-east-europe-caucasus-catastrophe-risk-insurance-facility?lang=en and http://www.europa-re.com/

Endnotes

¹ All dollar amounts are U.S. dollars unless otherwise indicated.

² Direct loss refers to the financial cost of destruction directly attributable to a natural disaster, such as the value of damage to buildings, infrastructure, cars and other durable goods, and crops.

³ Indirect loss refers to the wider economic or social consequences arising from direct damage, such as business interruptions, decreased tax revenue, loss of employment, or rise in poverty levels.

⁴ A cumulative output loss or a permanent reduction of a country's GDP from its pre-disaster predicted rate of growth.

⁵ This analysis uses Munich Re's natural disaster (NatCat) data on direct losses from natural disasters from 1960-2011. The analysis considers as "major" natural disasters those above a threshold defined by a minimum of 100 fatalities or \$250 million in losses in constant 2011 U.S. dollars. Small countries are those with landmass at or below the median size of all countries (roughly that of Honduras).

⁶ In this report the term "farmers" refers to all agricultural producers. Using the definition of the World Development Report 2008 on Agriculture for Development, agriculture consists of crops, livestock, agroforestry, and aquaculture.

⁷ Disaster-linked social safety nets and cash transfers are usually aimed at the poorest groups in society, who often do not own any assets or livestock, and who cannot afford insurance products. For example, agricultural insurance very often is targeted at groups earning a very low income, yet this is still a distinctly higher segment of society than beneficiaries of social protection programs.

⁸ Contingent liabilities involve spending obligations arising from past events that will be incurred in the future if uncertain discrete future events occur. Contingent liabilities can be further separated into explicit and implicit contingent liabilities. Explicit contingent liabilities are legal or contractual obligations, such as government guarantees. Implicit contingent liabilities are moral or expected but not legally required public obligations arising from public expectations or pressures, such as the bailout of banks (Cebotari et al 2009; Schiavo-Campo and Tommasi 1999). The variation in governments' contingent liability to natural disasters across countries is driven in great part by legally required or socially and politically

necessitated public support for reconstruction of private assets and social and economic recovery programs.

⁹ Aggravating factors included an election and the incoming government's efforts to honor its commitments, especially to universal free primary education (Benson and Clay 2004).

¹⁰ In 2006, the expected benefits outweighed the costs of purchasing such insurance.

¹¹ See Hallegatte 2014 for a more in-depth discussion of the welfare impact of indirect disaster costs.

¹² The authors define average typhoon wind speeds in the Philippines based on a catalogue of typhoons affecting the Philippines from 1979-2008.

¹³ For example, agriculture is a centerpiece of the Kenyan economy, generating approximately 24 percent of annual GDP and approximately 50 percent of revenue from exports. It is also an important source of employment, with over 70 percent of the population living in rural locations; 14 million are farmers and herders.

¹⁴ Based on a survey including 30 cooperatives, 220 large farms, and 20 corporate farms.

¹⁵ http://www.gfdr.org/sites/gfdr.org/files/Kenya_PDNA_Final.pdf

¹⁶ <http://www.fao.org/NEWSROOM/en/news/2005/89775/index.html>. Jan 8, 2014.

¹⁷ Note that disaster risk financing and insurance instruments do not, as a primary function, reduce liabilities. They reduce contingent liabilities—that is uncertain liabilities—by transferring the volatility of the cost to third parties. Risk is transferred, loss is not.

¹⁸ The importance of sound fiscal risk analysis and management practices is underscored by the recently revised IMF Fiscal Transparency Code.

¹⁹ For more detail on PEFA Assessments see www.pefa.org

²⁰ Aon Benfield, Reinsurance Market Outlook, 2014

²¹ Munich Re NatCat Service

²² An accumulation of risk occurs when a portfolio contains a concentration of risks that might give rise to exceptionally large losses from a single event.

²³ For an additional discussion of the potential for disaster risk financing to support discipline in public financial management, also see Dana and von Dahlen, 2014.

24 Innovations in disaster risk financing and insurance in developed countries are not discussed for the purposes of this paper. For disaster risk financing and insurance products and schemes in ASEAN countries, see WB/GFDRR 2012 report “Advancing Disaster Risk Financing and Insurance in ASEAN Member States: Framework and Options for Implementation.” See also the 2013 OECD report “Disaster Risk Financing in APEC Economies: Practices and Challenges.”

25 This period was also marked by private sector innovation in risk financing instruments for large corporations, insurers, and governments of industrialized countries, instruments that eventually became accessible to governments of developing countries (such as insurance-linked securities).

26 When Mongolia first created its Index-based Livestock Insurance Program the World Bank classified Mongolia as a low-income country. In 2008, its classification changed to lower-middle-income.

27 This timeline is not intended to be an exhaustive list. Rather, based on discussions between the authors and international experts and practitioners, the products and programs on the timeline show key milestones that paved the way for new developments and innovations in disaster risk financing and insurance.

28 Countries have previously issued catastrophe (cat) bonds to protect property insurance pools, such as a 2001 cat bond issued by the California Earthquake Authority and the 2003 cat bond issued to protect the Taiwanese Residential Earthquake Insurance Pool.

29 A parametric trigger makes a payment upon the occurrence of a predetermined event.

30 <http://www.tcip.gov.tr/zorunlu-deprem-sigortasi-istatistikler.html>. Feb 7, 2014.

31 http://unfccc.int/files/adaptation/application/pdf/swiss_re.pdf. Feb 7, 2014.

32 https://www.gfdr.org/sites/gfdr.org/files/I_WRC_Paper_FINAL_April11.pdf. Feb 7, 2014.

33 For more detailed discussion see <http://siteresources.worldbank.org/EXTDISASTER/Resources/8308420-1339601356604/AIDP-Strategy-Note-6May13.pdf>. March 30, 2014.

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35 http://www.wfcatprogrammes.com/c/document_library/get_file?folderId=39377&name=DLFE-2517.pdf Feb 7, 2014.

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37 The six participating countries are Cook Islands, the Marshall Islands, Samoa, the Solomon Islands, Tonga, and Vanuatu.

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39 http://www.swissre.com/about_us/global_partnerships/Swiss_Re_provides_Haitis_micro_entrepreneurs_wproceeds.html. Feb 7, 2014.

40 <http://www.artemis.bm/blog/2013/08/30/personal-parametric-weather-insurance-trialled-in-caribbean-by-crcif/>. Feb 7, 2014.

41 From an insurance perspective, data is high quality if it is reliable (so that it properly reflects the actual loss), timely (so that claims can be paid quickly), relevant (so that the product offers reliable protection), audited to international reinsurance standards, and cost-effective.

42 Farm-level multiple peril crop insurance is generally not feasible for small farmers and herders as the low sums insured and high cost of auditing data make the schemes uneconomic. Index insurance, on the other hand, has the advantage of being typically cheaper to deliver, but the quality of the index insurance product depends significantly on the quality of the index, which in turn depends on the quality of the underlying data.

43 Data auditing is the process of controlling data quality and assessing how the data is fit for the given purpose.

44 Moral hazard means that an insured party is less likely to invest in risk reduction because loss will be borne by the insurance company. Adverse selection means that only people at with the highest risk will buy insurance products, eventually rendering the market unsustainable.

45 Whether or not it is cost effective for a country to purchase this level of coverage depends on the frequency of disasters and the cost of insurance.

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Abbreviations

<i>ADB</i>	Asian Development Bank
<i>ARC</i>	African Risk Capacity
<i>CARD MBA</i>	Center for Agriculture and Rural Development Mutual Benefit Association
<i>CAT DDO</i>	World Bank Loan with Catastrophe Deferred Drawdown Option
<i>CatMex</i>	Mexico sovereign parametric catastrophe bond (2006)
<i>CCRIF</i>	Caribbean Catastrophe Risk Insurance Facility
<i>CLIMBS</i>	Philippines micro-insurance product
<i>DFID</i>	U.K. Department for International Development
<i>FONDEN</i>	Mexico Natural Disaster Fund
<i>GFDRR</i>	Global Facility for Disaster Reduction and Recovery
<i>HARITA</i>	Ethiopia Horn of Africa Risk Transfer for Adaptation
<i>IDB</i>	Inter-American Development Bank
<i>JICA</i>	Japan International Cooperation Agency
<i>MICRO</i>	Microinsurance Catastrophe Risk Organization
<i>OECD</i>	Organisation for Economic Co-operation and Development
<i>PCRAFI</i>	Pacific Catastrophe Risk Assessment and Financing Initiative
<i>PEFA</i>	Public Expenditure and Financial Accountability
<i>PSNP</i>	Ethiopia Productive Safety Net Program
<i>SECURE</i>	JICA Stand-by Emergency Credit for Urgent Recovery
<i>SME</i>	Small and Medium Enterprise
<i>SOE</i>	State Owned Enterprise
<i>TREIF</i>	Taiwan Residential Earthquake Insurance Fund
<i>UNFCCC</i>	United Nations Framework Convention on Climate Change
<i>UNISDR</i>	United Nations Office for Disaster Risk Reduction



Disaster Risk Finance helps countries improve financial resilience against natural disasters by implementing sustainable and cost-effective financial protection policies and operations. It supports governments, businesses, and households to manage the financial impacts of disaster and climate risks without compromising sustainable development, fiscal stability, or wellbeing. Financial protection complements investments in risk reduction, prevention, and building resilience. It addresses residual risk, which is either not feasible or not cost effective to reduce or prevent.

Only by looking at the financial impact of disasters comprehensively can governments build the financial resilience of society as a whole. This publication proposes an operational framework to guide countries in developing and implementing such comprehensive financial protection policies. It also takes stock of the progress in the field to date.

The **Disaster Risk Financing and Insurance Program** is a joint program of the World Bank's Finance & Markets Global Practice and the Global Facility for Disaster Reduction and Recovery (GFDRR). DRFIP has provided advisory services on disaster risk financing and insurance to more than 40 countries worldwide. The program works along four priority areas to support four main beneficiary groups governments, farmers, homeowners and SMEs, and the poorest and most vulnerable.

With support from the **Swiss State Secretariat for Economic Affairs (SECO)**, the DRFIP is working with selected middle-income countries to strengthen financial resilience and protect their fiscal balance. This is one component of the broader Swiss-World Bank Group partnership on fiscal risk management for middle income-countries, which also includes a component on government debt and risk management.

ABOUT GFDRR The Global Facility for Disaster Reduction and Recovery (GFDRR) helps high-risk, low-income developing countries better understand and reduce their vulnerabilities to natural hazards, and adapt to climate change. Working with over 300 national, community level, and international partners GFDRR provides grant financing, on-the-ground technical assistance helping mainstream disaster mitigation policies into country level strategies, and thought leadership on disaster and climate resilience issues through a range of knowledge sharing activities. GFDRR is managed by the World Bank and funded by 21 donor partners.

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