

# Fiscal Disaster Risk Assessment and Risk Financing Options

Sri Lanka



# **Fiscal Disaster Risk Assessment and Risk Financing Options**

SRI LANKA

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## Abbreviations

AAIB	Agricultural and Agrarian Insurance Board
AEL	annual expected loss
Cat-DDO	Catastrophe Deferred Drawdown Option
DRFI	disaster risk financing and insurance
FONDEN	Natural Disaster Fund (Mexico)
GDP	gross domestic product
GFDRR	Global Facility for Disaster Reduction and Recovery
GoSL	Government of Sri Lanka
GWP	gross written premium
IBSL	Insurance Board of Sri Lanka
MDM	Ministry of Disaster Management
MoF	Ministry of Finance
NBD	National Budget Department
NCDM	National Council for Disaster Management
NITF	National Insurance Trust Fund
PML	probable maximum loss
RII Act	Regulation of Insurance Industry Act
SLIC	Sri Lanka Insurance Corporation
TCIP	Turkish Catastrophe Insurance Pool



# Executive Summary

The objective of the report is to raise awareness of the fiscal impacts that natural disasters have on the budget of the Government of Sri Lanka (GoSL). It is envisioned to be used as a planning tool for the potential development of a comprehensive disaster risk financing and insurance (DRFI) strategy that would equip the Ministry of Finance (MoF) with additional instruments to manage the contingent liability posed by disasters. Its recommendations are a starting point for a collaborative discussion with the GoSL on the potential development of a broad DRFI program.

This DRFI program is also just one component of the comprehensive Sri Lanka Climate Resilience Program, which also comprises (a) the Climate Resilience Improvement Project (US\$110 million) to reduce immediate physical risks and improve understanding of disaster risks so that future investments are targeted to their best use; and (b) a World Bank Development Policy Loan with a Catastrophe Deferred Drawdown Option (Cat-DDO) (US\$102 million) to strengthen the country's fiscal resilience to disasters.

This study presents a series of complementary options for a national disaster risk financing strategy for Sri Lanka, drawing significantly from international experience and based on a preliminary review of the current budget management of natural disasters and a prototype fiscal risk analysis in Sri Lanka. It benefits from the international experience of the World Bank, which has assisted several countries in the design and implementation of sovereign disaster risk financing strategies (for example, in the Caribbean island states, Colombia, Indonesia, Mexico, Pakistan, Peru, the Philippines, and Vietnam) and property catastrophe risk insurance programs (for example, in Eastern Europe, Romania, and Turkey). This experience is necessarily tailored to the institutional, social, and economic characteristics of Sri Lanka as well as the availability of relevant data.

## Funding of Disaster-Related Expenditures

Currently, funds for disaster-related expenditure are allocated either through general budget formulation or extraordinary requests to the Treasury via the National Budget Department (NBD), and general budget procedures apply to the postdisaster execution of all funds. However, provinces follow a distinct and separate budgeting process, which does not fully meet their needs for disaster-related expenditure.

To help expedite funding and remedy shortfalls, the 2005 Sri Lanka Disaster Management Act provides for the establishment of a National Disaster Fund, but this fund has yet to be implemented. According to the 2005 Act, the fund is intended to consolidate external and internal funds for disaster-related expenditure, including funds in the form of loans, donations, gifts, or grants.

*The objective of the report is to raise awareness of the fiscal impacts that natural disasters have on the budget of the Government of Sri Lanka.*

*Sri Lanka's catastrophe risk profile is characterized by a mixture of high-frequency, low-severity events and a number of single large-loss events.*

## Risk Profile

Sri Lanka's catastrophe risk profile is characterized by a mixture of high-frequency, low-severity events and a number of single large-loss events. Floods are relatively frequent and less variable in terms of impact severity than other types of catastrophic events. Cyclones and droughts, however, are infrequent and typically have more-severe impacts.

Preliminary analysis was completed on historical (direct and indirect) losses arising from the physical and property damage impact of past disasters on relief assistance as well as housing and road reconstruction. Over the long term, the combined average annual loss to these sectors from natural disasters is estimated at SL Rs 50 billion (US\$0.38 billion). The annual expected loss (AEL) is highest from flooding (with an AEL of SL Rs 32 billion, or US\$0.24 billion), followed by cyclones and high winds (with an AEL of SL Rs 11 billion, or US\$0.08 billion). This annual expected sector-specific loss from natural disasters represents 0.50 percent of Sri Lanka's gross domestic product (GDP) and is equivalent to 3 percent of total government expenditure.<sup>1</sup>

## Insurance Industry Role

Twenty-one insurance companies currently operate in Sri Lanka, 18 of which offer non-life insurance with subclasses such as fire. Most insurers issue natural catastrophe coverage as extensions or endorsements of existing fire and allied perils policies, which may indicate an undervaluation of natural disaster risk.

The current insurance penetration and density of non-life products that relate to catastrophe risk is very low in Sri Lanka. Less than 1 percent of the residential property stock is currently insured against natural disasters.<sup>2</sup> This suggests significant growth opportunities for the insurance market.

The state-owned Sri Lanka Insurance Corporation (SLIC) is the non-life market leader in terms of total gross written premium (GWP) share. SLIC is the designated insurer for all state and interstate insurance and insures public infrastructure construction, such as roads and bridges, as well as some major hotels in Sri Lanka. The National Insurance Trust Fund's (NITF) potentially inadequate retrocessionaire role is also a source of concern for the industry.<sup>3</sup>

## Overview of Strategic Options

This study presents the GoSL with a series of options for consideration that could help the government increase its immediate financial response capacity against natural disasters and better protect its fiscal balance. Specifically, there are seven options for consideration spread across the short, medium, and long term (table ES.1).

<sup>1</sup> Loss estimates are based on estimated nominal 2014 GDP of SL Rs 9,929 billion, which is based on actual nominal 2013 GDP of SL Rs 8,671.1 billion plus 14.5 percent growth (the average of the preceding five years' growth). The natural disasters modeled include flood, landslide, cyclone, and drought. Tsunami was *not* modeled. Total government expenditure for this analysis is based on 2013 estimates.

<sup>2</sup> IBSL (Insurance Board of Sri Lanka), "Annual Report 2013" (Colombo, Sri Lanka: IBSL, 2014).

<sup>3</sup> The NITF was established by Act No. 28 of 2006 under the Ministry of Policy Planning, Economic Affairs, Child, Youth, and Cultural Affairs to implement government schemes that safeguard public and local governments from various forms of liability including unexpected property disaster (NITF Board, "About Us," accessed October 27, 2015, <http://www.nitf.lk/about.htm>).

**Table ES.1 Options for a National Disaster Risk Financing Strategy in Sri Lanka**

Time frame	Options
<b>Sovereign protection</b>	
Short term	1. Streamline damage-and-loss data collection and reporting system
Short to medium term	2. Develop financial tools to support decision making, including a disaster risk model for MoF
Short term	3. Develop a national disaster risk financing strategy
Medium term	4a. Establish a National Disaster Reserve Fund as fast-disbursement mechanism for the financing of postdisaster operations
Medium term	4b. Establish a robust catastrophe risk insurance program for public assets
Medium term	4c. Enhance the management of contingent liability related to social protection
<b>National Insurance Trust Fund (NITF)</b>	
Short term	5. Introduce a reinsurance strategy for the NITF
Medium term	6. Strengthen the agricultural insurance program
<b>Private insurance market</b>	
Medium term	7. Enhance data sharing on agricultural insurance

## Challenges

The biggest short-term challenges facing the GoSL are twofold: (a) the lack of a centralized damage-and-loss data collection system able to report information related to the damage and losses borne by different sectors, and (b) the lack of disaster risk assessment tools. Addressing both of these challenges would help quantify the underlying natural hazards facing Sri Lanka and allow the preliminary calculation of their likely financial impacts on the state. Once these activities are undertaken, they would inform the development of a national disaster risk financing strategy.

The subsequent implementation of a national disaster risk financing strategy would also require significant institutional capacity building. Disaster risk financing is one component of a comprehensive fiscal risk management strategy, which requires specific financial and actuarial expertise. Major capacity building related to disaster risk assessment and management of natural disasters would be required to develop and use financial tools to guide the GoSL in its national disaster risk financing strategy.



Colombo, Sri Lanka. Photo credit: Vidu Gunaratna/Thinkstock.com

# Public Financial Management of Disaster Risk

## Disaster Management Authority

The 2005 Sri Lanka Disaster Management Act established the National Council for Disaster Management (NCDM) as the country's supreme body for disaster management.<sup>4</sup> As such, it is responsible for guiding the allocation of all funds for disaster management, including funding allocations through the Reconstruction and Rehabilitation Fund established in 1993.

Before the NCDM was established, responsibility for disaster management had moved between various authorities (figure 1.1). The Ministry of Social Services (or equivalent) was responsible for all disaster management functions until 1996, when preparedness, mitigation, and response and recovery responsibilities were transferred to the National Disaster Management Center. After enactment of the 2005 Sri Lanka Disaster Management Act, disaster management fell under the purview of the Ministry of Disaster Management (MDM). The Act's legal definition of "disaster" has also clarified the respective responsibilities of the NCDM and MDM.<sup>5</sup>

## Funding of Disaster Expenditure

The 2005 Sri Lanka Disaster Management Act provides the basis for the establishment of a National Disaster Fund, but this fund has yet to be implemented.<sup>6</sup> The Fund falls under the purview of the NCDM, but because it has not yet been established, signatories for release of funds have not been appointed. The Fund is intended to facilitate emergency response, recovery, relief, and reconstruction.<sup>7</sup> Under the Act, the Fund is also intended to consolidate external and internal funds for disaster-related expenditure, including funds in the form of loans, donations, gifts, or grants.

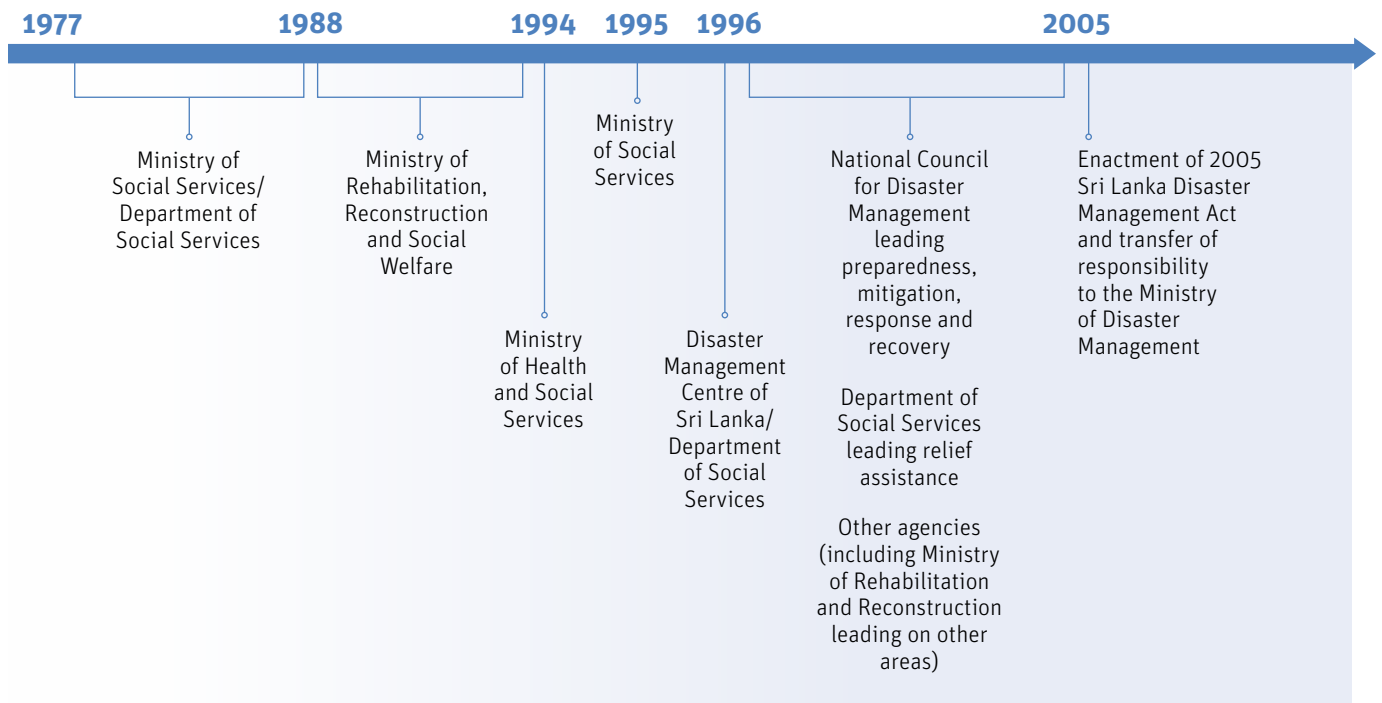
<sup>4</sup> The Sri Lankan Disaster Management Act No. 13 of 2005 was passed on May 13, 2005, by the Parliament of Sri Lanka. Its council is chaired by the president, with the prime minister as vice chair. The council also includes the Leader of the Opposition and the ministers of more than 20 ministries, including the chief ministers of all the provinces. For more information about the NCDM's composition, see appendix B.

<sup>5</sup> "Disaster means the actual or imminent occurrence of a natural or manmade event, which endangers or threatens to endanger the safety or health of any person or group of persons in Sri Lanka, or which destroys or damages or threatens to destroy or damage any property" (Clause 25, Act No. 13 of 2005). For a detailed list of events considered to be disasters under this definition, see appendix B.

<sup>6</sup> Clause 17(1) of the Act No. 13 of 2005 creates a National Disaster Fund.

<sup>7</sup> Clause 4(d), Act No. 13 of 2005.

**Figure 1.1 Disaster Management Authority in Sri Lanka, 1977–Present**



Currently, funds for disaster-related expenditure are allocated through general budget formulation or extraordinary requests to the Treasury via the National Budget Department (NBD), and general budget procedures apply to the postdisaster execution of all funds. The MDM and line ministries receive funds for their disaster-related responsibilities through the general budget formulation.

Under the 2013 National Policy on Disaster Management, the MDM is the entity responsible for immediate postdisaster spending, including immediately needed food supplies, water and sanitation, medical assistance, counseling assistance, shelter, clothing, and other immediate needs. The MDM also funds the overheads of emergency operation centers established in the Disaster Management Centre’s district and divisional secretary offices.

As part of this mandate, the MDM allocates postdisaster funds at the district level, following impact assessments and requests from the district secretaries. For emergency disaster relief and short-term, small-scale reconstruction, the MDM issues funds to the district secretaries.<sup>8</sup> It also provides guidance on the rates applicable to specific expenditure types (table 1.1). Large-scale reconstruction is beyond the remit of the NCDM and the MDM, falling instead to individual line ministries at the federal level. The budget process anticipates that line ministries account for large-scale postdisaster reconstruction costs in their annual budget estimates.

If disaster-related expenditure demands exceed provisions in the general budget formulation, the Treasury has recourse to a Miscellaneous Fund, which has been used in the past for disaster spending. The NBD director general authorizes transfers from the Miscellaneous Fund immediately upon request of the MDM.

<sup>8</sup> A Treasury circular lays out the types of qualifying expenditures by the district secretaries (NBD Circular No. 152(1), dated April 7, 2013).

**Table 1.1 Treasury Rate Guidance on Postdisaster Expenditures**

Relief category	Expenditure item	Amount to be paid (SL Rs)	Implementing ministry
Immediate relief	Cooked meals per person per day (duration and approval)	150 (up to 3 days by the divisional secretary; government agent or district secretary can approve another 4 days)	MDM through district secretaries
	Dry ration per person per week	385 (maximum)	
	Dry ration per family of 2 members per week	490 (maximum)	
	Dry ration per family of 3 members per week	595 (maximum)	
	Dry ration per family of 4 members per week	700 (maximum)	
	Dry ration per family of 5 members per week	805 (maximum)	
	Dry ration duration and approval	Up to 7 days by divisional secretary; government agent or district secretary can approve another 7 days	
	Aid for kitchen utensils	1,500	
	Aid for vocational instruments	3,000	
	Funeral expenses per person	15,000	
Disaster rehabilitation	Disaster-related casualty expenses	10,000 (maximum)	
	Subsidies for cultivation	25,000 (maximum)	
	Aid for self-employment	25,000	
	Rehabilitation for a completely damaged house	100,000 (maximum)	
	Rehabilitation for a partially damaged house	50,000 (maximum)	

Source: NBD Circular No. 152 (1).

If the Miscellaneous Fund does not have sufficient capacity, heads of department and secretaries may transfer additional funds between budget lines with the approval of the Treasury. However, this approval and the subsequent transfer process can take time, delaying the provision of urgent funding. In extraordinary cases, if intradepartmental transfer cannot meet the required demand, the relevant minister can submit a supplementary estimate to the Parliament of Sri Lanka. Parliamentary approval also takes a significant amount of time, and therefore raising funding in this way is not suitable for immediate postdisaster needs.

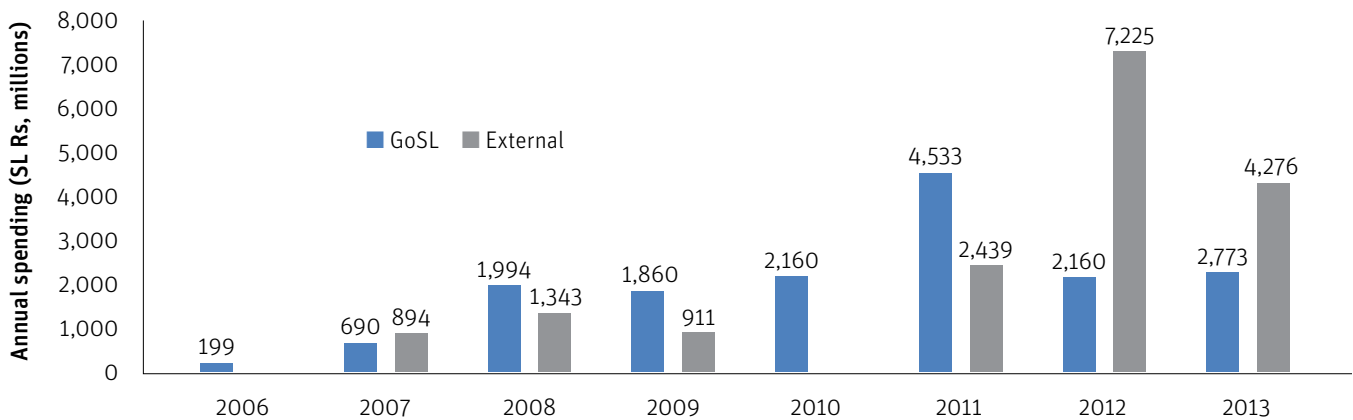
Between 2006 and 2013, the general budget allocated around SL Rs 35 billion for disaster-related projects (figure 1.2). This amount varied significantly year-on-year, reaching a high of SL Rs 9 billion in 2012 (after the severe flooding of 2011) and a low of SL Rs 200 million in 2006. The portion of spending attributable to external assistance executed on budget also varied significantly.

Provinces follow a distinct and separate budgeting process that does not fully account for disaster-related expenditure needs. The provincial governments prepare their budgets independently, but their budget formulation does not explicitly take disaster-related expenditure into account. Some small provision is made currently at the provincial level, through allocations to divisional secretaries through the Department of Social Services (DSS) for minor expenses on disasters. For example, the Western Provincial Council issued expenditures to its 40 divisional secretaries, through the DSS,

of SL Rs 12 million in 2010, SL Rs 9 million in 2011, and SL Rs 3 million in 2012. The provisions not only are small in the context of budget sizes and potential needs, but vary significantly from one year to the next.

In the absence of a National Disaster Fund, the national budget explicitly accounts for provision of external assistance to the implementing line ministries for disaster-related expenditure. Total expenditure on donor-linked programs carried out by various ministries (as implementing agencies) during 2006–13 exceeded SL Rs 17 billion (figure 1.2). Multiple factors drive the large variation in spending year-on-year; for example, severe flooding in 2011 led to a spike in externally funded spending in 2012 (as further described in box 1.1).

**Figure 1.2 Government and External Spending on Disaster Management in Sri Lanka, 2006–13**



Sources: Data collected March 2014 during on-site visits to the Sri Lanka Ministry of Highways, Ports & Shipping; Ministry of Local Government and Provincial Councils; and National Planning Department.

Note: GoSL = Government of Sri Lanka. Information on external spending data were unavailable for 2006 and 2010.

### Box 1.1 Funding for the Post-2011 Emergency Natural Disaster Rehabilitation Project

The Japan International Cooperation Agency (JICA) provided a loan to the GoSL following the 2011 flooding for the rehabilitation of irrigation and roads. The Emergency Natural Disaster Rehabilitation Project has spent nearly SL Rs 10 billion from the JICA loan between 2012 and 2014, mostly on road rehabilitation (table B1.1.1).

**Table B1.1.1 Spending on Emergency Natural Disaster Rehabilitation Project, 2012–14**

Year	Project sector irrigation spending (SL Rs, millions)	Project road spending (SL Rs, millions)	Total (SL Rs, millions)
2012	723	2,890	3,613
2013	839	3,437	4,276
2014	143	1,777	1,919
<b>Total</b>	<b>1,705</b>	<b>8,104</b>	<b>9,808</b>

Sources: Data collected March 2014 during on-site visits to the Sri Lanka Ministry of Highways, Ports & Shipping; Ministry of Local Government and Provincial Councils; and National Planning Department.



# Financial Disaster Risk Assessment

Quantifying risk is a critical first step in the development of any strategy for financial management of natural disasters. Furthermore, the value of such analyses goes well beyond disaster risk financing, because outputs have applications across all areas of disaster risk management, from contingency planning to resilient building. This chapter presents the results of initial quantitative analysis by the World Bank Disaster Risk Financing and Insurance (DRFI) Program to estimate possible disaster losses from a sector-specific perspective, using a probabilistic framework.<sup>9</sup> Sensitivity analyses are also presented to provide some context regarding possible total economic losses. It should be noted that any modeled results provide a view on possible loss experience, but they should not be taken as predictive of specific future events or annual experience. As models are only representations of possible realities, multiple valid views of risk can, and do, exist.

Sri Lanka's catastrophe risk profile is characterized by a mixture of high-frequency, low-severity events and a number of single large-loss events. Floods are relatively frequent, with impacts generally of small to moderate severity. However, cyclones and droughts are infrequent and typically have larger impacts.

Sri Lanka was also significantly affected by the 2004 Indian Ocean earthquake and tsunami, a major large-loss event. However, the probabilistic analysis excludes tsunami risk because the losses presented do not capture the total natural hazard risk for Sri Lanka. It was not appropriate to include tsunami risk in the analysis, given the limited data points in the context of the methodology applied. An estimate of tsunami risk for Sri Lanka based on a full probabilistic catastrophe risk model<sup>10</sup> would alter the shape of the curve, notably for the longer return periods.<sup>11</sup> We generally expect to see steeper curves—with greater divergence between short- and longer-return-period losses—when perils characterized by severe, infrequent events (such as tsunamis and earthquakes) are more dominant.

<sup>9</sup> The DRFI Program was established in 2010 as a partnership between the Global Facility for Disaster Reduction and Recovery (GFDRR) and the World Bank to improve the financial resilience of governments, businesses, and households against natural disasters (GFDRR, "Disaster Risk Financing and Insurance: What We Do," accessed October 29, 2015, <https://www.gfdr.org/disaster-risk-financing-and-insurance>).

<sup>10</sup> The analysis presented in this chapter uses an actuarial method based on historical losses, as the explanation of methodology describes (box 2.1). A full probabilistic model uses physical modeling of the hazard events in addition to loss and magnitude data to derive probabilistic loss curves, and allows the extrapolation of the view of risk beyond the loss record.

<sup>11</sup> The "return period" refers to the time period defining the probability of a flood's severity and associated loss, such as a 1-in-50-year loss or a 1-in-200-year loss.

## Losses from Costs of Relief Assistance and Housing and Road Reconstruction

Analysis was completed on historical (direct and indirect) losses arising from the physical and property damage of past disaster events on the costs of relief assistance and housing and roads reconstruction. This is a subset of full economic loss and is hereafter described as “housing/roads/relief” sector-specific losses. As discussed earlier, this analysis specifically *excludes* the impact of tsunami.

On average over the long term, Sri Lanka’s housing/roads/relief sector-specific losses per year from natural disasters are estimated at SL Rs 50 billion (US\$0.38 billion).<sup>12</sup> Annual expected losses (AEL) are the highest for flood peril, with an AEL of SL Rs 32 billion (US\$0.24 billion), followed by cyclone (SL Rs 11 billion, or US\$0.08 billion).<sup>13</sup> This annual expected sector-specific loss from natural disasters represents 0.5 percent of Sri Lanka’s gross domestic product (GDP) and is equivalent to 3 percent of total government expenditure.<sup>14</sup>

Sri Lanka is estimated to face housing/roads/relief losses related to natural disasters in excess of SL Rs 237 billion (US\$1.8 billion) once every 100 years.<sup>15</sup> This figure is equivalent to 2.4 percent of GDP and 14.2 percent of total government expenditures, taken as the total 2013 estimated expenditure figure.

The three tables below set out further estimates, as follows:

- ▶ Aggregate housing/roads/relief sector-specific AEL, by peril type and as a share of GDP and total government expenditure (table 2.1)
- ▶ Housing/roads/relief sector-specific losses per peril type, by return period (table 2.2)
- ▶ Housing/roads/relief sector-specific losses for all perils as a share of GDP and total government expenditure, by return period (table 2.3)

Next, the two figures display the models in terms of probable maximum loss (PML) curves, as follows:

- ▶ Fitted sector-specific PML curves by peril type, in billions of Sri Lanka rupees (figure 2.1)
- ▶ Fitted sector-specific PML curves by peril type, as a share of total government expenditure (figure 2.2)

<sup>12</sup> Loss estimates are based on estimated nominal 2014 GDP of SL Rs 9,929 billion, which is based on actual nominal 2013 GDP of SL Rs 8,671.1 billion plus 14.5 percent growth (the average of the preceding five years’ growth). The natural disasters modeled include flood, landslide, cyclone, and drought. Tsunami was *not* modeled.

<sup>13</sup> The AEL is an expression of the average annual loss over a long period of time.

<sup>14</sup> Total government expenditure for this analysis is based on 2013 estimates.

<sup>15</sup> The natural disasters modeled include flood, landslide, cyclone, and drought. Tsunami was *not* modeled.

**Table 2.1 Annual Aggregate Housing/Roads/Relief Losses for Sri Lanka, by Peril**

Loss measurement	Flood	Landslide	Drought	Cyclone	All perils <sup>a</sup>
Percentage of GDP	0.32	0.02	0.05	0.11	0.50
Percentage of total government expenditure	1.90	0.11	0.31	0.65	3.00
SL Rs, billions <sup>b</sup>	31.7	1.8	5.2	10.9	50.0
US\$, billions <sup>b</sup>	0.24	0.01	0.04	0.08	0.38

Source: World Bank DRFI Program, based on data from the DesInventar database of the United Nations Office for Disaster Risk Reduction (UNISDR) and United Nations Development Programme (UNDP) (<http://www.desinventar.lk:8081/DesInventar/main.jsp>), the Disaster Management Center of Sri Lanka, and other sources compiled for this overall report.

a. The perils modeled exclude tsunamis.

b. 2014 values.

**Table 2.2 Housing/Roads/Relief Losses for Sri Lanka, by Peril Type and Return Period**

*Sri Lanka rupees, billions*

Return period (years)	Flood only	Drought/cyclone/ landslide combined	All perils <sup>a</sup>
Mean	31.7	17.9	50.0
10	63.2	43.1	101.8
50	114.5	130.9	190.2
100	141.2	182.9	236.7
150	157.9	216.0	266.6

Source: World Bank DRFI Program, based on data from the DesInventar database of the United Nations Office for Disaster Risk Reduction (UNISDR) and United Nations Development Programme (UNDP) (<http://www.desinventar.lk:8081/DesInventar/main.jsp>), the Disaster Management Center of Sri Lanka, and other sources compiled for this overall report.

a. The perils modeled exclude tsunamis.

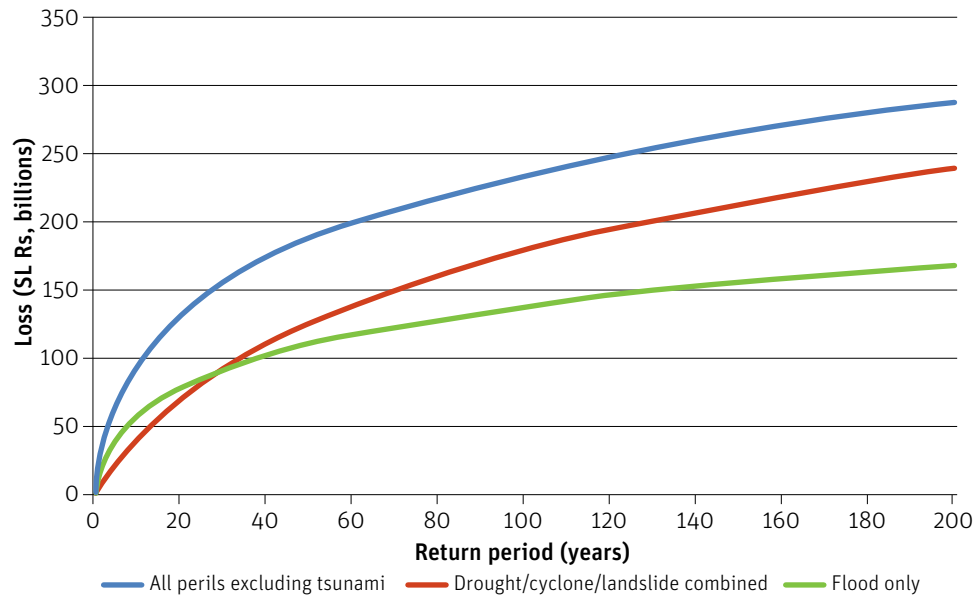
**Table 2.3 Housing/Roads/Relief Losses for Sri Lanka from All Perils as a Share of GDP and Total Government Expenditure, by Return Period**

Return period (years)	All perils <sup>a</sup> (% of GDP)	All perils <sup>a</sup> (% of total government expenditure)
Mean	0.5	3.0
10	1.0	6.1
50	1.9	11.4
100	2.4	14.2
150	2.7	16.0

Source: World Bank DRFI Program, based on data from the DesInventar database of the United Nations Office for Disaster Risk Reduction (UNISDR) and United Nations Development Programme (UNDP) (<http://www.desinventar.lk:8081/DesInventar/main.jsp>), the Disaster Management Center of Sri Lanka, and other sources compiled for this overall report.

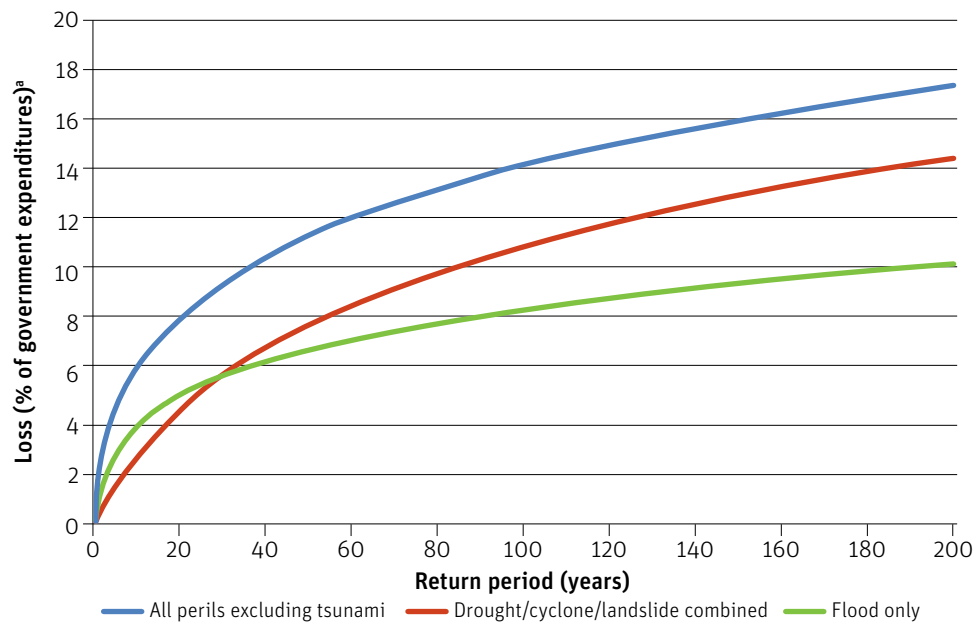
a. The perils modeled exclude tsunamis.

**Figure 2.1 Fitted Housing/Roads/Relief Probabilistic Loss Exceedance Curves, by Peril Type**



Source: World Bank DRFI Program, based on data from the DesInventar database of the United Nations Office for Disaster Risk Reduction (UNISDR) and United Nations Development Programme (UNDP) (<http://www.desinventar.lk:8081/DesInventar/main.jsp>), the Disaster Management Center of Sri Lanka, and other sources compiled for this overall report.

**Figure 2.2 Fitted Housing/Roads/Relief Probabilistic Loss Exceedance Curves as a Share of Total Government Expenditure, by Peril Type**



Source: World Bank DRFI Program, based on data from the DesInventar database of the United Nations Office for Disaster Risk Reduction (UNISDR) and United Nations Development Programme (UNDP) (<http://www.desinventar.lk:8081/DesInventar/main.jsp>), the Disaster Management Center of Sri Lanka, and other sources compiled for this overall report.

a. Based on 2013 government expenditures.

## Sensitivity Analysis for Total Economic Losses

Information on the full economic loss arising from past disaster events was not available except for the 2004 Indian Ocean earthquake and tsunami. Analysis of that event attributes approximately 35 percent of the total economic loss to the housing and roads sector.<sup>16</sup> A sensitivity analysis has been applied to the preceding analysis of disaster-related housing/roads/relief costs to estimate total potential economic loss from disasters under scenarios of different importance of the explicitly modeled housing/roads/relief losses.

The sensitivity analysis takes, as a baseline, the housing and roads costs equating to 35 percent of total economic losses from the Indian Ocean tsunami. The analysis then applies alternative figures of 25 percent and 45 percent to the importance of housing and road sector losses within the total economic loss (hereafter referred to as importance ratios). Because the authors had access to data on roads and housing sector losses, they could use these importance ratios (25–45 percent) to estimate different views of total economic losses (tables 2.4 and 2.5).

It should be noted that alternative analysis based on detailed economic loss data (if available) could produce materially different results. In addition, each major event has its own unique impacts and cost components for various economic sectors, which often vary significantly from event to event. As such, the following numbers and analysis should be considered for illustrative purposes only and not as a full scientific probabilistic estimation of economic losses. Also note that the analysis presented below *excludes* tsunami from all modeled figures.

If we assume that housing/roads/relief losses account for 25–45 percent of total economic losses, the long-term average total economic loss per year related to floods, drought, landslides, and cyclones is estimated at between SL Rs 111 billion (US\$0.9 billion) and SL Rs 200 billion (US\$1.5 billion). These figures represent 1–2 percent of Sri Lanka’s GDP and 7–12 percent of total government expenditure. Table 2.4 sets out estimated annual aggregate economic losses according to the sensitivity analysis assumptions, in both monetary amounts and as proportions of GDP and total government expenditure. Table 2.5 sets out the same estimates by return period.

**Table 2.4 Sensitivity Analysis of Annual Aggregate Total Economic Losses from Modeled Perils in Sri Lanka**

Loss measurement	Assumption 1: housing/roads/relief accounts for 25% of total loss	Assumption 2: housing/roads/relief accounts for 35% of total loss	Assumption 3: housing/roads/relief accounts for 45% of total loss
Percentage of GDP	2.0	1.4	1.1
Percentage of total government expenditure	12.0	8.6	6.7
SL Rs, billions <sup>a</sup>	200	143	111
US\$, billions <sup>a</sup>	1.5	1.1	0.9

Source: World Bank DRFI Program, based on data from the DesInventar database of the United Nations Office for Disaster Risk Reduction (UNISDR) and United Nations Development Programme (UNDP) (<http://www.desinventar.lk:8081/DesInventar/main.jsp>), the Disaster Management Center of Sri Lanka, and other sources compiled for this overall report.

Note: All perils are modeled except for tsunami.

a. 2014 values

<sup>16</sup> Weerakoon, Dushni, Sisira Jayasuriya, Nisha Arunatilake, and Paul Steele, “Economic Challenges of Post-Tsunami Reconstruction in Sri Lanka,” Asian Development Bank (ADB) Discussion Paper 75 (Tokyo: ADB Institute, 2007).

**Table 2.5 Sensitivity Analysis of Economic Losses from Disasters in Sri Lanka, by Return Period**

Return period (years)	Assumption 1: housing/roads/relief accounts for 25% of total loss <sup>a</sup>			Assumption 2: housing/roads/relief accounts for 35% of total loss <sup>a</sup>			Assumption 3: housing/roads/relief accounts for 45% of total loss <sup>a</sup>			Total economic loss from 2004 tsunami event <sup>b</sup> (% of GDP)
	SL Rs, billions	% of government expenditure	% of GDP	SL Rs, billions	% of government expenditure	% of GDP	SL Rs, billions	% of government expenditure	% of GDP	
Mean	200	12	2.0	143	9	1.4	111	7	1.1	6.9–9.6
10	407	24	4.1	291	17	2.9	226	14	2.3	6.9–9.6
50	761	46	7.7	543	33	5.5	423	25	4.3	6.9–9.6
100	947	57	9.5	676	41	6.8	526	32	5.3	6.9–9.6
150	1,066	64	10.7	762	46	7.7	592	35	6.0	6.9–9.6

Source: World Bank DRFI Program, based on data from the DesInventar database of the United Nations Office for Disaster Risk Reduction (UNISDR) and United Nations Development Programme (UNDP) (<http://www.desinventar.lk:8081/DesInventar/main.jsp>), the Disaster Management Center of Sri Lanka, and other sources compiled for this overall report.

a. Excludes loss from tsunami.

b. Estimated loss from 2004 Indian Ocean earthquake and tsunami.

### Box 2.1 Loss Risk Estimation Data, Methodology, and Key Assumptions

The technical results in this chapter derive from an actuarial analysis of past disasters in Sri Lanka, from 1998 to 2012 inclusive. This analysis is based on empirical analysis of past losses and not on a probabilistic catastrophe model (which is not available).

Basic checks were completed by comparing various tables, but no independent checks were completed. Any material errors in the underlying data could materially affect the results of this technical analysis.

#### Methodology

The methodology followed these key steps:

- ▶ Historical losses were compiled into a single table of aggregate losses, by peril and event year.
- ▶ Losses were then deflated to historical rupee values and divided by nominal GDP to calculate the loss as a percentage of GDP.
- ▶ Historical loss rates (as a percentage of GDP) were analyzed for past trends, by peril and by combination of perils, and the data were detrended where necessary.
- ▶ A number of statistical distributions were fitted to the aggregate loss rates. Each distribution was reviewed for goodness of fit, and the most appropriate was then adopted.
- ▶ For each fitted distribution, 10,000 simulations were generated, and the 10,000 event years were chosen for the adopted distribution. PML curves were then generated from the fitted distribution.
- ▶ Losses in 2014 values were estimated by multiplying the loss rates (from the adopted distribution) by an estimate of GDP for 2014.
- ▶ A sensitivity analysis was undertaken to provide context around potential total economic losses by assuming that the housing/roads/relief losses accounted for various proportions of the total loss. This approach has limitations, including that (a) alternative analysis based on detailed economic loss data could produce materially different

**Box 2.1, continued**

results, and (b) the importance ratios applied (the importance of housing and road sector losses within the total economic cost) use data from a single event as a baseline (35 percent taken from the Indian Ocean tsunami). Each major event has its own unique impacts and cost components for various economic sectors, which often vary significantly from event to event, which is a key limitation of this approach.

**Assumptions**

The analysis uses the following key assumptions:

- ▶ A sensitivity analysis around a baseline of 35 percent for transforming housing/roads/relief sector-specific losses into full economic losses is reasonable, as taken from the 2004 tsunami loss estimates.
- ▶ Nominal GDP for 2014, estimated at SL Rs 9,928.8 billion, is equal to 2013 GDP multiplied by assumed GDP growth of 14.5 percent ( $9,928.8 = 8,671.1 * 1.145$ ).
- ▶ Total government expenditure (current and capital) for 2013 is estimated at SL Rs 1,669 billion.
- ▶ The fitted statistical distributions are a reasonable approximation of the loss impact of natural disasters.
- ▶ GDP is a reasonable exposure measure for estimating losses.
- ▶ The methodology adopted and estimates of historical losses are appropriate and without material error.
- ▶ There are no material errors or omissions in the data underlying the disaster damage report (for example, the DesInventar database).
- ▶ Past price inflation is a good proxy to deflate the historical losses into historical rupee amounts.

*Sources:* World Bank DRFI Program, based on data from the DesInventar database of the United Nations Office for Disaster Risk Reduction (UNISDR) and United Nations Development Programme (UNDP) (<http://www.desinventar.lk:8081/DesInventar/main.jsp>), the Disaster Management Centre of Sri Lanka, and other sources compiled for this overall report.



Gampola, Sri Lanka. Photo credit: BethWolff43/Thinkstock.com



# The Domestic Insurance Market

## Market Overview

This chapter provides an overview of the current insurance and reinsurance market in Sri Lanka as well as the market conditions for DRFI products in the country. It also provides insights into natural catastrophe insurance in Sri Lanka and its current capacity to meet any shortfalls, including through microinsurance schemes.

Twenty-one insurance companies now operate in Sri Lanka, of which 3 offer only life insurance, 6 concentrate on non-life (or general) insurance, and 12 focus on both life and non-life insurance. Non-life insurance includes subclasses for fire (natural perils), marine, health, motor, and other policies that do not belong in the life insurance category. Natural perils or catastrophe insurance includes atmospheric perils, earthquakes, floods, tsunamis, tidal waves, and volcanic eruptions. However, it typically excludes slope failures and landslides.

Sri Lanka Insurance Corporation (SLIC) is the non-life market leader in terms of total gross written premium (GWP) share, followed by private insurers Ceylinco Insurance, Janashakthi Insurance, Union Assurance, and Peoples Insurance. These five insurance companies dominate the market, with a total of 71 percent GWP of the general insurance business.

The combination of a rise in motor insurance with a sharp decrease in terrorism insurance has significantly affected fire insurance, and consequently natural perils insurance, in Sri Lanka. Table 3.1 shows the performance of the non-life insurance market from 2008 through 2013 in terms of GWP. During this period, the year-on-year growth of the motor insurance sector is striking. This growth can largely be explained by the increase in volume of new vehicle registrations and the required insurance for such vehicles in Sri Lanka. In contrast, fire policies (whose subclass includes terrorism) experienced a sharp reduction in GWP from 2009 to 2010. This is possibly because of the National Insurance Trust Fund (NITF)'s 75 percent reduction in terrorism coverage rates after the end of the Sri Lankan Civil War in May 2009.

**Table 3.1 GWP Performance of Non-Life Insurance Business in Sri Lanka, by Class, 2008–13**

Class	Gross written premium (SL Rs, thousands)					
	2008	2009	2010	2011	2012	2013
Fire	6,826,563	7,049,399	5,012,443	5,376,094	5,422,347	6,310,911
Marine	1,826,549	1,442,729	1,498,832	1,678,027	1,917,570	1,841,345
Motor	18,717,735	17,897,763	20,948,782	27,141,119	31,637,508	33,081,602
Miscellaneous	7,187,417	7,158,375	7,641,390	9,133,584	10,717,025	11,943,490
Total	34,558,264	33,548,266	35,101,447	43,328,824	49,694,450	53,177,348

Source: IBSL (Insurance Board of Sri Lanka), "Annual Report 2013" (Colombo, Sri Lanka: IBSL, 2014).

In 2012, non-life insurance penetration (comprising total GWP as a percentage of GDP) was only 0.66 percent, below that of India (0.78 percent) but above Pakistan's insurance market (0.28 percent).<sup>17</sup> The low penetration rate could be attributed to low awareness of the benefits of insurance, state provision of free health services to all citizens, and pension schemes for all public sector employees.<sup>18</sup> On the other hand, a low penetration combined with the country's growing economy suggests significant growth opportunities for the Sri Lankan insurance market.

The insurance density (or GWP per capita) increased by almost 14 percent in 2012 to SL Rs 4,287.11 (US\$33), of which SL Rs 2,338.50 (US\$18) accounted for non-life insurance.<sup>19</sup> This again places Sri Lanka between India (US\$53) and Pakistan (US\$9). The increase in insurance density could be attributed to improved awareness of insurance products and increased economic activity. Table 3.2 indicates the level of development of the non-life insurance market between 2008 and 2013.

**Table 3.2 Insurance Premium Income and Penetration in Sri Lanka, 2008–13**

Indicator	2008	2009	2010	2011	2012	2013
Life insurance premium income (SL Rs, millions)	23,613	24,005	31,152	35,162	37,477	41,306
Non-life insurance premium income (SL Rs, millions)	34,558	33,548	35,101	43,329	49,694	53,177
Total premium income (SL Rs, millions)	58,171	57,553	66,253	78,491	87,171	94,483
Growth of total premiums (%)	12.10	(1.06)	15.12	18.47	11.06	8.39
GDP (SL Rs, billions)	4,411	4,835	5,604	6,544	7,579	8,674
GDP growth (%)	6.0	3.5	8.0	8.2	6.3	7.3
Total industry premium as % of GDP	1.32	1.19	1.18	1.20	1.15	1.09
Penetration (premium of long-term insurance business as % of GDP)	0.54	0.50	0.56	0.54	0.49	0.48
Penetration (total premium of general business as % of GDP)	0.78	0.69	0.63	0.66	0.66	0.61
Industry density (ratio of total industry premium income to population, in SL Rs)	2,877.33	2,814.33	3,207.91	3,761.11	4,287.11	4,612.76

Source: IBSL (Insurance Board of Sri Lanka), "Annual Report 2013" (Colombo, Sri Lanka: IBSL, 2014).

<sup>17</sup> Swiss Re, "World Insurance in 2012: Progressing on the Long and Winding Road to Recovery," Sigma No. 3/2013 (New York: Swiss Reinsurance Company Ltd, 2013).

<sup>18</sup> Insurance Board of Sri Lanka (IBSL), pers. comm., 2014.

<sup>19</sup> Swiss Re, "World Insurance in 2012."

Discussions with the insurance industry in the context of this study highlighted that, as a consequence of the 2004 Indian Ocean earthquake and tsunami, net earned premiums for fire policies increased from SL Rs 687 million in 2004 to SL Rs 1,034 million in 2005.<sup>20</sup> This was because of an increase in fire policy sales and potentially an increase in premiums soon after the tsunami. However, in 2008, a high net combined ratio (an indicator of profitability that, if exceeding 100 percent, is not profitable) of 122 percent showed that the non-life insurance sector had low profitability. This was directly due to a fire net claims ratio of 82 percent, which resulted from flood losses in 2008 as well as a competitive business environment. A much-improved combined ratio of 99 percent in 2012 could be attributed to a premium increase in the non-life insurance market and a reduction in the net claims ratio of fire policies.<sup>21</sup>

Most insurers issue natural catastrophe coverage as extensions or endorsements of existing fire and allied perils policies, which may suggest an undervaluation of natural disaster risk. Within such extensions or endorsements, insurers either provide additional coverage at the same premium as the fire and allied perils policy or at a slightly higher premium in accordance with the existing policy's conditions. In instances where the sum insured or the natural catastrophe risk is high, insurers may conduct a detailed survey to determine whether to provide or decline coverage. This survey can include assessment of historical losses, engineering surveys, and zoning maps of risk-prone areas. According to key industry players, if insurers were to issue separate natural catastrophe coverage, the required premium would be higher than the premium for fire and allied perils.<sup>22</sup> Insurers are therefore reluctant to market natural catastrophe coverage separately. This might imply a potential undervaluation of natural catastrophe risk.

Each insurance company has its own methodology to assess the additional premium for natural perils. High-risk policies—which can be based on factors such as the sum insured, the level of premium, or the location (for example, proximity to natural catastrophe or high-risk zones)—are treated on a case-by-case basis, taking into consideration policyholders' risk exposure and past claim experience. Usually a deductible is imposed when granting natural perils coverage.

## Key Market Players

### *Sri Lanka Insurance Corporation (SLIC)*

As the designated insurer for all state and interstate insurance, SLIC insures public infrastructure construction such as roads and bridges as well as some major hotels in Sri Lanka. The Department of Public Finance states that “all government and semi government institutes should, in accordance with their requirements, obtain general insurance cover [Marine, Fire, Motor, and General Accident] only from the National Insurance Trust Fund or the Sri Lanka Insurance Corporation Ltd.”<sup>23</sup> SLIC also has a risk management department that carries out site-specific analyses and risk-zoning approaches to quantify natural catastrophe risk. However, most public assets are not insured for catastrophic perils by the line ministries or public sector bodies. Furthermore, no comprehensive inventory of public assets is available to SLIC to quantify this direct sovereign risk.

<sup>20</sup> IBSL (Insurance Board of Sri Lanka), “Annual Report 2012” (Colombo, Sri Lanka: IBSL, 2013)

<sup>21</sup> IBSL, “Annual Report 2012.”

<sup>22</sup> Interviews and discussions held January–March 2014 with senior managers of the following government agencies and insurance companies: Agriculture Insurance Board, AIA Insurance, Allianz Insurance Lanka, Amana Takaful Insurance, Asian Alliance Insurance, Ceylinco Insurance, Continental Insurance, HNB Assurance, Insurance Board of Sri Lanka, Janashkathi Insurance, National Insurance Trust Fund, Orient Insurance, Peoples Insurance, Sanasa Insurance, and Union Assurance.

<sup>23</sup> Public Finance Circular No. PF/437, dated September 18, 2009.

With large reserves at its disposal and a large premium base, SLIC can provide competitive insurance market rates. The four other leading private non-life insurance companies must rely on aggressive pricing, low premiums, and speedy settlement of claims to attract customers.

### ***National Insurance Trust Fund (NITF)***

The state-owned NITF—Sri Lanka’s sole national reinsurer—provides medical insurance as well as crop, motor, strike riot, civil commotion and terrorism, and migrant workers insurance and reinsurance products. A government-sponsored pool of funds was set up to cover risks arising from strike, riot, civil commotion, and terrorist (SRCC&T) activities. The NITF manages this SRCC&T Fund, to which insurance companies are required to cede all premiums collected for terrorism coverage. The crop insurance scheme is only available to paddy farmers to cover them against the loss of their crops due either to natural perils such as drought and floods or to the peril of wild elephants destroying their paddy fields. Last, under the Regulation of Insurance Industry (RII) Act, the 18 companies that cover non-life insurance are required to cede 30 percent of their reinsurance premiums to the NITF.<sup>24</sup>

The NITF’s potentially inadequate retrocessionaire role is a source of concern for the industry. The government’s initial rationale for setting up the NITF was that a significant amount of GWP could be retained in Sri Lanka, with savings in foreign exchange being remitted to reinsurers. However, primary insurers commonly observe that the NITF is often delayed in settling general claims related to legitimate losses. Furthermore, in the event of a major catastrophe, the NITF may need to rely on the GoSL for financial assistance, which would then increase sovereign risk. In addition, insurance companies are unanimously concerned about the NITF’s *ability* to quickly and effectively settle claims in the event of a catastrophic disaster. Many favor the creation of an independent insurance fund or pool for natural catastrophes that would be under the control of either the insurance industry (independent of the state) or a limited liability company with private insurers as stakeholders.<sup>25</sup>

### ***Agricultural and Agrarian Insurance Board (AAIB)***

The AAIB is a specialist insurance division of the Ministry of Agricultural Development and Agrarian Services. It provides insurance schemes for paddy, maize, and vegetable crops as well as livestock in identified areas of Sri Lanka. Insurance premiums are based on the Central Bank of Sri Lanka’s established cost of cultivation. Moreover, provisions under the RII Act do not apply to the AAIB, which therefore is not required to cede 30 percent of all premiums to the NITF.

Approximately 90 percent of the AAIB’s GWP is drawn from bank loans for farming activities, while the other 10 percent comes from private individuals. However, the AAIB provides insurance coverage to less than 5 percent of Sri Lanka’s farming community, yielding GWP income of SL Rs 137 million in 2011. In the case of paddy farming, for instance, farmers favor the NITF because its coverage is free (in contrast to the AAIB, which charges a nominal premium).<sup>26</sup> Regardless, the AAIB successfully met the challenge of a total payout of SL Rs 268 million for the 2010–11 floods.

<sup>24</sup> As of January 1, 2013.

<sup>25</sup> Views expressed in the paragraph are based on interviews and discussions held January–March 2014 with senior managers of the following government agencies and insurance companies: Agriculture Insurance Board, AIA Insurance, Allianz Insurance Lanka, Amana Takaful Insurance, Asian Alliance Insurance, Ceylinco Insurance, Continental Insurance, HNB Assurance, Insurance Board of Sri Lanka, Janashkthi Insurance, National Insurance Trust Fund, Orient Insurance, Peoples Insurance, Sanasa Insurance, and Union Assurance.

<sup>26</sup> AAIB pers. comm., 2014.

### *Insurance Board of Sri Lanka (IBSL)*

Beyond the NITF, the Sri Lankan insurance sector is regulated by the Insurance Board of Sri Lanka (IBSL) and governed by the RII Act. The RII Amendment Act of 2011 also brought the NITF under the IBSL's purview. The Board's role is to regulate insurance companies and brokers, implement policies, and monitor the requirements and programs of Sri Lanka's 21 insurers. The IBSL also collects, compiles, and publishes key life and non-life (including fire) insurance statistics that directly relate to catastrophe insurance. However, it does not require a breakdown of premiums and claims per type of peril under fire policies. This hinders the quantification and assessment of catastrophe risk in Sri Lanka. There are no tariffs for fire and allied perils insurance in Sri Lanka.

### *Private Reinsurers*

Although the RII Act contains no provisions for the licensing of reinsurance arrangements, a registered company wishing to engage in reinsurance business has to obtain the IBSL's approval. Major private reinsurers in Sri Lanka include General Insurance Corporation of India, Scor Re, Munich Re, and Swiss Re.

The IBSL requires insurers to reinsure with companies that have long-term ratings (for example, BBB with Standard & Poor's or B+ with Moody's). Such requirements, however, do not apply to the NITF. In this context, some reinsurers have started to tighten their underwriting conditions applicable to selected property policies and to exclude catastrophe coverage, while other leading overseas reinsurers are committed to providing coverage for high-severity catastrophe losses.

### *Insurance Brokers*

Given the increase in motor vehicle premiums and low barriers to entry, the insurance industry has experienced an upsurge in insurance brokers in recent years. By 2012, 54 insurance brokers had entered the market. Non-life insurance constituted 98.5 percent, and life insurance 1.5 percent, of the brokerage industry. General insurance business generated through insurance brokering companies also constituted 25.2 percent of the total GWP.<sup>27</sup>

### *Microinsurers*

Sanasa Insurance Company Limited (SICL) is a service support organization with a microinsurance business, operating mostly in rural areas of Sri Lanka. The company enjoys high market penetration (currently at 15 percent in rural areas), thanks to its extensive network of offices across the island. However, only a small proportion of this business is devoted to general insurance. SICL products include life, general, motor, agricultural, and livestock insurance.<sup>28</sup>

### *Business and Housing Lenders*

Financial institutions that grant business and housing loans require a fire policy for the former and a mortgage protection insurance policy for the latter to protect the property or stock from the perils included in the policy. In the case of business loans, the policy is given in the name of the borrower, with the financial institution named as an interested party. Policies for housing loans more closely resemble life policies and do not cover fire or allied perils that include natural perils. Further, these policies will extend to the end of the mortgage period as opposed to the value at risk.

<sup>27</sup> IBSL (Insurance Board of Sri Lanka), "Annual Report 2012" (Colombo, Sri Lanka: IBSL, 2013).

<sup>28</sup> Information from Sanasa Insurance Company Ltd. (<http://www.sicl.lk/about.html>).

### *Effects on Insurers of IBSL Regulatory Changes*

The insurance industry dynamic was altered as a result of regulatory changes introduced by the IBSL. These changes included implementing a risk-based capital (RBC) model for Sri Lanka's financial industry, which has been positively received by the domestic insurance industry. The RBC model requires an insurance company with a higher risk to hold a larger amount of capital.

Table 3.3 shows the solvency indicators of individual general insurance companies. The required solvency margin (RSM) is the minimum buffer of assets required over and above a company's liabilities to be able to cover for uncertain risks. All of the individual general insurance companies shown in table 3.3 are above the RSM, showing a solvency ratio (available solvency margin [ASM] as a ratio of the RSM) well above the ratio of one. However, it is not clear how the calculation of RSM takes catastrophe risk into account. There are also currently no specific regulations in the RII Act governing catastrophe insurance.

**Table 3.3 Solvency and Technical Reserves of General Insurance Companies in Sri Lanka, as of December 31, 2012**

Insurer	General insurance business <sup>a</sup>			
	Available solvency margin (ASM) (SL Rs, thousands)	Required solvency margin (RSM) (SL Rs, thousands)	Solvency ratio (ASM/RSM)	Technical reserves <sup>a</sup> (SL Rs, thousands)
AIA	1,587,812	395,709	4.01	1,702,296
AIG	223,992	97,341	2.30	399,942
Allianz General	562,065	249,548	2.25	1,010,087
Amana Takaful	420,995	227,176	1.85	511,409
Asian Alliance	576,562	260,425	2.21	781,103
Ceylinco Insurance	2,442,288	1,841,647	1.33	5,686,878
Continental	341,303	194,932	1.75	611,398
Cooperative	508,019	244,683	2.08	717,559
HNB Assurance	1,119,244	287,795	3.89	924,712
Janashakthi Insurance	1,860,757	1,115,908	1.67	4,103,078
LOLC	285,865	273,294	1.05	1,074,318
MBSL	113,752	197,278	0.58	567,695
Orient	436,971	55,626	7.86	150,739
Peoples Insurance	883,822	585,831	1.51	2,238,159
Sanasa Insurance	55,570	50,000	1.11	131,198
Sri Lanka Insurance	12,216,661	2,814,390	4.34	11,767,131
Union Assurance	1,714,780	827,106	2.07	3,040,948
<b>Total</b>	<b>25,350,459</b>	<b>9,718,689</b>	<b>2.61</b>	<b>35,418,650</b>

Source: IBSL (Insurance Board of Sri Lanka), "Annual Report 2013" (Colombo, Sri Lanka: IBSL, 2014).

a. Reinstated audited figures.

The IBSL is also in the process dividing life and non-life insurance business into two separate entities, with the goal of completing this initiative by 2015. This is believed to be a challenge for most insurers, both financially and operationally. Although the larger insurers have already achieved a certain degree of segregation between the two, the smaller insurers still seem less equipped for

the split. In addition, there lies a possibility for consolidation within the insurance industry through mergers and acquisitions.

## Natural Catastrophe Insurance and Losses

The most frequent natural disasters in Sri Lanka are floods, landslides (typically excluded in a fire policy), and droughts. Drought is insured under the agriculture insurance scheme (AAIB) because it predominately affects crops. Gross claims for floods usually amount to approximately 0.02 percent of the industry GWP for fire policies. Net claims significantly increased in 2007 and 2009 because of floods in many areas of Sri Lanka including the eastern, southern, and western provinces. They decreased in 2010, 2011, and 2012, possibly because of improved flood prevention systems, especially in the Greater Colombo area.

For this report, information on net claims from eight insurers was collated and extrapolated to the whole market. Taking into consideration those companies' market shares and the industry's customer retention rates, total industry flood claims for 2007–12 were calculated as well as potential industry gross claims as a percentage of industrywide GWP for fire policies (table 3.4).

**Table 3.4 Flood Claims in Sri Lanka, Selected Insurance Companies, 2007–12**

Indicator	2007	2008	2009	2010	2011	2012
Flood losses from eight insurance companies (SL Rs, millions)	219.62	174.19	23.66	686.16	367.71	191.20
Total general insurance market share of the eight companies (%)	76.24	80.67	77.92	75.01	72.65	70.07
Projected industry net claims for floods (SL Rs, millions)	288.06	215.93	30.36	914.76	506.14	272.87
Customer retention (net % of general insurance market)	22.58	14.13	16.24	15.55	23.92	23.62
Projected industry gross losses for floods (SL Rs, millions)	1,275.75	1,528.16	186.97	5,882.69	2,115.97	1,155.25
Projected industry gross losses (% of industry fire-class GWP)	2.1	4.4	0.6	16.8	4.9	2.3

Source: IBSL (Insurance Board of Sri Lanka), "Annual Report 2012" (Colombo, Sri Lanka: IBSL, 2013).

Natural catastrophe coverage is usually provided for free under the fire and allied perils policy if the policy is deemed low-risk. If any particular peril included under the fire and allied perils policy is considered high-risk, the premium for that particular peril is increased, depending on the exposure, in the form of an endorsement or extension. However, the premium increase is often minimal to provide a competitive offer.

When assessing high-risk areas for natural catastrophes, a significant proportion of insurers have developed their own analytical data programs to determine policyholders' premiums. The data are drawn from surveys, historical events, and geographical and weather patterns from the Disaster Management Centre as well as from policyholders' past claim experience. Insurers consider their methods to be proprietary and confidential.

Although the 2004 Indian Ocean earthquake and tsunami caused the largest insurance loss in the history of Sri Lanka's insurance industry—a total insurance loss of approximately US\$129 million—all of the major insurance companies survived the incurred losses, thanks largely to their comprehensive reinsurance programs and low market penetration. More than 70 percent of insured losses were recovered from reinsurance. Though the peril of tsunami was not included in policies issued with agreement and support from their reinsurers, local insurers agreed to settle claims if the policy covered flood or earthquake. In 2004, as a result of the tsunami, the net claims ratio was 123.9 percent. After the tsunami, most claims were settled within days. Ex gratia payments were also made to policyholders who did not have proper insurance to cover their losses. It must also be noted that large infrastructure such as railways and roads were government-owned and not insured. A major portion of the impact was therefore absorbed by the state. Should a similar catastrophe happen in the future, this could create a sovereign protection risk.



# Options for a National Disaster Risk Financing Strategy in Sri Lanka

A comprehensive national disaster risk financing strategy should be designed to improve the Government of Sri Lanka's (GoSL) capacity to access immediate financial resources in the event of a national disaster, while maintaining its fiscal balance. Building on the country disaster risk financing framework promoted by the World Bank, seven options for a comprehensive disaster risk financing strategy in Sri Lanka are presented (table 4.1).<sup>29</sup>

**Table 4.1 Options for a National Disaster Risk Financing Strategy in Sri Lanka**

Time frame	Options
<b>Sovereign protection</b>	
Short term	1. Streamline damage-and-loss data collection and reporting system
Short to medium term	2. Develop financial tools to support decision-making, including the development of a disaster risk model for MoF
Short term	3. Develop a national disaster risk financing strategy
Medium term	4a. Establish a National Disaster Reserve Fund as fast-disbursement mechanism for the financing of postdisaster operations
Medium term	4b. Establish a robust catastrophe risk insurance program for public assets
Medium term	4c. Enhance the management of contingent liability related to social protection
<b>National Insurance Trust Fund</b>	
Short term	5. Introduce a reinsurance strategy for the National Insurance Trust Fund
Medium term	6. Strengthen the agricultural insurance program
<b>Private insurance market</b>	
Medium term	7. Enhance data sharing on agricultural insurance

<sup>29</sup> The World Bank's disaster risk financing framework is further discussed in appendix F.

## Sovereign Protection

### *Option 1: Streamline Damage-and-Loss Data Collection and Reporting*

Historical data are a crucial component of disaster risk assessment and actuarial analysis, and thus play a significant role in the development of disaster risk management strategies and financing instruments. Sri Lanka's current systems, however, lack the ability to collect and report information related to the damage and losses sustained by different sectors such as transport, education, health, agriculture, livelihoods, industries, and services. At present, the closest available tool is the DesInventar historical disaster database, managed by the Disaster Management Centre of Sri Lanka under the Ministry of Disaster Management (MDM). This system only gathers information on the impact of disasters on individuals and housing. In addition, the National Disaster Relief Services Center (under the same ministry) maintains a system based on Sahana software, which aims to collect data required for relief provision.<sup>30</sup>

A new database in line with the standard damage-and-loss assessment methodology should therefore be developed to allow line agencies at the national and subnational levels as well as local authorities to report damage and losses easily. It would also enable the Ministry of Finance (MoF), MDM, and other line ministries to access critical information for recovery planning. It should be noted that although this initiative could be launched in the short term, completion of a comprehensive loss database might take 15–20 years.

### *Option 2: Develop Financial Tools to Support Decision Making, Including a Disaster Risk Model for MoF*

#### *Disaster Risk Assessment*

The design of a national disaster risk financing strategy starts with a detailed disaster risk assessment. It is critical to quantify risk in order to understand the size of losses to be managed and the costs and benefits of using different financing sources to manage these losses. Catastrophe risk modeling techniques can complement the actuarial analysis of historic loss data to assess the financial and fiscal exposure to natural disasters. The Sri Lanka Climate Resilience Program is developing detailed risk models for 10 selected river basins.

#### *Georeferenced Exposure Database*

Next, a national georeferenced exposure database should be built that includes the attributes of public and private buildings and infrastructure exposed to natural disasters, such as schools, hospitals, public buildings, roads, and bridges, as well as agricultural land and cropping patterns. It could also include private assets such as houses. This database, combined with the catastrophe risk model discussed below, would allow, among other applications, the assessment of the financial and fiscal impact of natural disasters. Exposure information of this type would also be critical for the insurance industry to offer sustainable and affordable property catastrophe insurance products.

<sup>30</sup> Sahana ([www.sahanafoundation.org](http://www.sahanafoundation.org)) is an internationally recognized, web-based disaster management system that addresses common postdisaster coordination problems such as finding missing people, managing aid, and managing volunteers. Sahana software was originally developed by a group of Sri Lankan information technology professionals to help their country recover in the immediate aftermath of the 2004 Indian Ocean earthquake tsunami. Among the world's currently available proprietary disaster management systems, Sahana is the only free and open disaster management system that can be downloaded and customized freely.

Such a database has already been developed for the city of Batticaloa under the World Bank’s Open Cities Project.<sup>31</sup> The project’s objective was to map the complete building stock, including critical assets and road infrastructures, of the Manmunai North Divisional Secretariat, which covers 68 square kilometers and includes about 90,000 people. The characteristics collected focused on the basic information necessary for vulnerability assessment. Footprints and basic characteristics (including number of floors, usage, and construction materials of walls and roof) were collected for all 30,000 buildings in the area. These data are now freely available in OpenStreetMap and in the government geospatial data-sharing platform RiskInfo ([www.riskinfo.lk](http://www.riskinfo.lk)) for easy use by many stakeholders.<sup>32</sup>

### *Disaster Risk Model*

Finally, a disaster risk model should be developed for the MoF. The ongoing flood and drought risk models—financed by the US\$110 million Climate Resilience Improvement Project (a component of the government’s Climate Resilience Program)—will identify and measure the economic and financial risks in nine selected river basins.

In turn, the disaster risk model would produce, as outputs, losses in financial terms that can inform the government’s contingent liability. Further applications (financial decision-making tools) could be developed to use the reported losses to help the MoF design the national disaster risk financing strategy, including the size of the annual budget allocation to the Rehabilitation and Reconstruction Fund and any disaster risk transfer strategy (for example, insurance). Mexico’s Ministry of Finance and Public Credit currently uses such a model (further described in box 4.1).

### ***Option 3: Develop a National Disaster Risk Financing Strategy***

The national disaster risk financing strategy should rely on a risk-layering approach that promotes the use of a mix of instruments that both retain and transfer risk. This could include risk retention (through reserves or contingency budget and contingent credit lines) as well as risk transfer instruments (such as insurance). See appendix A for further details and a comparative analysis of risk financing and risk transfer products. Appendix F describes the operational framework for implementing disaster risk financing and insurance (DRFI) solutions.

<sup>31</sup> The Open Cities Project, launched in 2012, is a component of the Open Data for Resilience Initiative (OpenDRI), which generates usable information through community mapping techniques including OpenStreetMap (OSM). For more details, see the Open Cities Project website: <http://www.opencitiesproject.org/>. (World Bank, “Open Data for Resilience Initiative: Planning an Open Cities Mapping Project,” guide book, Washington, DC: World Bank, 2014).

<sup>32</sup> OpenStreetMap (OSM) is a free, editable map of the world, viewable at <http://www.openstreetmap.org>. RiskInfo is a GeoNode set up for the GoSL to display spatial data related to disaster risk. GeoNode is a GFDRR-implemented open-source application and platform for developing geospatial information systems and deploying spatial data infrastructures. For more information, see the GeoNode website: <http://www.geonode.org>.

### Box 4.1 R-FONDEN: The Financial Catastrophe Risk Model of Mexico's Ministry of Finance and Public Credit

To inform the design of a risk financing strategy for its Natural Disaster Fund (FONDEN), the Government of Mexico developed a catastrophe risk model called R-FONDEN (for Riesgo-FONDEN, or FONDEN Risk). This probabilistic risk model offers catastrophe risk analysis of four major perils (earthquake, floods, tropical cyclones, and storm surge) that could threaten infrastructure in key sectors (education, health, roads, and low-income housing) at the national, state, and substate levels. The analysis can be performed on a scenario basis or on a probabilistic basis.

R-FONDEN takes as input a detailed exposure database (including details of buildings, roads, and other public assets). It produces, as outputs, risk metrics including annual expected loss (AEL) and probable maximum loss (PML).

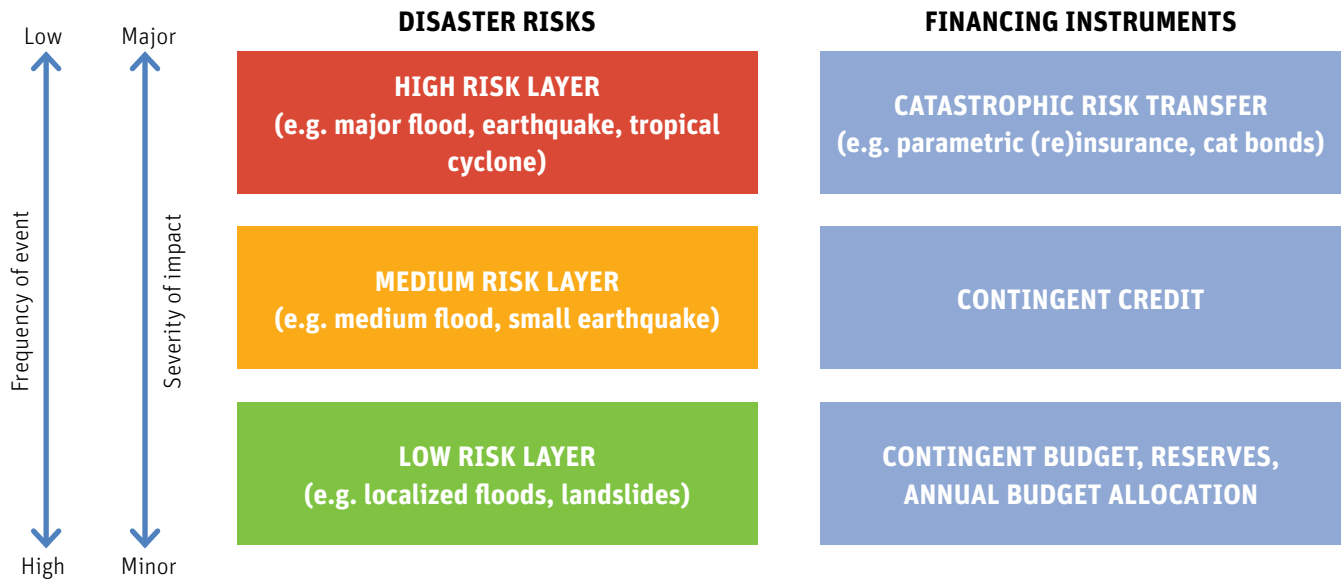
The Ministry of Finance and Public Credit currently uses this model, in combination with the actuarial analysis of historic loss data, to monitor the disaster risk exposure of the FONDEN portfolio and to design disaster risk transfer strategies such as the placement of indemnity-based reinsurance and the issuance of catastrophe bonds.

For further information on FONDEN, see appendix C.

*Sources:* GFDRR (Global Facility for Disaster Reduction and Recovery), "FONDEN: Mexico's National Disaster Fund: An Evolving Inter-Institutional Fund for Post-Disaster Expenditures," fact sheet (Washington, DC: GFDRR, 2013); GFDRR and World Bank, "FONDEN: Mexico's Natural Disaster Fund—A Review" (Washington, DC: World Bank, 2012).

Disaster risk layers could be financed through an optimal combination of financial instruments, using a three-tiered financial strategy (figure 4.1). The costs and benefits of using different instruments would need to be assessed quantitatively and qualitatively in the context of Sri Lanka's disaster risk profile to determine their value within a national strategy as follows:

- ▶ *Low-risk layer (for disasters with return periods of about 5 years or less):* The annual budget allocation or contingency budget could finance recurrent disaster losses such as localized floods or landslides.
- ▶ *Medium-risk layer (for disasters with return periods of about 5–20 years):* Contingent credit would finance losses from disasters that are more severe but less frequent. This budget instrument would allow the GoSL to draw down funds quickly after a natural disaster. It has already been introduced in Sri Lanka, in the form of the Development Policy Loan with Catastrophe Deferred Drawdown Option (Cat-DDO), which was declared effective by the World Bank on August 22, 2014.
- ▶ *High-risk layers (for disasters with return periods greater than 10 years):* For low-frequency, high-severity risks, the GoSL could consider the feasibility of risk transfer to the international capital and insurance and reinsurance markets through either traditional or nontraditional catastrophe (re)insurance or nontraditional (re)insurance products, such as catastrophe bonds and catastrophe derivatives. Disaster risk transfer instruments, such as disaster insurance, can offer

**Figure 4.1 Three-Tiered Financial Strategy for Disaster Risk: A Bottom-Up Approach**

Source: GFDRR (Global Facility for Disaster Reduction and Recovery), "Disaster Risk Financing and Insurance Program," factsheet (Washington, DC: GFDRR, 2012), [http://siteresources.worldbank.org/EXTDISASTER/Resources/8308420-1353538006746/4Pager\\_GFDRR-DRFI-program\\_final\\_Nov21\\_2012.pdf](http://siteresources.worldbank.org/EXTDISASTER/Resources/8308420-1353538006746/4Pager_GFDRR-DRFI-program_final_Nov21_2012.pdf).

valuable capacity for events beyond the capacity of the risk retention instruments described above. The GoSL could consider buying parametric insurance against major disasters, whereby payouts could be disbursed based on parametric triggers such as the physical magnitude of a hazard event. This type of insurance product is considered transparent by the international markets and allows for fast claim settlements (usually within two to four weeks).

In summary, the GoSL should consider a bottom-up disaster risk financing approach. The GoSL should first secure financing for recurrent events (bottom risk layer) through risk retention (operationalization of national reserves and/or contingent credit) and then deal with the higher risk layers through the consideration of disaster risk transfer instruments.

#### ***Option 4a: Establish a National Disaster Reserve Fund as a Fast-Disbursement Mechanism for the Financing of Postdisaster Operations***

A National Disaster Reserve Fund (NDRF) could serve to rapidly finance postdisaster operations. A basket of mechanisms and instruments could be developed as part of an NDRF, akin to a financial trust, which would disburse funds after a disaster according to predetermined rules of disbursement and procurement to allow for rapid implementation of recovery operations. This facility could build on the successful example of Mexico, which established the Natural Disaster Fund (FONDEN), further discussed in box 4.2. Funds from the Cat-DDO could also be channeled through this mechanism.

#### Box 4.2 Mexico's Natural Disaster Fund (FONDEN)

The Government of Mexico created the Natural Disaster Fund (FONDEN) in 1996 in response to the delays faced in the postdisaster financing of emergency and recovery activities. FONDEN is a financial mechanism to provide the federal agencies and the Mexican states with postdisaster financial resources. FONDEN's mandate is to (a) finance postdisaster emergency assistance (through a revolving fund), and (b) provide the 32 Mexican states and the line ministries (for example, the Ministry of Infrastructure, Ministry of Health, Ministry of Education, and Ministry of Human Development) with financial resources in case losses from natural disasters exceed their budget capacity.

FONDEN finances the postdisaster recovery and reconstruction of public assets (100 percent of federal assets and 50 percent of state and municipal assets) and low-income houses. In 1999, the FONDEN Trust Fund was established to help finance the FONDEN program through a catastrophe reserve fund that accumulates the unspent disaster budget of each year.

For further details about FONDEN, see appendix C.

*Source:* World Bank, "FONDEN: Mexico's Natural Disaster Fund—A Review" (Washington, DC: World Bank: 2012).

#### **Option 4b: Establish a Robust Catastrophe Risk Insurance Program for Public Assets**

Natural disasters can have severe impacts on public infrastructure such as roads and bridges. Countries' strategies for financing reconstruction will vary depending on many factors, including access to capital markets and the size of the event with respect to the fiscal budget. For example, developed economies with easy access to the capital markets may choose to self-insure because they have access to additional financial capacity to bear the full cost of recovery and reconstruction when a disaster strikes. Other countries may require by law that public assets have catastrophe insurance against natural disasters.

However, in practice, despite the introduction of compulsory insurance, most public assets remain either uninsured or underinsured. This occurs partly because public managers are reluctant to spend a portion of their limited budgets on insurance premiums. They also often lack even basic information on how to select cost-effective insurance coverage.

A catastrophe risk insurance program for public assets could be established in Sri Lanka to promote disaster insurance of public assets in collaboration with the insurance industry. Typically, this program would aim to offer technical assistance to public entities in the design of their catastrophe insurance coverage of public assets. Standardized terms and conditions for the property insurance policies would be developed in collaboration with the insurance industry (with companies such as Sri Lanka Insurance Corporation (SLIC)), which would help public managers identify their risk exposure and insurance needs. The program could also structure a national insurance portfolio of public assets to be placed in the private insurance and reinsurance market. A national approach to insuring public assets would allow for economies of scale and diversification benefits and thus lower reinsurance premiums.

#### ***Option 4c: Enhance the Management of Contingent Liability Related to Social Protection***

Responsive, scalable social protection programs and systems have the potential to mitigate the impact of natural disasters on poor households. By providing a safety net to affected individuals, social protection programs can prevent beneficiary households from depleting already-limited savings, cutting expenditure on essential items, and reducing investments in human capital (such as schooling) in the face of disasters. For instance, evidence shows that the implementation of social protection programs that provide cash and in-kind transfers (cash-for-work programs, social funds, and categorical services and benefits) in parallel with more-traditional relief and reconstruction efforts have played an increasingly important role in reducing short-term food insecurity among affected populations and ensuring long-term recovery in the aftermath of disasters in many countries in South Asia (including Maldives and Pakistan) as well as in Turkey.

Flexible social protection systems that are disaster-triggered and linked to disaster risk management systems and contingent financing also have the potential to reduce the administrative and financial burdens of governments when responding to disasters. Among these burdens, postdisaster transfer mechanisms can be administratively and logistically cumbersome; identifying affected people is time-consuming and often inefficient, particularly after a disaster; and funds can take too long to reach those with immediate needs. Scalable programs with built-in risk mitigation and risk financing mechanisms can respond quickly to beneficiaries' needs within existing systems. These programs provide immediate assistance to poor people; protect development gains by preventing people from falling back into poverty after a disaster; and promote shared prosperity through better targeting, focusing on underlying factors affecting inequality such as gender. To those ends, the programs use census and survey data as well as geospatial platforms to locate vulnerable people.

Finally, disaster-linked social protection programs can build governments' capacity to provide timely, focused assistance to affected vulnerable populations in the aftermath of a disaster while protecting their long-term fiscal balance through risk financing instruments. This can be achieved by making full use of financial instruments that allow for a more efficient management of disaster-related liabilities. To ensure the effectiveness of such programs, a key step is to quantify the costs and benefits of disaster-linked social protection schemes and their budgetary impacts.

### **National Insurance Trust Fund**

#### ***Option 5: Introduce a Reinsurance Strategy for the National Insurance Trust Fund***

Currently, the National Insurance Trust Fund (NITF) acquires 30 percent of all reinsurance coverage from the private market. However, the government lacks a strong understanding of the NITF's full liability. At the same time, an effective risk management strategy is not in place. Although the NITF is implicitly backed by the MoF, an important event could lead to significant claims from private insurers that may be difficult for the NITF to meet.

To better manage this liability, the GoSL could introduce a risk-layering strategy. This would include an assessment of the full liability in the NITF's portfolio as well as modeled loss projections to better understand the likely claim requirements after a significant event. The benefit of such a strategy would be to limit the MoF's liability in the aftermath of a major event, at a time when the government budget will already be stretched.

### **Option 6: Strengthen the Agricultural Insurance Program**

To transfer more responsibility for disaster recovery and rehabilitation to private individuals, the MoF has begun to reform its agricultural subsidy program. The subsidy itself has decreased, and the savings from the reduced subsidy are being used to support an insurance premium for small farmers. However, the effectiveness and sustainability of the insurance scheme has not been evaluated. Challenges include the following:

- ▶ Limited understanding of annual payouts under the scheme and maximum payout requirements, which could lead to difficulties in meeting claims
- ▶ An inconsistent trigger for claim payments, resulting in an ad hoc product response
- ▶ Absence of a strategy to manage the liability under the scheme, potentially leading to the inefficient allocation of capital

Even though the uptake of the product has been effective, distribution of the program could be improved in some respects. More diagnostic work could be undertaken to identify specific areas of engagement to support the scaling and efficiency of this program. Such activities could include the following:

- ▶ Increasing the understanding of liability under the scheme
- ▶ Improving the pricing mechanism
- ▶ Increasing the efficiency of the payment trigger
- ▶ Evaluating the benefits of pooling the collective risk into a captive
- ▶ Increasing the efficiency of distribution and claims payments

### **Private Insurance Market**

The current insurance penetration and density of non-life products that relate to catastrophe risk is very low in Sri Lanka. Less than 1 percent of the residential property stock is currently insured against natural disasters.<sup>33</sup> This is a consequence of factors such as low penetration, prevalence of government-run social welfare, and general aversion to the concept of insurance.

Catastrophe pools within the domestic private insurance market are not recommended in this note. Initiatives to pool risk into national vehicles for catastrophe risk have had some success in other countries. The domestic insurance industry, among others, has also shown some interest in a tariff-based natural catastrophe fund. However, research suggests that a multiperil catastrophe pool might not be the best option for Sri Lanka for several reasons:

- ▶ The resilience of the domestic insurance industry, as shown, for example, by its coping mechanisms and absorption of losses after the 2004 Indian Ocean earthquake and tsunami
- ▶ Recent developments in loss history and increased capital and regulatory requirements under the new risk-based capital model, which has guided the insurance industry to better manage risks

<sup>33</sup> IBSL (Insurance Board of Sri Lanka), “Annual Report 2013” (Colombo, Sri Lanka: IBSL, 2014).

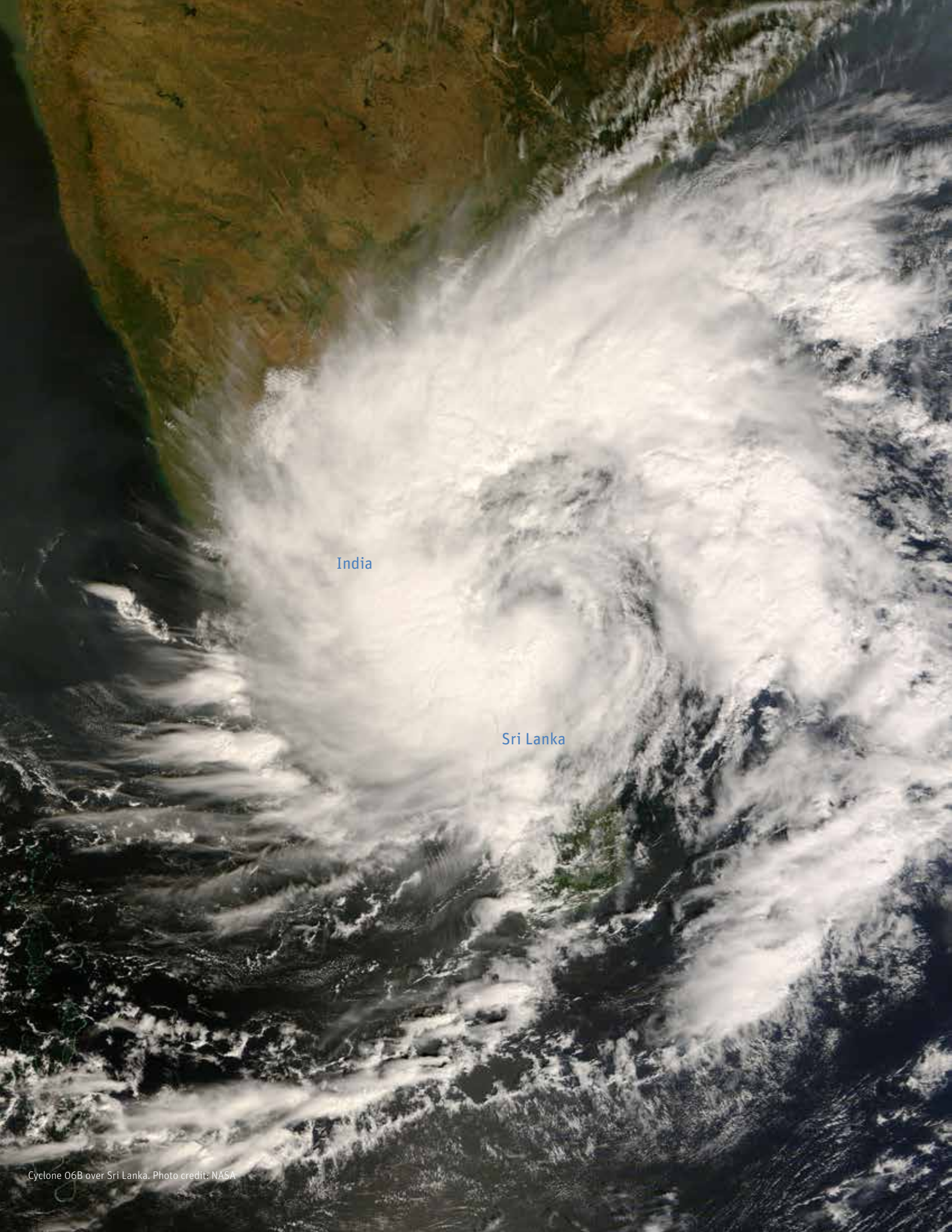


- ▶ Challenges of developing an insurance vehicle or pool for the lower-intensity, higher-frequency peril of flood
- ▶ Research indicating that human-driven factors—a significant driver of flood risk—could be mitigated through better drainage management

#### ***Option 7: Enhance Data Sharing on Agricultural Insurance***

Several private insurance companies have expressed an interest in developing crop insurance products. Sanasa Insurance Company Limited has introduced such a product. The lack of available data, such as hydrometeorological information, however, has presented a key obstacle to the further development and implementation of crop insurance products.

A program to facilitate data and information sharing for insurance service providers would help deepen market penetration. This would include supporting the establishment of data-sharing platforms at required resolutions and formats and strengthening the capability of agencies in providing such services, including the Department of Meteorology, the Irrigation Department, and the Disaster Management Centre.



India

Sri Lanka

Cyclone 06B over Sri Lanka. Photo credit: NASA

# Appendix A: World Bank Disaster Risk Financing and Insurance Framework

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 that is neither feasible nor cost-effective to mitigate.<sup>34</sup>

## Definition and Beneficiaries of DRFI Solutions

Historically, governments addressed the financial effects of natural disasters mostly on an ad hoc basis after events. However, they are increasingly focusing on proactive predisaster planning. This began with a handful of industrialized countries and is gradually being taken up by governments from around the world.

Disaster risk financing and insurance (DRFI) aims to increase the resilience of vulnerable countries against the financial impact of disasters. A comprehensive strategy can secure access to postdisaster financing before an event strikes, ensuring rapid, cost-effective liquidity to finance recovery efforts. The main beneficiary groups of financial protection include national and local governments, homeowners and small and medium-size enterprises (SMEs), farmers, and the poorest. Governments normally seek to strengthen the financial resilience of these groups using appropriate strategies for each as follows:

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

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

<sup>34</sup> Appendix A is excerpted from GFDRR (Global Facility for Disaster Reduction and Recovery) and World Bank, "Financial Protection against Natural Disasters: An Operational Framework for Disaster Risk Financing and Insurance" (Washington, DC: World Bank, 2014).

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 US\$70 million as of January 2014.

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

*Example:* The Indian government adopted risk financing and insurance principles to transition its National Crop Insurance Program from a social crop insurance scheme to a market-based crop insurance program. As a result, farmers receive the claims payments much faster and have improved coverage of their assets.

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

*Example:* The government of Ethiopia is integrating disaster risk contingency planning and financing into the Productive Safety Net Program, its food security safety net. Starting in 2006, the program began using DRFI tools on a trial basis to expand its capacity during extreme events. A contingent financing window allowed Ethiopia to increase the number of beneficiaries of food assistance during the 2011 Horn of Africa drought from 6.5 million to 9.6 million drought-affected people.<sup>35</sup>

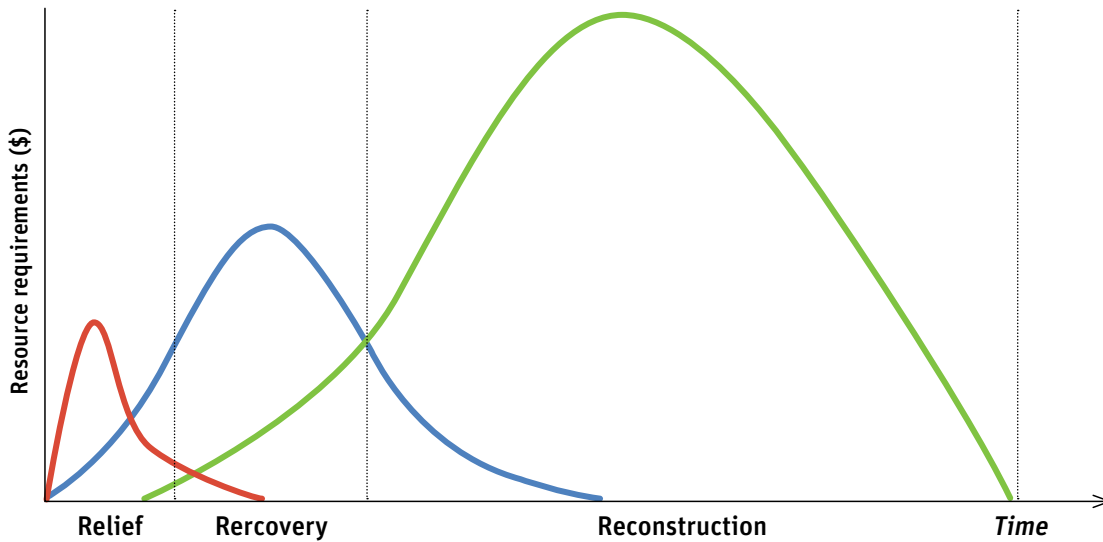
## Key Considerations for Financial Protection

A government has access to many different sources of financing for postdisaster response and reconstruction. The government can mobilize some of these options following a disaster, such as budget reallocations or credit (ex post). Other options need to be established before a disaster hits, such as contingent credit lines or insurance (ex ante). These financing options all differ in terms of their cost of use, amount of money available when disaster hits, and speed of access.

Alternative instruments are not inherently better or worse; they simply address different needs. For example, after a disaster, a government could issue bonds or raise taxes to pay for reconstruction. Such measures provide access to large sums of money but take a long time to become available. Insurance, on the other hand, can be much more expensive but can help governments manage the volatility of unplanned demands on budgets by spreading the cost of disaster across time. This presents governments with a trade-off in managing costs and risk.

To efficiently address the funding needs arising from disasters, a number of considerations are important. First, understanding the timing of needs is essential. Immediate liquidity is crucial to support relief and early recovery operations, while the government has more time to mobilize the majority of resources for the reconstruction program (figure A.1).

<sup>35</sup> World Bank, "Ethiopia's Productive Safety Net Program (PSNP): Integrating Disaster and Climate Risk Management: Case Study," Working Paper 80622, a component of the Building Resilience to Disaster and Climate Change through Social Protection Toolkit (Washington, DC: World Bank, 2013).

**Figure A.1 Timing of Postdisaster Funding Needs**

Source: Ghesquiere, F., and O. Mahul, "Financial Protection of the State against Natural Disasters: A Primer," Policy Research Working Paper 5429 (Washington, DC: World Bank, 2010).

A second consideration is the cost of different sources of money. Table A.1 provides an indicative cost multiplier for different financial risk instruments. This multiplier is defined as the ratio between the cost of the financial product (such as the premium of an insurance product or the expected net present value of a contingent debt facility) and the expected payout over its lifetime.

Taking these considerations into account, a government can combine different instruments to protect against events of varying 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.

**Table A.1 Costs and Benefits of Financial Instruments for Financing Postdisaster Expenditure**

Instrument	Indicative cost (multiplier)	Disbursement (months)	Amount of funds available
<i>Ex post financing</i>			
Donor support (humanitarian relief)	0–1	1–6	Uncertain
Donor support (recovery and reconstruction)	0–2	4–9	Uncertain
Budget reallocations	1–2	0–9	Small
Domestic credit (bond issue)	1–2	3–9	Medium
External credit (for example, emergency loans, bond issue)	1–2	3–6	Large
<i>Ex ante financing</i>			
Budget contingencies	1–2	0–2	Small
Reserves	1–2	0–1	Small
Contingent debt facility (for example, Cat-DDO)	1–2	0–1	Medium
Parametric insurance	1.5 and up	1–2	Large
Alternative risk transfer (for example, Cat bonds, weather derivatives)	1.5 and up	1–2	Large
Traditional (indemnity-based) insurance	1.5 and up	2–6	Large

Source: Ghesquiere, F., and O. Mahul, “Financial Protection of the State against Natural Disasters: A Primer,” Policy Research Working Paper 5429 (Washington, DC: World Bank, 2010).

Note: Cat-DDO = Development Policy Loan with Catastrophe Deferred Drawdown Option. The cost multiplier represents the estimated cost of resources as a multiple of the average expected loss it finances. Donor grants do not have a financial cost but are often reallocated from other ongoing projects and may have an opportunity cost. Reserves are generally held in short-term assets; their cost is the difference between the returns on long-term investments and short-term investments. Budget reallocations are funds reallocated from other programs and may have an opportunity cost; unless they affect the credit rating of a government, the cost of emergency loans is reflected in the interest rate applied.

# Appendix B: Legal Disaster Risk Management Framework in Sri Lanka

## Current Legal Framework

The National Council of Disaster Management was established as per Clause 2(1) of the 2005 Sri Lanka Disaster Management Act No. 13. According to Clause 3(1), sections a–e, the council shall consist of the following:

- ▶ The “president” as chair
- ▶ The “prime minister” as vice chair
- ▶ The Leader of the Opposition
- ▶ The ministers in charge of the following areas:
  - ◆ Social welfare
  - ◆ Rehabilitation and construction
  - ◆ Environment
  - ◆ Home affairs
  - ◆ Health
  - ◆ Science and technology
  - ◆ Housing
  - ◆ Cost conservation
  - ◆ Irrigation
  - ◆ Power
  - ◆ Defense
  - ◆ Police
  - ◆ Finance
  - ◆ Land
  - ◆ Fisheries and aquatic resources
  - ◆ Foreign affairs
  - ◆ Water supply
  - ◆ Highways
  - ◆ Urban development
  - ◆ Education
  - ◆ Chief ministers of all the provinces

## Legal Definition of “Disaster” in Sri Lanka

Clause 25 of the 2005 Sri Lanka Disaster Management Act No. 13 of 2005 states, “Disaster means the actual or imminent occurrence of a natural or manmade event, which endangers or threatens to endanger the safety or health of any person or group of persons in Sri Lanka, or which destroys or damages or threatens to destroy or damage any property.”

This legal definition includes the following disasters:

- ◆ Landslide
- ◆ Cyclone
- ◆ Flood
- ◆ Drought
- ◆ Industrial hazard
- ◆ Tsunami
- ◆ Earthquake
- ◆ Aerospace hazard
- ◆ Maritime hazard
- ◆ Fire
- ◆ Epidemic
- ◆ Explosion
- ◆ Air raids
- ◆ Civil or internal strife
- ◆ Chemical accident
- ◆ Radiological emergency
- ◆ Oil spills including inland and marine oil spills
- ◆ Nuclear disaster
- ◆ Urban and forest fire
- ◆ Coastal erosion
- ◆ Tornados, lightning strikes, and severe thunderstorms

## Appendix C: Mexico's Natural Disaster Fund (FONDEN)

Mexico has a long history of, and broad exposure to, natural disasters. Located along the world's "fire belt"—where 80 percent of the world's seismic and volcanic activity takes place—Mexico is a seismically active country. The country is also highly exposed to tropical storms and is located in one of the few regions of the world that can be affected simultaneously by two independent cyclone regions: the North Atlantic and the North Pacific.

To address its vulnerability to adverse natural events, Mexico has developed a comprehensive institutional approach to natural disasters. The catalyst to comprehensive disaster risk management was the Mexico City earthquake of 1985, which killed 6,000 people, injured 30,000 others, and left a total of 150,000 victims. Total direct losses exceeded US\$4 billion.

Mexico established the National Civil Protection System (SINAPROC) in 1986 as the main mechanism for interagency coordination of disaster efforts. SINAPROC is responsible for mitigating losses of societal and essential functions caused by disasters. Responsibility for SINAPROC lies with the Ministry of the Interior, within which the National Center for Disaster Prevention (CENAPRED) was also established. CENAPRED is an institution that bridges the gap between academic researchers and government by channeling research applications developed by university researchers to the Ministry of the Interior.

### The Natural Disaster Fund (FONDEN)

Despite developing an institutional approach to disasters, all levels of government in Mexico were still regularly required to reallocate planned capital expenditures toward financing postdisaster reconstruction efforts. Budget reallocations created delays and scaling back of investment programs while also slowing deployment of funds for recovery efforts. In response, legislation was passed in 1994 to require federal, state, and municipal assets to be privately insured. In 1996, the government created the Natural Disasters Fund (FONDEN) in the Ministry of Finance and Public Credit.

FONDEN is an instrument for the coordination of intergovernmental and interinstitutional entities to quickly provide funds in response to natural disasters. Its main purpose is to provide immediate financial support to federal agencies and local governments recovering from a disaster, particularly for (a) provision of relief supplies, and (b) financing for reconstruction of public infrastructure and low-income homes. FONDEN is also responsible for carrying out studies on risk management and contributing to the design of risk transfer instruments.

### Main Features

FONDEN was originally established as a budgetary tool to allocate funds annually to pay for expected expenditures for disaster losses. In 1999, FONDEN was modified through the establishment of the FONDEN Trust Fund, a catastrophe reserve fund that accumulates the unspent disaster budget of each year.



Financial support is directed toward public infrastructure as well as low-income households that, because of their poverty status, need government assistance. The adverse natural events covered by FONDEN consist of geological perils (including earthquake, volcanic eruption, tsunami, and landslide) and hydrological perils (including drought, hurricane, excess rainfall, hail storm, flood, tornado, and wildfire).

FONDEN is based on three complementary instruments: the Revolving Fund, the FONDEN Program, and the FONDEN Trust Fund. The first provides monies for disaster relief efforts, the second supports reconstruction of infrastructure, and the third manages Mexico's catastrophe risk financing strategy. They are further described as follows:

- ▶ *Revolving Fund*: This fund finances emergency supplies to be provided in the aftermath of a natural disaster, such as shelters, food, primary health care, and so on. In the case of high probability of a disaster, or imminent danger, the local governments can declare a situation of emergency and obtain resources from FONDEN immediately. Doing so allows local governments to take measures to prepare for immediate relief needs.
- ▶ *FONDEN Program*: This program finances rehabilitation and reconstruction projects for public infrastructure (owned by municipal, state, and federal governments) as well as the restoration of natural areas and private dwellings of low-income households following a natural disaster.
- ▶ *FONDEN Trust Fund*: This Trust Fund manages FONDEN's assets, including its risk transfer strategy (reinsurance or alternative risk transfer instruments). The federal FONDEN Trust manages the financial resources provided by the federal government, including the annual budget allocation. The state FONDEN Trusts, set up for each of the 32 states, manage the financial resources received from the federal FONDEN Trust after a natural disaster.

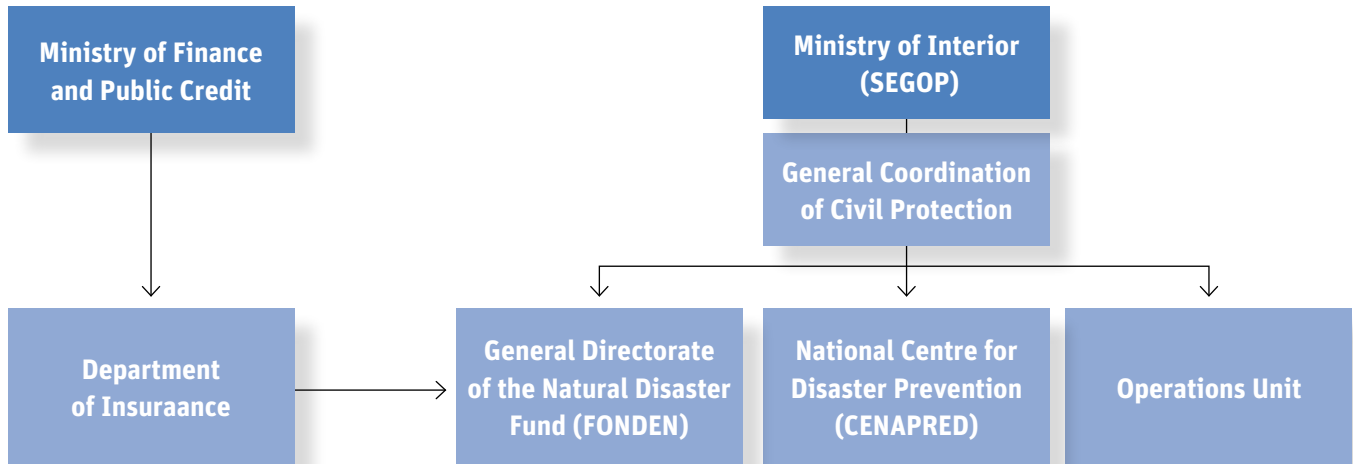
## Institutional Structure

Located within the civil protection unit of the Ministry of the Interior (figure C.1), FONDEN is a trust managed by one of Mexico's main state-owned development banks (Banobras).<sup>36</sup> The structure of FONDEN includes a counterparty in each of the 32 Mexican states, including Mexico City, to facilitate the assignment and management of federal transfers. The main advantage of this structure is the ability to provide resources to state governments immediately—on average, five days after the disaster.

The FONDEN Trust receives an annual allocation from the Ministry of Finance and Public Credit to develop and manage its risk financing strategy. The risk is layered, with some tranches retained and others transferred through various instruments. To transfer risk to the reinsurance markets for parametric coverage or the capital markets for catastrophe bonds, the FONDEN Trust places excess risk first with the public insurer Agroasemex. This entity passes on the risk to the markets.

<sup>36</sup> Banobras stands for Banco Nacional de Obras y Servicios Públicos (National Bank of Public Works and Services).

Figure C.1 FONDEN Organizational Structure



Source: Adapted from Global Facility for Disaster Reduction and Recovery (GFDRR) and World Bank, "FONDEN: Mexico's Natural Disaster Fund—A Review" (Washington, DC: World Bank, 2012).

## FONDEN Program

The purpose of this program is to provide financing to state and local governments that are overwhelmed by the occurrence of a disaster. The assessment of losses to be cofinanced by FONDEN is based on a specific procedure involving the local and federal authorities. This procedure includes six main steps and should not exceed 23 days after occurrence of the disaster:

1. After a disaster, a specialized federal or state agency (for example, the meteorological department or geosciences department) certifies the occurrence of a natural disaster and informs the state government.
2. Within 4 days after a natural disaster, the state government sets up a technical committee to identify and assess the damage.
3. Within 10 days, the technical committee provides the state government with a technical and financial evaluation of the natural disaster.
4. Within 15 days, the state government informs the federal government. The Ministry of the Interior issues a declaration of a state of natural disaster. Meanwhile, the Ministry of Finance and Public Credit authorizes FONDEN to release early partial contribution to the state.
5. Within the next 2 days, the Ministry of the Interior should (a) ensure that the requested assistance is related to the natural disaster; (b) verify that the damaged infrastructure has not benefited from FONDEN in the past (if this is the case, the proof of insurance of the damage infrastructure is requested); and (c) formally approve the cofinancing of the reconstruction of the damaged assets.
6. The claims are authorized to be financed by FONDEN. In the case of federal assets, the federal FONDEN Trust pays the contractor directly. In the case of state or municipal assets, the federal FONDEN Trust transfers the funds to the state FONDEN Trust once the state government has transferred its contribution.

## FONDEN Trust

The federal government aims to promote the private insurance of specific public assets owned by federal agencies and state governments, thus reducing its financing dependence on FONDEN in case of a natural disaster. The federal government has empowered FONDEN to develop a catastrophe risk financing strategy, relying on private risk transfer instruments such as reinsurance and catastrophe bonds. This helps FONDEN to increase its financial independence and overcome some political economy issues.

The financial structure of FONDEN is depicted in figure C.2. The public bank Banobras acts as the account manager of the FONDEN Trust. The public reinsurer Agroasemex intermediates any financial transactions with the international reinsurance and capital markets.

**Figure C.2 FONDEN Financial Structure**



*Source:* Adapted from Global Facility for Disaster Reduction and Recovery (GFDRR) and World Bank, “FONDEN: Mexico’s Natural Disaster Fund—A Review” (Washington, DC: World Bank, 2012).

*Note:* cat bonds = catastrophe bonds.

## FONDEN 2011 Disaster Risk Financing Strategy

FONDEN’s disaster risk financing strategy relies on a combination of risk retention and risk transfer. To execute this strategy, FONDEN receives an annual budget allocation from the federal budget, which is sometimes complemented by an exceptional budget allocation in the case of a major disaster. To purchase insurance coverage, the federal law was modified to allow FONDEN to transfer risk to the reinsurance and capital markets, with the insurance premium being defined as a service in the government budget law. The transferring of risk to the reinsurance and capital markets is intermediated by the public reinsurance company Agroasemex. Figure C.3 describes FONDEN’s disaster risk financing strategy for 2011.

**Figure C.3 FONDEN Disaster Risk Financing Strategy, 2011**

<b>Mexico MultiCat Bond / Mex\$3.5 billion</b>
<b>Indemnity-based reinsurance / Mex\$6 billion</b>
<b>Exceptional budget allocation / Mex\$2.5 billion</b>
<b>Annual budget allocation / Mex\$10 billion</b>

*Source:* Adapted from Global Facility for Disaster Reduction and Recovery (GFDRR) and World Bank, “FONDEN: Mexico’s Natural Disaster Fund—A Review” (Washington, DC: World Bank, 2012).

*Note:* The Mexico MultiCat bond covers only earthquakes in three zones and hurricanes in three zones.

To implement the risk financing strategy, the federal budget included a budget line of 0.4 percent of the government expenditures for the financing of public assets and FONDEN, which corresponded to Mex\$10 billion in 2011. If the annual budget allocation is insufficient, FONDEN can receive an exceptional budget allocation from the federal government reserve funds (such as the oil fund).

For the first time, in 2011, FONDEN placed an indemnity-based excess-of-loss (XL) reinsurance treaty on the international reinsurance market. Reinsurance payouts are based on the losses reported by FONDEN that are borne by the federal government (that is, 100 percent of the damage to federal assets and 50 percent of the damage to state or municipal assets and low-income housing). The losses reported to FONDEN included replacement costs (on average, 75 percent of the total losses) and improvement costs (on average, 25 percent of the total losses). Only replacement losses are covered under the reinsurance treaty. As of March 2011, the federal government was expecting to place a XL reinsurance treaty of Mex\$6 billion on excess of Mex\$12.5 billion.

FONDEN also secured the protection of a catastrophe bond. In 2006, it issued a US\$160 million catastrophe bond (CatMex) to transfer Mexico's earthquake risk to the international capital markets. It was the first parametric cat bond issued by a sovereign entity. After the CatMex matured in 2009, Mexico decided to further diversify its coverage by pooling multiple risks in multiple regions. In October 2009, with assistance from the World Bank, it issued a multiperil cat bond using the World Bank's newly established MultiCat Program. The federal government issued a four-tranche cat bond (totaling US\$290 million) with a three-year maturity, called MultiCat Mexico. It provided (binary) parametric insurance to FONDEN against earthquake risk in three regions around Mexico City and hurricanes on the Atlantic and Pacific coasts. The cat bond repaid the principal to investors unless an earthquake or hurricane triggers a transfer of the funds to the Mexican government. During the lifetime of the bond, no event triggered a repayment.

## Appendix D: Turkish Catastrophe Insurance Pool

Bridging the contents of Europe and Asia, Turkey is highly exposed to severe earthquakes. Despite the common occurrence of earthquakes, Turkey's private insurance market was long unable to provide adequate capacity for catastrophe property insurance against earthquake risk. Without adequate commercial protection of residential buildings, the government faced a significant contingent financial exposure in postdisaster reconstruction of private property.

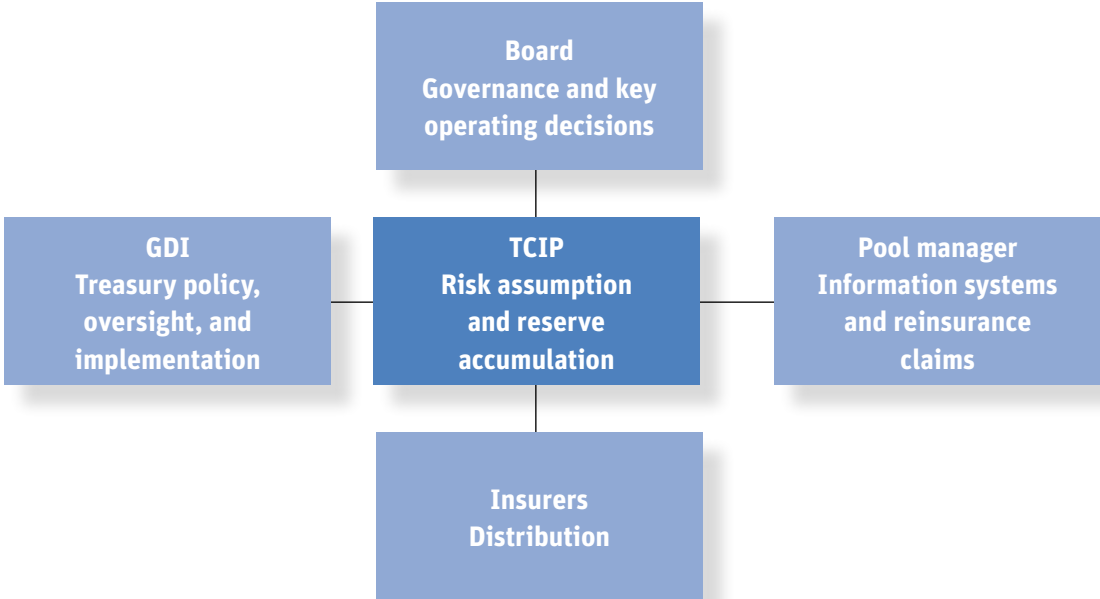
After the Marmara earthquake in 2000, in cooperation with the World Bank, the government worked to limit its financial exposure to the residential housing market through the establishment of the Turkish Catastrophe Insurance Pool (TCIP). The pool enables the Government of Turkey to ensure that owners who pay property taxes on domestic dwellings can purchase affordable, cost-effective coverage. As a result, the government's contingent fiscal exposure to earthquakes is decreased by the transferring of risk to the international reinsurance markets, which reduces pressure to provide postdisaster housing subsidies.

The TCIP is a public sector insurance company that is managed on sound technical and commercial insurance principles. It operates as a genuine public-private partnership with most, if not all, operational functions outsourced to the private sector (figure D.1). The TCIP purchases commercial reinsurance, and the Government of Turkey acts as a catastrophe reinsurer of last resort for claims arising out of an earthquake with a return period of greater than 300 years. The full capital risk requirements for the TCIP are funded by commercial reinsurance (currently in excess of US\$1 billion) and its own surplus capital (about US\$0.5 billion).

The TCIP policy is a stand-alone property earthquake policy with a maximum sum insured per policy of US\$65,000; an average premium rate of US\$46; and a 2 percent of sum-insured deductible. Premium rates are based on the construction type (two types) and property location (differentiating among five earthquake risk zones) and vary from less than 0.05 percent for a reinforced concrete house in a low-risk zone to 0.60 percent for a house in the highest-risk zone.

The TCIP sold more than 3 million policies at market-based premium rates (23 percent penetration) in 2009, compared with 600,000 covered households when the pool was established. To achieve this level of penetration, the government invested heavily in insurance awareness campaigns and made earthquake insurance compulsory for homeowners on registered land in urban centers. The legal framework for the program envisages compulsory enforcement mechanisms in urban settings, while coverage is voluntary for homeowners in rural areas.

**Figure D.1 Operational Structure of the Turkish Catastrophe Insurance Pool (TCIP)**



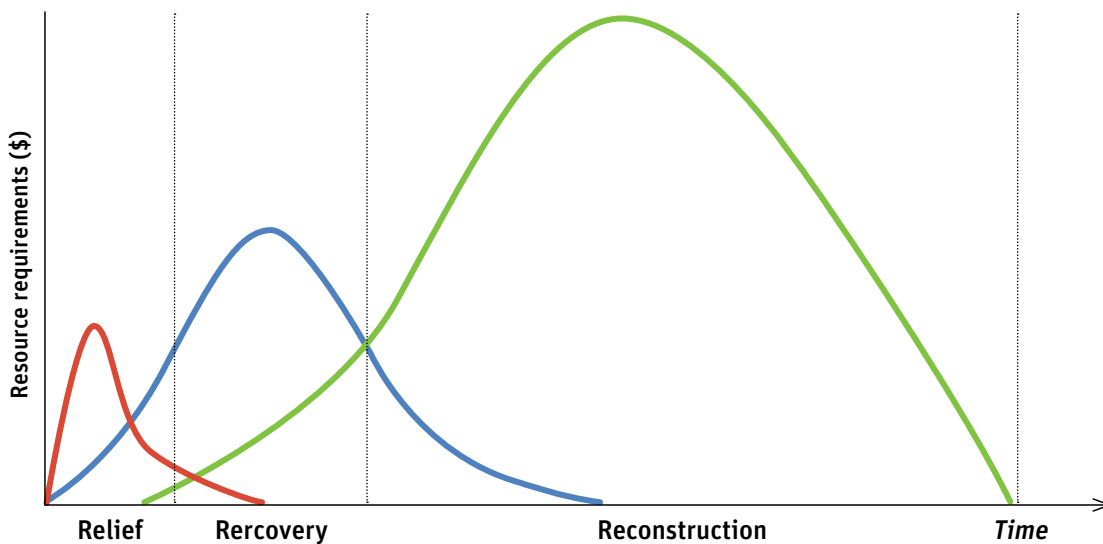
Source: Gurenko, Eugene, Rodney Lester, Olivier Mahul, and Serap Oguz Gonulal, Earthquake Insurance in Turkey: History of the Turkish Catastrophe Insurance Pool (Washington, DC: World Bank, 2006).

Note: GDI = General Directorate of Insurance.

## Appendix E: Postdisaster Operational Phases

The role of disaster risk financing and insurance for the postdisaster operational phases is further detailed in “Financial Protection against Disasters: An Operational Framework for Disaster Risk Financing and Insurance” (Working Paper 94988, World Bank, Washington, DC, 2014). A summary is provided below of the three operational phases: emergency response and relief, recovery, and reconstruction (figure E.1).

**Figure E.1 The Three Postdisaster Phases**



Source: Ghesquiere, F., and O. Mahul, “Financial Protection of the State against Natural Disasters: A Primer,” Policy Research Working Paper 5429 (Washington, DC: World Bank, 2010).

**Emergency response and relief operations.** This phase includes emergency assistance to the affected population to ensure basic needs, such as shelter, food, and medical attention. This assistance, provided during or immediately after a disaster, can save lives, reduce health impacts, ensure public safety, and meet the basic subsistence needs of the people affected. This phase aims to stabilize the society and to prevent or mitigate further loss. Such costs can be difficult to estimate *ex ante* because they depend on the specific characteristics of the catastrophic event (location, intensity, time of the year [winter or summer], time of day [day or night], and so on). But the costs are relatively small compared with the subsequent recovery and reconstruction operations. Although relief costs are limited, they need to be financed within hours after a disaster. The capacity of governments to mobilize resources for relief operation on short notice should be a key component of their risk financing strategy.

**Recovery operations.** Following the initial relief efforts, recovery operations are crucial to limit secondary losses and ensure that reconstruction can start as soon as possible. They aim at the restoration and improvement, where appropriate, of facilities, livelihoods, and living conditions

of disaster-affected communities, including efforts to reduce disaster risk factors. In other words, recovery operations restore the society's functions, such as reopening of schools, businesses, and so on, even if only in temporary shelters. They include, among other things, the emergency restoration of lifeline infrastructure (for example, water, electricity, and key transportation lines); the removal of debris; the financing of basic safety nets; and the provision of basic inputs (such as seeds and fertilizers) to restart agricultural activities. It is also during this phase that engineering firms can be mobilized to start the design of infrastructure work that will take place during the reconstruction phase. The government may also have to subsidize the basic restoration of private dwellings, particularly for low-income families, before the reconstruction phase starts.

**Reconstruction operations.** This phase generally centers on the rehabilitation or replacement of assets damaged by a disaster. They include repair and rebuilding of housing, industry, infrastructure, and other physical and social structures that make up that community or society. These include public buildings and infrastructure that are the direct responsibility of the state. National or local authorities generally have to face obligations that go beyond their own assets. In most cases, the government will have to subsidize the reconstruction of private assets, particularly housing for low-income families who could not otherwise afford to rebuild their homes.



## Appendix F: Operational Framework for Implementing DRFI Solutions

The Disaster Risk Financing and Insurance (DRFI) Operational Framework developed by the World Bank DRFI Program seeks to provide governments implementing financial protection strategies with a framework for the development and implementation of cost-effective, sustainable DRFI solutions.<sup>37</sup> The structure of the DRFI Operational Framework emerged through a long, sustained dialogue and many years of working with governments and the private sector. It builds on more than 15 years of intensive partnerships with more than 60 countries worldwide in developing DRFI strategies and addressing challenges at both the policy and technical levels.

This framework aims to answer basic questions and challenges usually faced by governments when they initiate or improve their DRFI strategies. Experience has shown that a DRFI engagement is usually triggered by two main entry points. First, governments often are looking to implement a specific product or financial instrument; here, the challenge is to help policy makers situate this instrument in the larger context of financial protection and disaster risk management. Second, governments may start from a particular development goal—such as protecting small farmers against drought or ensuring *access* to immediate postdisaster liquidity for central and local governments—in which case it is necessary to identify the appropriate solutions. In both cases, the DRFI Operational Framework provides governments with an initial orientation to start the relevant discussions with all stakeholders and 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.

Although the overall goal of DRFI—to increase the financial resilience of society to disasters—is common across all countries, a government has many options to achieve this goal, depending on its circumstances and time frame. The DRFI Operational Framework helps governments and policy makers identify and prioritize solutions appropriate for their countries. Introducing a common language also enables and strengthens the international cooperation often required between governments and their partners as well as among governments to exchange experiences and good practice. A structured, consistent way of approaching disaster risk financing helps governments better identify and implement their priorities and enables international development partners and the private sector to better support them in doing so.

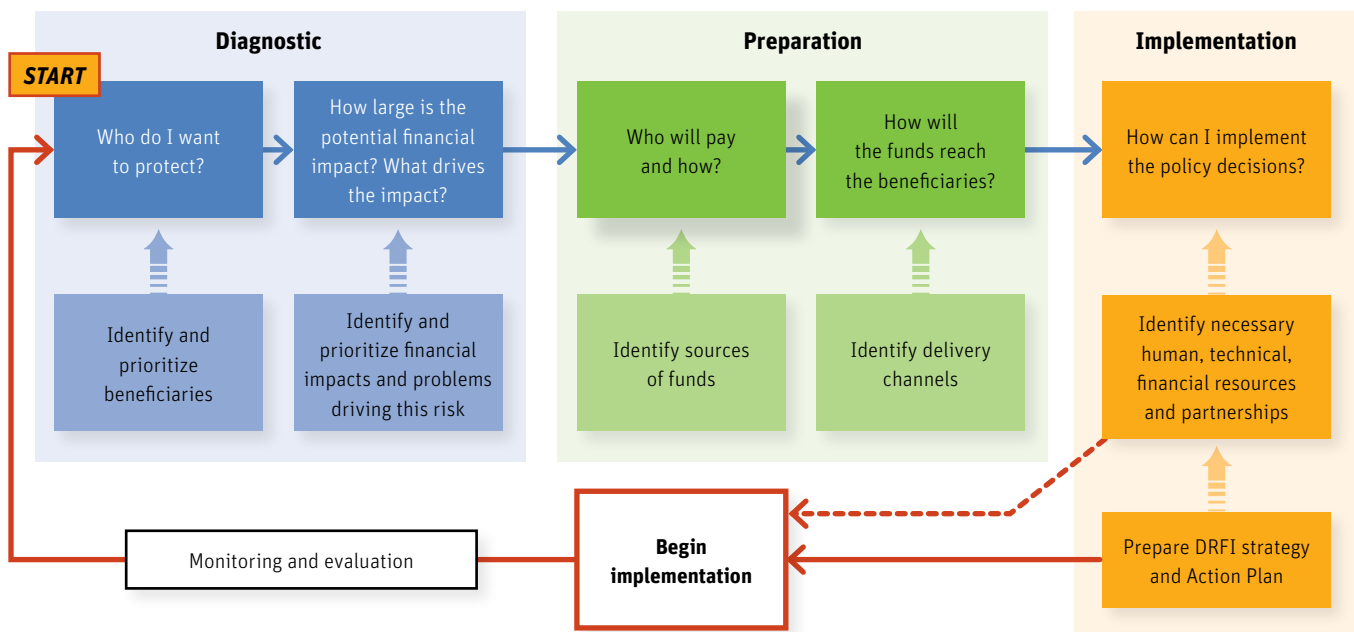
The Operational Framework is not, however, a blueprint for action, meant to provide detailed guidance on how to carry out each step. Such implementation requires the sustained engagement and commitment of the countries and their partners. Countries are diverse, and so are their DRFI needs and solutions. Low-income countries constrained by a lack of capacity may not use financial instruments in the same way that middle-income countries yield and fine-tune them. Small island developing states subject to financial shocks that can reach multiples of gross domestic product (GDP) face different challenges than large middle-income countries that are trying to safeguard low-income populations against disasters.

<sup>37</sup> This framework is laid out in “Financial Protection against Disasters: From Products to Comprehensive Strategies—An Operational Framework for Disaster Risk Financing and Insurance,” Working Paper 94988 (Washington, DC: World Bank and GFDRR, 2014), which this appendix summarizes.

The DRFI Operational Framework is presented in three components that should be seen as one package and applied in an iterative way: (a) a decision tree for governments engaging in DRFI (figure F.1); (b) an overview of government actions to increase financial resilience of defined beneficiaries (table F.1); and (c) illustrative examples from international experience (table F.2).

The decision tree guides policy makers through a set of fundamental questions to guide the process of identifying the appropriate policy and developing the required actions to implement it (figure F.1). A government’s DRFI engagement can be seen in three main phases: diagnostic, preparation, and implementation. As a first step, governments need to identify and prioritize the problems they want to address. Second, policy makers—in line with their priorities—need to define a set of solutions and develop a DRFI strategy. Finally, to implement the strategy, the government needs to design and execute an action plan.

**Figure F.1 DRFI Operational Framework: A Government Decision Tree**



Source: Adapted from “Financial Protection against Disasters: An Operational Framework for Disaster Risk Financing and Insurance” (Working Paper 94988, World Bank, Washington, DC, 2014). ©World Bank. Further permission required for reuse.

At each step of the decision process, policy makers can consult the second component of the DRFI Operational Framework—the matrix of policy objectives and actions (table F.1)—to help answer the questions and develop and implement the DRFI strategy. The steps in the decision process are as follows:

1. *Identify and prioritize overarching goals and beneficiaries* of planned DRFI engagement
2. *Assess risks* to identify the impacts that are of concern and the problems driving those impacts
3. *Arrange financial solutions*, starting by identifying and prioritizing sources of funds to mitigate financial impacts

4. *Deliver funds to beneficiaries* after identifying effective delivery channels of those funds
5. *Identify policy goals and actions needed*, consolidate them into a Strategy and Action Plan, and begin implementation
6. *Monitor and evaluate* implementation to refine policies and actions

Finally, the third component of the DRFI Operational Framework presents illustrative examples of how governments are implementing DRFI solutions (table F.2). Although this decision process is presented sequentially, governments usually begin engagement in DRFI to address an acute challenge. It is important to develop a comprehensive strategy, but governments need not put off implementation for many years. Many actions can—and should—start immediately while a full diagnostic is carried out and a strategy is developed.

**Table F.1 World Bank DRFI Program Operational Framework: Government Actions for Financial Protection**

Actions	Government actions for financial protection of the state		Government actions for financial protection of society	
	Government: national and local (sovereign DRFI)	Homeowners and SMEs (property cat risk insurance)	Farmers and herders (agricultural insurance)	Low-income population (social protection)
<b>Assess risks</b>	<ul style="list-style-type: none"> <li>▶ Collect and manage risk and loss data</li> <li>▶ Quantify potential disaster-related losses from fiscal and budget perspective</li> <li>▶ Assess potential postdisaster (short-term and long-term) funding gaps</li> </ul>	<ul style="list-style-type: none"> <li>▶ Collect and manage risk and loss data</li> <li>▶ Quantify potential disaster-related losses from property damage</li> <li>▶ Identify proportion of losses incurred by public and private stakeholders</li> <li>▶ Assess capacity of domestic insurance markets</li> </ul>	<ul style="list-style-type: none"> <li>▶ Collect and manage disaster risk-and-loss and impact data</li> <li>▶ Quantify potential disaster-related losses on low-income population</li> <li>▶ Quantify fiscal impact of potential disaster-related losses through social protection programs</li> </ul>	<ul style="list-style-type: none"> <li>▶ Secure contingent funding for social protection programs against disasters</li> <li>▶ Complement or enhance social protection programs with insurance principles and market-based products including use of transparent rules for payouts</li> </ul>
<b>Arrange financial solutions</b>	<ul style="list-style-type: none"> <li>▶ Develop financial decision-making tools</li> <li>▶ Develop national strategy for financial protection                             <ul style="list-style-type: none"> <li>• Secure immediate liquidity for budget support following disasters: risk layering including reserves, contingent credit, and catastrophe risk transfer</li> <li>• Secure longer-term reconstruction financing such as insurance program for public assets</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▶ Promote domestic demand for insurance                             <ul style="list-style-type: none"> <li>• Financial incentives through premium subsidies and/or tax breaks</li> <li>• Compulsory versus voluntary schemes</li> <li>• Awareness and education of consumers on insurance products</li> </ul> </li> <li>▶ Develop domestic supply of insurance                             <ul style="list-style-type: none"> <li>• Assess legal and regulatory environment to allow private sector to develop and test private insurance solutions while protecting consumers</li> <li>• Risk data collection, management, and sharing</li> <li>• Product development (indemnity- and index-based)</li> <li>• Insurance pools</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▶ Develop risk market infrastructure to support delivery channels                             <ul style="list-style-type: none"> <li>• Underwriting and claims settlement process</li> <li>• Delivery channels through insurance agents</li> <li>• Alternative delivery channels: banks, microfinance intermediaries, input providers, NGOs, and others</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▶ Improve beneficiary targeting and assessing eligibility for postdisaster payouts</li> </ul>
<b>Deliver funds to beneficiaries</b>	<ul style="list-style-type: none"> <li>▶ Establish national disaster fund</li> <li>▶ Establish transparent, timely, and effective postdisaster loss reporting mechanisms</li> <li>▶ Establish postdisaster budget execution mechanisms to transfer funds from national to subnational level and from Ministry of Finance to line ministries</li> </ul>	<ul style="list-style-type: none"> <li>▶ Reduce underlying drivers of risk</li> <li>▶ Promote improved risk information</li> </ul>		
<b>Linkages to DRM</b>				

Source: Adapted from “Financial Protection against Disasters: An Operational Framework for Disaster Risk Financing and Insurance” (Working Paper 94988, World Bank, Washington, DC, 2014).  
 Note: DRFI = Disaster Risk Financing and Insurance. SMEs = small and medium enterprises. cat risk = catastrophe risk. NGO = nongovernmental organization. DRM = disaster risk management.

Table F.2 World Bank DRFI Operational Framework: Examples of Financial Protection

Actions	Government: national and subnational (sovereign DRFI)	Homeowners and SMEs (property cat risk insurance)	Agricultural producers and herders (agricultural insurance)	Low-income population (social protection)
<p><b>Assess risks</b></p>	<p>The Government of <b>Colombia</b> included the assessment of contingent liabilities from disasters in its fiscal risk management strategy.</p> <p>In <b>Mexico</b>, R-FONDEN, a probabilistic catastrophe risk modeling tool, creates probabilistic simulations of potential material and human losses from disasters.</p> <p><b>Morocco</b> has developed a probabilistic catastrophe risk modeling tool to assist the government in prioritizing its risk mitigation investments.</p> <p>The <b>Philippines</b> is developing a catastrophe risk model to evaluate options for risk transfers and insurance to reduce the fiscal burden of disasters.</p> <p>The <b>Pacific Risk Information System, under the Pacific Catastrophe Risk Assessment and Financing Initiative</b>, includes a database of over 3.5 million georeferenced buildings and infrastructure in 15 Pacific island countries. It was used to develop the Pacific Catastrophe Risk Insurance Pilot.</p>	<p>In <b>Taiwan, China</b>, the Residential Earthquake Insurance Fund (TREIF) has developed an earthquake risk model to strengthen the independence and professionalism of the government's earthquake risk assessments.</p> <p>The preparation of the <b>Southeast Europe and Caucasus Regional Catastrophe Risk Insurance Facility</b> includes extensive multihazard country risk assessments for climate and geological hazards.</p>	<p><b>India</b> has developed detailed agricultural risk assessment tools to help policy makers 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 <b>Mongolia</b>, livestock censuses and surveys are used to inform the government about the economic and fiscal impact of adverse weather events as well as in the design and pricing of index-based livestock insurance policies.</p>	<p>In the <b>Philippines</b>, a survey is mapping out the poorest communities, enabling better targeting of social welfare support to communities, including assistance related to disaster risk.</p>

Actions	Government: national and subnational (sovereign DRFI)	Homeowners and SMEs (property cat risk insurance)	Agricultural producers and herders (agricultural insurance)	Low-income population (social protection)
<p><b>Arrange financial solutions</b></p>	<p><b>Contingent lines of credit</b> provide developing countries with funds immediately following disasters. Products are offered by the World Bank, the Inter-American Development Bank, and the Japan International Cooperation Agency.</p> <p>The first multicountry risk pool, the <b>Caribbean Catastrophe Risk Insurance Facility</b>, established in 2007, offers 16 small island-state countries over US\$150 million in hurricane and earthquake coverage.</p> <p>In 2006, <b>Mexico</b> transferred US\$450 million of earthquake risk to financial markets by combining the world's first government catastrophe (cat) bond (Cat MEX, totaling US\$160 million) and parametric reinsurance (US\$290 million).</p> <p>In <b>Colombia</b>, the government uses standardized terms and conditions informed by international best practices to purchase catastrophe insurance for its public buildings.</p>	<p>The <b>Turkish Catastrophe Insurance Pool (TCIP)</b>, 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 <b>Japanese public-private earthquake insurance program</b> 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 <b>Mongolia</b> protects the livelihoods of 11,000 herders, equivalent to 22 percent in piloted provinces in 2012.</p> <p><b>India's</b> weather-based crop insurance has been in place since 2007 for 11 growing seasons, with 11.6 million farmers and US\$370 million covered in the most recent season. Meanwhile, the national crop insurance program since 2010 has offered more than 1.1 million farmers a total of US\$67 million coverage in yield crop insurance.</p> <p>In <b>Morocco</b>, the government and the agricultural mutual insurance company have established a crop insurance program for cereals which currently covers 700,000 hectares and will soon be extended to fruit trees.</p>	<p>The Productive Safety Net Programme (PSNP) in <b>Ethiopia</b> is aimed at enabling the rural poor facing chronic food insecurity to resist shocks, create assets, and become food self-sufficient.</p> <p>In 2011, reinsurance company MiCRO (Microinsurance Catastrophe Risk Organization) was established to provide insurance coverage to women-owned microenterprises in <b>Haiti</b>.</p> <p>Insurance products of the Center for Agriculture and Rural Development Mutual Benefit Association (CARD MBA) in the <b>Philippines</b> are mandatory for members of a network of institutions including CARD NGO and CARD Bank, providing scale and preventing adverse selection.</p>

Actions	Government: national and subnational (sovereign DRFI)	Homeowners and SMEs (property cat risk insurance)	Agricultural producers and herders (agricultural insurance)	Low-income population (social protection)
<p><b>Deliver funds to beneficiaries</b></p>	<p>The Government of <b>Mexico</b> established a postdisaster loss reporting mechanism managed by its Natural Disaster Fund (FONDEN). Affected states can therefore access timely payments from FONDEN, reducing time-consuming coordination problems.</p> <p>In the <b>Cook Islands</b>, the establishment of the Disaster Emergency Trust Fund has reduced delays in emergency response.</p>	<p>As a public private partnership, the <b>Turkish Catastrophe Insurance Pool (TCIP)</b> relies on the domestic insurance market for the distribution and claims settlement.</p>	<p>Distribution in the <b>Moroccan</b> multiperil crop insurance program takes place either by linkage to loans made by Crédit Agricole or by direct marketing of Moroccan Agricultural Mutual Insurance (MAMDA), the sole provider of agriculture insurance in the country, structured as a mutual.</p> <p>The national crop insurance program in <b>India</b> 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>Horn of Africa Risk Transfer for Adaptation (HARITA) was launched in <b>Ethiopia</b> in 2007 as a pilot program to address the needs of small-scale farmers through drought insurance, credit, and risk reduction, allowing farmers to pay for insurance through labor, an idea based on “food-for-work” programs.</p> <p>MiCRO’s coverage in <b>Haiti</b> is bundled with loans from Fonkoze, the country’s largest microfinance institution.</p>
<p><b>Linkages to DRM</b></p>	<p><b>Mexico’s</b> Natural Disaster Fund (FONDEN) has evolved to include financial accounts to finance investment in risk reduction. It promotes informed decisions 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 <b>Turkey</b> legally abolished its obligation to fund the reconstruction of residential dwellings following earthquakes, strengthened building construction codes, and enhanced supervision thereof.</p>	<p><b>Indian</b> farmers’ agricultural insurance premiums are now based on their individual risk profile after the national crop insurance program moved to a risk-based “actuarial regime.” This allows farmers to see the riskiness of planting different crops and choose appropriately.</p>	<p>Members of <b>Ethiopia’s</b> 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>

Source: Adapted from “Financial Protection against Disasters: An Operational Framework for Disaster Risk Financing and Insurance” (Working Paper 94988, World Bank, Washington, DC, 2014).

Note: DRFI = Disaster Risk Financing and Insurance. SMEs = small and medium enterprises. FONDEN = Natural Disaster Fund (Mexico). cat risk = catastrophe risk. NGO = nongovernmental organization. DRM = disaster risk management.







