

BACKGROUND PAPER

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Reduction

FINANCIAL PROTECTION AGAINST NATURAL DISASTERS: FROM PRODUCTS TO COMPREHENSIVE STRATEGIES – AN OPERATIONAL FRAMEWORK FOR DISASTER RISK FINANCING AND INSURANCE

(DRAFT)

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*AN OPERATIONAL FRAMEWORK
FOR DISASTER RISK FINANCING AND INSURANCE*

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**DISASTER RISK FINANCING AND INSURANCE PROGRAM
WORLD BANK – GLOBAL FACILITY FOR DISASTER REDUCTION AND RECOVERY**



Acknowledgments

This report was 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 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 at the 3rd World Conference on Disaster Risk Reduction in March 2015.

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Section I: Policy Messages

To be completed following peer review

Questions to which the team is seeking advice

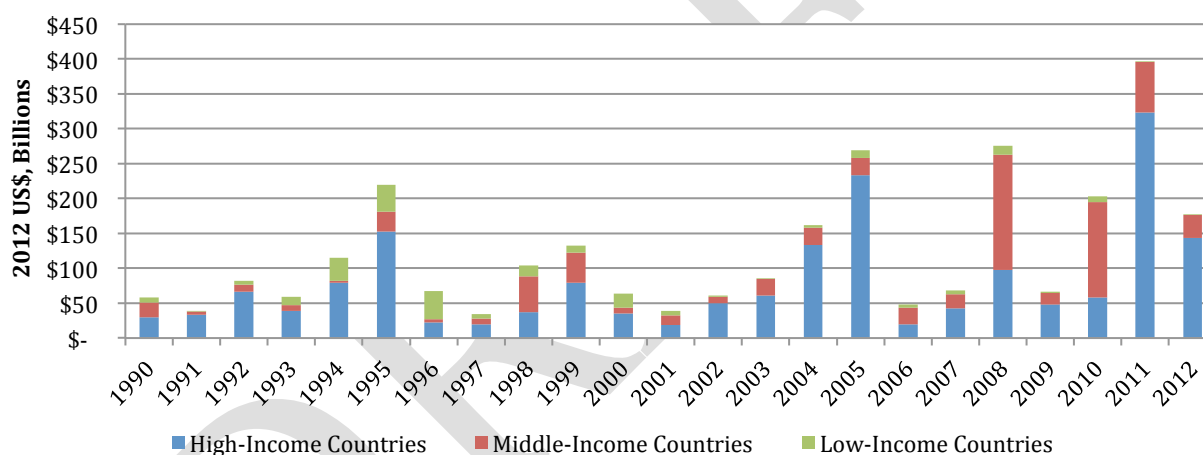
- *Section 5 on pages 39-51. How can the Operational DRFI framework be further refined to provide useful guidance to governments engaging in DRFI and their international partners? Does the framework currently answer the most commonly encountered questions by governments engaged in DRFI?*
- *Figure 9 on page 28. Does the timeline reflect the most important developments in disaster risk financing and insurance over the past decade? Are any significant events missing?*
- *Table 6 on page 56. Do you agree with the suggested treatment of financial protection in HFA2? How could the Priority for Action and Key Activities be further refined to capture the breadth and depth of this policy area?*
- *What would be your 3-5 most important policy messages on financial protection against natural disasters to the international community? Both in the preparation for the successor agreement to the HFA, as well as for the years ahead to advance the implementation of DRFI policies.*

Section II: Financial Impact of Natural Disasters

When record floods inundated large swaths of Thailand, including its capital city of 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 continued to affect the government 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 the current account to US \$11.9 billion from a projected \$20.6 billion, and caused a loss in tax revenue of 3.7 percent 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 impact. 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 nationally reported smaller disasters are included (UNISDR, 2013). The true impact of disasters is of course much higher still. These loss figures only account for direct loss, excluding indirect³ loss and the wider effects of disasters.

Figure 1 Direct disaster loss by income group



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

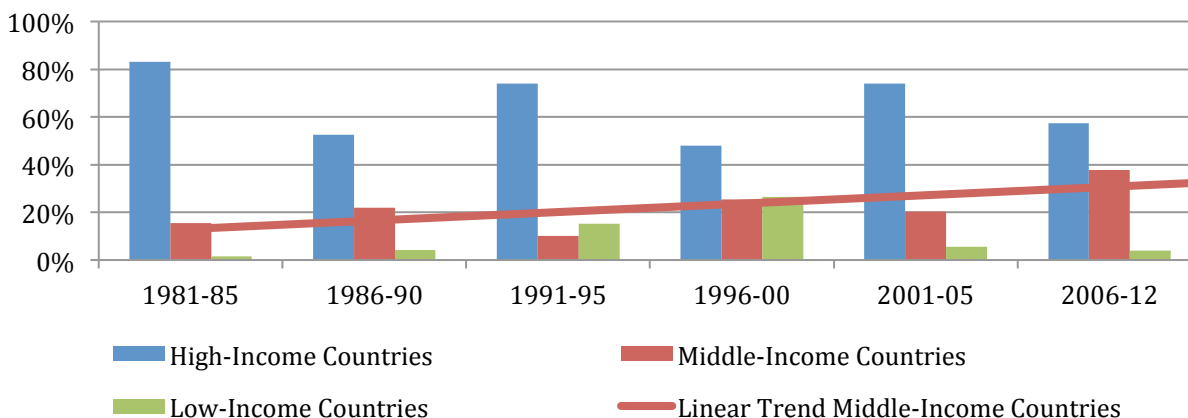
The trends in losses hide a wide range of impact. Events that are comparable in terms of physical parameters, total loss, or affected population, have a vastly different macroeconomic impact depending on a country's level of development, size (geographic and population), and degree of insurance penetration. 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.

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 the direct damage, such as business interruptions, decreased tax revenue, loss of employment, or rise in poverty levels.

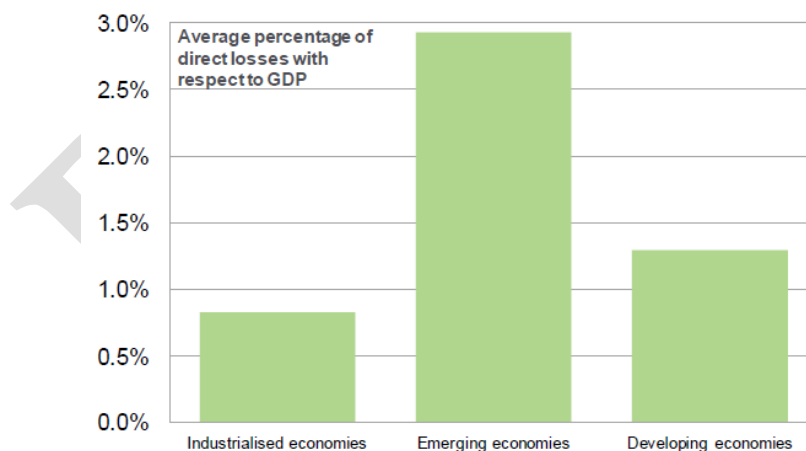
Figure 2 Relative distributions of direct loss between high-, middle-, and low-income countries (as percent of total annual direct loss)



Source: Authors with data from Swiss Reinsurance Corporation

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). Although average direct loss relative to GDP is less for low-income countries, this does not consider the most important impact—lost lives and human capital. Much of this pattern can be explained through the rapid increase in the asset base in developing countries, most of which does not take disaster risk into account during construction and is left vulnerable to natural hazards.

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



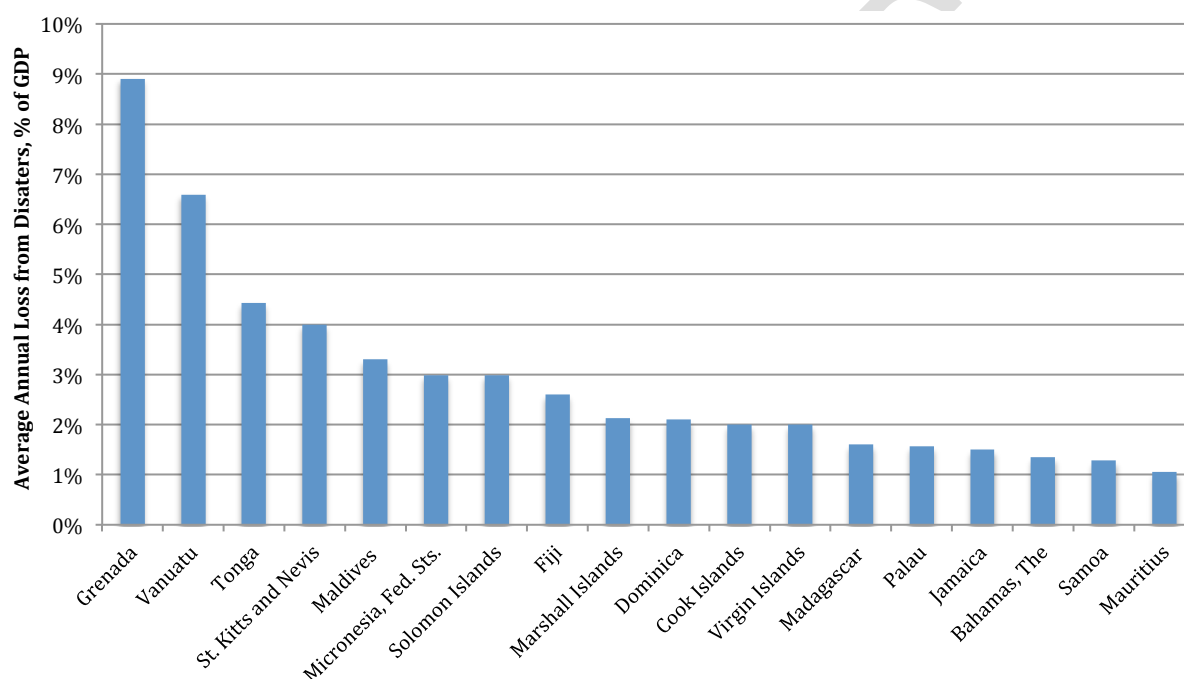
Note: Loss figures from MunichRe NatCat Service; county groups according to World Bank 2012 classification.

Source: MunichRe, 2013a

The concentration of loss in small countries, and particularly in small island developing states, leads to even more severe macroeconomic effects. The devastation wrought by 2004's Hurricane Ivan in the Caribbean caused economic loss almost double the annual GDP of each Grenada and the

Cayman Islands as well as significant damage in Jamaica, reminding us of the catastrophic devastation disasters can inflict (Young and Pearson, 2008). Small island states across the Caribbean and Pacific bear average losses exceeding over three 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%, with 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.

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



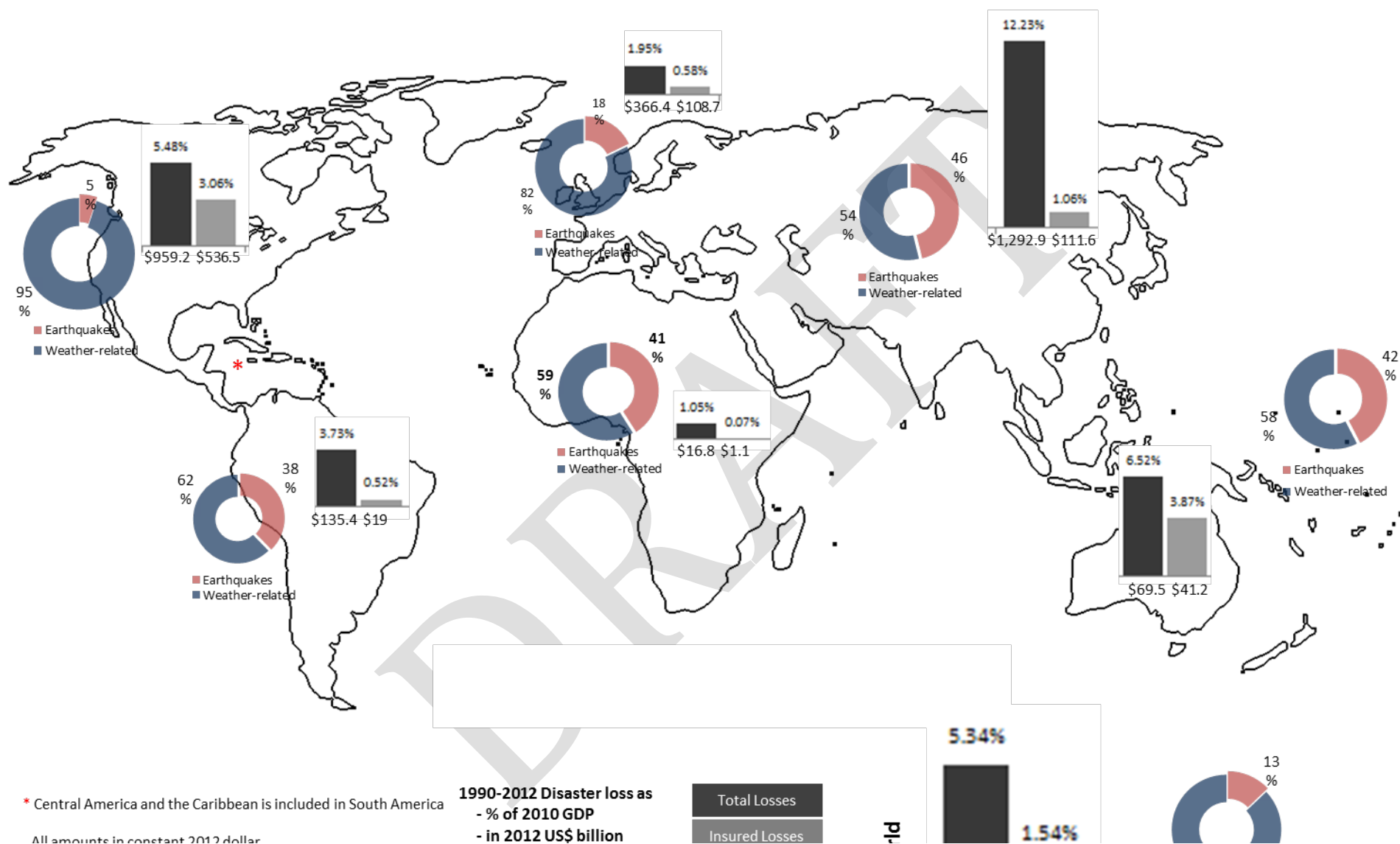
Source: Prepared by World Bank, based on reported disaster damage from Em-DAT data base and for Pacific Islands on modeled annual losses from cyclones, earthquakes and tsunamis.

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

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 and/or \$250 million in losses in constant 2011 US dollars. Small countries are those with landmass at or below the median size of all countries (roughly that of Honduras).

Disaster loss 1990-2012 as % of 2010 GDP, by continent



The Policy Maker's Burden: Financial Impact across Society

In mitigating the financial impact of disasters, experience suggests policy makers are primarily concerned with the effects on the government, homeowners and small- and medium-enterprises (SMEs), agricultural producers, and the poorest⁶. This segmentation is largely the result of the type of cost associated with a disaster—for example both homeowners and SMEs are concerned with building damage. Table 1 summarizes some of the major direct and indirect financial effects of natural disasters on these groups. These are then discussed in turn.

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

<p><u>Government</u></p> <p><i>Direct</i></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 and betterments of reconstructed infrastructure, as well as for relocation for at-risk population; • Expenditure on social and economic recovery support programs; • Realization of contingent liabilities to state-owned enterprises (SOEs), to firms that are critical to economic recovery, etc. <p><i>Indirect</i></p> <ul style="list-style-type: none"> • Decreased revenues 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 impacts (loss of livelihoods). 	<p><u>Homeowners and SMEs</u></p> <p><i>Direct</i></p> <ul style="list-style-type: none"> • Reconstruction costs for damages to often uninsured or underinsured assets; • Human fatalities, injuries, and disabilities. <p><i>Indirect</i></p> <ul style="list-style-type: none"> • Loss of income/ livelihood due to business interruption/unemployment, loss of wage earner; • Loss of income / livelihood due to economic decline; • Increased borrowing costs. • Additional expenses such as arising from alternative accommodation during reconstruction and for healthcare
<p><u>Agricultural producers</u></p> <p><i>Direct</i></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 and environment. <p><i>Indirect</i></p> <ul style="list-style-type: none"> • Loss of income due to interruption of crop/livestock/fish stock production; • Loss of income due to economic decline and/or lack of access to markets; • Increased borrowing costs. • Increased risk aversion and resulting adoption of low yielding but safer seed varieties 	<p><u>The poorest</u></p> <p><i>Direct</i></p> <ul style="list-style-type: none"> • Reconstruction costs for damaged assets; • Replacement of livestock. <p><i>Indirect</i></p> <ul style="list-style-type: none"> • Decreases in livelihood expenditures (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.

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

⁶ 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 without enough money to consider any insurance products. For example, agricultural insurance very often is targeted at very low income groups, yet this is still a totally different segment of society.

depending on the definition of the government's contingent liability to natural disasters,⁷ 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 for 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 reconstruction of public assets and low-income housing following disasters (Government of Mexico and World Bank, 2012). In addition to replacement of the damaged assets, governments' should consider higher costs for improvement and betterments so they do not 'build back the risk'. 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 residents, SMEs, and agricultural producers 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 responsibility for all of its outstanding claims (Benson and Mahul, 2013).

⁷ 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) and 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.

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 percent⁸, 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 six to eight percent for 10-year bonds. Natural disasters raise the costs of borrowing for affected governments, increasing sovereign bond spreads by one to two percent on average for up to nine months following an event (CaribRM, 2012). 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 destitute from 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. And long-term development prospects suffer as the government diverts public funding from social and economic development programs to fill these gaps.

Direct financial impact on homeowners and SMEs

The global emerging middle class is projected to more than double 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 in property—specifically the family home. In the United States, the primary residence represents 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.⁹ 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 (PCI, 2010).

⁸ 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).

⁹ In 2006, the expected benefits outweighed the costs of purchasing such insurance.

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 too go uninsured. 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 closure of small businesses following the earthquake (Muir-Wood, 2011).

Indirect financial impact on homeowners and SMEs

Like the government, SMEs can suffer significant indirect economic loss, usually totaling more than their direct damages. Interruptions to business can arise from direct damage to the business's property, or from damage to infrastructure or other business operations along the supply chain. Following the Marmara 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 community¹⁰.

Natural disasters can also cause significant reductions in household income and investment in human capital. A recent study of the effect of typhoons on average household incomes in the Philippines found a decline of 6.6 percent for the year following a typhoon across all households exposed to average typhoon wind speeds (Anttila-Hughes and Hsiang, 2013).¹¹ The same study identified reductions in household expenditure, with particularly severe reductions in critical human capital investments such as education (13.3 percent) and health care (14.3 percent).

Direct financial impact on agricultural producers

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, is important for the balance of trade due to import and export of crops and is a key provider of employment.¹² Agricultural producers, such as farmers, herders, and fishermen are highly exposed to multiple, often systemic risks to production, such as natural perils, crop and livestock diseases, and insect invasions. Brazilian farmers reported that regularly occurring risks—those occurring once every few years—generated average production loss of 20-40 percent¹³ (Tüller, M, et al., 2009). In Kenya, the overall effect of the 2008-2011 drought was estimated at US\$12.1 billion¹⁴, with the majority (72%) of the losses falling on individuals, households, or enterprises who 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 global grain

¹⁰ See Hallegatte, 2014 for a more in-depth discussion of the welfare impact of indirect disaster costs.

¹¹ The authors define average typhoon wind speeds in the Philippines based on a catalogue of typhoons affecting the Philippines from 1979-2008.

¹² For example agriculture is a centerpiece of the Kenyan economy, generating approximately 24% of annual GDP and approximately 50 percent of revenue from exports. It is also an important source of employment, with over 70% of the population living in rural locations of which approximately 14 million are farmers and herders.

¹³ Based on a survey including 30 cooperatives, 220 large farms, and 20 corporate farms.

¹⁴ http://www.gfdrr.org/sites/gfdrr.org/files/Kenya_PDNA_Final.pdf

trade (New York Times, 2010). 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). Most fishers 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 fishers in affected countries.¹⁵ The insurance industry, however, reported little to no loss in this sector (RMS, 2005).

Indirect financial impact on agricultural producers

Similar to other economic sectors, agricultural producers 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 micro-finance 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 higher yielding farming practices (such as investing in fertilizer) are often too great for vulnerable households to bear, resulting in the adoption of lower-risk, yet low-yielding farming practices.

Direct financial impacts on the poorest

The poorest may own few physical assets at risk, but what they do have is often highly exposed. Low-income communities tend to be located in more hazardous locations, have fewer savings, and lack insurance protection compared to higher-income communities. In Katmandu, Nepal, almost 25 percent of houses in rapidly growing squatter settlements located on steep slopes along the banks of three rivers fall victim to flooding regularly during the monsoon season. Storm water drains and sewage networks operate at only 40 percent of their capacity, the result of blockages from debris and solid waste that is allowed to accumulate. Thus, in addition to physical damage, residents are also susceptible to water-borne diseases (Baker, 2012).

While in absolute terms the damages to individual households may be small, across society they are often the most devastating relative to income. Subsistence farmers can be particularly hard hit where the destruction of crops or death of livestock often means the complete loss of livelihoods.

Indirect financial impacts 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. In the Philippines,

¹⁵ <http://www.fao.org/NEWSROOM/en/news/2005/89775/index.html>. Jan 8, 2014.

income loss following a typhoon persists for years in low-income populations, whereas higher-income populations fully recover 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 safety nets may also struggle with increased demand during disasters if they lack the capacity to expand support.

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Section III: Disaster Risk Financing and Insurance – A Prospective Solution to Financial Protection

Governments can take steps to reduce the financial impacts of disasters discussed through a comprehensive approach to disaster risk management to protect the population and assets. The World Bank and the Global Facility for Disaster Reduction and Recovery have developed a framework to guide practical approaches to disaster risk management, which relies on a combination of: 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 reduce, retain or transfer them.

Through an integrated approach to risk management, decision makers should always begin by understanding the risk, and then consider the costs and benefits of investing in risk reduction, risk aware investments to

avoid the creation of risk in the first place, or risk financing. To sustainably reduce the financial impact of disasters governments should always consider ways to reduce the underlying drivers of this 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 risk financing strategy, 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.

Inherently designed for managing the financial impact of loss and damages caused by shocks from natural hazards, disaster risk financing and insurance can also help countries prepare for increased climate variability and extreme events associated with climate change. From a disaster risk financing perspective, while climate risks may lead to an increase in 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 a crucial role in helping countries become more resilient to climate risks.

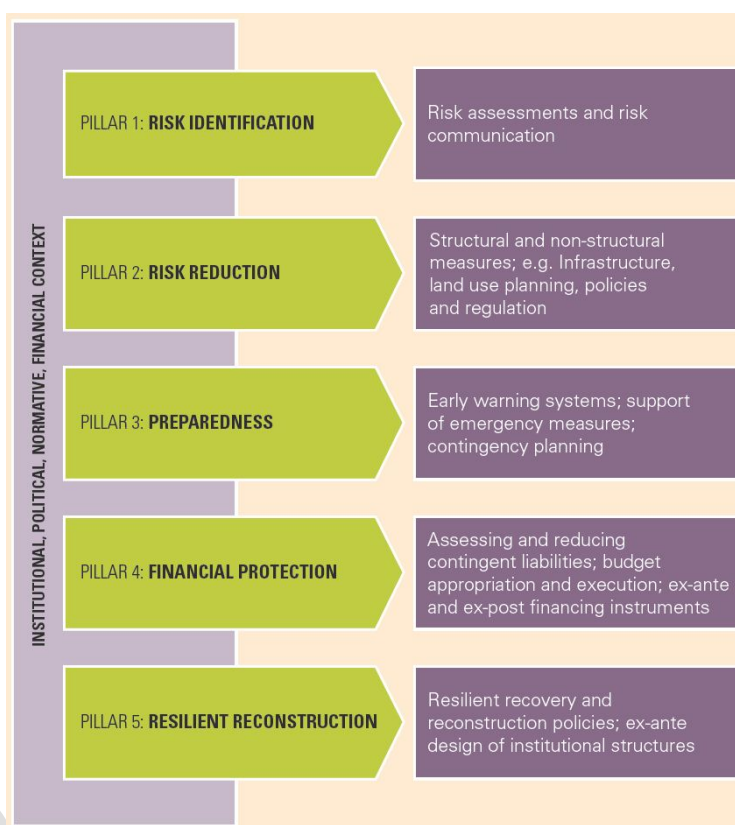


Figure 5 World Bank-GFDRR Disaster Risk Management Framework

Definition and beneficiaries of disaster risk financing and insurance Solutions

Historically, governments mostly addressed the financial impacts of natural disasters on an ad-hoc basis following events. In lights of the impacts discussed, countries are increasingly focusing on

proactive planning before a disaster strikes. This began with a handful of industrialized countries, but is gradually taken up by governments from around the world.

Disaster risk financing and insurance aims to increase the resilience of vulnerable countries against the financial impacts of disasters. A comprehensive strategy can secure access to post-disaster financing before an event strikes to ensure rapid cost-effective liquidity and support cost effective recovery. Governments normally have four different ways to strengthen the financial resilience of the key beneficiaries identified: national and local governments; homeowners and small and medium-sized enterprises; agricultural producers; and the poorest (see Table 2):

- *Sovereign Disaster Risk Financing* aims to increase both the financial response capacity of national and subnational governments, as well as their access to effective funding for reconstruction and recovery. This policy area encompasses mobilization, allocation, and disbursement of funds following disasters.

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 loan with 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—and catastrophe risk transfer solutions to finance low frequency, high severity events—such as sovereign insurance pools by Caribbean and Pacific island states. To transfer risk to specialized risk carriers, the government of Colombia is building on international best practice in insuring public concessions for infrastructure worth US\$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, improving outcomes for farmers by reducing long delays in claims payment and improving coverage for farmers.

- *Disaster-linked social protection* helps governments strengthen the resilience of the poorest and most vulnerable through the application of insurance principles and tools to enable social protection programs such as social safety nets to scale up cash transfers to beneficiaries immediately following disaster shocks.

Example: The government of Ethiopia is integrating 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 scale up food assistance during the 2011 Horn of Africa drought from 6.5 to 9.6 million drought-affected people (World Bank, 2013).

Table 2 DRFI policy areas and immediate beneficiaries

<p>SOVEREIGN DISASTER RISK FINANCING Beneficiaries: Governments Indirect beneficiaries: Society</p> <ul style="list-style-type: none"> • Increases financial response and reconstruction capacity through improvements to: <ul style="list-style-type: none"> - 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 mitigation. 	<p>PROPERTY CATASTROPHE RISK INSURANCE Beneficiaries: Homeowners and SMEs Indirect beneficiary: Government</p> <ul style="list-style-type: none"> • 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 mitigation.
<p>AGRICULTURAL INSURANCE Beneficiaries: Farmers and Fishermen Indirect beneficiary: Government</p> <ul style="list-style-type: none"> • 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 mitigation. • 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). 	<p>DISASTER-LINKED SOCIAL PROTECTION Beneficiaries: The Poorest Indirect beneficiary: Government</p> <ul style="list-style-type: none"> • 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 mitigation. • Safeguards vulnerable people from falling into poverty.

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, directly or indirectly reduce, and manage its contingent liabilities to natural disasters.¹⁶ These options do so by using financial risk information to clarify the financial costs and benefits of disaster risk mitigation, 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 leverage multiple-wins. For example if a government decides to establish a risk financing pool to retain a layer of agriculture risk, this

¹⁶ 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.

same entity could be used to absorb a layer of risk from a cash transfer program that will scale-up in case of a disaster, allowing the government to build on the initial investment in developing a risk financing entity for multiple uses. Moreover, if the underlying risk triggering a scale up of the cash transfer program are not the same as for the agricultural insurance program, the entity will be able to further diversify its risk, enabling it to offer lower premiums.

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. 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. Financial risk analytics empowers policy makers to understand the all-important details when deciding between financial instruments. For example this can help governments identify the most appropriate and financially efficient strategies to fund disaster losses, based on their country 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 is at the nexus of four major policy practices: disaster risk management—contributing to building resilience; public financial management—managing the impact of disasters on public finances; financial sector development—building a strong insurance sector for risk transfer; and social protection—contingent financing to reach the poorest groups (see Figure 6). It is best advanced when integrated into broader strategies in one or more of these fields.

Strong financial management of disaster risk is particularly important to support the execution of broader disaster risk management strategies. Disaster risk financing and insurance programs promote a shift by financial officials to become aware of disaster risk in public investments; puts a “price tag” on risk to clarify cost-benefit trade-offs in investment in risk mitigation, risk retention, and risk transfer; and ensures that the government is financially prepared to enact a swift post-disaster response.

Illustrating the broad and cross cutting nature of disaster risk financing, seven pathways have been suggested by which sovereign disaster risk financing benefits governments. These include i) access to capital, ii) speed, iii) autonomy, iv) market signals, v) knowledge (risk assessment and pricing of risk), vi) discipline, and vii) financial management capacity (Dana and von Dahlen, 2014).



Figure 6 DRFI at the nexus of related fields

Considerations for financial protection for a government

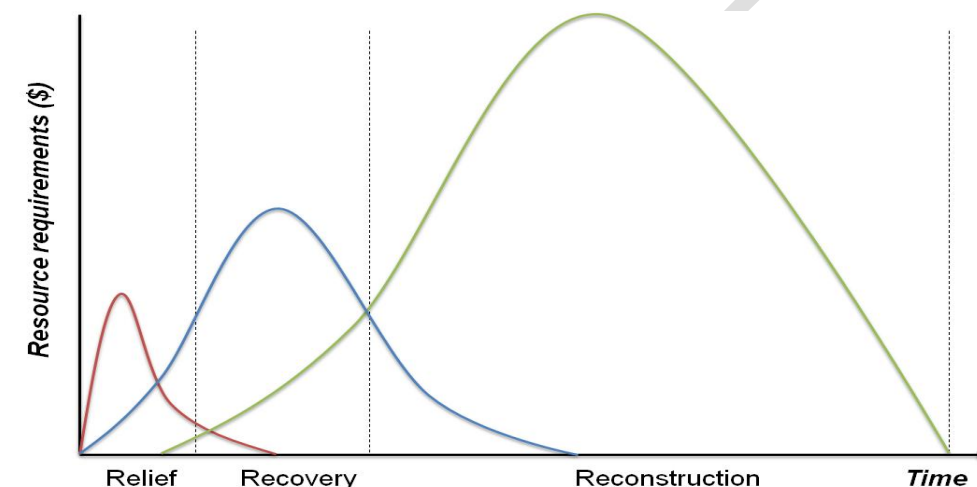
A government can access many different sources of financing for post-disaster response and reconstruction. Some of these options can be mobilized by the government following a disaster (ex-post)—such as budget reallocations or credit. Others need to be established before a disaster hits (ex-ante)—for 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, and speed of access. Alternative instruments are not inherently better or worse, they are suitable to address different needs. For example, following a disaster a government could issue bonds or raise taxes in order to pay for reconstruction. These options provide access to very large sums of money but this will take a long time to access. Insurance, on the other hand, can be much more expensive but can help governments manage the volatility of disaster impacts on the budget by spreading the cost through time.

To efficiently address the funding needs arising from disasters, a number of considerations are important. First, understanding the timing of needs is essential. In the aftermath of a major disaster, the government will not require the money 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 7). This has clear implications on the design of cost-effective, financial management of disasters.

Figure 7 Timing of post-disaster funding needs



Source: Ghesquiere and Mahul (2010)

A second consideration is the cost of different sources of money. Table 3 provides an indicative ‘cost multiplier’ for financial instruments. This multiplier is defined as the ratio between the (opportunity) 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 determined by the legal and administrative processes that drive their use (Ghesquiere and Mahul, 2010).

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

Instruments	Indicative Cost (multiplier)	Disbursement (months)	Amount of funds available
Ex-post financing			
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
Ex-ante financing			
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	2 and up	1-2	Large
Alternative Risk Transfer (for example CAT bonds, weather derivatives)	2 and up	1-2	Large
Traditional (indemnity based) insurance	2 and up	2-6	Large

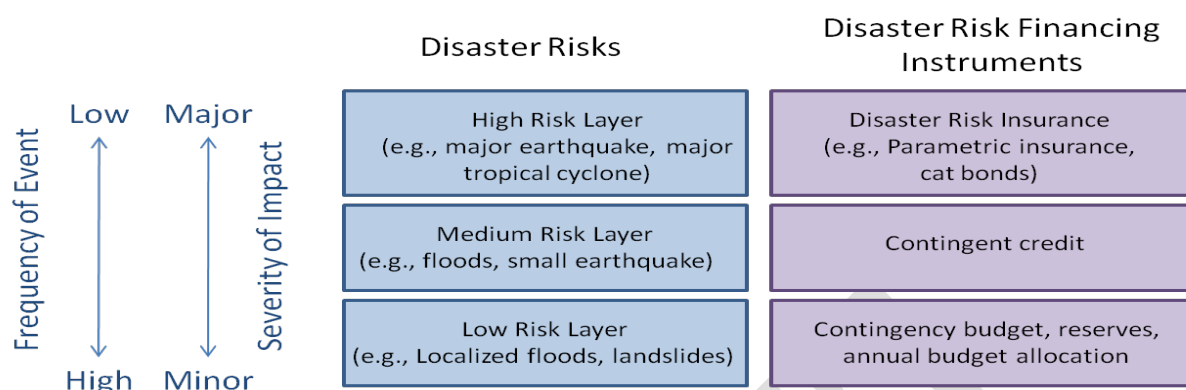
Source: Ghesquiere and Mahul (2010)

For example, market-based risk transfer is usually an effective but expensive proposition for governments that otherwise have access to sufficient sovereign financing. Yet they can effectively reduce volatility of disaster impacts 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 cover against extreme events, but is not appropriate to protect against low intensity events which 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 8).

Figure 8 Three-tiered risk layering strategy for governments



Source: Ghesquiere and Mahul (2010)

A comprehensive and sustainable financial protection strategy for the government generally brings together pre-and post-disaster financing instruments, which 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 necessary—much larger—sums for reconstruction through budget reallocations and from capital markets through bond issues.

Historically the balance has been tipped too far towards relying on post-disaster (ex-post) funding sources. Governments can access these resources without previous financial arrangements which often exceed the available expertise and experience available. There will be cases where these instruments will be less expensive than pre-arranged financing sources, however, they can take a long time to negotiate (such as emergency loans), can be highly variable and unpredictable (like donor’s assistance), and can endanger development programs that often take many years of preparation (for example due to budget reallocation). Risk financing instruments that the government establishes before disaster hits (ex-ante) can avoid these drawbacks but require advanced planning, and can be more expensive and limited in amount.

In addition, 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 reduce 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, such as catastrophe risk assessment, to support the growth and build the capacity of domestic insurers while supporting the sale of reliable, cost-efficient insurance products. 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

While risk financing cuts across multiple different government agendas, a country's ministry of finance is almost always the steward of successful disaster risk financing and insurance measures. In a growing number of countries, the ministry of finance is adopting integrated approaches to risk management, including against natural hazards. Numerous countries, such as Colombia, Indonesia, Panama, and Peru, have established fiscal risk management divisions within the ministry of finance tasked with 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, agricultural insurance programs typically require leadership from the ministry of agriculture—as well as the private sector and the international community. Box 1 discusses some of the public financial management challenges that can impede disaster risk financing and insurance measures and that require ministry of finance leadership.

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 dealing with budget management, asset and liability management, debt management, economic policy or sometimes insurance divisions or 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.

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.¹⁷

Box 1 Public financial management challenges to 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 ex-ante and ex-post sources of financing for disasters, but the use of proactive financial protection instruments requires relative well developed 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)¹⁸ assessments—international assessments reviewing the condition of country 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.

¹⁷ The importance of sound fiscal risk analysis and management practices is underscored by the recently revised IMF Fiscal Transparency Code.

¹⁸ For more detail on PEFA Assessments see www.pefa.org

The adoption of 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, complicating the alignment of future expenditure 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 key areas such as 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

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, 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 distribution of money 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 comply with regulatory requirements that maintain the financial stability of the industry—sufficient capital is crucial to insurance companies. Capital in the reinsurance market alone is estimated at over \$500 billion.¹⁹ 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. Conversely, 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.

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 were passed out of the domestic market and onto international reinsurers.²⁰ Access to this capacity can support the sustainable growth of a domestic insurance market.

¹⁹ Aon Benfield, Reinsurance Market Outlook, 2014

²⁰ Munich Re NatCat Service

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 has extensive *technical expertise* in designing products, quantifying and managing risk accumulations, underwriting catastrophe exposure and settling claims. Drawing on this can help overcome the challenges that impede the spread of catastrophe insurance market development in developing countries, such as the lack of data and trained people, high cost of offering products, and low awareness and understanding of catastrophe risk exposure. Private sector insurance companies and banks can also support catastrophe risk modeling, the collection of data on the cost of extreme events, the promotion of risk awareness through educational programs and product marketing.

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 aims to do 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 insurance product wordings to stimulate market development.

In addition, the private sector has proved time and again its ability to innovate to overcome market development challenges. This has produced new products and tools that have increased the efficiency of product offerings, and increased access to cover to previously excluded groups.

Box 2 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 an event) was first developed in response to the needs of the private insurance industry, for pricing and accumulation²¹ management. 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.

²¹ 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.

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.

Introduce technical and transparency standards

Cooperation with the private sector can play an important role to instill and support technical and transparency standards in public financial management. To access insurance, governments need a robust 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 placed 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 - this enhanced capacity will have applications beyond the contract itself.²²

Product expansion

The private sector led the development of risk-transfer products that *trigger*—meaning they pay-out—based on physical hazard parameters 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 of a range of crops.

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; and the Pacific Catastrophe Risk Insurance Pilot in 2013.

²² 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.

Section IV: 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 under 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 of 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 across 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. And innovations in new tools often take place in waves around key experiences and developments—such as the first sovereign risk pool—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 for proactive financial protection against devastating natural disasters had started to take hold.²³ Too much has happened to capture here comprehensively, but key developments will highlight the lessons learned from this period (see Figure 9). Building on these lessons, this paper then presents an operational framework for financial protection. But while much has been achieved, gaps and questions remain nonetheless.

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 high-income 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

²³ Innovations on 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 2013 OECD report “Disaster Risk Financing in APEC Economies: Practices and Challenges”.

Program, set up in 1968 in response to a long history of flood loss and challenges with adverse selection. 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 mitigation and avoidance (G20 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. 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.

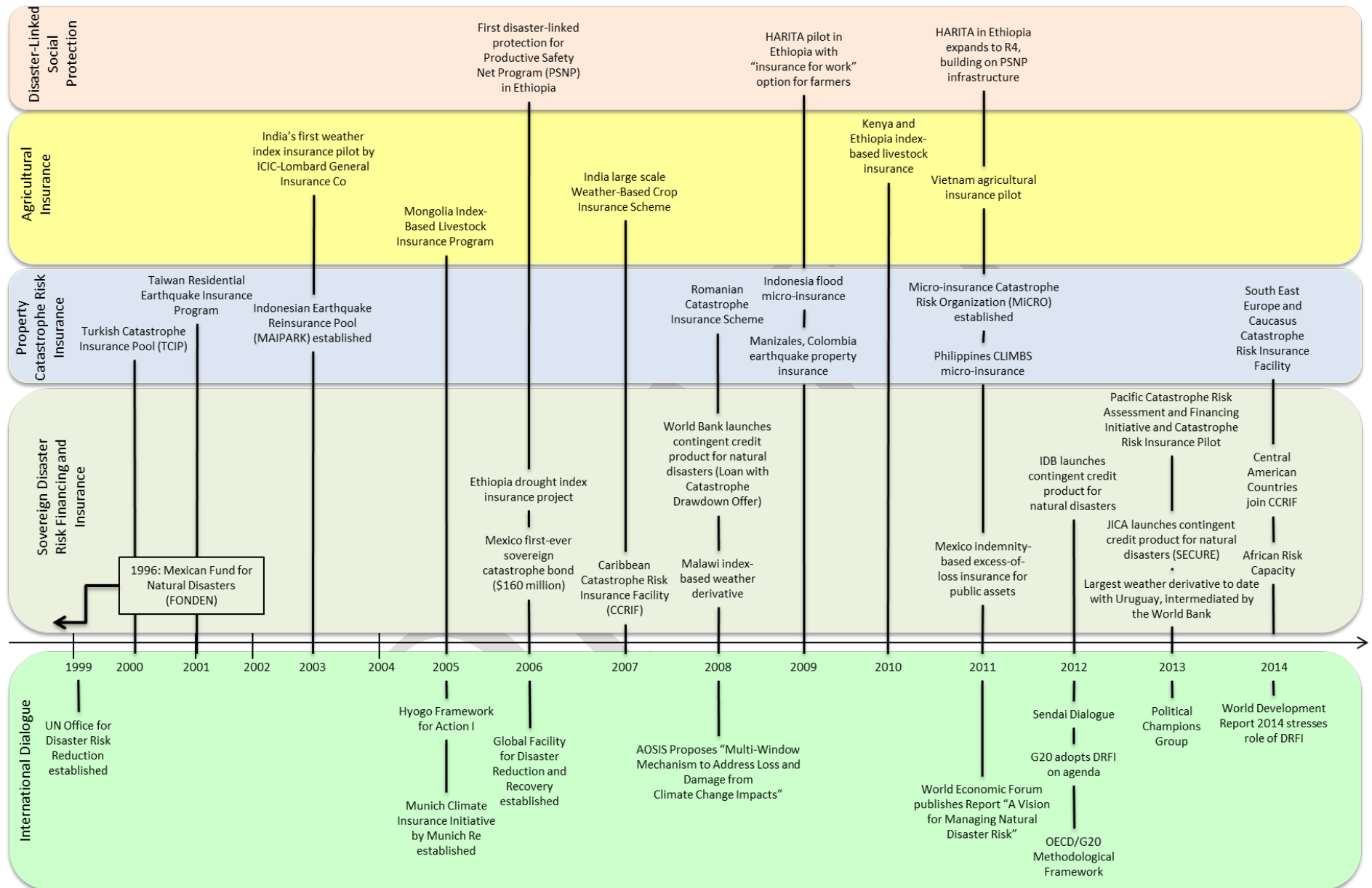
With few exceptions, agricultural insurance programs were in their infancy or performing poorly across developing countries. Following a period from 1950 onwards that saw a major growth in ultimately poor-performing public sector multi-peril crop insurance programs, in the 1990s developing countries began to shift from public to market-based programs, often promoted under public-private partnerships (Mahul and Stutley, 2010). The most important changes in this new wave of catastrophe and agricultural insurance programs are in the role of 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, which increased its willingness to carry such risk.²⁴ Nonetheless, many agricultural insurance pilots by the private sector—usually implement with support from donor partners and mainly for index-based crop insurance—still failed to scale up sustainably.

Mongolia is a notable example of successful early activity in a low-income country.²⁵ 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).

²⁴ 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).

²⁵ 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.

Figure 9 Historical evolution of disaster risk financing and insurance in developing countries since 2000²⁶



²⁶ This timeline is not intended to be an exhaustive list. Rather, based on discussions between the authors and the 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.

Challenges and lessons

Instead of waiting for a disaster to happen to consider how to absorb its financial impacts, makers in developing countries began to recognize the benefits of proactive planning for 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 disasters. An important role emerged for the international community to support financial protection measures before disasters hit, at the same time as the signing of the Hyogo Framework for Action (HFA) in 2005 began to promote 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 in 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 3). 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.

Box 3 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 an 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.

New approaches for financial instruments to help address common problems in risk financing resulted in a string of new market-based products for developing countries, including parametric catastrophe bonds and weather derivatives for national governments; disaster-linked contingent credit; and regional risk pooling mechanisms. Product innovation remained the norm until the end of the decade.

Between 2005 and 2008 a number of new financial instruments emerged to help developing countries overcome these constraints and 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.²⁷ The \$160 million parametric

²⁷ Countries have previously issued cat bonds to protect property insurance pools; such as a 2001 cat bond issued by the California Earthquake Authority or the 2003 cat bond to protect the Taiwanese Residential Earthquake Insurance Fund.

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 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, 2012).

Another groundbreaking development, the Caribbean Catastrophe Risk Insurance Facility (CCRIF) launched in 2007, was a first-of-its-kind government risk-sharing platform aimed at assisting member countries to manage part of their catastrophe risk exposure (see Box 4).

Box 4 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 underinsurance (existing but inadequate insurance coverage by policy holders) in the economy.

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 as well as ongoing discussions on disaster risk financing solutions among the Indian Ocean island countries.

Contribution by Simon Young, CEO of Caribbean Risk Managers, Facility Supervisor of CCRIF

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 contingent loan for disaster response, the Development Policy Loan with Catastrophe Deferred Drawdown Option, or Cat DDO (see Box 5). Created first and foremost to encourage investment in risk reduction 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.

²⁸ A parametric trigger makes a payment upon the occurrence of a predetermined event.

Box 5 Contingent Line 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) in 2008 to Costa Rica, additional international organizations have embraced the provision of 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 seven countries for a total value of \$1.27 billion, with one additional loan currently under preparation. These loans include: 2014, Sri Lanka, \$102 million (under preparation); 2011, Colombia, \$250 million; 2011, El Salvador, \$50 million; 2011, Panama, \$66 million; 2011, the Philippines, \$500 million; 2010, Peru, \$100 million; 2009, Guatemala, \$85 million; 2008, Colombia, \$150 million; 2008, Costa Rica, \$65 million.

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. A SECURE program is currently in preparation for the Philippines.

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 looking towards financial protection.

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 enhanced supervision of these construction standards. By 2013, the pool had sold more than 6 million policies, compared to the only 600,000 covered households when it was set up²⁹.

Partnerships of 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

²⁹ <http://www.tcip.gov.tr/zorunlu-deprem-sigortasi-istatistikler.html>. Feb 7, 2014.

forefront in driving innovation in agriculture insurance. Two pilot programs, with technical support from the World Bank, 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 helped 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 regional-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.³⁰ 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.³¹ 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, none of the index-based insurance pilots have managed to reach large scale outreach. Key reasons included underinvestment in the data market infrastructure and lack of government involvement³². 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.³³ 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, the flood micro-insurance product in Indonesia was not renewed in 2010 after a one-year pilot. Low uptake has largely 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.³⁴

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

³⁰ http://unfccc.int/files/adaptation/application/pdf/swiss_re.pdf. Feb 7, 2014.

³¹ https://www.gfdrr.org/sites/gfdrr.org/files/1_WRC_Paper_FINAL_April11.pdf. Feb 7, 2014.

³² For more detailed discussion see <http://siteresources.worldbank.org/EXTDISASTER/Resources/8308420-1339601356604/AIDP-Strategy-Note-6May13.pdf>. March 30, 2014

³³ http://www.gfdrr.org/sites/gfdrr.org/files/documents/DRFI_Malawi_WeatherInsurance_Jan11.pdf. Feb 7, 2014.

³⁴ http://www.wfcatprogrammes.com/c/document_library/get_file?folderId=39377&name=DLFE-2517.pdf Feb 7, 2014.

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. The better integration of 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 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 such 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. Assistance by the international community in contracting such instruments has facilitated longer-term engagements on comprehensive risk financing strategies and the required institutional arrangements. 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. This 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, limited understanding of their 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 sustained efforts in disaster risk financing and insurance.

2010-Present: From products to strategies for financial protection

By 2010, disaster risk financing and insurance practitioners started working with a number of governments to design comprehensive disaster risk financing strategies rather than focusing on individual products (Mahul & Ghesquiere, 2010). While still limited across the world, a growing number of governments' began to address their contingent liabilities through systematically building on risk identification and risk assessments, combining various financial instruments to manage different layers of sovereign risk, determined by the frequency and severity of risk.

Increasingly the international community also 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, integrated 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 and World Bank Group Annual Meetings demonstrated 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. Yet a long way remains from international consideration to implementation

in countries that need it the most. While a number of countries are leading the way in this field, in many others progress remains extremely limited.

Moreover, the international community began to consider disaster risk financing and insurance - and particularly market-based risk transfer mechanisms - as an effective part of climate 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 United Nations (UN) established an international mechanism 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 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 development cooperation 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 the Philippines, was among the first countries to develop an explicit national disaster risk financing 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, specifically through a group approach to insuring central government buildings and by increasing insurance requirements for government concessions in transport infrastructure such as roads and ports.³⁵ 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 6).

Box 6 Post-disaster budget execution

Sustainable and effective disaster risk financing and insurance strategies can help governments mobilize funds to address potential financial needs and manage volatility on fiscal accounts 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, such as a legal framework for emergencies, budget appropriation and execution, and fiduciary control and management of the funding channels.

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

³⁵ <http://go.worldbank.org/Y8QYKWYBA0>. Feb 7, 2014.

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.

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 by June 2014. 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 equal to or 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 countries³⁶ 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 \$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 Africa 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 establishment of a pan-African risk pool to manage drought risk is being explored and is expected to launch in 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 7).

Box 7 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.

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 FONDEN at the national level, by providing seed funding.

³⁶ The six participating countries are Cook Islands, the Marshall Islands, Samoa, the Solomon Islands, Tonga, and Vanuatu.

Colombia has begun to improve technical 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 or 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

Significant developments are also taking place in insurance programs focused on the most vulnerable groups of society. In 2011 Oxfam partnered with the World Food Program to build on the HARITA insurance project in Ethiopia, designing the Rural Resilience Initiative or R4, a large-scale initiative expanding coverage to Senegal with two additional countries planned and developing tools to help the most vulnerable people build livelihoods resilient to the effects of natural disaster.³⁷ 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.³⁸ 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. This represents the advancements and innovative approaches that are currently tested in the area. 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.³⁹

Increasingly the use of financial risk analytical tools is empowering governments to make more informed decisions. For example, financial risk analytics enables decision makers to evaluate potential earthquake risk transfer schemes to help protect its existing debt portfolio. Or they allow governments to analyze the costs and benefits of different product structures and their potential impact on its medium-term debt portfolio. For example, each risk financing instrument comes with an opportunity cost to the government, however, but work has only just begun to develop a coherent methodology for governments to assess the true economic cost of alternative risk financing strategies (Clarke and Poulter, 2014). See Box 8 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 (See also Box 9).

³⁷ http://www.oxfamamerica.org/static/media/files/R4_Rep_Jul_Sept2013_WEB.pdf. Feb 7, 2014.

³⁸ <http://www.swissre.com/about-us/global-partnerships/Swiss-Re-provides-Haitis-micro-entrepreneurs-with-insurance-proceeds.html>. Feb 7, 2014.

³⁹ <http://www.artemis.bm/blog/2013/08/30/personal-parametric-weather-insurance-trialled-in-caribbean-by-ccrif/>. Feb 7, 2014.

Box 8 How risk modeling and analytics are informing disaster risk financing in Mexico

The government of Mexico developed the probabilistic catastrophe risk modeling 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 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 and 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.

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 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—both with close involvement by the government—have scaled up to sustainable programs. 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 to enable national insurance companies pass on agriculture risk to reinsurance markets. It should also foster an enabling legal and regulatory environment to unlock the innovative potential of the private sector, play a key role in 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 achieve the market size required for sustainability.

Building on lessons learned over more than 20 years of experience in agricultural insurance, the World Bank launched the Agricultural Insurance Development Program (AIDP) in 2013 with an operational focus on public-private partnerships. The AIDP approaches agricultural insurance as one component of an overall integrated agricultural risk management strategy. It also looks to

leverage investments made in developing the agriculture insurance markets for multiple-wins. For example, investments in data and risk financing can be used to enhance existing cash transfer programs through developing components that automatically scale up following disasters, increasing welfare payments to the poorest and most vulnerable rural households.

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.

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 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).

Financial protection can help all groups of 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 have high concentration in developed countries. Looking beyond the creation of new markets, 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).

Section V. An Operational Framework for Disaster Risk Financing and Insurance

This section seeks to tie together the experience and collected knowledge from partners in the public and private sector in order to create a practical and instructive operational framework for governments looking to establish or improve disaster risk financing and insurance schemes. As a framework for the development and implementation of cost-effective, sustainable disaster risk financing and insurance solutions it aims to answer basic questions and challenges usually faced by governments during this process.

The structure of this framework has emerged through a long sustained dialogue and many years working with governments and the private sector, such as insurance and reinsurance companies. 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 to disaster risk financing and insurance for solutions to acute challenges and disaster impacts. As they consider the most appropriate financial protection policies to pursue they need not put off implementation for many years. Many urgent and short term actions can—and should—begin immediately; others require a longer period of time. For example: “Before the Ministry of Finance can use risk transfer, an existing law must first be revised or replaced. I anticipate it will take two years to modify this law.” 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.

An operational framework also introduces a common language to enable and strengthen the international cooperation often required between governments and their partners, as well as through knowledge sharing between governments themselves, 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 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 sustained engagement and commitment of the countries and their partners, responding to a country’s specific needs. For example, low-income countries constrained by a lack of capacity may not 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 for two main reasons. Often governments are looking to implement a specific product or financial instrument such as risk transfer to international markets; here, the challenge is to help policy makers situate this instrument in the larger context of financial protection and disaster risk management. Governments may also be seeking help in achieving a particular development goal, such as

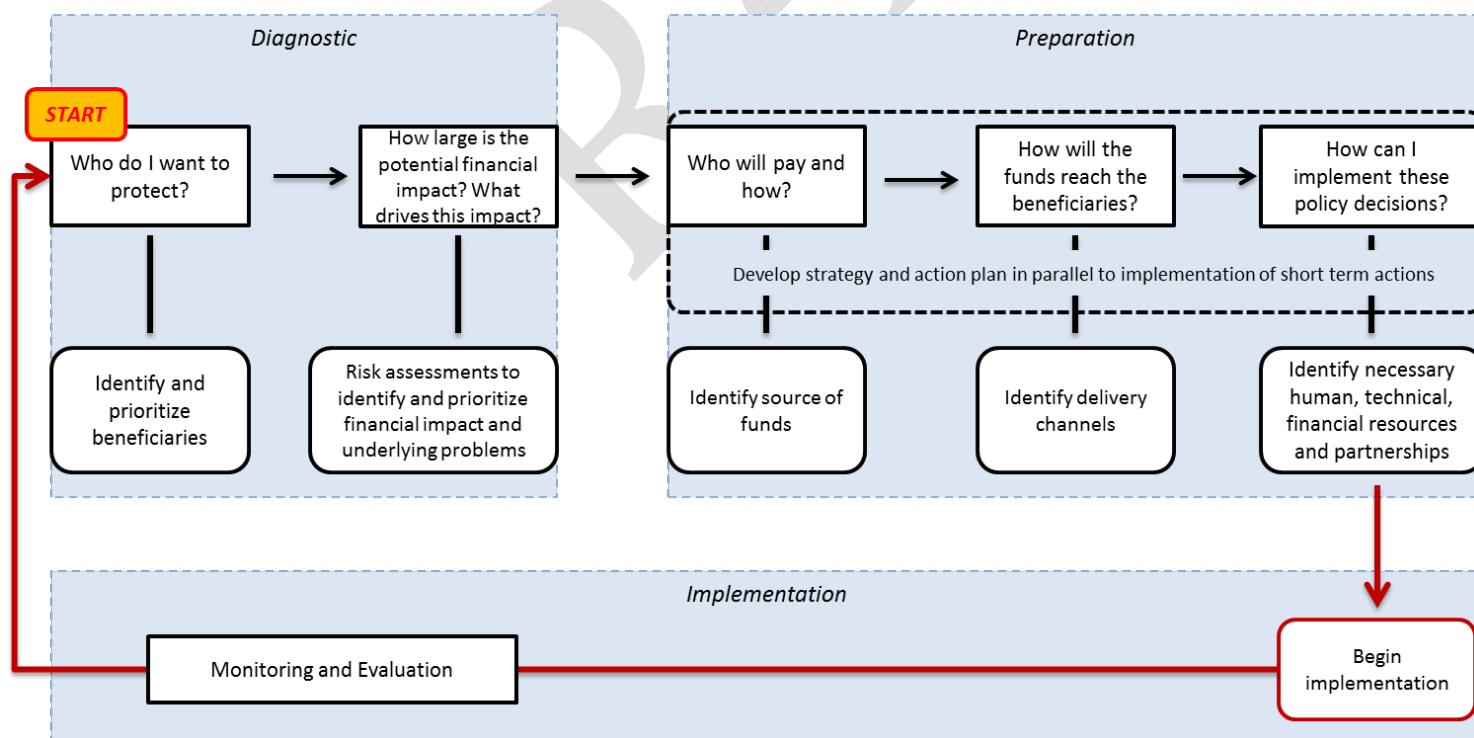
protecting smallholder farmers against drought or ensuring access to immediate post-disaster liquidity for central or subnational governments.

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 tax payers 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 needed actions to implement these choices, depending on the particular situation and timeframe

The World Bank’s *Operational Disaster Risk Financing and Insurance Framework* is presented in three components: (i) a decision process for governments engaging in the disaster risk financing and insurance process (see Figure 10); (ii) an overview of actions governments can consider to increase financial resilience of defined beneficiaries (see Figure 11); and (iii) illustrative examples from international experience (see Figure 12).

The first component (see Figure 10) lays out a good practice decision process on *how* a decision maker interested in financial protection best goes about first identifying and prioritizing the key policy objectives and subsequently developing 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. This engagement usually follows three main phases: diagnostic, preparation, and implementation. The following section discusses each of the three phases in more detail. Annex II presents a more comprehensive flowchart of this decision-making process.

Figure 10 A decision process to guide governments in building financial resilience



As the first step in implementing disaster risk financing solutions, policy makers should identify the beneficiary of their intended risk financing policy. As discussed earlier, four main beneficiaries of financial protection policies can be identified: the government, homeowners and SME's, agricultural producers or fishers, and the poorest in society. Second, risk assessments help identify the impacts that concern decision makers and the underlying causes driving these impacts—such as budget volatility from emergency spending following hurricanes or protecting the fiscal balance against potential liabilities from uninsured public assets. In the preparation phase the government will consider the mechanisms to address these impacts—for example risk transfer to international markets or deciding to rely on post-disaster budget reallocations—as well as decide how these funds can reach the intended beneficiaries and what is needed to implement these policies. Monitoring and evaluation is crucial during implementation to identify what works, what doesn't and why, and subsequently refine the policy goals and actions. Once the government is implementing policy decisions to address its immediate concerns, it can consolidate those activities into a disaster risk financing and insurance strategy and associated action plan to work towards a comprehensive approach to financial protection.

Each step of the decision-making process should be seen integrated in the wider risk management approach pursued by the government, to consider how financial management can supplement or support investments in risk reductions. As they consider risk financing and insurance options policy makers can consult the second component of the framework, a matrix of policy objectives and actions (see Figure 11). Considering the larger context of any policy objectives pursued can lead to multiple-wins, as there are no clear boundaries between most activities and investments can advance multiple priorities in parallel. 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.

Finally, the third component of the framework (see Figure 12) presents illustrative examples of how governments are implementing disaster risk financing and insurance solutions.

Figure 11 Operational DRFI Framework: Actions for governments to build financial resilience across society

Beneficiaries Actions	Government actions for financial protection of the state	Government actions for financial protection of society		
	Government – National and Subnational (Sovereign disaster risk financing)	Homeowners and SMEs (Property Cat Risk Insurance)	Farmers and Herders (Agricultural Insurance)	The Poorest (Social Protection)
Assess Risks	<ul style="list-style-type: none"> Collect and manage risk and loss data Assess and legally establish contingent liabilities of the state 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 Identify 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/impact data Quantify potential disaster-related losses on the poor (welfare impact) Quantify potential disaster-related loss through social protection on government budget (fiscal impact)
Arrange Financial Solutions	<ul style="list-style-type: none"> Develop financial decision-making tools Develop a national strategy for financial protection <ul style="list-style-type: none"> Secure immediate liquidity for budget support following disasters: risk layering such as reserves, contingent credit, and catastrophe risk transfer Secure longer-term reconstruction financing, e.g. an insurance program for public assets 	<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 on 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 supervision to allow private sector to develop private insurance solutions while 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 market-based scalability mechanism, including use of transparent rules for payout Develop eligibility criteria for post-disaster component Determine targeting mechanism
Deliver Funds to Beneficiaries	<ul style="list-style-type: none"> Establish a national disaster fund Establish transparent, timely, and effective 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. 		<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

Figure 12 Operational DRFI Framework: Illustrative examples of financial protection

Beneficiaries	Government - National and Subnational (Sovereign DRFI)	Homeowners and SMEs (Property Catastrophe Risk Insurance)	Agricultural Producers and Herders (Agricultural Insurance)	The Poorest (Social Protection)
Assess Risks	<p>The government of Colombia included the assessment of contingent liabilities from disasters in the government's 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 has developed a probabilistic catastrophe risk modeling tool to assist the government in prioritizing their risk mitigation investments.</p> <p>The Philippines is developing 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 its 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>	<p>India has developed detailed agricultural risk assessment tools to help policymakers to better understand the economic consequences of drought, quantify such impacts, and investigate the impacts of risk coping strategies, at both the farm and state levels.</p> <p>In Mongolia, livestock census/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, enabling better targeting of social welfare support to communities, including assistance related to disaster risk.</p> <p>Kenya's Hunger Safety Net Program is investing in poverty mapping to understand levels of vulnerability of households. The International Livestock Research Institute developed models to understand drought risk in northern Kenya</p> <p>The technical engine of the ARC risk pool, Africa RiskView combines existing operational rainfall-based early warning models on agricultural drought in Africa with data on vulnerable populations to form a standardized approach for estimating food insecurity response costs across the continent.</p>
Arrange Financial Solutions	<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 US\$150 million in hurricane and earthquake coverage.</p> <p>In 2006, Mexico transferred US\$450 million of earthquake risk to financial markets by combining the world's first government catastrophe (cat) bond (Cat MEX – US\$160 million) and parametric reinsurance (US\$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, increasing 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 (JERC), an earthquake reinsurance pool backed by the Government.</p>	<p>The Index-Based Livestock Insurance Pilot in Mongolia protects the livelihoods of 11,000 herders or 22 percent 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. While the national crop insurance program 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 cereals which currently covers 700,000 ha and will soon be extended to fruit trees.</p>	<p>The Productive Safety Net Programme (PSNP) in Ethiopia is aimed at enabling the rural poor facing chronic food insecurity to resist shocks, create assets and become food self-sufficient; including continent grant with the World Bank for emergency scale up.</p> <p>Insurance products of 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>
Deliver Funds to Beneficiaries	<p>The government of Mexico established a post-disaster loss reporting mechanism managed by FONDEN. Affected states can therefore access timely payments from the Natural Disaster Fund (FONDEN), reducing time-consuming coordination problems.</p> <p>In the Cook Islands, the establishment of the Disaster Emergency Trust Fund has served to reduce delays in emergency response.</p>	<p>As a public private partnership the Turkish Catastrophe Insurance Pool relies on the domestic insurance market for the distribution and claims settlement.</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>	<p>Distribution 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 enhance crop cutting experiments, improving the accuracy of claims assessments while reducing 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>
Linkages to DRM ↓	<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 states to complete a risk assessment (including development of a risk atlas) before being eligible for financing for risk mitigation projects</p>	<p>After setting up the TCIP, the Government of Turkey legally abolished its obligation to fund the reconstruction of residential dwellings following earthquakes, strengthened building construction codes, and enhanced supervision thereof.</p>	↓	<p>Members of PSNP households must participate in productive activities that will build more resilient livelihoods, such as rehabilitating land and water resources and developing community infrastructure, including rural road rehabilitation and building schools and clinics.</p>



In the diagnostic phase, policy makers identify who will benefit from their new disaster risk financing policies, the nature and size of the financial impact to be addressed, and what problems in particular are driving this impact.

The first question for policy makers is whether they understand the financial impact disasters cause in their country. On average how high are the costs to the budget faced by the government each year? Has a rigid social safety net led to an increased poverty rate after a disaster? Does recurrent emergency spending to rural households represent an increasing financial burden to the state? Does a large middle class go uninsured against disasters? Is the government highly indebted and unable to bear acute fiscal stress from a major natural disaster?

Identifying such financial problems is not always straightforward, especially if the country has not recently experienced a major natural disaster. Even if a policy maker can identify these problems, the underlying factors causing them may be unclear. For example: “I know the social and economic impact of cyclones is exacerbated by delays in disbursing government funds, but I don’t know whether this is because of hold ups in budget identification, allocation, approval, or mobilization.”

A preliminary financial assessment can identify a country’s financial and fiscal exposure and current capacity to finance disasters, as well as the level of development of insurance markets. Such assessments help the government to better understand and prioritize its needs and the best way to move forward given limited resources.

Identifying problems to be solved before taking action is important to maintain a focus on *problems* to be solved rather than *products* to be implemented. This ensures that the policies governments pursue are appropriate to the long-term results sought. For example, once a government has clearly identified the problem it is looking to solve and pursuant demands it can approach the reinsurance market in an empowered position with increased negotiating power, as opposed to the disempowered position of only knowing that it wants to be insured.

Preliminary diagnostics can be conducted within a relatively short timeframe and without significant resource investments. Limitations to financial data may, however, limit the depth of analysis if there are no concurrent investments in data. International organizations have started to support countries to conduct these diagnostics. The World Bank, for example, works with countries from early stages of planning for disaster risk management—such as to identify funding gaps, vulnerable populations, and determine if financial protection or other risk reduction measures are the best way forward—through the design and implementation of comprehensive financial protection strategies—such as in evaluating financials instruments through cost-benefit analysis and placing these instruments in a layered strategy.

Policy makers will likely identify multiple problems to address, either independently or with the aid of a diagnostic assessment (see Figure 13 for examples of such problems). Given that even a determined government faces capacity and resource constraints, along with competing political and budgetary priorities, it is essential that policy makers prioritize the problems to address and when to address them. Here again, engagement with international partners can help guide policy makers, although ultimately it is the government officials themselves who understand their country’s needs best and must make these determinations. The strategy should be aligned to core national priorities and development plans, which are often articulated in a national policy documents.

Social, economic, and political factors should also be considered, such as upcoming elections or society’s expectations of government support to the poor.

Figure 13 Examples of problems driving financial risk to the government and different groups in society

Governments <ul style="list-style-type: none"> • Low capacity and lack of a system for post-disaster budget management and execution; • Legal or economic constraints to reallocate government budget or raise funds in the short term, depending on economic conditions; • Opportunity cost of and political pressure against accumulating disaster reserve funds; • Limited or low-quality insurance of key public assets; • Growing public asset base at risk; • Unclear contingent liabilities from natural disasters. 	Homeowners and SMEs <ul style="list-style-type: none"> • Low technical and financial capacity of domestic insurers to offer and service affordable, high-quality catastrophe insurance products; • Lack of availability of reinsurance and risk financing mechanisms for local insurance companies to offload risk internationally; • Lack of key public goods, such as risk data; • Limited demand by homeowners and SMEs for catastrophe insurance products; • Expectations for government support following disasters, often based on precedents.
Farmers and Fishermen <ul style="list-style-type: none"> • Typically very weak demand for insurance, particularly from people who would benefit the most; • Needed investments and data access rights for data market infrastructure (such as high quality indices) often lacking; • Lack of reinsurance and risk financing mechanisms available for local insurers to offload covariate risk to international markets; • Lack of government policy on agriculture insurance, limiting confidence to engage in private sector insurance companies. 	The Poorest <ul style="list-style-type: none"> • Lack of delivery channels for the poorest (for example only very few have bank accounts); • Lack of upfront agreement about who will pay for shocks lead to slow, poorly targeted ex-post negotiations; • Lack of communication or cooperation between government agencies overseeing social safety net, natural disaster, and financial management.

Dedicating resources to diagnostic assessments is useful at all stages of engagement. Financial disaster risk analysis can provide a wide range of information to inform financial decision-making, including comparative financial analysis of various instruments available to the government and cost-benefit analysis of different combinations of these instruments. For example, a detailed analysis of annual expected loss and probable maximum loss to public buildings—for example schools, hospitals, and government offices—and infrastructure—such as roads, bridges, ports, and dams—can help a government determine the financial reserves required for a natural disaster fund for public asset reconstruction.

While technical, financial, and actuarial information is essential, so is the ability to interpret it. Practitioners first need to be able to demand the right type of information from their analytical team or partners. Then, they must interpret this information while considering nontechnical factors such as the domestic political economy context, taking into account issues like politics, competing interest groups, and inter-institutional relations. Only then are they equipped to communicate with decision makers on how they propose the government should advance. This task can appear daunting to governments constrained by limited experience and financial resources. But they need not develop all of this capacity in-house. A growing number of international organizations as well as insurance and reinsurance brokers are offering a suite of risk analytical tools (such as probabilistic catastrophe risk and actuarial models) and services to build governments' capacity and support evidence-based decision making (see Box 9).

Box 9: Disaster Risk Financing Analytics in the World Bank

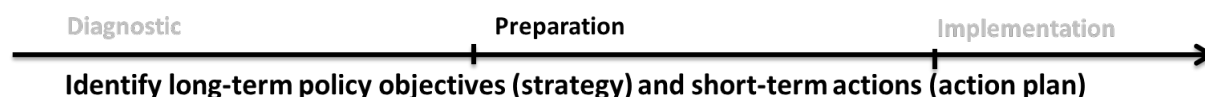
As mechanisms to better manage financial risk become more complex and technically advanced, countries often lack the human and financial resources, knowledge, and experience to properly understand and effectively use existing products.

Globally, countries and international donors are investing significant resources in data collection and risk modeling. But the resulting technical risk information, such as simulated losses, average annual loss, probable maximum loss, is often unsuitable for the kind of financial analysis needed to inform disaster risk financing decision making by governments. The technical risk information does not provide the required analysis of

advantages and disadvantages of different financial instruments which policy makers need to understand in order to make disaster risk financing decisions. To support decision making in policy formulation, countries need to close the gap between the data generated by probabilistic risk models and financial analysis that is useful to political decision makers who do not have an engineering or actuarial background (see also Ley-Borrás and Fox, 2014).

Responding to this demand, the World Bank is increasing work on its Disaster Risk Financing and Insurance Risk Analytics program. This program combines rigorous actuarial tools with technology to produce financial analysis that is useful and understandable to government decision makers. The World Bank will also document good practices and lessons learned from projects that included such analysis, work with counterparts in developing country governments to build their expertise and understanding in the use of these tools, and monitor and test the effectiveness of the solutions developed.

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Once policy makers have identified the financial problems of greatest concern, they can set their overarching goals and policy objectives for the next five to ten years. A government's overarching goal can vary significantly between countries. For example the government of Indonesia is looking to protect its budget against disaster shocks, while the government of the Philippines has a two-fold goal: to sustain economic growth and to protect development gains from natural disaster shocks; and to reduce the impact of natural hazards on the poorest and most vulnerable of society. At the same time, though it is important for a government to develop a strategy and action plan, this should not delay the simultaneous implementation of short-term and especially urgent priorities.

Even when the financial impact is clearly understood, different governments will have different priorities, for example promoting resilient growth versus protecting the vulnerable. Figure 14 provides examples of long-term policy objectives.

Figure 14 Examples of long-term policy objectives for increasing financial resilience of groups across society

<p><u>Governments</u></p> <ul style="list-style-type: none"> • Generate and use financial disaster risk information to improve decision making; • Improve management of budget volatility caused by natural disasters; • Implement a damage assessment, budget allocation, and budget execution framework; • Secure a cost-efficient approach to insuring public assets; • Implement clear guidelines for declaration of a disaster and for procedures in disaster relief effort. 	<p><u>Homeowners and SMEs</u></p> <ul style="list-style-type: none"> • Provide access to affordable, effective catastrophe insurance in partnership with the insurance sector; • Increase insurance supervisor's capacity to effectively supervise the provision of catastrophe insurance and micro-insurance; • Build the domestic insurance market's technical and financial capacity to sell and service catastrophe insurance products; • Build demand for insurance to help achieve sustainable critical market size.
<p><u>Farmers and Fishermen</u></p> <ul style="list-style-type: none"> • Provide access to affordable, effective agricultural insurance in partnership with the private insurance sector; • Increase the insurance supervisor's capacity to effectively supervise the provision of agricultural insurance; • Support Banks in better management of their balance sheet and responsible expansion of agricultural credit to farmers; • Build the domestic insurance market's technical and financial capacity to sell and service agricultural insurance products. 	<p><u>The Poorest</u></p> <ul style="list-style-type: none"> • Integrate disaster risk considerations into social safety nets; • Implement contingency planning for social safety nets to ensure immediate scalability during and after natural disasters; • Develop clear risk financing structure for scalability component of cash transfer programs to enable efficient access to funds; • Link affordable, effective catastrophe micro-insurance with social safety net programs.

When defining their objectives, policy makers often prioritize based on evidence from financial risk analytics, in line with national or subnational development plans or laws, and taking into account political or social factors. Policy makers will also want to consider the human, technical, and financial resources and partnerships required for potential policy objectives. For example, in Colombia, the Ministry of Finance understood that in order to improve its insurance of public assets, it would need to partner with the government's public procurement agency and infrastructure management agency. Early discussions with these entities helped to ensure that the ministry's goals were feasible.

In fact, the government of Colombia was the first governments in the world 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 4).

Table 4 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; 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.

Once a strategy has been developed, the government can define an action plan outlining specific steps it will take to implement its policy goals over the next two to three years. The action plan should outline the details of how the government will move forward, including identifying needs, assigning responsibilities, and setting deadlines. Short-term actions could include the development of better exposure data to support risk identification, legal and institutional changes to allow the government to contract insurance or other disaster risk financing instruments, exploring options for a subnational risk pool, or establishing terms and conditions for contracting insurance for public assets. Annex III provides answers to some commonly asked questions in the preparation of a risk financing and insurance strategy and action plan, such as: why should the government invest in risk market infrastructure (and what is that anyway) or what is the role of premium subsidies?

While the government's longer-term strategy remains in place for five to ten years, the action plan should be a living document; the government should expect to regularly review and update it, reflecting developments in implementation.



Implementing a national disaster risk financing and insurance strategy typically occurs over several years, requiring long-term commitment and investment by the government, and alignment with the overall disaster risk management agenda. Before beginning implementation, the government should consider whether it has the necessary human, technical, and financial resources and partnerships in place. Partners, including public entities, other country governments, international organizations, and private firms, should have clear and realistic roles and responsibilities that take into account what resources they can and cannot contribute.

The government should use its action plan to guide the strategy's implementation. Often, progress will be incremental, with technical and institutional advances enabling longer-term progress. For example, a government seeking to use insurance to help protect its budget may start with a parametric product while improving its financial risk information. It can then add additional risk financing products to its portfolio to develop a more comprehensive solution. Sometimes, legal challenges arise that require changes to existing laws. In a handful of countries, for example, the law does not allow the government to purchase insurance⁴⁰ because public officials cannot pay invoices until a good or service is received, prohibiting insurance premiums paid for an indemnification that may not arrive.

Throughout the strategy's implementation, decision makers face many policy decisions, such as deciding between different financial tools and then configuring the selected instrument (see Table 5 for a description of such tools). For example, to answer the commonly asked question "What is the expected cost of the parametric risk-transfer product in question?" a country considering risk transfer to insurance markets needs to make a series of decisions, including:

- Which geographical areas (cities, regions) of the country should be covered?
- How much financial protection should be purchased for each area? What size of payouts and coverage limits are required for each area covered?
- What kind of events should trigger a payment? Do I need to be covered against more recurrent or rare, extreme events?
- What type of payout structure should be used? Should the government opt for a complete payment if the product is triggered or choose an incremental structure and thus reduce the premium?

⁴⁰ Interestingly, in other countries, the law requires the government to purchase insurance for its assets.

Table 5 Overview of catastrophe risk financing and insurance instruments for governments

	Government Reserve Fund	World Bank Contingent Credit (Cat DDO)	Traditional / Parametric Reinsurance	Cat Bond	World Bank Cat Swap
Risk	Retained	Retained	Transferred	Transferred	Transferred
Immediate liquidity	Yes	Yes	Yes, when Parametric	Yes, when Parametric	Yes, when Parametric
Risk Taker	Government	Government	Reinsurer	Capital markets	Capital markets
Trigger	N/A	Declaration of natural disaster by government	Loss / Index	Indemnity and parametric available	Indemnity and parametric available
Cost of coverage	Budgeted resources	Fees plus loan repayments	Insurance premium	Insurance premium ⁴¹	Insurance premium
Transaction costs (incurred to obtain coverage)	N/A	N/A	Broker, legal, modeling, loss adjustment	Lead coordinators, Legal, Modeling, Rating Agency	Cost for modeling
Duration of coverage	N/A	Multi-year	One-year or multi-year	Multi-year	Multi-year
Credit risk	N/A	World Bank	Government	Collateral	World Bank

Source: World Bank Disaster Risk Financing and Insurance Program, adapted from World Bank Treasury.

Strong, informed partnership is a key theme in this paper: a disaster risk financing and insurance agenda cannot be implemented alone. The most important partnerships are within the government. For example, a Ministry of Finance seeking to relieve fiscal pressure by insuring more public assets while supporting domestic insurers may need the insurance supervisor's guidance to understand how much public catastrophe risk the domestic market can absorb. The private sector is equally important. If, for example, the government seeks to establish or improve the sustainability of property catastrophe risk insurance or agriculture insurance programs, it will need to partner with the domestic and international insurance market. Involving the international market brings high-rated reinsurers and capital-market partners with strong technical capacity, financial balance sheets, and references.

International organizations can provide impartial technical, financial, and actuarial disaster risk financing expertise and in some cases financing capacity at below market rates or on concessionary terms. A number of organizations have established dedicated teams and programs to support governments in the disaster risk financing agenda and have collaborated with regional organizations and governments to launch large regional programs, including the African Risk Capacity and the Caribbean Catastrophe Risk Insurance Facility, both discussed earlier. Closer to home, non-governmental organizations (NGOs) can prove critical partners for disaster risk financing efforts that require engagement with the local community, where NGOs often have the required trust and the capacity to educate and train community members.

⁴¹ The premium takes the form of the 'spread' for a catastrophe bond. This is paid, in addition to the investment return from the collateral account to the party taking the risk.

Monitoring and Evaluation

Throughout, monitoring and evaluation must be a crucial part of the strategy's implementation. This includes both monitoring progress as well as evaluating the impact thereof and results achieved. Continuous feedback from monitoring and evaluation efforts enables an iterative process with regular refinement and adjustments to both the strategy and action plan. For example, if a new catastrophe insurance program is not raising the rate of insurance coverage of the target population, modifications to the program design may be required.

Sufficient tools and indicators for monitoring and evaluation are, however, still mostly lacking. Anecdotal evidence suggests that ex-ante financial protection strategies improve countries' resilience to disasters and, in turn, protect their development trajectories. But the evidence base on the effectiveness of these financial protection solutions is limited, and there is no widely-accepted framework for evaluating their effectiveness or ineffectiveness. Developing monitoring and evaluations tools and indicators is a major challenge that is currently being addressed through collaboration among governments, private sector representatives, international financial institutions, donors, and other members of the international community (see box 9). This is important not only directly looking at the benefits and cost of risk financing instruments, but for example also looking towards associated fields such as public expenditure following disasters. Better understanding 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).

Box 10 Assessing the effectiveness of sovereign disaster risk financing programs

The number and type of financial and budgetary instruments to assist governments in managing their fiscal liability to disaster risk has grown exponentially in recent years – from risk retention instruments such as budget allocations, reserves, and contingent lines of credit, to risk transfer instruments such as reinsurance and catastrophe bonds. Yet, despite growing interest, the evidence on the impact, effectiveness and efficiency of sovereign disaster risk financing and insurance programs remains limited.

Chasing answers and solid evidence, the World Bank and the Global Facility for Disaster Reduction and Recovery (GFDRR) have partnered with the U.K. Department for International Development (DFID) to better understand the impact and effectiveness of alternative financial protection strategies. Launched in 2013, the project will span over three years to develop and test a quantitative impact appraisal framework. The first two years of the project will focus on extensive background research to identify and address the evidence gaps and will test the draft framework in a series of country case studies. The evidence collected through the research and country case studies tracks will then feed into the final framework.

To date, the project has brought together the background research across disciplines, which is currently compiled into a framework for the country pilots. This will inform the final development of the framework that could be used by national governments, donors, and development partners to help maximize the impact of their support for their sovereign risk financing strategies.

Disaster risk financing and insurance is but one aspect of comprehensive disaster risk management. While it can offer countries many possibilities in addressing the financial impacts from disasters, financial protection policies cannot be sustainable unless they are integrated in 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 impacts that cannot be reduced or prevented. Improved evidence to better understand the benefit and costs of alternative risk financing activities help 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.

Section VI: Looking to the Future

Governments have made significant progress in implementing disaster risk financing solutions. Much has been learned, and these lessons enabled the formulation of the first operational disaster risk financing and insurance framework to help governments structure work on financial resilience. But disaster risk financing and insurance is a sophisticated agenda with complex institutional and technical aspects. Many problems that have emerged over the years remain unsolved, with policy makers exploring new ideas to find solutions. At the same time new opportunities have emerged to build on lessons learned and cooperate across disciplines to leverage a larger impact.

Open challenges to increase financial resilience to disasters

Technical challenges

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 to 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 it requires for proactive planning, such as historical records of how disasters affected public finances in the past and information for probabilistic financial and actuarial analysis. It may also lack expertise 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. 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 11 for a more detailed discussion of these challenges.

Comprehensive fiscal risk management: The ability of ministries of finance in developing countries to manage fiscal risks is often limited, if it exists at all. Without a proactive approach to fiscal risk management overall, ministries may also lack the mindset, knowledge, and institutional support to integrate fiscal risks from natural disasters. A broader shift in thinking to ex-ante risk management is required for comprehensive fiscal risk management, often with technical and financial support from international organizations and donors.

Strengthening evidence: The uptake by developing country governments of ex ante financial protection measures has seen tremendous growth along with the number of available tools, yet evidence on impact, effectiveness, and efficiency is still limited. Initiatives such as the World Bank's Impact Appraisal Program (see Box 10) 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.

Box 11 Challenges in risk assessment 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, 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, adequate integration of low-income housing. Exposure data may also rely heavily on official census data and disregard unofficial settlements – such as shanty towns or squatter towns – that regularly suffer the most damage in a disaster and often exclude infrastructure and public buildings.

Even where countries can access risk modelling tools, they are 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 risky and 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 organizations such as Google provide information already in their possession free of charge for development purposes – such as disaster risk financing.

Data on exposure may be scattered among different governmental 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. And when countries do share data, they often receive no reward for their efforts—that is, they receive no usable feedback or product 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 required to address this demand, help governments increase post-disaster financial response capacity, and build domestic catastrophe insurance markets. Probabilistic risk assessment and CAT 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. Through simplifying complex technical data and providing key financial figures, this works 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

Operational challenges

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 donor's need 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.

Silos 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 the ministry of agriculture or public works is essential for implementation. Bringing together these different agencies with different agendas is a key 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. The design of national financial protection strategies needs to take into account the incentives they generate for example by discouraging subnational governments from investing in risk reduction.

Institutional Challenges

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.

Disaster risk financing fund: 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 resourced solely dedicated to allowing risk retention it can also serve as the first building block to anchor the development of a more comprehensive disaster risk financing and insurance strategy. However the development of dedicated fund requires discussion and agreement with the ministry of finance and, in many cases, with the legislative branch. Beyond the institutional and administrative challenges this often involves a political dimension.

Opportunities to expand the impact of disaster risk financing and insurance

Social safety net programs and disaster risk financing: Few developing country social safety nets are currently supported by disaster risk financing strategies. 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 support subnational governments implement financial protection measures will not only help 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 addressing the usually lower capacity and expertise at the subnational level. With

the rapid rate of urbanization in developing countries, integrating disaster risk financing and disaster risk management into city-level planning has also become increasingly urgent. In Asia, for example, unprecedented levels of economic and population growth has 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 risks: Disaster risk financing and insurance should be considered as an integral part of comprehensive climate risk management -- providing tools that have been shown to effectively manage the financial impacts of disaster 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 challenges. 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 the HFA 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 and other global policy groups like the G20 and APEC are taking it up as an important topic.

The successor to the Hyogo Framework for Action, to be agreed in early 2015 after the HFA 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 must be part of such a priority for action.

Table 6 Recommended treatment of financial protection in HFA2

Priority for Action:	Reduce financial impact of natural disasters on the government and society
Key Activities:	<ul style="list-style-type: none">i. Improve decision making on the financial management of disasters.ii. Prepare and implement sovereign disaster risk financing strategies relying on a combination of financial instruments and programs.iii. Promote responsible increased access by governments and people to affordable, sustainable, cost-effective catastrophe and agricultural insurance products.iv. Integrate disaster risk considerations into the design of social protection programs.

Reliable indicators at the outcome and impact level should underwrite not only the future review mechanisms of the next Hyogo framework, but also help countries evaluate the impact of and adjust new national risk financing strategies. 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 should be reflected in the outcome and impact level indicators selected for the second Hyogo framework.

Table 7 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
Key Activities:	
i.	<p>Improve decision making on financial management of disasters.</p> <ul style="list-style-type: none"> (a) <i>Promote the availability, quality, and consistency of risk data.</i> (b) <i>Develop and promote probabilistic catastrophe risk and actuarial models.</i> (c) <i>Develop and use financial decision-making tools.</i> (d) <i>Establish transparent, timely, and effective post-disaster loss reporting mechanisms.</i> (e) <i>Build the required capacity and technical expertise for disaster risk financing.</i> (f) <i>Strengthen the use of financial risk information to guide risk reduction activities.</i>
ii.	<p>Prepare and implement national disaster risk financing strategies relying on a combination of financial instruments and programs.</p> <ul style="list-style-type: none"> (a) <i>Assess contingent liabilities of the state to disasters and improve their integration by the Ministry of Finance in fiscal risk management.</i> (b) <i>Quantify potential disaster-related losses from a fiscal and budget perspective.</i> (c) <i>Assess potential post-disaster (short-term and long-term) funding gaps.</i> (d) <i>Develop a national strategy for financial protection to secure immediate liquidity following disasters for short-term and longer-term reconstruction financing.</i> (e) <i>Establish a national disaster fund with dedicated resources.</i> (f) <i>Adopt pre-disaster budget management and post-disaster budget execution mechanisms for natural disasters.</i>
iii.	<p>Promote responsible increased access to affordable, sustainable, cost-effective catastrophe, agricultural and weather insurance products for governments, businesses, farmers, and households.</p> <ul style="list-style-type: none"> (a) <i>Quantify potential property and agricultural disaster losses and identify losses incurred by public and private stakeholders.</i> (b) <i>Assess the capacity of domestic insurance markets and establish public-private partnerships to improve those markets.</i> (c) <i>Promote domestic demand for insurance.</i> (d) <i>Develop domestic supply of insurance.</i> (e) <i>Improve supervision and regulation of catastrophe risk insurance.</i>
iv.	<p>Strengthen the resilience of the poorest by integrating disaster risk considerations into the design of social protection programs.</p> <ul style="list-style-type: none"> (a) <i>Quantify potential disaster-related financial losses on the poorest and the fiscal impact that disasters pose through social protection programs.</i> (b) <i>Secure contingent funding for social protection programs against disasters.</i> (c) <i>Complement social protection programs with insurance principles and private sector products.</i> (d) <i>Improve the process for identifying beneficiaries and assessing their eligibility for post-disaster payouts.</i>

Annex I: Example of how to use the Operational Disaster Risk Financing and Insurance Framework

The second component of the operational framework groups policies into four beneficiary groups and three main categories: financial risk analytics, mechanisms to secure funds, and post-disaster funding allocation and disbursement.

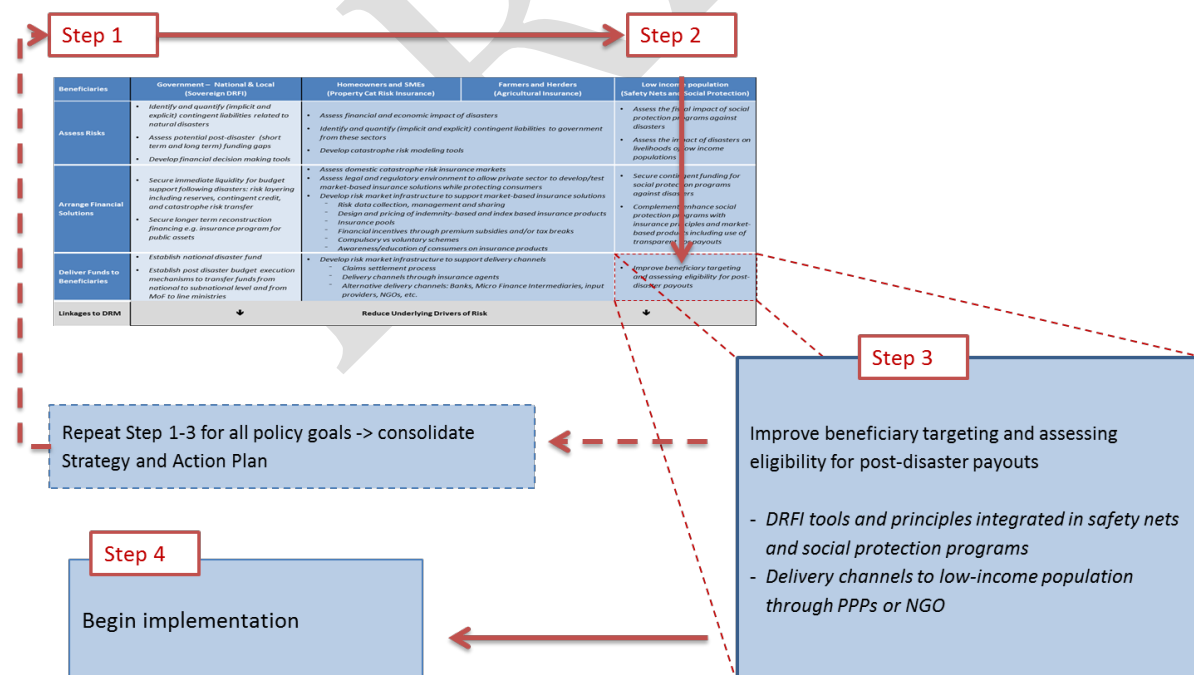
The following questions can help guide users through this matrix.

- What kind of financial impact from disasters concern me and who should be the beneficiaries of my disaster risk financing and insurance engagement? *[This is the column in the matrix]*
- What are the problems to solve in order to address these impacts? For example, do I understand the full impact of disasters on my budget? How can I finance recovery from these effects? How can I involve the private sector better to take on a bigger risk burden? *[This is the row in the matrix]*
- What policies should I pursue to achieve my desired development objective? What actions and partners are needed to get there? *[These are the policies inside each cell]*

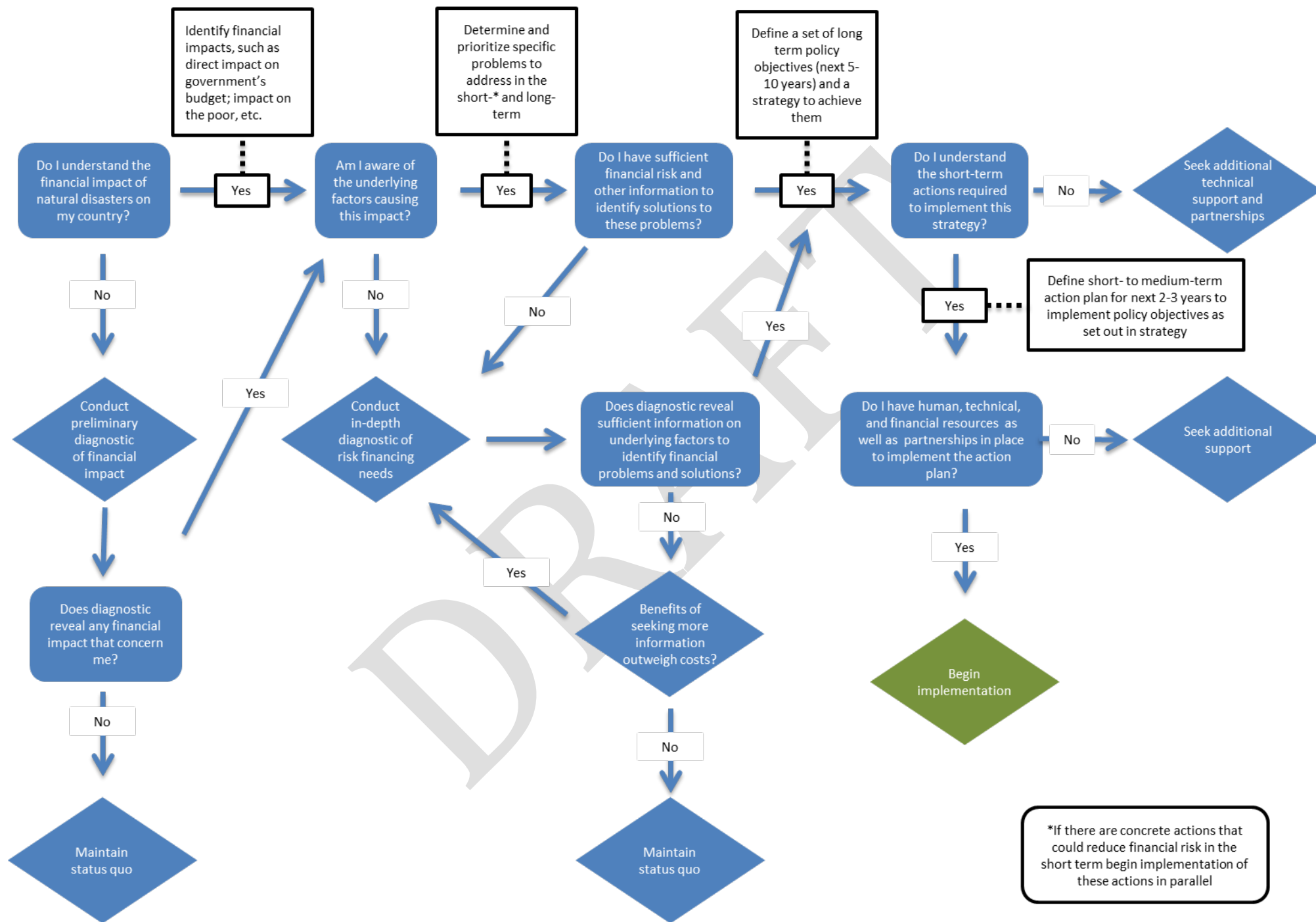
Once decision makers have identified and prioritized their objectives they may want to consider combining multiple policy objectives and associated actions into a comprehensive disaster risk financing and insurance strategy and action plan.

Figure 15 provides an illustration of how this operational framework could help a decision maker identify the appropriate policy options if the overarching policy goal has been identified as the need to 'reduce the impact of disasters on the poorest through quicker payout of social safety nets following disasters'.

Figure 15 Example of applying the Disaster Risk Financing and Insurance Operational Framework



Annex II: 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 III: 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 management of 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 without the possible disadvantages and sustainability issues of direct premium subsidies. Access rights to data often held by government agencies but not accessible for the development of insurance solutions is a particular challenge that the government plays a key role in addressing.

High quality data⁴² is indispensable for developing insurance markets, as it forms the basis for effective and sustainable insurance solutions to stakeholders throughout society. Agricultural insurance products for low-income farmers or herders, for example, are usually built on indices that use agricultural or climatic data.⁴³ Only if the index accurately reflects conditions experienced by the farmer is it likely to provide cost-effective, reliable protection with low basis risk (see also next point). Policy makers play an important role in establishing a framework for data collection, auditing⁴⁴, 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 which serves as an indication of the harvest size—which enables the construction of indexes that reliably protect farmers. Reliable data auditing and data management are also necessary for governments to access international reinsurance markets, which require a high standard of data to develop and price insurance products. If they have concerns about how the data is audited, international reinsurance firms 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 the promotion of micro-insurance including agricultural index insurance, which has now been ratified in all 14 ministers of finance.

Banking regulation may also be relevant as 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.

⁴² 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 the product offers reliable protection), audited to international reinsurance standards, and cost-effective.

⁴³ 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.

⁴⁴ Data auditing is the process of controlling data quality and assessing how the data is fit for the given purpose.

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 prearranged trigger such as crop yield estimates in a given geographical area or the location and intensity of an adverse natural event 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, but using a modeled loss index when exposure data are available. 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 they allow 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 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, or when a payout is triggered without any damage and losses incurred. Improved accuracy of hazard data collection systems, increased openness and centralization of historical data, and quality-enhanced risk assessments could reduce basis risks, enabling a more efficient and effective use of parametric insurance. For any government it is crucial to understand the basis risk given the proposed insurance options, and carry out 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 increase outreach and achieve 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 most 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, such as they can lead policyholders to underinvest in risk mitigation activities—such as irrigation or diversifying crops planted—or invest in nonviable crops. 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.

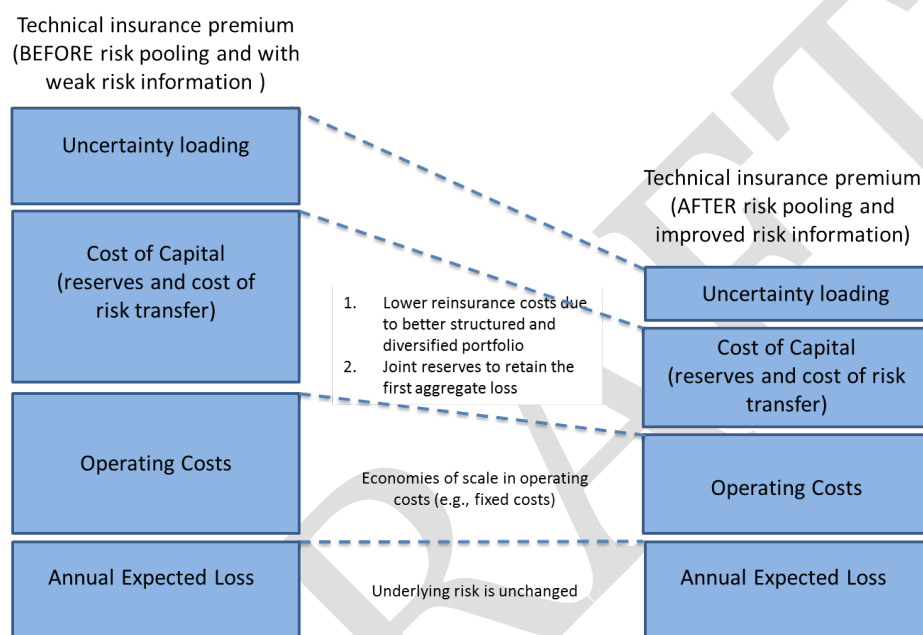
The government of India significantly subsidizes the cost of providing data to the country's private agriculture insurance market. Similarly, the government of Mongolia pays for the collection of all data used in its Index Based Livestock Insurance Scheme and provides it to accredited insurance

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 pay-outs. 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 my 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 16).

Figure 16 How insurance premiums benefit from risk pooling and improved risk data



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

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% reduction in premium with the risk pooling mechanism when compared to buying the same coverage individually.

Annex IV: Natural Disaster Losses 1990-2012, in 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
Weather-related	\$ 864	\$ 467
South America	\$ 135,448	\$ 18,988
Earthquakes	\$ 51,017	\$ 9,747
Weather-related	\$ 84,431	\$ 9,242
World	\$ 2,841,077	\$ 818,554
Earthquakes	\$ 105,788	\$ 798,350
Weather-related	\$ 712,766	\$ 2,042,728

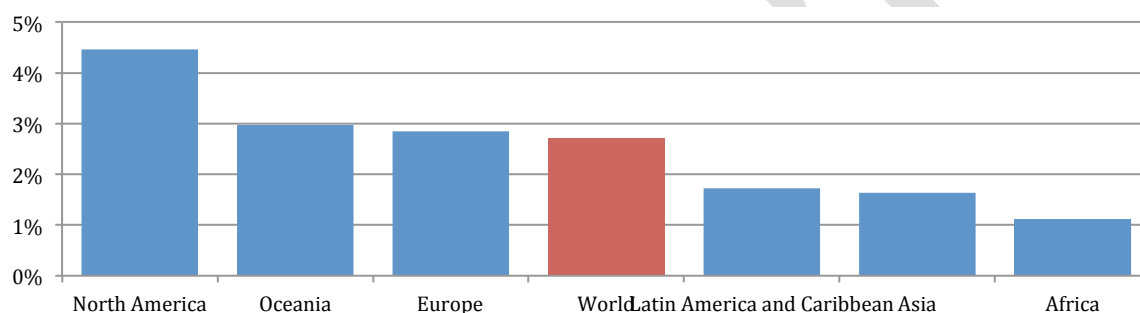
Source: Swiss Reinsurance Corporation

Annex V: Insurance and the Financial Resilience of Countries

The full story of the losses disasters inflict cannot be explained without looking at the financial vulnerability of countries. For example, the macroeconomic cost of natural disasters is directly related to the 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 17).

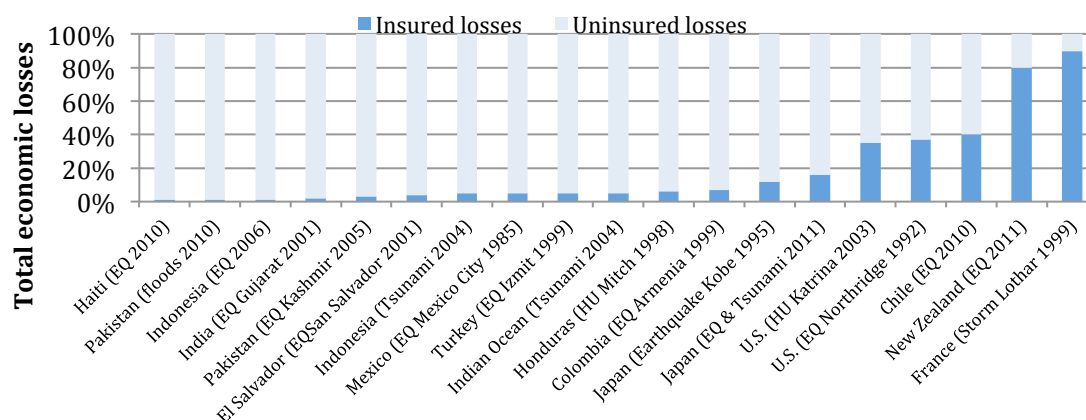
Figure 17 2012 Penetration of non-life insurance, premiums as percentage of GDP



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

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 18).

Figure 18 Insured versus uninsured loss of selected events



Source: World Bank Disaster Risk Financing and Insurance Program.

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.

Annex VI: 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/
Index-based flood insurance in Bangladesh	http://www.swissre.com/media/news_releases/nr_20130820_Flood_insurance_Dhaka.html
Turkish Catastrophe Insurance Pool	http://www.gfdrr.org/sites/gfdrr.org/files/documents/_Turkish_CIP.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://gfdrr.org/sites/gfdrr.org/files/I_Mongolia%20IBLIP_Final.pdf
Pacific Catastrophe Risk Assessment and Financing Initiative	http://pcrafi.sopac.org/
Ethiopia Horn of Africa Risk Transfer for Adaptation	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/home
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.gfdrr.org/sites/gfdrr.org/files/I_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/aosis_insurance061208.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.gfdrr.org/fondenmexicosnaturaldisasterfundreview
Vietnam Agricultural Insurance Pilot	http://cgd.swissre.com/features/Agricultural_reinsurance_in_Vietnam.html

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Acronyms

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