

Fiscal Disaster Risk Assessment

Options for Consideration

PAKISTAN



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Contents

Acknowledgements.....	5
Abbreviations.....	6
Executive Summary.....	7
Chapter 1: Introduction	10
Chapter 2: Fiscal Management of Natural Disasters	13
Emergency Response/Relief Phase.....	18
Recovery Phase.....	19
Reconstruction Phase	20
Chapter 3: Financial Disaster Risk Assessment.....	21
Contingent liability and post-disaster spending needs.....	21
Analysis of historical disasters in Pakistan.....	22
Statistical fiscal disaster risk analysis.....	24
Preliminary earthquake risk profile of Pakistan.....	28
Chapter 4: Review of the Private Catastrophe Risk Insurance Market.....	32
Background	32
Overview of the market	32
Private property catastrophe insurance	35
Chapter 5: Options for a National Disaster Risk Financing Strategy.....	38
Option 1: Develop a central database for recording disaster losses and expenditures	38
Option 2: Operationalize the National and Provincial Disaster Management Funds.....	39
Option 3: Clarify contingent liability associated with post-disaster cash transfer programs and enhance financing sources behind the programs.....	40
Option 4: Develop financial disaster risk assessment tools.....	42
Option 5: Develop a national disaster risk financing strategy	44
Option 6: Establish a robust catastrophe risk insurance program for public assets	46
Option 7: Promote property catastrophe insurance for private dwellings	47
Annexes.....	49
Annex 1. Historical Natural Disaster Database for Pakistan	50
Annex 2. World Bank Development Policy Loan with Catastrophe Deferred Drawdown Option.....	54

Key Features.....	54
Pricing Considerations	54
Annex 3. Mexican Natural Disaster Fund FONDEN.....	57
The Fund for Natural Disasters (FONDEN).....	57
Main Features of FONDEN	57
FONDEN Institutional Structure.....	58
FONDEN Program.....	59
FONDEN Trust	59
The FONDEN Disaster Risk Financing Strategy for 2011.....	60
Annex 4. Turkish Catastrophe Insurance Pool	62
Annex 5. The Post-Disaster Operational Phases.....	64
Annex 6. Operational Framework for Implementing Disaster Risk Financing and Insurance Solutions	66
Source of Financing Post-Disaster.....	73
Annex 7. Examples of World Bank Initiatives to build Financial Resilience to Disasters (taken from World Bank Disaster Risk Financing and Insurance Program review)	78

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Abbreviations

ADB	Asian Development Bank
AEL	Annual Expected Loss
AJK	Azad Jammu and Kashmir
CAT DDO	Catastrophe Deferred Drawdown Option
CRESTA	Catastrophe Risk Evaluations and Standardizing Target Accumulations
DDMAs	District Disaster Management Authorities
DNA	Damage and Needs Assessment
DRFI	Disaster Risk Financing and Insurance
FATA	Federally Administered Tribal Areas
GFDRR	Global Facility for Disaster Reduction Recovery
GoP	Government of Pakistan
KPK	Khyber Pakhtunkhwa
MFIs	Microfinance Institutions
MoF	Ministry of Finance
NADRA	National Database and Registration Authority
NDMA	National Disaster Management Authority
NDMC	National Disaster Management Commission
NDMF	National Disaster Management Fund
NICL	National Insurance Company Limited
PDMA	Provincial Disaster Management Authority
PDMF	Provincial Disaster Management Fund
PML	Probable Maximum Loss
PRCL	Pakistan Reinsurance Company Limited
PSDP	Public Sector Development Program
SECP	Securities and Exchange Commission of Pakistan

Executive Summary

The objective of the report is to raise awareness as to the financial impacts that natural disasters have on the budget of the Government of Pakistan (GoP), and to form the basis for a continued dialogue between the GoP and the World Bank on the potential development of a strategy for financing disaster losses. The study presents a series of complementary options for development of a national disaster risk financing strategy, based on a preliminary fiscal risk analysis and a preliminary review of the current budget management of natural disasters in Pakistan. The recommendations provided in this document are therefore a starting point for a collaborative discussion with the Government of Pakistan on the potential development of a broad DRFI program that would equip the Ministry of Finance with additional instruments to manage the contingent liability posed by disasters. This report follows a request from the Government for advisory services from the World Bank in the areas of disaster risk identification and the resulting fiscal impacts on the state.

This study presents options for a national disaster risk financing strategy for Pakistan, drawing significantly from international experience. It benefits from the international experience of the World Bank, which has provided assistance to several countries on the design and implementation of sovereign disaster risk financing strategies (e.g. México, Colombia, Peru, Indonesia, Vietnam, Philippines and the Caribbean island states) and property catastrophe risk insurance programs (e.g. in Turkey, Romania and Eastern Europe). This experience is necessarily tailored to the institutional, social and economic characteristics of Pakistan, as well as the availability of relevant data.

On average, approximately 3 million people are affected by natural catastrophes each year in Pakistan, which equates to approximately 1.6 percent of the total population. According to an analysis of historical natural disaster data, since 1973 approximately 77 percent of the all the people affected by natural disasters were impacted by flooding events.

Pakistan faces a major financing challenge arising from natural catastrophes, with flooding causing an estimated annual economic impact of between 3 and 4 percent of the Federal Budget¹. Preliminary analysis in this report estimates the annual economic impact of flooding at between US\$ 1.2 billion and US\$ 1.8 billion, equivalent to between 0.5 percent and 0.8 percent of national GDP²; however simulations show that a major flood event (occurring, on average, once every 100 years) could cause losses in excess of US\$ 15.5 billion³, which equates to around 7 percent of national GDP⁴, equivalent to almost 40 percent of the Federal Budget. To consider in terms of annual probability, there is a one percent chance in any year that a major event of this size will occur. While the Government tries to meet the needs arising from the aftermath of natural disasters, the funding gaps especially for reconstruction of affected infrastructure lead to its deterioration especially the protective capacity resulting in additional losses in proceeding disaster events.

¹ Budget estimate taken from 2014-2015 Budget in Brief (<http://finance.gov.pk/>) exchange rate fixed at 102

² 2013 GDP figure used, numbers rounded

³ Upper bound estimate taken from two methodologies. See Chapter 3 for further detail.

⁴ 2013 numbers

Although progress has been made on the establishment of financing mechanisms for dealing with disaster losses, significant work still remains to operationalize structures and to ensure that financing mechanisms are appropriately provisioned. A structure for dedicated federal and provincial funds for disaster risk management has been established under the National Disaster Management Act 2010. However, challenges still remain with respect to operationalization of the funds, and standardization of procedures across provinces. It remains very difficult for the GoP to analyze the financing needs and gaps for meeting relief, recovery and rehabilitation support to the affected portion of the population. The heavily de-centralized approach to disaster risk financing in the provinces is a key contributor to these challenges. The mechanisms through which disasters are financed vary from province to province, depending on the administrative systems in place and the ready availability of funds. There is a need for a sustainable plan to ensure that the NDMF and provincial funds are adequately provisioned in the context of likely needs.

While the federal and provincial governments recognize the need for allocating resources in their budgets for disaster response prior to a disaster, they lack the technical basis to determine such allocations. At present post-disaster expenditures are financed from contingent and supplementary budgets during the relief and recovery phases and from the annual Public Sector Development Program during the reconstruction phase. The inaccessibility of data on the underlying hazards and their past and possible future financial implications is one barrier to the process of informed ex-ante provisioning of funds. A development of technical capacity and necessary tools to quantify likely needs for disaster-related expenditure would help the government to both: (i) determine appropriate allocations through the budget; and (ii) to also explore and make informed proposals for possible sources of financing outside of the budget.

This study presents the GoP 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; these options are listed in Table 1. These options follow the operational framework of: (i) assess risk; (ii) arrange financial solutions; and (ii) deliver funds to beneficiaries.

Table 1. Options for a national disaster risk financing strategy in Pakistan.

Timeframe	Options for disaster risk financing
Short term	Develop a central database for disaster losses and expenditures to better predict future financial costs of disasters
Short term	Operationalize the National and Provincial Disaster Management Funds
Short term	Clarify contingent liability associated with post-disaster cash transfer programs and restructure financing sources behind the programs to ensure efficient access to funds in the event of a disaster
Short/Medium term	Develop financial disaster risk assessment tools including development of financial catastrophe risk models for MoF

Short/Medium term	Develop a national disaster risk financing strategy that proposes models for improving financial response capacity to disasters
Medium term	Establish a robust catastrophe risk insurance program for public assets
Medium/Long term	Promote property catastrophe risk insurance for private dwellings

The implementation of a national disaster risk financing strategy would require significant institutional capacity building, and further work to quantify likely needs for disaster-related expenditure. Disaster risk financing is just one component of a comprehensive fiscal risk management strategy, which requires specific financial and actuarial expertise. Major capacity building on disaster risk assessment and international best practice in financial management of natural disasters would be required for the development and use of financial tools to guide the GoP in its national disaster risk financing strategy.

Chapter 1: Introduction

Pakistan is vulnerable to a number of adverse natural events and has experienced a wide range of disasters over the past 40 years, including floods, earthquakes, droughts, cyclones and tsunamis.

These hazards are further exacerbated by growing urbanization, increased vulnerability and shifting climatic patterns, that can result in the occurrence of increasingly severe natural disasters. Over the past decade, damages and losses resulting from natural disasters in Pakistan have exceeded US\$ 18 billion. As the population and asset base of Pakistan increases, so does its economic exposure to natural disasters. A summary of the economic impact of selected natural disasters since 2005 is shown in Table 1.1

Table 1.1: Estimated economic impact of major natural disasters in Pakistan since 2005. Estimated losses (both US\$M, and as percentage of GDP) are as at time of event. Source: Preliminary Damage and Needs Assessments (DNA).

Event	Provinces impacted	Estimated Losses (US\$M)	Estimated Losses as % of national GDP
Earthquake (2005)	AJK and KPK	2,857	2.6%
Cyclone Yemyin (2007)	Sindh and Balochistan	322	0.2%
Floods (2010)	Entire country	10,500	6.0%
Floods (2011)	Sindh and Balochistan	3,730	1.8%

The World Bank is supporting the Government of Pakistan (GoP) in building capacity in the area of Disaster Risk Management (DRM) in order to build resilience from both humanitarian and fiscal shocks associated with natural disasters. The recurring floods of 2010 and 2011 highlighted the need and importance of developing financial mechanisms to help the government mobilize resources in the immediate aftermath of a disaster, while buffering the long-term fiscal impact of such events. There is a need to develop an overarching policy document in the form of a national disaster risk financing strategy, which could enable the government to make an informed choice on accessing various sources of funding to respond to disasters, including ex-ante and ex-post financing instruments.

Historically, a reactive, emergency response approach has been the predominant way of dealing with disasters in Pakistan. To that end, the West Pakistan National Calamities (Prevention and Relief) Act of 1958⁵, which governed disaster risk management activities, was mainly concerned with organizing the emergency response. Following the 2005 earthquake which affected Azad Jammu and Kashmir (AJK), and the Khyber Pakhtunkhwa (KPK) Province (the then North-West Frontier Province, NWFP) it became clear that appropriate policy and institutional arrangements needed to be put in place to mitigate potential losses of life and property from future disasters, while protecting federal and provincial budgets.

⁵ Herein referred to as the 'National Calamities Act, 1958'.

The National Disaster Management Ordinance of 2006 established the National Disaster Management Authority (NDMA) as an executive arm of the National Disaster Management Commission (NDMC). The NDMA has been made operational to coordinate and monitor implementation of national policies and strategies on disaster risk management. This new system is designed to devolve and de-centralize the mechanisms for disaster risk management. Provincial Disaster Management Commissions (PDMCs) and Authorities (PDMAAs) have been established while similar arrangements have been made in AJK, Northern and the Federally Administered Tribal Areas (FATA), eventually establishing the Sindh Disaster Management Authority (SDMA), the Gilgit Baltistan Disaster Management Authority (GB-DMA) and the FATA Disaster Management Authority (FDMA) respectively. District Disaster Management Authorities (DDMAAs) have been set up across the country and are viewed as the linchpins of the whole system, playing the role of the first line of defense in the event of a disaster.

A National Disaster risk Management Framework (NDMF) has been formulated to guide the work of the entire system in the area of disaster risk management. It identifies national strategies and policies for disaster risk management, with nine priority areas highlighted to establish and strengthen policies, institutions and capacities: (i) institutional and legal arrangements for DRM, (ii) hazard and vulnerability assessment, (iii) training, education and awareness, (iv) disaster risk management planning, (v) community and local level programming, (vi) multi-hazard early warning systems, (vii) mainstreaming disaster risk reduction into development, (viii) emergency response systems, and (ix) capacity development for post disaster recovery.

While the necessary legal, institutional and policy measures have been taken by the Government of Pakistan for DRM, there are a number of entities working on DRM with overlapping mandates at the federal level in addition to NDMA. These include the Earthquake Reconstruction & Rehabilitation Authority (ERRA), the Emergency Relief Cell (ERC), and the Federal Flood Commission (FFC), amongst others. This multiplicity of institutions is also present at the provincial level, which include, PDMAAs, the Provincial Irrigation Departments (PIDs), and the Civil Defence and Rescue Services. Similarly, in addition to the NDMA Act, there are a number of legal parameters covering disasters and emergency situations that overlap between government agencies and tiers.

The World Bank is providing technical assistance to the GoP for the development of a national disaster risk financing strategy. This non-lending technical assistance aims to: (i) assess the fiscal exposure of the GoP to natural disasters; (ii) propose options for the development of a national strategy to improve financial response capacity for natural disasters; and (iii) promote property catastrophe risk insurance for both public and private dwellings.

Disaster risk financing and insurance (DRFI) is one of the five pillars in the proactive and strategic framework for disaster risk management (DRM) promoted by the World Bank. The World Bank has been promoting a proactive and strategic framework for DRM based on five pillars: (i) risk identification; (ii) risk reduction; (iii) preparedness; (iv) financial protection; and (v) resilient recovery. Despite prevention and mitigation efforts, no country can fully protect itself from the impacts of major natural catastrophes. Disaster risk financing and insurance allows governments to increase their financial response capacity in the aftermath of a disaster, and to improve access for affected populations to

financial tools to aid recovery. These financial mechanisms can also reduce the impact of disasters on social and economic development by smoothing financial shocks and preventing governments and populations from resorting to adverse coping mechanisms that disrupt development initiatives and productivity. The types of mechanism that this practice area encompasses are detailed in the table below, along with mechanism beneficiaries.

Table 1.2 Disaster risk financing and insurance policy areas and benefits

<p style="text-align: center;">SOVEREIGN DISASTER RISK FINANCING Beneficiaries: Governments</p> <ul style="list-style-type: none"> • Increases financial response and reconstruction capacity through improvements to: <ul style="list-style-type: none"> - Resource mobilization, allocation, and execution; - Insurance of public assets; - Social safety net financing. • Protects the stability of public finances by reducing the financial volatility in public expenditure generated by disasters. • Clarifies the government’s contingent liability following disasters in terms of public assets, the private sector and state-owned enterprises, and the poor. • Provides incentives for public investment in risk reduction measures. 	<p style="text-align: center;">PROPERTY CATASTROPHE RISK INSURANCE Beneficiaries: Homeowners and SMEs</p> <ul style="list-style-type: none"> • Provides access to compensation for physical property damage and indirect losses arising from that damage. • Increases awareness and understanding of financial vulnerability to natural disasters. • Helps distribute risk and burden of recovery between public and private sectors. • Can incentivize investment in risk reduction by business and households.
<p style="text-align: center;">AGRICULTURAL INSURANCE Beneficiaries: Farmers</p> <ul style="list-style-type: none"> • Provides access to compensation for production losses and damage to productive assets. • Helps distribute risk and burden of recovery between public and private sectors. • Increases awareness and understanding of financial vulnerability to agricultural risks. • Encourages farmers to invest more in risk reduction measures. • Allows for the adoption of higher yielding, but riskier, farming methods. • Increases access to financial services and markets for low-income households (insurance, banking, savings). 	<p style="text-align: center;">DISASTER-LINKED SOCIAL PROTECTION Beneficiaries: The Poorest⁶</p> <ul style="list-style-type: none"> • Mitigates financial shocks by providing compensation for livelihood or asset losses through flexible social safety nets. • Increases awareness and understanding of vulnerability to natural disasters. • Can incentivize investment in risk reduction by the government or at risk affected population. • Safeguards vulnerable people from falling into poverty.

Source: World Bank Disaster Risk Financing and Insurance Program taken from “Financial protection against natural disasters: from products to comprehensive strategies”

⁶ There are segments of populations for which market-based instruments are not viable, and this is where disaster-linked social protection becomes a vital tool. Micro-insurance can be used to target some lower-income households, but may not be suitable for the poorest households.

This report contains the main findings and recommendations of this initial technical assistance. There are five chapters including this introduction. Chapter 2 presents an overview of the budget processes for the financing of natural disaster losses during each of the three post-disaster phases (see Annex 6): immediate emergency response, recovery, and reconstruction. Chapter 3 provides a preliminary financial disaster risk assessment for Pakistan, focusing particularly on the fiscal impact of natural disasters. Chapter 4 presents an overview of the private catastrophe insurance market; and Chapter 5 reviews the options for future financing of natural disaster recovery and reconstruction expenditures. This final chapter includes options for sovereign risk financing and for the promotion of commercial catastrophe insurance for the private property sector. The report is complemented by 7 technical annexes that provide information on further analyses and results.

This report also includes input from major donors that assist Pakistan in responding to natural disaster response as well as invest in overall risk reduction interventions. From the time of initiation of the report, pro-active consultation has been undertaken with a number of donors who have shown interest in the findings and recommendations of the report. Initial findings of the report have also been shared with the donors bilaterally as well as through the platform of Partnership for Disaster Resilience in Pakistan (PDRP), which serves as the donor coordination platform on DRM. The donors have also agreed to take the key messages from this report and make it part of their dialogue with the Government of Pakistan on disaster resilience.

Chapter 2: Fiscal Management of Natural Disasters

This chapter provides an overview of the fiscal management of natural disasters in Pakistan. There are well-defined procedures for the management of disasters from an administrative perspective. A structure for dedicated federal and provincial funds for disaster risk management has been established under the National Disaster Management Act 2010. However, challenges still remain with respect to operationalization of the funds, and standardization of procedures across provinces. It remains very difficult for the GoP to analyze the financing needs and gaps for meeting relief, recovery and rehabilitation support to the affected portion of the population. The heavily de-centralized approach to disaster risk financing in the provinces is a key contributor to these challenges.

The current regulatory framework for post disaster management was established by the GoP under the National Disaster Management (NDM) Act, 2010. This act, “An Act to provide for (the) establishment of a National Disaster Management System for Pakistan”, was approved by the parliament on 8th December 2010 (Act No XXIV of 2010) and came into force retroactively on 17th August, 2007⁷. Under clause-1 sub-clause-b of the NDM Act of 2010, a disaster is defined as “a catastrophe or a calamity in an affected area arising from natural or a man-made cause or by accident, which results in a substantial loss of life or human suffering or damage to and destruction of property”.

⁷ Hereafter referred to as the ‘NDM Act of 2010’. For clarification, the Ordinance was approved by the Chief Executive in 2007, while it was passed by the Parliament as a law in 2010. It came into force from the date of the promulgation of the Ordinance.

Prior to the implementation of the NDM Act of 2010, a reactive emergency response approach was the predominant way of dealing with natural disasters in Pakistan. This approach, guided by the National Calamities Act 1958, focused mainly on emergency response. Following the 2005 earthquake, the GoP recognized the importance of disaster risk reduction for sustaining long-term social, economic and environment development. As such, the GoP embarked on a program to establish appropriate policy, legal and institutional arrangements and implemented strategies and programs to minimize national risks and vulnerabilities. Most notably, the National Disaster Management Authority (NDMA) Ordinance of 2006 was passed, specifically to be implemented by the National Disaster Management Disaster Commission (NDMC). The ordinance was later superseded by the National Disaster Management (NDM) Act in 2010.

Clauses 29 and 30 of the NDM Act of 2010 pertain to the establishment of national disaster funds. The act established a National Disaster Management Fund (NDMF) administered by the federal government and separate provincial funds for disaster risk management administered by each of the provincial governments. Specifically, the act stipulates that the National Disaster Management Fund (NDMF) shall be administered by the NDMA towards meeting the expense of emergency, preparedness, response, mitigation, relief and reconstruction. The act also specifies rules on emergency procurement and accounting (Clause 32 of the NDM Act of 2010), to facilitate the use of the funds post-disaster. For example, this clause empowers district authorities to authorize respective departments to undertake procurements for rescue and relief as it deems necessary. Under clause 29 (sub-clause 4) of the NDM Act of 2010, the NDMF shall be kept in one or more accounts maintained by the NDMA in either local or foreign currency in any scheduled bank in Pakistan and shall be operated in accordance with the directions of NDMA.

Clause 11⁸ of the NDM Act of 2010 provides guidance on the types of expenditures incurred by the federal government following natural disasters. These expenditures include shelter, food, drinking water, medical cover and sanitation, special provisions for vulnerable groups, ex-gratia assistance on account of loss of life and also assistance for damage to housing and restoration of livelihoods. In addition other relief activities and expenditures may be incurred as deemed necessary.

The NDM Act of 2010 explicitly references different sources of financing for the National Disaster Management Fund (NDMF), but there is a need for a sustainable plan to ensure that the NDMF and provincial funds are adequately provisioned in the context of likely needs. Clause 29 (sub-clause 2) of the NDM Act of 2010 describes the following source of financing for the NDMF: (i) grants made by the federal government, (ii) loans, aid and donations from national or international agencies, (iii) donations received from any other source, (iv) the Prime Minister’s Disaster Relief Fund, (v) any other fund related to natural calamities established at the federal level as the federal government may determine appropriate. Clause 30 (sub-clause 2)⁹ of the NDM Act of 2010 describes the following source of financing for the Provincial Disaster Management Funds (PDMFs): (i) grants made by the federal

⁸ Titled “guidelines for minimum standards of relief”.

⁹ Titled “Establishment of Funds by Provincial governments”.

government or provincial governments, (ii) loans, aid and donations from national or international agencies provided in the prescribed procedures.

At the time of writing, grants have made by the federal government to the NDMF, but the limited allocations and legacy issues with respect to the pre-existing system have prevented the NDMF from being fully operationalized. In the case of the National Disaster Management Fund, the government has allocated some funds to it, but it is not currently being used for disaster response. The Prime Minister’s Disaster Relief Fund remains the main vehicle being used to channel government funds to those affected by natural disasters. A sustainable plan is required to ensure that sufficient funds are available in the NDMF and PDMFs to face disaster losses, examining financing possibilities across a range of sources. Currently, in the event that allocations to the NDMF were to become exhausted then it is likely that the Ministry of Finance (MoF) would be approached for extra funds. This demand would likely be met from reallocation of the existing allocations, such as slow moving development projects or unused/surplus funds. However, in other cases, supplementary grants could be required to meet exceptional additional demand.

The authorities and functions of the NDMA are outlined under clause-9, sub clause (b, c and d)¹⁰, of the NDM Act of 2010. In part IV of their National Disaster Response Plan (NDRP) of March 2010, the NDMA defines three levels of emergencies which are shown in Table 2.1.

Table 2.1: Definition of emergency levels according to the National Disaster Response Plan (NDRP) of March 2010.

Emergency Level	Description
Level 1 (small events)	Localized emergency events to be dealt with by the DDMA at the district level. For example small scale fires, landslides, floods, canal or sub-canal breaches and low level epidemics.
Level 2 (medium events)	An emergency which overwhelms the capacity of the DDMA. The DDMA can request PDMC through the PDMA.
Level 3 (large events)	In the event of case a disaster beyond the capacity of provincial/regional government, a national emergency is declared.

Small, level 1, events are limited to a single district and the District Administration, headed by the Deputy Commissioner (DC)/District Coordination Officer (DCO), is responsible for relief efforts and leads coordination of all departments. Their staff undertakes the initial situation and needs assessment which is conveyed to the Provincial Disaster Management Authority (PDMA); in parallel, the Provincial Finance Department is also informed of the financial requirements that could arise from the disaster.

For medium-sized, level 2 events that are limited to an individual province, on receipt of information of a disaster covering more than one district, the PDMA coordinates with the DC/DCOs of the affected districts. In addition the PDMA coordinates with the relevant line departments of the province to assess the situation and to oversee the provision of relief to the affected population. The PDMA also notifies

¹⁰ Titled “Powers and Functions of the National Disaster Management Authority”.

the Chief Executive of the province for allocation of the resources required. The NDMA is also alerted on the nature of the disaster and regular situation reports are shared.

For large, level 3, events that extend across provincial boundaries, the NDMA coordinates the efforts of the various PDMA's and provincial ministries and departments. While the relief assistance is led by the respective PDMA's, the NDMA stands by to meet any gaps or raise resources through the office of the Prime Minister and the federal Ministry of Finance. The NDMA also coordinates the donor community by sharing situation reports, needs assessments and support preparation of relief and response plans for raising donor resources.

There remains a lack of standardization in procedures related to disaster risk management across provinces, despite specifications in the NDM 2010 Act. In general, the disaster risk management system defined in the NDM Act of 2010 and national disaster response plans are not followed in full at the provincial level. Across the provinces approaches vary, in the case of Punjab disasters are typically managed following instructions given in war books such as the financial war book; elsewhere instructions in the Natural Calamities Act, 1958 are followed. At present, there are no institutional mechanisms to calculate the financial impacts of disasters within the federal or provincial exchequers. Following a disaster, with the support of the World Bank and Asian Development Bank (ADB), the GoP undertakes a Damage and Needs Assessment (DNA) which estimates the direct losses as well as the reconstruction costs by sector and province across both the public and private sector.

The post-disaster financial responsibilities of provincial governments are not well defined. At the provincial level, although the financial responsibilities of governments are not defined, generally they conform to the expenditures listed in Table 2.2. In addition to these expenditures, other relief mechanisms may be provided. In Punjab, for instance, short term waivers on taxes on water and land are common following a disaster. In certain cases waiver of interest on agriculture loans are allowed as well as a delay in the repayment of these loans.

Table 3.2: Post-disaster provincial expenditures by operation. Source: Provincial Disaster Management and Contingency Plans.

Operation	Expenditures
Emergency / Relief	Food supply, provision of medical care (medicines etc.), provision of drinking water, provision of shelter.
Recovery and reconstruction of public infrastructure and buildings	Reconstruction and repair of roads and bridges; reconstruction and repair of health units, hospitals, schools and other public buildings.
Other assistance to populations	Provisions of seeds and fertilizer, provision of money (cash) for reconstruction and repair of houses, provision of compensation money (cash) for injured/dead.

Since 2005, estimates of the total costs through the three post-disaster phases have exceeded US\$5 billion on two occasions. Total estimates for post-disaster costs for the 2005 earthquake and the 2010

floods were approximately \$US5.2 billion and US\$8.7 billion respectively. Estimates made during the respective preliminary damage and needs assessments for four selected events since 2005 are shown in Figure 2.1.

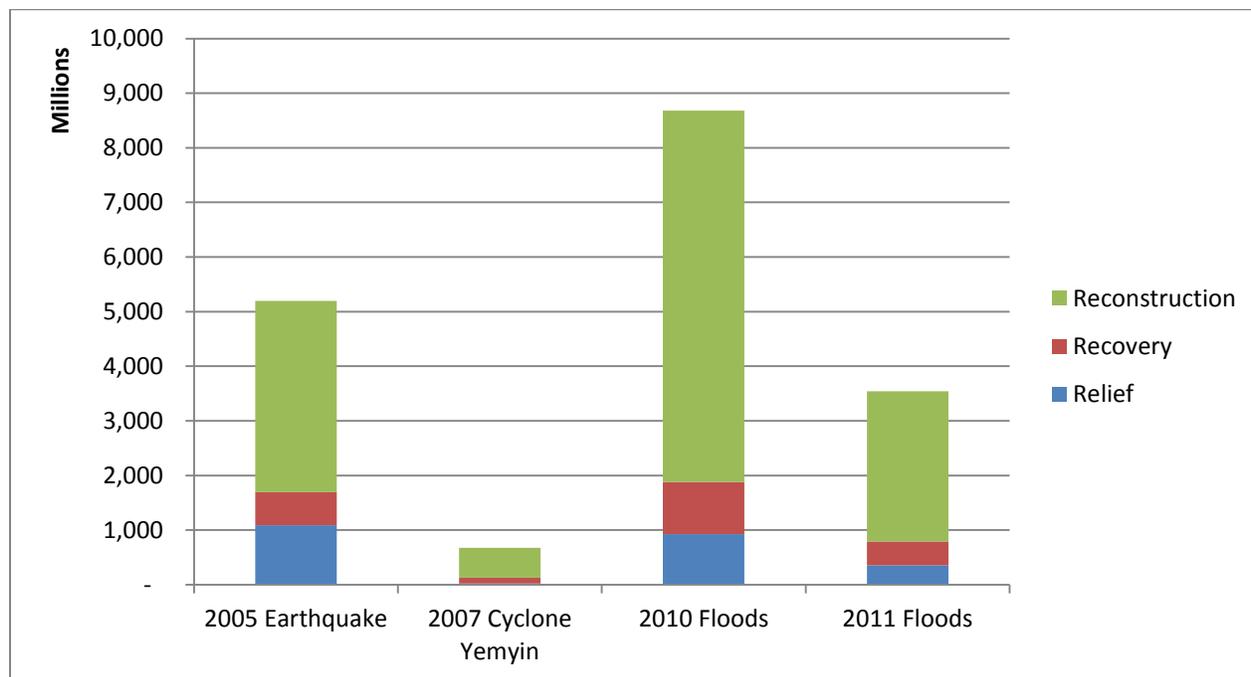
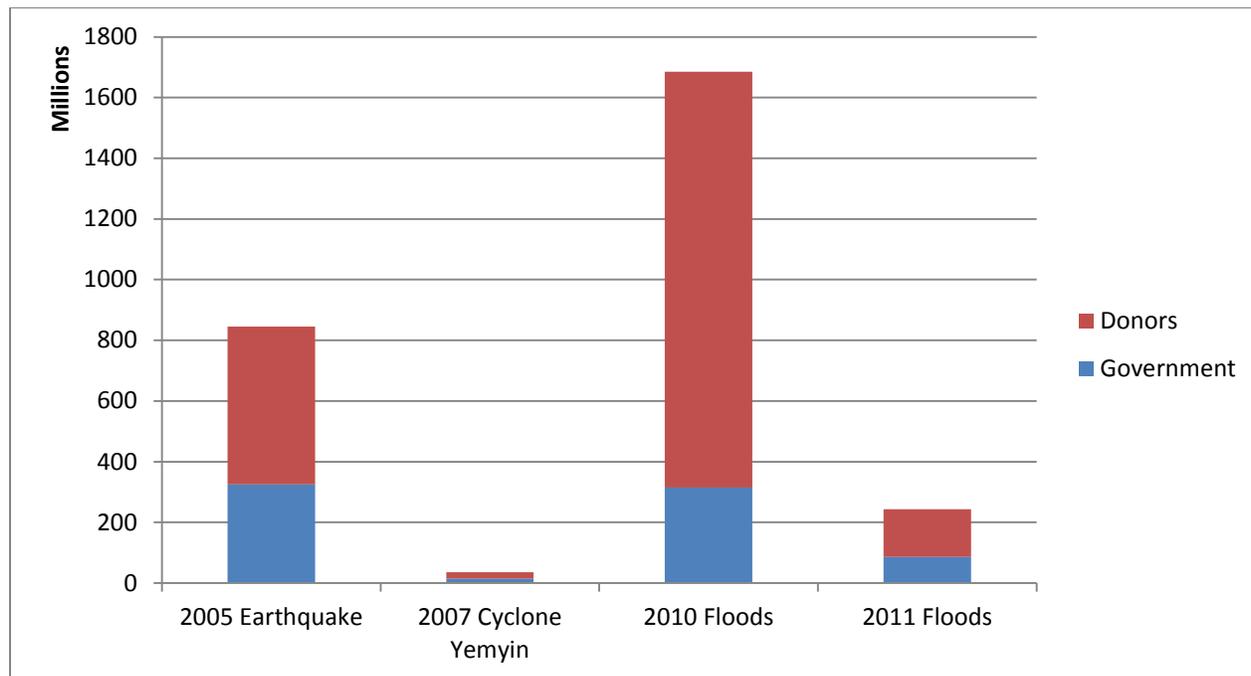


Figure 2.1: Post-disaster cost estimates by phase for four selected major natural catastrophes in Pakistan. Source: Flash Appeals, Humanitarian Response Plans and Damage and Needs Assessments.

Donor assistance can represent a significant, although uncertain, part of financing natural disasters, indeed since 2005 donor assistance has accounted for between approximately 60% and 80% of total post-disaster expenditures during the relief and recovery phases. For example, following the 2005 earthquake approximately US\$520 million (62%) of a total estimated expenditure of US\$845 million for relief and recovery came from international donors. For the 2007 Cyclone Yemyin, international donor assistance accounted for approximately 59% of total relief and recovery spending (US\$21 million of a total of US\$36.2 million). In 2010 and 2011, following the devastating flood events, donors contributed 81% (US\$1.37 billion) and 65% (US\$157 million) of the relief and recovery spending. This information is summarized in Figure 2.2. However, it should be noted in the Figure 2.1 above that the total costs of the events summarized are between 4 and 7 times greater than the expenditures contributed to recovery and reconstruction. Thus, while donor financing plays an important role in financing recovery and reconstruction, it accounts for only 5%-16% percent of the financing needs.

Figure 2.2: Government and donor expenditures for relief and recovery for selected natural disasters in Pakistan. Source: Flash Appeals, Humanitarian Response Plans and Damage and Needs Assessments.



The remaining part of this chapter is dedicated to describing the roles and responsibilities of the various public entities for each of the three post-disaster phases. The main sources of post-disaster funding are summarized in Figure 2.3.

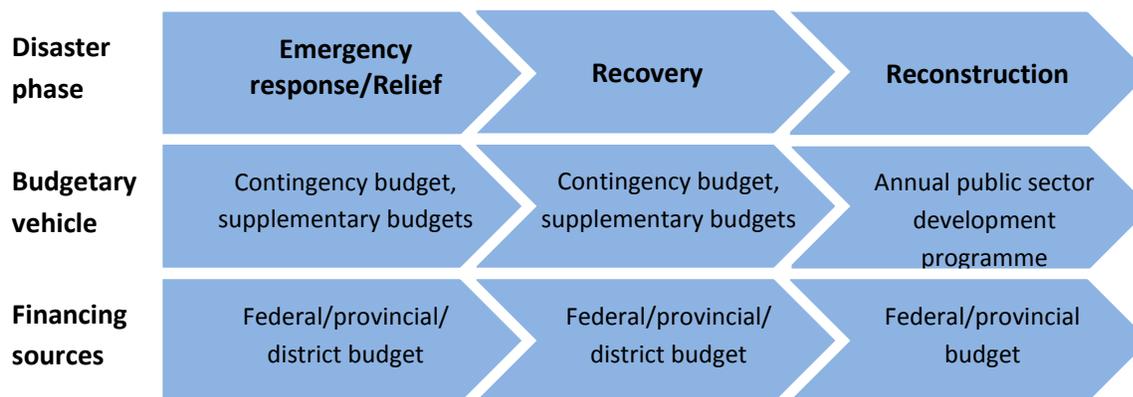


Figure 2.3 Financing of post-disaster operations in Pakistan. Source: authors

Emergency Response/Relief Phase

Funds for emergency response activities are immediately available from a variety of sources, depending on the size of the disaster. For small (level 1) events, district governments use their own financial resources for emergency response through their contingency budget lines. If these funds are not sufficient (for example in the case of a medium-size, level 2, event) then funds may be provided by

the provincial government from their contingency budget lines (where available). This process continues for level 3 events, crossing provincial boundaries, where, should the respective district and provincial budgets be exhausted, then additional funding is taken from the federal budget. Any additional expenditures are adjusted in the following year's budget through the demand for supplementary grant¹¹.

KPK, Sindh and Baluchistan have allocated a contingency budget in their respective provincial budgets to meet disaster relief and response requirements as they occur to ensure prompt availability of funds. However in the case of the Federal government and Punjab province, supplementary grants are typically used for the provisioning of post-disaster funds and the required contingent funds are initially met by re-appropriation from the surplus heads such as unused salary budget. Once these funds are exhausted and additional grants are required, they are approved by the respective assembly within the following fiscal year's budget. This procedure is also followed in the case of Baluchistan, Sindh and KPK if the existing funds are not enough to fund post-disaster expenditures.

Recovery Phase

The recovery phase (also called the rehabilitation phase) starts after the emergency response phase and typically lasts three to six months. During this specific post-disaster phase, lifeline infrastructure (e.g. water, electricity, sanitation, etc.) and key public buildings and infrastructure (e.g. hospitals and bridges, etc.) are repaired. Housing rehabilitation assistance is also provided to the affected households.

Clause 11¹² of the NDM Act of 2010 provides some insights into the types of expenditures incurred by the federal and provincial governments which include compensation on account of loss of life and also assistance on account of damage to houses and restoration of means of livelihood. Clause 12¹³ of the NDM Act of 2010 allows the NDMA the national authority to direct that, for severe disasters, relief may be granted in the repayment of loans or that fresh loans may be granted to the affected population with appropriate concessions.

The NDM Act of 2010 does not stipulate the method through which post-disaster payments are made to the affected population. However in practice first the affected region is identified as a 'calamity hit area', and then the data of expected beneficiaries is sent to the NADRA (National Database and Registration Authority) for verification. Once the beneficiary details are verified then these affected people are issued ATM cards through which they may obtain the cash compensation in one or more tranches¹⁴.

The funding mechanisms during the recovery phase are currently exactly the same as during the emergency response phase. Presently funds for financing the post-disaster recovery phase come from contingency budgets and supplementary budgets at the district, provincial and federal level. Initially

¹¹ Supplementary demand for grants and appropriations represents expenditures which could not be met from within the budget allocations under various normal annual demands and appropriation.

¹² Titled 'Guidelines for minimum standards of relief'.

¹³ Titled "Relief in loan repayment, etc."

¹⁴ There are no standard defined procedures for cash transfers to those affected by disasters and the mechanism could range from providing cross-cheques to ATM cards depending on the situation and the needs.

funds are sourced from the district budgets and as these become exhausted additional funding from provincial budgets are made available. In the case of significant (level 3) natural catastrophes, then district and provincial budgets are supplemented by funding from the federal budget.

Reconstruction Phase

The reconstruction of public assets (at federal and provincial levels) is mainly financed through the Annual Public Sector Development Program (PSDP). The PSDP of the federal and provincial governments consists of a series of projects and programs which are developed according to the long term development needs of Pakistan. The expenditures spent on PSDP are met from revenue and capital accounts of the federal and provincial governments.

Line ministries are responsible for the reconstruction of their assets. Each affected ministry at either the federal or provincial level obtains estimates of the extent of disaster damages and prepares an appropriate program for the reconstruction of the affected public assets and infrastructure. Typically these programs are prepared by the relevant line ministries with the consultation of the ministry of finance of either the federal or provincial governments. The proposed programs are put before the national or provincial assemblies, as part of the PSDP of the federal or provincial government, for their approval. As soon as the programs are approved, they are implemented by the respective line ministries, as described in the “Government of Pakistan, Accounting Policies and Procedures Manual” for federal and provincial governments.

At this time there is no central mechanism to track the expenditures incurred on relief, recovery and reconstruction as it is spread across different tiers of governance as well as across the various federal and provincial ministries and departments. The difficulty in tracking expenditures on relief, recovery and reconstruction following disasters makes it very challenging for the GoP to assess the needs and shortfalls for funds for disaster-related expenditure. A system to better track disaster-related expenditures across all the various implementing agencies would improve future needs assessments, and also the transparency and accountability of funds spent post-disaster.

Chapter 3: Financial Disaster Risk Assessment

The assessment of the economic and fiscal risk related to natural disasters, including contingent liabilities, is the first stage in developing disaster risk financing strategies. Such an assessment typically requires both historical damage, loss and expenditure data, along with loss estimates calculated from natural catastrophe risk models. The World Bank and ADB have supported the GoP in assessing the impacts of natural hazards through detailed post-disaster Damage and Needs Assessments. These assessments were prepared following the 2005 earthquake, Cyclone Yemyin in 2008, and the 2010 and 2011 floods. Although data is limited, in this chapter preliminary fiscal risk profiles are developed for the Government of Pakistan.

A preliminary assessment of the government's contingent liability to disasters indicates that the government faces a major financing challenge arising from natural catastrophes. Flooding is a major driver of risk, causing an estimated annual economic impact of between 3 and 4 percent of the Federal Budget¹⁵, (between US\$ 1.2 billion and US\$ 1.8 billion). This range is equivalent to between 0.5 percent and 0.8 percent of national GDP¹⁶; however simulations show that a major flood event (occurring, on average, once every 100 years) could cause losses in excess of US\$ 15.5 billion¹⁷, which equates to around 7 percent of national GDP¹⁸, equivalent to almost 40 percent of the Federal Budget.

Contingent liability and post-disaster spending needs

The contingent liability of the government due to natural disasters can create significant fiscal risk. However the GoP's contingent liability is not clearly defined in law and makes a fiscal risk assessment difficult to perform. Beyond its explicit contingent liability and associated spending needs (such as the reconstruction of public assets and infrastructure), the government may have a moral and social responsibility (implicit contingent liability) to assist the population in the aftermath of an extreme disaster event. For example, the government provides not only emergency assistance (e.g. food, shelters and medical supplies) but it can also finance recovery and reconstruction activities such as assistance for the rebuilding of low-income housing. Contingent liabilities arising through the establishment of disaster-linked social protection schemes also need to be considered in such an analysis.

The post-disaster contingent liability of the GoP can be categorized into short-term, medium-term and long-term spending needs. All financial resources do not need to be mobilized immediately after the occurrence of a disaster. Indeed, in the aftermath of a disaster, resources must be mobilized quickly to fund post-disaster emergency and recovery activities. Once the recovery phase is complete, the GoP must mobilize longer-term resources to meet its reconstruction needs. In general there are three broad categories of post-disaster spending needs for which governments assume their contingent liabilities: (i) repair of nationally-owned public assets such as national roads, major water infrastructure, and national government buildings (typically in the medium-term)); (ii) repair of sub-nationally owned public assets such as provincial and district roads, health facilities, schools, or local markets (typically in the short-to-

¹⁵ Budget estimate taken from 2014-2015 Budget in Brief (<http://finance.gov.pk/>) exchange rate fixed at 102

¹⁶ 2013 GDP figure used, numbers rounded

¹⁷ Upper bound estimate taken from two methodologies. See Chapter 3 for further detail.

¹⁸ 2013 numbers

medium term); and (iii) compensation for deaths/injuries, increased payments through safety net schemes and stimulus grants for livelihood recovery and housing reconstruction (typically in the short term).

A major challenge for the government in the aftermath of a disaster is to access immediate liquidity to finance its short-term spending needs. While there are various financial instruments that can be mobilized for the post-disaster reconstruction phase, including additional credit and tax increases, financial instruments that ensure access to immediate liquidity after a disaster are more challenging to access. See Annex 6 which describes the potential financial instruments available.

Assessing the short-term post-disaster spending needs is essential. To devise a cost-effective disaster risk financing strategy, especially for the funding of short-term post-disaster public spending needs, it is critical to assess those possible public spending needs that create additional fiscal risk for the government.

Analysis of historical disasters in Pakistan

A database of the impacts of natural disasters across Pakistan between 1973 and 2012 has been developed for this report. In this dataset, developed primarily from NDMA and PDMA data sources, the number of people affected by historical disaster events has been estimated and used as a proxy for the severity of each event. During this 40 year time period, 102 individual natural disaster events have been catalogued and analyzed for their impacts on the affected populations (see Annex 2 for more details on this catalog).

On average, each year approximately 3 million people are affected by natural catastrophes, which equates to approximately 1.6 percent of the total population. Figure 3.1 shows the number of people estimated to have been affected by natural disasters since 1973 by peril type.

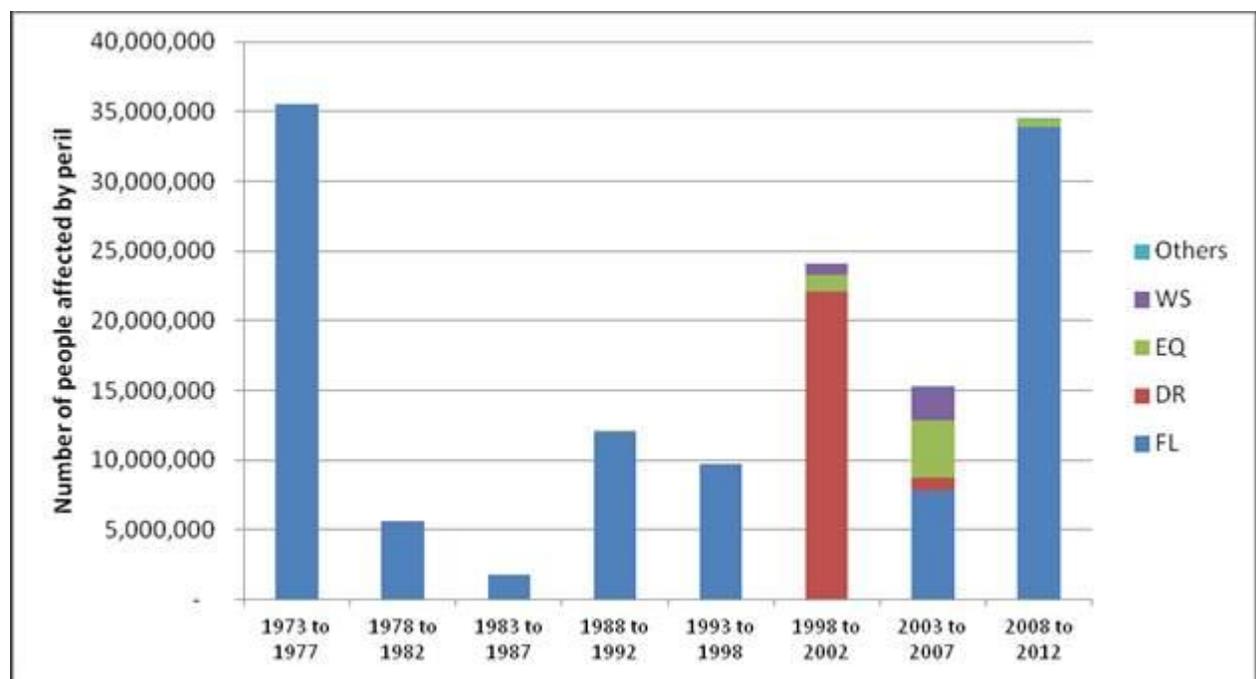


Figure 3.1: Number of people affected by natural disasters in Pakistan since 1973. Source: authors.

Since 1973 approximately 77 percent of the all the people affected by natural disasters were impacted by flooding events. Flood events have been the type of natural catastrophe responsible for impacting the most people over the last 40 years with approximately 77 percent of the total affected population having experienced a flood-type disaster. Drought is the next most damaging peril, followed by earthquake, windstorm and others (avalanches, landslides, etc.). This information is summarized in Figure 3.2.

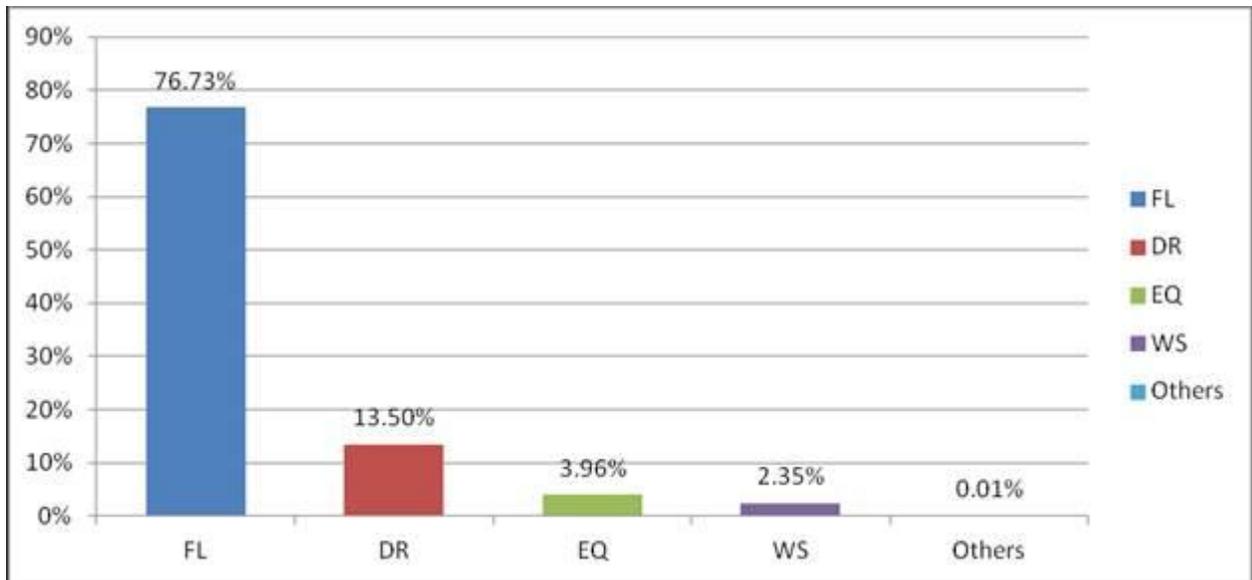


Figure 3.2: Number of total people affected by each peril across Pakistan between 1973 and 2012. Source: authors.

Eighty seven percent of the people affected by natural catastrophes were resident in Punjab and Sindh. Analysis of the historical data identifies that the two most impacted provinces are Punjab (66.6 percent of all people affected) and Sindh (20.1 percent). The high number of affected people in these provinces is due to a number of factors including high population density, poor infrastructure, the geomorphology of the regions and the location of high numbers or residential properties on floodplains. A further 12 percent were resident in KPK and Baluchistan, with the remaining (less than 2 percent) in AJ&K, Gilgit Balistan and the region of Federally Administered Tribal Areas (FATA). Figure 3.3 summarizes the geographical distribution of affected people.

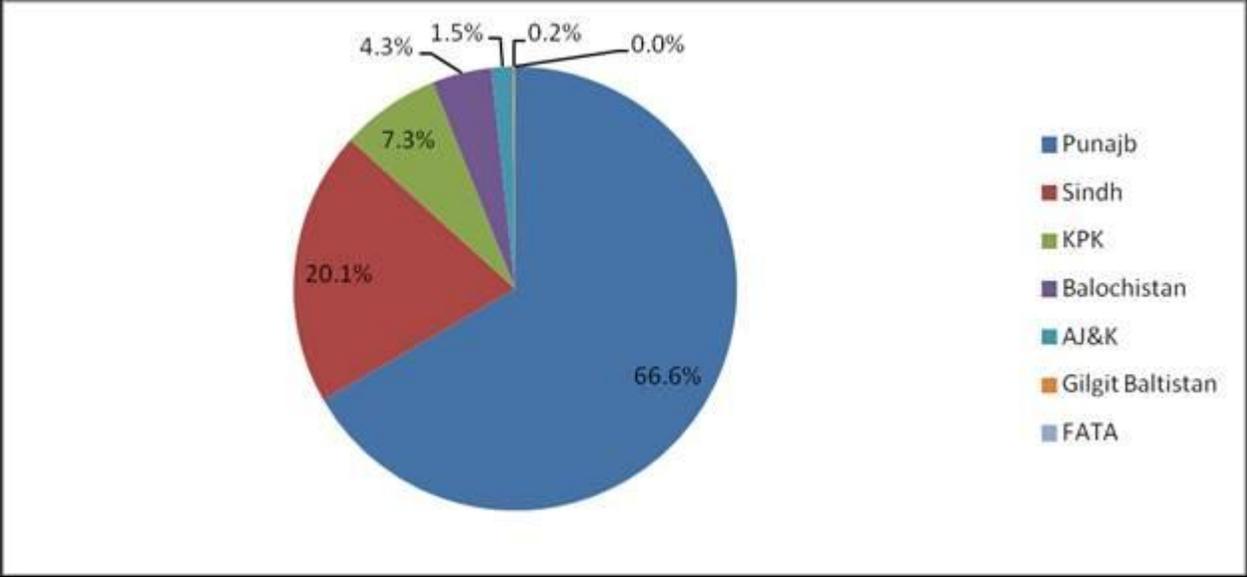


Figure 3.3: Geographic distribution of people affected by natural perils in Pakistan since 1973

Since 1973 there have been 11 natural catastrophe events that - were they to occur in the present day - could affect over four million people in Pakistan. Of the 11 disasters estimated to have impacted over four million people, eight have been flooding events. Furthermore, the top three most impactful events (the floods of 2010, 1976 and 1973) affected well over 10 million people each. This information is summarized in Figure 3.4.

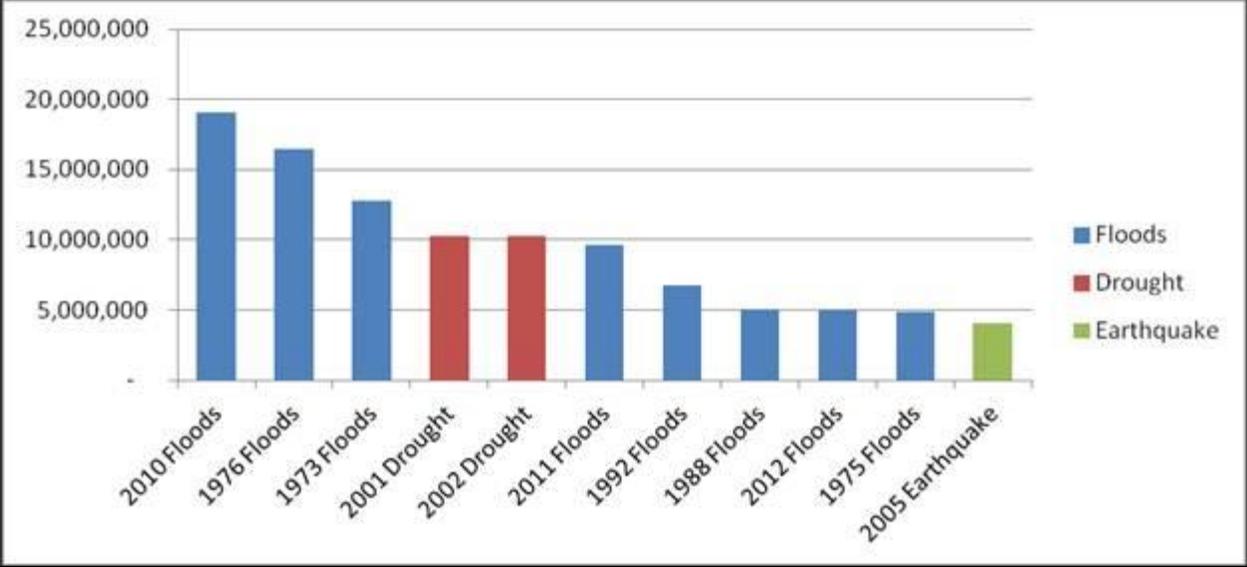


Figure 3.4: Number of people affected by natural disasters estimated to have impacted over four million people (trended to 2012). Source: authors.

Statistical fiscal disaster risk analysis

The fiscal disaster risk profile of Pakistan which reflects the government’s contingent liabilities to natural disasters is built on actuarial analyses of historical disaster impact data collected for this

report. Preliminary fiscal disaster risk profiles for the peril of flood only¹⁹ are developed for the whole country and one province (Punjab) due to availability of data. In particular, risk metrics such as the annual expected loss (AEL) and probable maximum losses (PMLs) have been estimated. The AEL is an estimate of the long term annual average loss, while the PML gives estimates of possible large losses. The PML is defined as an estimate of the aggregate annual maximum loss that is likely to arise on the occurrence of an event or series of events with a certain probability. For example, a PML with a 100-year return period is the estimated loss caused by an event occurring once every 100 years on average (i.e. with a one percent probability of occurrence per year on average).

Preliminary fiscal flood risk profiles of Pakistan and Punjab

The fiscal disaster risk profiles of Pakistan and Punjab, related to the public spending needs for post-disaster operations, are estimated by using the number of people affected by disasters as identified in this report. Post-disaster expenditures financed by the government in the first few months after a catastrophe are estimated using an indirect approach based upon the number of people identified as being affected by an event.

Following analysis of the historical impact data it was concluded that a meaningful, robust disaster risk profile could only be generated for flood risk – the most significant peril in Pakistan’s recent history. As such, 40 years of flood events have been used to generate risk profiles for both: (i) the entire country, and (ii) the province of Punjab. Analyses have been performed to fit statistically-significant distributions through the actual impact data to allow extrapolation of the 40 years of flood events to make calculations of the possible severity of events with a low probability of occurrence (e.g. with a 1-in-100 year, or 1-in-250 year probability).

The government post-disaster budget expenditure per person affected by a flood disaster is estimated at between US\$400 and US\$600. Based on an analysis of the impacts of natural disasters in Pakistan, it is estimated that, on average, the GoP allocates between US\$400 and US\$600 for every person affected by a significant flooding event. A portion of this cost is the direct financial compensation for the affected households for reconstruction of damaged housing and livelihoods support and the remaining is for the reconstruction of critical public assets. Combining these estimates of fiscal cost per affected person, preliminary fiscal flood risk profiles have been calculated for the country of Pakistan and the province of Punjab. Option 1 assumes average fiscal cost of a person impacted by a flooding event is \$400; while Option 2 assumes the fiscal cost is \$600.

This preliminary analysis indicates that the annual national fiscal disaster losses from flood are in the range US\$1.2 billion to US\$1.8 billion; equivalent to 3 to 4 percent of the Federal Budget, or 0.5 to 0.8 percent of GDP²⁰. Once every 100 years these losses are expected to exceed either US\$10.3 billion or US\$15.5 billion (depending on the option assumed) which is in the range of to 25 to 37 percent of the Federal Budget, or around 4 to 7 percent of GDP. Or to consider in terms of annual probability, there is a

¹⁹ There are not enough historical records in the data for drought and earthquake events to perform this actuarial analysis in a suitably robust manner.

²⁰ 2013 GDP figures, 2014-2015 budget estimate taken from Budget in Brief (<http://finance.gov.pk/>), exchange rate fixed at 102

1 percent probability in any year that an event exceeding either US\$10.3 billion or US\$ 15.5 billion will occur. Figure 3.4 shows the indicative fiscal loss exceedance curve, the indicative AEL and selected PML values. In an average year, the fiscal losses are estimated in the range US\$1.2 billion to US\$1.8 billion. Every 10 years, they could exceed between US\$3.4 billion and US\$5.2 billion; and every 100 years they could exceed, depending on the methodology, US\$10.3 billion or 15.5 billion.

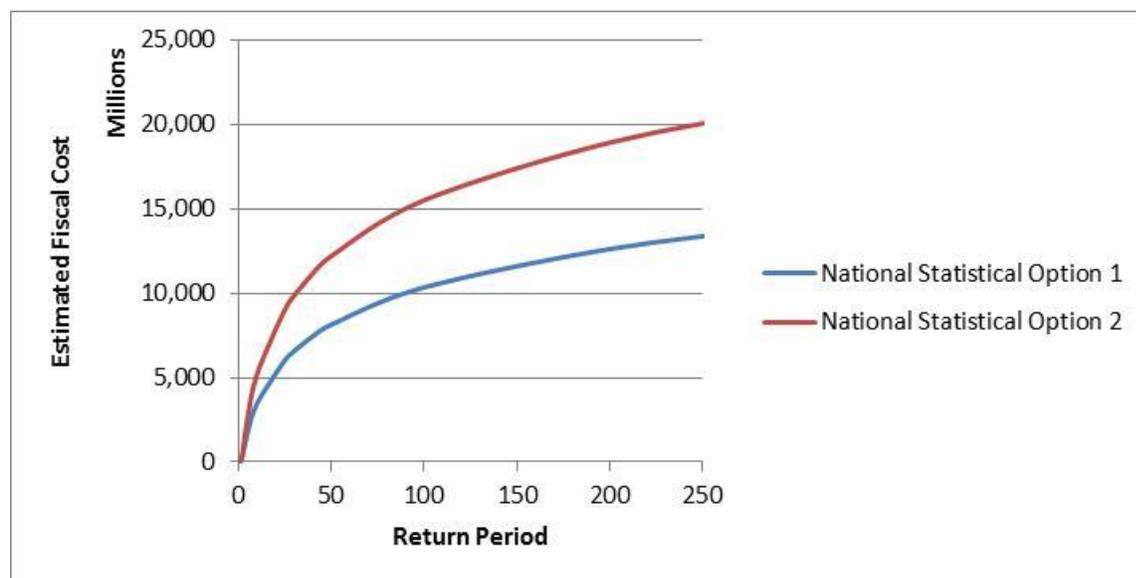


Figure 3.5: Estimated national fiscal flood risk profile for Pakistan - indicative exceedance probability curve. Source: authors.

Indicative Risk Metrics	National Statistical Flood Option 1 (US\$ million)	National Statistical Flood Option 1 (% GDP) (% Federal Budget)	National Statistical Flood Option 2 (US\$ million)	National Statistical Flood Option 1 (% GDP) (% Federal Budget)
Annual Expected Loss	1,179	0.5% (3%)	1,769	0.8% (4%)
Probable maximum Losses:				
10 year return period	3,476	1.5% (8%)	5,214	2.2% (12%)
25 year return period	6,037	2.6% (14%)	9,055	3.9% (22%)
50 year return period	8,142	3.5% (19%)	12,213	5.3% (29%)
100 year return period	10,344	4.5% (25%)	15,517	6.7% (37%)
200 year return period	12,621	5.4% (30%)	18,932	8.2% (45%)
500 year return period	15,719	6.8% (37%)	23,579	10.2% (56%)
1,000 year return period	18,094	7.8% (43%)	27,140	11.7% (65%)

In the case of Punjab province alone, this analysis indicates that the annual provincial disaster losses from flood are in the range US\$0.8 billion to US\$1.2 billion and that once every 100 years losses are expected to exceed between US\$7.4 billion and US\$11.1 billion (depending on the option assumed).

Figure 3.5 presents the actuarial results of the analysis for flood events in the Punjab province.

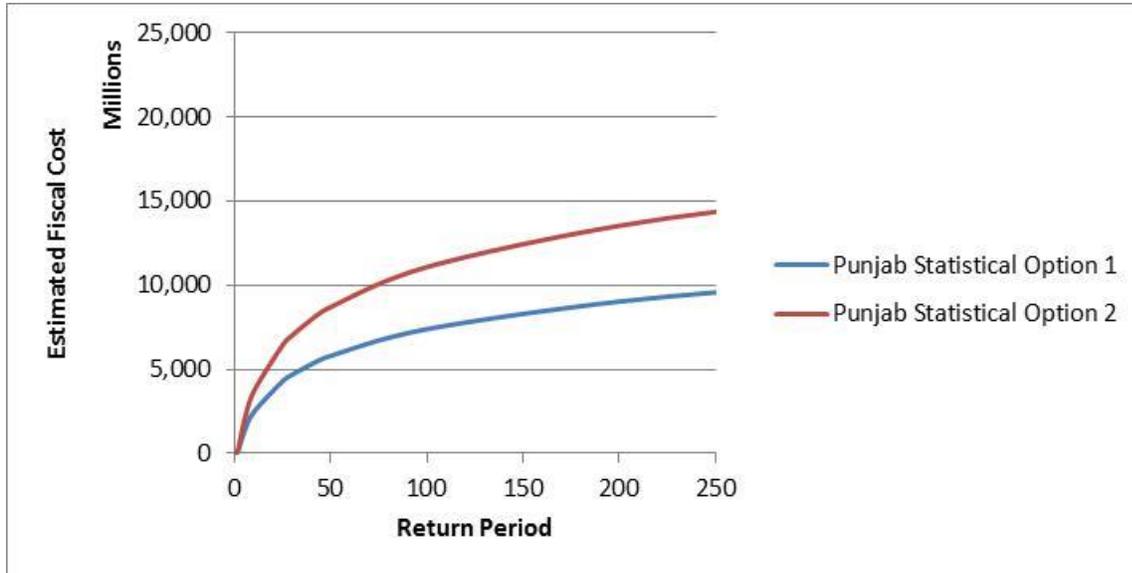


Figure 3.6: Estimated national fiscal flood risk profile for Punjab province - indicative exceedance probability curve. Source: authors.

Indicative Risk Metrics	Punjab Statistical Flood Option 1 (US\$ million)	Punjab Statistical Flood Option 2 (US\$ million)
Annual Expected Loss	831	1,247
Probable maximum Losses:		
10 year return period	2,456	3,685
25 year return period	4,289	6,433
50 year return period	5,799	8,698
100 year return period	7,379	11,069
200 year return period	9,016	13,523
500 year return period	11,237	16,855
1,000 year return period	12,946	19,419

Preliminary earthquake risk profile of Pakistan

The historical disaster impact dataset collated for this study did not contain enough drought, tropical cyclone or earthquake events to allow a reliable actuarial analysis of the possible fiscal impacts of these types of natural catastrophes. However, a prototype probabilistic earthquake model was utilized to demonstrate the value of such a modeling approach, given the availability of appropriate input datasets. The results from this model are presented as illustration of this approach, but further development and refinement is necessary.

Probabilistic catastrophe risk models offer the government innovative tools to assess their financial exposure to natural disasters. Governments in both developed and developing countries are increasingly using catastrophe risk modeling techniques to guide their disaster risk management and financing decisions. Such tools allow for the probabilistic assessment of low-frequency, high severity disasters, such as a major earthquakes and their potential losses. See Box 3.1.

BOX 3.1: Probabilistic catastrophe risk modeling

Fiscal disaster risk assessments for governments can be developed using inputs from probabilistic catastrophe risk models. Catastrophe modeling techniques were originally developed by the international (re)insurance industry to assess the risk on portfolios of underwritten assets (e.g. buildings) and are increasingly being used by governments to analyze their exposure to adverse natural events. Typically catastrophe risk models comprise the following components:

Hazard Module: This module contains a catalog of thousands of potential natural catastrophe events that could occur in a region, each one defined by a specific frequency and severity of occurrence. Analyses are performed on the historical occurrence of catastrophic events to capture the extent of possible events, based on expert opinions.

Exposure Module: This is a geo-referenced database of assets at risk, capturing important attributes such as geographical location, type of occupancy (e.g. residential, commercial, industrial, agricultural) and construction (e.g. wood, steel, masonry), age and number of stories.

Vulnerability Module: This is a series of relationships which relate the damage to an asset to the level of intensity of a peril (e.g. ground shaking for earthquakes, wind speed for tropical cyclones). The relationships will vary by peril and by the characteristics of each asset; for example a small wooden house and a tall concrete building will respond in different ways to a ground shaking caused by an earthquake and as such, they will be damaged in different ways and to different extents. On a larger scale, for instance when analyzing an entire neighborhood or city, proxies may be used to capture the overall vulnerability of an area.

Loss Module: This module combines the information in the other three components in order to calculate the overall losses expected for selected perils impacting a portfolio of assets of interest. Typically there are two kinds of risk metrics produced: average annual losses (AALs) and probable maximum losses (PMLs). The AAL is the expected loss, on average, every year for the risks being analyzed; while the PMLs describe the largest losses that might be expected to occur for a give return period (within a given time period), such as a 1-in-50 year loss or a 1-in-200 year loss.

Risk metrics produced by probabilistic catastrophe risk models can be used to complement historical analyses and are particularly useful to policy makers in assessing the probability of losses and the maximum loss that could be generated by major events (e.g. an earthquake affecting a major city or a cyclone affecting a major port).

This preliminary probabilistic earthquake risk modeling approach complements the actuarial historical impact analysis. A preliminary analysis of the damages caused by earthquake (shake only) to residential properties only is presented. This earthquake risk assessment produced a national level seismic probabilistic loss exceedance profile for housing damage at the national level.

A significant amount of research and expertise went to producing the earthquake loss estimation. The probabilistic earthquake risk modeling was conducted using key input datasets from local experts in Pakistan that detail the most up to date seismic hazard analysis and housing inventory analyses (at a spatial resolution of 1 km²) for the whole country. The modelling also evaluated the impact as if the 2005 earthquake were to occur at the present time.

The probabilistic seismic hazard analysis was derived from results of over 30,000 simulated earthquakes affecting Pakistan. Information about the number of dwellings, construction type (katcha, brick, concrete etc.) and height were obtained from detailed studies and census information. The damage and loss functions were based on nine vulnerability functions developed for Pakistan using a mix of building heights and construction types. The replacement values (or monetary value of the properties - updated to current values) were obtained after consultations with local engineers and Pakistan-specific information on unit cost of construction from the World Housing Encyclopedia project (Ali, 2006; Ali and Muhammad, 2007; Hicyilmaz, 2011; Lodi, 2012a; Lodi, 2012b). The total modelled replacement value of building stock was estimated at US\$ 561 billion in current prices.

This preliminary analysis indicates that the annual expected earthquake loss to residential properties/housing sector is approximately US\$ 1 billion and that once every 100 years these losses are expected to exceed US\$18.7 billion. The loss exceedance curve shows the potential earthquake losses for key return periods. The results show that earthquake risk in Pakistan is very significant and should be considered to have a significant fiscal impact. It also shows that in the long term, annually 0.2% of the total value of the building stock in Pakistan is impacted by earthquake loss.

This preliminary earthquake analysis also indicates that a recurrence of the 2005 earthquake would cause a present day economic loss of approximately US\$ 2.8 billion which is almost double as compared to the losses caused to the housing sector by the 2005 earthquake. One output of the probabilistic earthquake approach is a deterministic ('as-if' scenario) analysis of 2005 earthquake. If this event were to occur in the present day, the total economic loss to residential properties is estimated at approximately US\$ 2.8 billion, which corresponds to a return period of around 26 years. Given the increase in number of buildings in Pakistan since 2005, this analysis indicates that the number of properties affected (i.e. damaged) would be greater than in the present day, but the actual number of properties destroyed would be lower (having been built better after the 2005 earthquake).

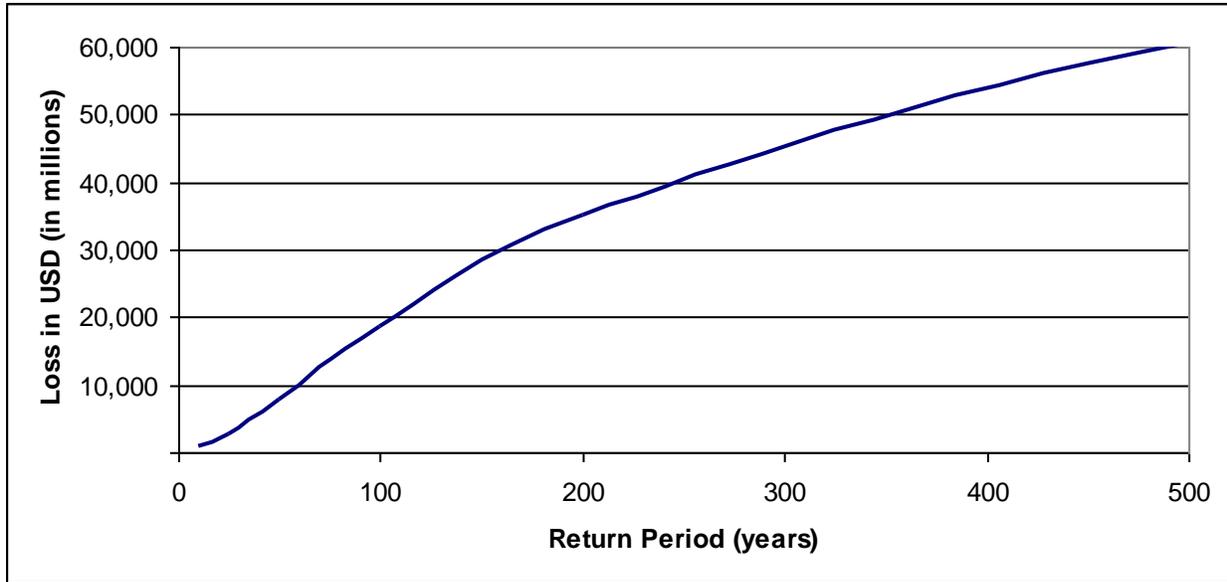


Figure 3.7: Estimated national earthquake risk profile for residential properties in Pakistan - indicative exceedence probability curve. Source: authors.

Indicative Risk Metrics	Pakistan Residential Earthquake (US\$ million)	As % of exposed value
Annual Expected Loss	956	0.2%
Probable maximum Losses:		
10 year return period	949	0.2%
25 year return period	2,750	0.5%
50 year return period	7,660	1.4%
100 year return period	18,700	3.3%
200 year return period	35,000	6.2%
500 year return period	60,700	10.8%
1,000 year return period	80,600	14.4%

In summary, although the flood fiscal disaster risk analysis should be seen as preliminary, it provides the GoP with an order- of magnitude estimate of their possible public spending needs for post-disaster operations. Due to the lack of historical earthquake and tropical cyclone events, it was not possible to perform an actuarial analysis of the possible fiscal costs of these types of natural catastrophes. This actuarial analysis should be complemented by more rigorous catastrophe modeling techniques, particularly for the assessment of future possible losses caused by major disasters. In order to illustrate the value of probabilistic and deterministic catastrophe models, a prototype earthquake model has been developed which provides an estimate of the possible losses to private residential properties from this

peril, although this model would require additional developments and refinements before the outputs could be used towards developing a natural disaster financing strategy. In lieu of more robust modeling estimates, the results of the flood risk profiles for Pakistan and Punjab are used as an input to a series of options that the GoP may wish to consider towards the development of a preliminary national disaster risk financing strategy (see Chapter 5).

This report also highlights two different approaches to disaster risk analysis to estimate fiscal impacts using actuarial and scientific/engineering based methods. However, it is also important to recognize that the financial impacts estimated are for direct losses from independent hazard events. For example, the losses do not consider impact of landslides after an earthquake in northern Pakistan. This impact could be further exacerbated if an earthquake occurred during the rainy season further increasing the likelihood of landslides. Therefore, the preliminary loss estimates generated using these methods may not necessarily represent the maximum losses possible.

Chapter 4: Review of the Private Catastrophe Risk Insurance Market

Background

Global experience has demonstrated that risk transfer chains, such as insurance and reinsurance, can be a key instrument in absorbing a significant portion of the economic impacts associated with natural disaster events. This chapter outlines the current insurance market operating in Pakistan, focusing in particular on Pakistan's non-life insurance market and products, followed by implications for natural catastrophe insurance.

The insurance market in Pakistan is underdeveloped. Insurance in Pakistan remains underdeveloped due to a lack of awareness and understanding of the different products and a lack of new products within the insurance market. From a geographical perspective too, the provinces of Baluchistan, KPK and FATA have been adversely impacted by civil unrest and associated political security issues. In these provinces, the outreach of insurers is limited only to the larger cities such as Quetta and Peshawar, leaving the rural areas un-catered for.

Overview of the market

There are currently 49 insurers, one national reinsurer and some international reinsurers operating in Pakistan. All of these participants are regulated by the Securities and Exchange Commission of Pakistan (SECP). The SECP also licenses and regulates insurance brokers, loss surveyors and adjustors. However, under the current regulatory framework, insurance agents are not required to be licensed by the regulator, though all their activities are monitored and controlled through the insurance companies who are required to maintain a register of their agents and held responsible for all acts and omissions of the agents. The government-owned non-life insurer, the National Insurance Company Limited (NICL), though fully regulated by SECP, is under the administrative control of the Ministry of Commerce.

In Pakistan, the overall insurance penetration (life and non-life premium as percentage of GDP) has remained less than 1% over the last few years, which is one of the lowest in the region. The insurance industry in Pakistan is relatively small compared to its geographical peers, as demonstrated by the low insurance penetration in comparison to other countries in the SAARC²¹ region. In 2011 the total insurance penetration (life and non-life) was approximately 0.7 percent in Pakistan, lower than in Bangladesh (0.9 percent), Sri Lanka (1.2 percent) and India (4.1 percent). The total life and non-line insurance penetration in these four countries is summarized in Figure 4.1. Traditionally, the agent selling network is the dominant distribution channel for the delivery of insurance products in Pakistan. There are also a small number of insurance brokers operating in the market.

²¹ South Asian Association for Regional Cooperation or SAARC is an organization of South Asian nations, which was established in 1985 when the governments of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka formally adopted its charter providing for the promotion of economic and social progress, cultural development within the South Asia region. It is headquartered in Kathmandu, Nepal. For details, visit <http://www.saarc-sec.org/>

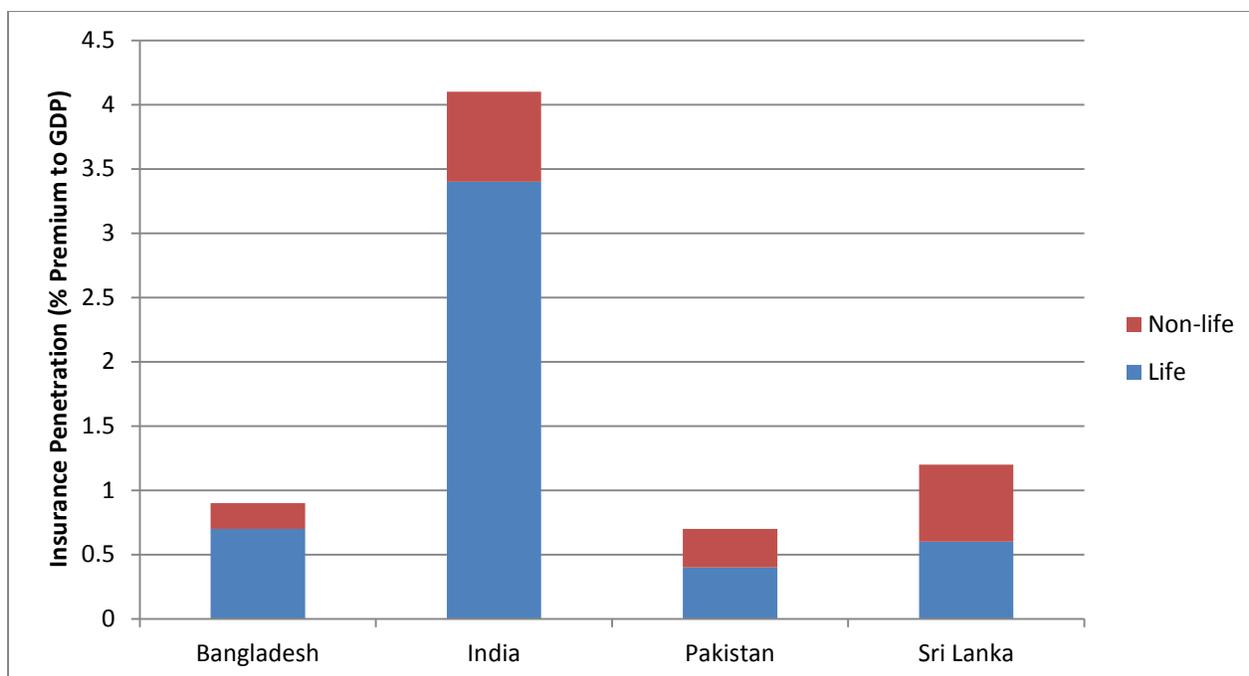


Figure 4.1. Insurance penetration in the South Asia region for selected countries in 2011. Source: Swiss Re: sigma No. 2/2011.

Total annual gross premium revenue of Pakistan’s non-life insurance sector was approximately US\$ 0.57 billion at the end of 2013. Gross premium revenues in Pakistan’s non-life sector have grown from approximately US\$0.33 billion in 2006 to approximately US\$0.57 billion in 2012. Over the same time period gross premium revenue in Pakistan’s life sector grew from approximately US\$0.23 billion to approximately US\$0.88 billion.

The non-life insurance sector since 2007 has seen annual growth rates decreased by 11% to 2009. However since 2009 annual growth rates have increased by 6%. In contrast to the life sector has sustained an average annual growth rate of approximately 25% from 2007 onwards. Fluctuating growth rates in the non-life sector are primarily due to the economic downturn that commenced in 2007, coupled with a decline in consumer and industrial financing by banks. This was the main driving force for non-life insurance growth, as non-life insurance is mostly centered on commercial lines. However, no visible efforts have been made by the insurers to expand the outreach to personal lines of business; therefore growth has remained relatively stagnant.

The number of non-life insurers in Pakistan is not increasing and in fact nearly 24 non-life insurers have exited the market since 2009. Typically those companies that have left the market have done so either due to voluntary factors or regulatory actions owing to compliance irregularities²². According to the Herfindahl–Hirschman Index (HHI)²³, given the small size of the market, the existence of 40 non-life

²² Personal Communication, SECP, 2013

²³The Herfindahl index (also known as Herfindahl–Hirschman Index, or HHI) is a measure of the size of firms in relation to the industry and an indicator of the amount of competition among them. Named after economists Orris C. Herfindahl and Albert O. Hirschman, it is an economic concept widely applied in competition law, antitrust and also technology management. It is defined as the sum of the squares of the market shares of the 50 largest firms (or summed over all the firms if there are fewer

insurers as of 2012, indicates increased competition and decrease in market power. This could have an impact on technically sound catastrophe rates.

Based on gross written premiums, four insurance companies account for approximately 63 percent of the non-life market. In 2012, the EFU General, Adamjee Insurance, Jubilee Insurance and NICL insurance companies enjoyed approximately 63 percent of the total non-life market, NICL is State owned. Of the remaining 37 percent, 22 percent was shared by ten mid-size insurers, with the final 15 percent being split across 25 small-size insurance companies. As a consequence the lower end of the non-life insurance sector is considered over-competitive with aggressive pricing techniques and pressures on profitability due to the intense commercial competition

Insurance of public assets: The state-owned NICL insurance company has a 12 percent non-life market share, with the remaining 88 percent being covered by the remaining private insurers. The NICL non-life market share has been relatively stable over the past five years as its core business is to insure public assets of government and semi-government organizations (SECP, 2013). Private insurers occupy approximately 88 percent of the market with three large insurers having a combined market share of 50 percent in 2012 (i.e. 44 percent of the total market share).

The Regulator: The Insurance Ordinance, 2000 law entrusted the responsibility of supervising insurance business to Securities and Exchange Commission of Pakistan. In addition, the SECP's mandate has grown to include supervision and regulation of the insurance sector, non-banking finance companies and private pensions. The SECP also provides oversight of various external service providers to the corporate and financial sectors, including chartered accountants, credit rating agencies, corporate secretaries, brokers, and insurance surveyors.

The Reinsurer: The majority 51%-state owned Pakistan Reinsurance Company Limited (PRCL) accounts for approximately 20 percent of the total non-life reinsurance premiums written in 2012. The PRCL, the only reinsurer in Pakistan, is listed on the Karachi Stock Exchange. However, the domestic insurers also reinsure with international reinsurers directly or through reinsurance brokers. During 2012, premium of over (approximately) US\$0.28 billion, both in treaty and facultative contracts, was been remitted abroad to foreign reinsurers which constitute approximately 49.5 percent of the total gross written premium of non-life insurers, an increase from 37 percent in 2008. For example, from 2008 to 2012 Swiss Re alone retained approximately, 20 per cent of the overall non-life business and no risk was retroceded. The reinsurance treaties of Swiss Re in Pakistan normally cover fire & allied perils, business interruption together with Natural Catastrophe perils.

To address undercapitalization of the market, SECP along with its stakeholders are currently deliberating a Risk-Based Capital (RBC) model where the minimum capital requirement would need to be increased. By 2017, it is likely that the minimum capital requirements for non-life insurers would increase from the current PKR 300 million to PKR 500 million. The solvency ratio of an insurer is the size

than 50) within the industry, where the market shares are expressed as fractions. The result is proportional to the average market share, weighted by market share. As such, it can range from 0 to 1.0, moving from a huge number of very small firms to a single monopolistic producer. Increases in the Herfindahl index generally indicate a decrease in competition and an increase of market power, whereas decreases indicate the opposite.

of its premium written relative to the capital. In Pakistan, the solvency regime for the insurance industry has also been recently revised in 2012 and prescribed under the SEC (Insurance) Rules, 2002. It is a dynamic solvency regime whereby the assets admissible for the purpose of calculating the solvency of an insurance company and their respective percentages have also been prescribed. SECP also licenses and regulates the loss adjusters.

The reinsurance broker's perspective: Large international brokers encourage clients operating in Pakistan to have appropriate catastrophe insurance covers. This is based on actuarial catastrophe models, especially for small sized clients, as the large and medium sized ones usually buy the extended coverage of earthquake and floods along with their fire policies. A small number of direct insurance brokers exist in the market but very few have expanded from the commercial and corporate market into serve the retail consumers.

Alternative Insurance Distribution channels: Pakistan's microfinance industry has matured and diversified over last 10 years. Although, there has been virtually no development of specific standalone micro insurance market products in the last few years in Pakistan, Major Financing Banks (MFBs), Microfinance Institutions (MFIs), multidimensional NGOs and more recently, the commercial banks and telecom companies through the branchless banking platform have matured. The MFI product range has also broadened to include products beyond the typical enterprise loan and now include insurance and alternative credit products such as emergency loans, housing microfinance and remittances. Bancassurance and mobile banking too are rapidly becoming the mode of choice for the delivery of financial products, though Bancassurance is a growing and significant distribution channel; there exists certain pressure due to high commission costs charged by the banks for providing this service. However, Pakistan's microfinance sector is vulnerable to fiscal shocks due to natural disasters. Discussions with the MFBs, MFIs, and Pakistan Microfinance Network (PMN) revealed that the microfinance sector suffered heavily in the floods of 2010 and the catastrophic rains in 2011. Consequently, many of the microfinance institutions become reluctant to lend or work in areas that are disaster prone despite the need for creating access to finance and poverty alleviation in these regions.

Private property catastrophe insurance

An analysis of natural catastrophe insured losses indicates there is severe underinsurance in Pakistan. According to a survey conducted as part of this report, of participants in the Pakistan insurance market the largest insured loss events were the 2010 floods, followed by the 2011 floods (Table 4.1). Anecdotal evidences have strongly suggested that during many of the recent natural catastrophe events there was significant underinsurance. Most properties and assets damaged by recent disasters were either uninsured or not covered for the perils required.

Type of Hazard	Year	Location	Sum Insured	Gross Premium	Net Premium	Gross Claims	Net Claims	Retention Ratio	Loss Ratio
Earthquake	2005	Kashmir	107,066	470	377	16	16	80%	4%
Floods	2009	South	53,292	1,233	845	166	126	69%	15%
Floods	2010	South	775,761	2,118	1,071	3,342	303	51%	28%
Floods	2011	South	316,440	708	299	85	17	42%	6%
Floods	2012	South	20,458	46	23	12	5	49%	21%
Floods	2012	North	75,864	38	8	1	0	22%	3%

Table 4.1: Natural catastrophe insurance losses of the insurance industry in Pakistan (PKR in Million). For the policies affected: Sum insured is the total sum insured by the insurance companies; Gross premium is the premium earned for the sum insured on a gross basis; net premium is the premium earned for the sum insured on a net basis; Gross claims is the total value of claims before insurance limitations such as deductibles and limits were applied; Net claims is the net value of claims after insurance limitations such as deductibles and limits were applied. Retention ratio is net premium as a percentage of Gross premium; and Loss ratio is net claims as a percentage of net premiums (Source: original research findings for this report)

In Pakistan, catastrophe insurance cover is by default not included in a Fire policy but available as an extension to a fire policy. However, this is subject to additional premium rates that cover against the risks of earthquake (fire and shock) and atmospheric disturbances including flood and other extraneous or additional perils. Catastrophe insurance coverage usually include buildings, machinery, business interruption (BI), household contents, stocks, stock-in-process and other contents covered under the fire insurance policy.

The earthquake and atmospheric disturbance are the most prominent catastrophic products available in the market, as a bundled product, and the premium rates range from between 0.60 per mille to 1.20 per mille per annum for both perils with various terms, conditions and deductibles being applied. These rates are usually applied on the sum insured of the risk; however, in some cases it is written on the first loss basis as well. Since, commercially available catastrophe risk models for Pakistan are limited²⁴ pricing leading domestic insurance companies tend to be conservative. Moreover, as premium for natural perils is charged as part of the total premium for a fire and allied peril policies, it is not possible to assess the premium for national catastrophe covers itself.

NICL, the government-owned insurer has the exclusive mandate under law to provide insurance for public assets. Section 166 of the Insurance Ordinance, 2000, defines the exclusive role of NICL vis-à-vis insurance whereby it is required that all insurance business relating to any public property, or to any risk or liability appertaining to any public property, shall be placed with NICL only and shall not be placed with any other insurer. The classes being underwritten by NICL includes Fire, Marine, Engineering, Aviation, Motor, Travel and Crop. Despite, being given this mandate, NICL has not initiated any specific catastrophe insurance program for public assets (buildings, their contents, and national infrastructure). As NICL has been entrusted with this specific mandate to insure the public sector property and risks, it is imperative to review the retention capacity versus reinsurance figures of NICL. NICL's average retention

²⁴ As of 2012, there is only a windstorm and earthquake model available from EQECAT Inc.

during last 3 years has remained around 50% which shows a reasonable risk appetite coupled with strong backing by reinsurers.

Discussions with the leading insurers as well as the Regulator revealed that there is very limited understanding of the catastrophe exposure in the domestic insurance market, mainly owing to the lesser availability of risk mapping data, and therefore the rates charged might be below the level required considering the earthquake, flood and tsunami exposures. The lack of discipline in the market and competition is further restricting the required upward revision in premium rates. Further, in Pakistan, no specific or standardized underwriting guidelines are available to the industry for the underwriting of catastrophe risks.

The local insurers have shown their strong reservation on the implication of the 72 hours' disaster definition clause²⁵ due to non-availability of the precise data, and it is practically very difficult to enforce it. Applications of event limits also remain a major concern for the insurers. Some insurers report that they conduct portfolio analyses to determine the expected distribution of losses from possible events such as atmospheric disturbances or earthquakes based on "Catastrophe Risk Evaluations and Standardizing Target Accumulations" (CRESTA) zone statistics. However, there is no consistent risk zoning approach to classify risks.

The development of catastrophe insurance and reinsurance in Pakistan is currently being limited. There is no technical awareness and visible appetite for new products as lesser knowledge and non-innovative thinking for catastrophe insurance products is limiting the development of this important line of business.

With the exception of few larger insurers, generally the insurance companies do not fully understand natural catastrophe insurance products, which in turn translate into lower awareness among the consumers or potential policyholders. One consequence of this situation is underinsurance, which many times is unintentional, as the policyholders are not aware of the possible coverage or (lack of), and need a catastrophe insurance. One of the most critical, but prevalent, issues is the lower insurance density (premium per capita) and penetration (premium per GDP) in the country, due mainly to lower disposable incomes, education and awareness, religious factors and outreach of insurers.

²⁵ An hour's clause is used by the re/insurance industry to define time period of a natural catastrophe event. The hour's clause aggregates all losses occurred in a time frame (usually 72 hours) as a single event. This has implications for deductibles, limits and per occurrence liability of policies.

Chapter 5: Options for a National Disaster Risk Financing Strategy

A comprehensive national disaster risk financing strategy should be designed to improve the capacity of the GoP to access immediate financial resources in the event of a national disaster and to ensure that required funds are efficiently delivered to beneficiaries, while maintaining the fiscal balance.

Seven options for a comprehensive disaster risk financing strategy in Pakistan are presented. Table 5.1 lists a summary of the options for consideration. These options follow the operational framework of: (i) assess risk; (ii) arrange financial solutions; and (ii) deliver funds to beneficiaries.

Table 5.1. Options for a national disaster risk financing strategy in Pakistan.

Timeframe	Options for disaster risk financing
Short term	Develop a central database for disaster losses and expenditures to better predict future financial costs of disasters
Short term	Operationalize the National and Provincial Disaster Management Funds
Short term	Clarify contingent liability associated with post-disaster cash transfer programs and enhance financing sources behind the programs to ensure efficient access to funds in the event of a disaster
Short/Medium term	Develop financial disaster risk assessment tools including development of financial catastrophe risk models for MoF
Short/Medium term	Develop a national disaster risk financing strategy that proposes models for improving financial response capacity to disasters
Medium term	Establish a robust catastrophe risk insurance program for public assets
Medium/Long term	Promote property catastrophe risk insurance for private dwellings

Option 1: Develop a central database for recording disaster losses and expenditures

A centralized database of historical budget expenditures and losses relating to disasters would support a better understanding of the country's fiscal exposure to natural disasters. In Pakistan the decentralized, reactive approach to financing disasters which differs province-to-province makes it extremely difficult to perform a national analysis of the fiscal impact of natural catastrophes.

While this report has compiled a database of natural disaster occurrences since 1973, along with a measure of their impacts (number of people affected), there is very limited data available on (i) the actual economic costs of these events, (ii) the public expenditures spent financing these losses, and (iii) the mechanisms through which these funds were allocated and directed towards post-disaster relief, recovery and reconstruction activities.

A central database, where historical disaster budget expenditures and losses are compiled, would allow the GoP to analyze it's past fiscal exposure to natural catastrophes and this information would be invaluable in helping to understand and predict the future financial costs of disasters to the state. A development of technical capacity and necessary tools to quantify likely needs for disaster-related

expenditure would help the government to both: (i) determine appropriate allocations through the budget; and (ii) to also explore and make informed proposals for possible sources of financing outside of the budget. This information can also be used to help the government identify areas where clarification of policy on types and extent of post-disaster spending may be necessary.

The key agencies for the establishment and maintenance of such a database would be the National Disaster Management Authority, the Provincial Disaster Management Agencies and the Ministry of Finance. The development of any such database would look to draw from existing budgetary and disaster risk management structures and systems rather than to create a new isolated structure.

Option 2: Operationalize the National and Provincial Disaster Management Funds

The NDM Act of 2010 established a National Disaster Management Fund at the federal level and Provincial Disaster Management Funds in each province; however all of these funds are yet to be officially operationalized. Presently the main sources of post-disaster funding are contingency and supplementary budget lines (for relief and recovery) and the annual public sector development program (for reconstruction). The National and Provincial Disaster Management Funds could be used to consolidate some of the currently disparate sources of financing for disaster-related expenditures. Having dedicated funding structures in use could assist with tracking and reporting of post-disaster spending, and could also help clarify the division of post-disaster responsibilities in advance of event occurrence through a rules-based approach to access. Dedicated structures with emergency protocols and clear rules for release of funds can also help improve speed of access to post-disaster financing for implementing agencies.

There exists already a legislative basis and administrative structure for the NDMF and PDMFs. The next steps to operationalize these funds would involve development of a sustainable plan for financing the funds, and work with the relevant authorizing and implementing agencies to integrate the funds into post-disaster processes. Any additional procedural or policy specification that may be required to make the funds as efficient as possible could be determined through this exercise.

As regards a plan for financing, these funds could fund some portion of the low risk layers within a national disaster risk financing strategy (see Option 2). Guided by the preliminary flood risk profiles developed for this report, financing for disaster losses of between US\$ 1.2 and 1.8 billion is required on an annual basis. Similarly, in the case of Punjab, needs of between US\$ 0.8 and 1.2 billion on an annual basis have been identified through the preliminary flood risk analysis. Additional analyses would be required for other perils and other provinces, but these figures give a ball-park estimate of the size of disaster risk management funds required in Pakistan.

In México, the national Fund for Natural Disasters (FONDEN) was set up in 1996 to provide quick funds following natural catastrophes. Some of the main benefits from the establishment of the fund include clarification of division between Federal and State post-disaster responsibilities, the encouragement of insurance purchase by public asset managers, commitment of entities to an audited rules-based approach in the use of post-disaster disbursements, and the development of a linked financing structure

that leverages both public and private capital. For more information on this initiative see Box 5.1 and also Annex 3.

Box 5.1: Mexican 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 towards financing post-disaster reconstruction efforts. Budget reallocations created delays and scaling back of investment programs, while also slowing deployment of funds for recovery efforts.

In response, in 1994, legislation was passed to require federal, state and municipal assets to be privately insured. In 1996, the government created the Fund for Natural Disasters in the Ministry of Finance (FONDEN).

FONDEN is an instrument for the coordination of intergovernmental and inter-institutional entities to quickly provide funds in response to natural disasters. FONDEN's main purpose is to provide immediate financial support to federal agencies and local governments recovering from a disaster, and in particular for the: i) provision of relief supplies; and, ii) 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 See Annex 4 for additional details.

The FONDEN program has also been used by the Federal Government to promote financial discipline at all levels. A rules-based approach, making access to FONDEN funds conditional on the purchase of insurance for public assets is one mechanism through which the program seeks to instill financial discipline. Under these rules, the FONDEN program will only fund up to 50 percent of the reconstruction cost for federal assets that are not insured and that have received support in the past. For uninsured state assets, the figure is 25 percent. No support is available if the asset is damaged a third time, and remains uninsured. In contrast, insured assets are eligible for FONDEN funding to cover 100 percent of reconstruction costs for federal assets and 50 percent for local assets irrespective of past claims through the program. FONDEN also uses its connection with the private insurance market to commit both the Federal and state governments to an audited rules-based approach to post-disaster disbursements. An insurance contract is in place between the program and the international markets, which is linked to loss reporting by state and federal entities covered under the FONDEN program. Thus the reconstruction requests and implementation are subject to the transparency standards of the international markets, in addition to the formal process of post-disaster reconstruction reporting managed by the Ministry of the Interior (SEGOB).

Source: Fonden (2011)

Option 3: Clarify contingent liability associated with post-disaster cash transfer programs and enhance financing sources behind the programs

The GoP manages cash transfer programs that provide rapid financial relief to vulnerable populations in the aftermath of disasters. Cash transfer programs were designed in response to the 2005 earthquake, and the 2010 floods (at a national level), and to the large floods in 2011 and 2012 (at a provincial level). In 2012, the GoP has developed a Disaster Response Action Plan for future cash

transfer based responses. The plan, approved by the Prime Minister, gives responsibility for early recovery cash transfer support to the Cabinet Division, building on the 2010 flood response which was a partnership between the federal and provincial governments and served as the blueprint for the 2011 and 2012 provincial programs. The plan provides clear mechanisms for administering future early recovery cash transfer programs including using a combination of geographic and poverty targeting for beneficiary identification with verification of eligible beneficiaries done by NADRA. However, to date this plan, while approved, is not being implemented as planned at the federal level. At the provincial level some efforts have been made, for example in Punjab where the Government is trying to put systems in place for efficient cash transfer responses, building on their experience from their previous provincial level cash-transfer responses to flooding disaster. These experiences could help with the set-up for a systematic post-disaster safety net.

For the poverty based targeting of these cash transfers, the plan recommends utilizing the National Poverty Registry (NPR) that covers almost the entire population of the country (more than 27 million households) and facilitates different score cut offs to represent percentiles of the poorest population. While the country also has a nationwide social safety net - the Benazir Income Support Programme (BISP, see Box 5.2), that utilizes the NPR to identify its beneficiaries, the cut off for disaster recovery benefits can be set depending on fiscal space and need – either above or below the cut off used to identify BISP beneficiaries. Given the frequency of disasters (particularly floods) impacting Pakistan, and the aggregate value of the transfer payments, such cash transfer recovery programs represent a material and uncertain fiscal liability for the GoP. While the mechanics of the payment system function well, there is not a clear understanding of the annual expected payments required from the program or of the probable maximum payments. Furthermore, there is no financial strategy in place to ensure that the requisite funds are available on a timely basis without requiring a reallocation of resources from ongoing and planning government expenditures.

At present, the extent of liability varies with both the severity of the disaster, and available fiscal space. Discussions could be held with GoP to determine whether the extent and size of cash transfers could be explicitly defined, clarifying government responsibility in the case of a disaster size. Once the contingent liability is defined, a risk financing strategy (including options such as reserves, contingent credit instruments and insurance) could be developed to manage its volatility, and thus look to address the issue of fiscal space.

In order to adequately plan for likely future demands from this program, the contingent liability needs to be clearly quantified. A process to perform such quantification would require inputs from risk assessment tools (informing likely frequency and intensity of natural hazard in Pakistan), retrospective disaster impact analyses (informing the relationships between geography and intensity of disaster events and the resulting cash payments), and explicit GoP policy on whether to respond with cash and responsibility for fiscal liability and the amount of payments (tranches etc.).

Therefore, it could be valuable to explore whether the efficiency of the mechanism could be improved through:

- (i) Increased understanding of the range of the annual liability that arises from the program;
- (ii) Explicitly defining the liability as described above;
- (iii) Developing a risk financing strategy to manage the financial cost of the liability.

Box 5.2: Benazir Income Support Program (BISP)

BISP was set up as an autonomous national Safety Net authority through an Act of the Parliament in 2010. The program is currently targeting more than 7 million families through a Proxy Means Test based poverty census. Keeping in view the available fiscal space and the benefit amount to be paid to the beneficiaries, the program currently targets around 20% of the poorest. The objective of the program is to protect against sharp rises in inflation and other financial shocks and to allow the opportunity to the poor to come out of poverty through complementary graduation programs. The cash support is Rs 1,200 per month per family but paid on quarterly basis (e.g. Rs. 3,600 per quarter). More than 80% of the disbursements are being made through electronic means (mobile phone and Debit Cards) which allow beneficiaries the facility to draw money through point of sales and ATMs. The program is also testing intermediate and long term graduation options ranging from a Conditional Cash Transfer Program linked to Primary Education of the beneficiaries' children, aiming at breaking the intergenerational poverty; to imparting skills and microcredit for livelihood support. BISP's budget is mainly provided by GOP through its development budget (93%) and the rest of the funds are provided through other sources such as DFID, the World Bank and the Asian Development Bank. While there is no contingency allocation in this budget to cater specifically to any cash transfer for disaster response the mechanism is geared to immediately add on any additional cash support to the existing beneficiaries of BISP if required.

The completion of the Proxy Means Test for BISP resulted in a National Poverty Registry which other programs are also using to target the poorest. To that end, the GoP approved a plan for the use of cash transfers in response to future disasters using the poverty registry and geographic location for the initial identification of emergency recovery cash transfer beneficiaries.

Option 4: Develop financial disaster risk assessment tools

The design of a comprehensive national disaster risk financing strategy begins with a detailed disaster risk assessment. Presently neither the federal government, nor the provincial governments, performs assessments of the likely budgetary impacts of natural catastrophes. Catastrophe risk modeling techniques can complement the actuarial analysis of historical loss data to assess the financial and fiscal exposure to natural disasters. Catastrophe risk models combine information on the underlying natural perils (hazard), the assets at risk (exposure) and their potential damageability (vulnerability) to calculate estimates of economic and fiscal risk (see Box 3.1 for more information).

Hazard modules for the major perils should be developed. In this report, an actuarial analysis of historical fiscal impacts has been performed to generate preliminary fiscal disaster risk profiles for the government of Pakistan and the province of Punjab for the peril of flood. These analyses alone were

possible due to the data available for flood events across the country and in Punjab. The lack of historical data for other major perils (in particular earthquakes and tropical cyclones) means that hazard models should be developed or acquired which will provide preliminary estimates of the frequency and severity of these additional perils at the federal and provincial levels. Technical expertise residing within national geoscience and academic entities can be leveraged to help develop specific hazard modules, with World Bank guidance if required. At the time of writing, efforts are underway to address this requirement for greater technical understanding of the natural hazards facing Pakistan. A National Working Group (NWG) has been established, along with sub-Technical Working Groups (TWGs) on seismic hazard, flood hazard, exposure, vulnerability and risk communication.

A national geo-referenced exposure database could be built. This dataset would include the locations and attributes of public and private buildings, and infrastructure exposed to natural perils. The public assets cataloged would include schools, hospitals, water and sanitation facilities, public buildings, roads and bridges; while private dwellings could also be included, especially those identified as being an implicit contingent liability to the GoP (i.e. the housing stock belonging to the lowest socio-economic groups). Agricultural assets such as crops, and geo-referenced socio-economic data on households could also be included to assess population needs and impacts on farmers. This database could support immediate needs assessments post-disaster, and would also be used as an input to one or more catastrophe risk models allowing the economic and fiscal impacts of natural disasters to be better quantified. In addition, this information would be of great use for the insurance industry to allow it to offer sustainable and affordable property catastrophe insurance products.

Financial decision-making tools could be developed for the MoF. A catastrophe risk model combining analyses of flood, earthquake and tropical cyclone hazards could be the basis of financial decision-making tools to be used by the MoF. This model would include a financial model that would build on the modeled losses of the catastrophe risk model and the historical losses. This tool could assist the MoF in the design of the national disaster risk financing strategy, including the size of the annual budget allocation to the National and Provincial Disaster Management Funds, the structuring of contingent social safety net programs, and any disaster risk transfer strategy (such as insurance). Such a financial model is currently being used by the MoF in México and is described in Box 5.3.

BOX 5.3: R-FONDEN – The financial catastrophe risk model of the Ministry of Finance of México

The Government of Mexico developed, for its national disaster fund FONDEN, a catastrophe risk model called RFONDEN. This probabilistic risk model offers catastrophe risk analysis for four major perils (earthquake, floods, tropical cyclones, and storm surge), for infrastructure in key sectors (education, health, roads, and low-income housing) at the national level, state level and sub-state level. 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, and produces) as outputs risk metrics including AEL and PML.

This model is currently used by the Ministry of Finance, in combination with the actuarial analysis of historic loss data, to monitor the disaster risk exposure of the portfolio of FONDEN 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 the Mexican national disaster fund FONDEN see Annex 4.

By developing disaster risk models for the natural hazards impacting Pakistan, the GoP can help stimulate the development of technical understanding in this field in the private sector. One of the key highlights of Chapter 4 of this report is the low level of technical understanding in the (re)insurance sector of Pakistan. Detailed hazard and exposure models developed by the GoP could be used to improve the knowledge base in the private sector, which in turn could help to improve (i) the quality of the insurance products offered by the market, (ii) portfolio optimization of the primary insurance market, (iii) negotiations on reinsurance pricing and rating agency submissions of insurance companies (ii) the overall level of market penetration of non-life insurance across Pakistan. All of these would help to reduce the contingent liability on the GoP in the event of a natural disaster occurrence.

Option 5: Develop a national disaster risk financing strategy

A national disaster risk financing strategy could be developed by the Government of Pakistan with the technical support of the World Bank which articulates how disaster losses will be financed at the national, provincial, business and household levels. The strategy would articulate policy on post-disaster interventions for different beneficiary groups, and would also present a plan for financing expected costs. A mix of financing mechanisms would be determined based on expected losses, applied in a risk layering approach. This approach offers an optimal mix of risk retention (through reserves/contingency budget and contingent credit lines) and risk transfer instruments, such as insurance. See Annex 1 for further details and a comparative analysis of risk financing and risk transfer products. Annex 7 describes an operational framework for implementing disaster risk financing and insurance solutions.

Disaster risk layers could be financed through an optimal combination of financial instruments. Figure 5.1 shows the three tiered financial as described in the following text.

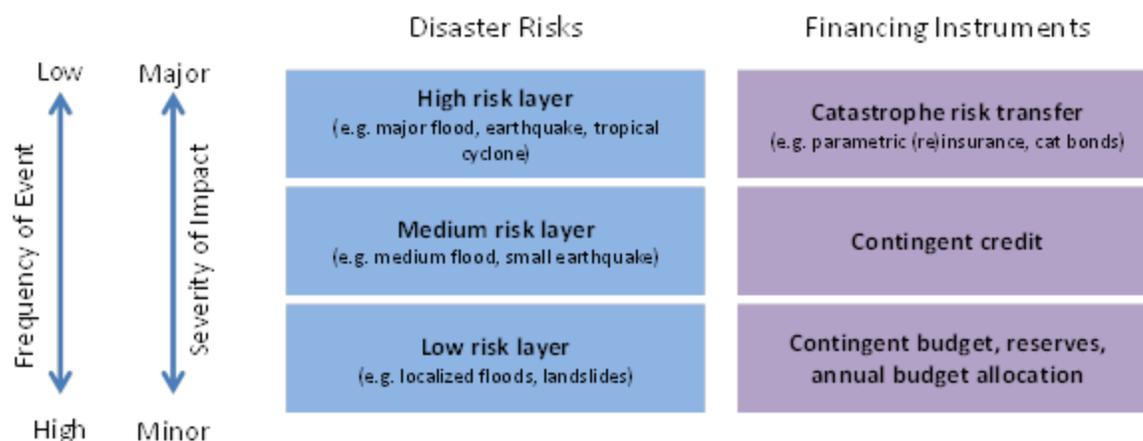


Figure 5.1: Bottom up approach to three-tier financial strategy against natural disasters. Source: Authors

The preliminary flood risk profiles conducted as part of this report indicates that the government faces average costs of between US\$ 1.2 and 1.8²⁶ billion every year. Furthermore, a major flood event (occurring, on average, once every 100 years) could cost upwards of US\$ 10 billion. Different financial instruments will be suitable for financing the smaller, recurrent losses, and the large infrequent losses, to which Pakistan is exposed. The contingent liability arising from establishment of any disaster-linked social protection schemes should also be considered within the financing strategy.

For example, the National and Provincial Disaster Management Funds could be operationalized and funded appropriately to deal with some part of the more frequent, smaller losses using grants from the annual budget combined with external financing sources. For larger events which are not cost-efficient to pre-fund, contingent instruments such as insurance and contingent credit become an effective tool. A number of countries in Central and South America have used the World Bank's contingent credit product – the Development Policy Loan with Catastrophe Deferred Drawdown Option – to access rapid liquidity in the event of a disaster. The Government of the Philippines also used one of these facilities to draw down \$500 mn to respond to Tropical Storm Sendong which struck at the end of 2011. Governments are also increasingly using risk transfer instruments, such as insurance, catastrophe bonds and catastrophe derivatives to deal with infrequent large events. In these cases, the higher 'per-dollar payout' cost of risk transfer relative to retaining risk through reserves or credit is merited by the substantial financial capacity they offer. For example, the Government of Mexico has transferred catastrophic hurricane and earthquake risk to the international markets via a catastrophe bond, since 2006. The latest transaction in 2012 placed \$315 mn of risk via a catastrophe bond.

Box 5.4: World Bank Development Policy Loan with Catastrophe Draw Down Option

The Development Policy Loan (DPL) with catastrophe deferred drawdown options (e.g. Cat DDO) offers a source of immediate liquidity that can serve as bridge financing while other sources (e.g. concessional funding, bilateral aid or reconstruction loans) are being mobilized after a natural disaster. Borrowers have access to financing in amounts up to US\$500 million or 0.25 percent of GDP (whichever is less). The Cat DDO has a 'soft' trigger, as opposed to a 'parametric' trigger; funds can be drawn down upon the occurrence of a natural disaster resulting in the declaration of a state of emergency. See Annex 3 for additional details.

In summary, a 'bottom-up' disaster risk financing approach should be considered by the GoP. The GoP should secure financing for recurrent events through risk retention (operationalization of national and provincial reserves and/or contingent credit) and then deal with the higher risk layers by increasing its level of financial resilience through the consideration of disaster risk transfer instruments.

²⁶ This represents the annual expected national disaster loss from modelled perils only, and is included for demonstration of rough magnitude of losses only

Option 6: Establish a robust catastrophe risk insurance program for public assets

Public assets such as schools and hospitals, and public infrastructure such as roads and bridges, can be severely impacted by natural disasters. Countries' strategies for sourcing reconstruction financing 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 as they can access additional financial capacity to bear the full cost of recovery/reconstruction when a disaster strikes. Other countries may require by law that public assets have catastrophe insurance against natural disasters. Even where catastrophe risk insurance is compulsory, in practice, most public assets remain either uninsured or under-insured. This is in part because the public managers are reluctant to spend part of their limited budget to pay insurance premiums, and because they lack information required to select a cost-effective insurance coverage.

Public assets are required to be insured by law in Pakistan and NICL has the mandate to provide insurance for public assets. However, it is not clear how comprehensive this coverage is and what the uptake rate of insurance is by managers of public assets. Initial research suggests that public assets and infrastructure are not comprehensively insured against catastrophic risks in Pakistan, although some provinces/municipalities have recently insured specific, select public assets. This highlights the need for a comprehensive database of public infrastructure. NICL could also make use of such a database to determine the insurability of these assets. Initiatives by the NDMA, the World Bank and other agencies to collate, share and synthesize geospatial information including property and infrastructure that could potentially be affected by natural catastrophes could be very valuable for an insurance program of public assets.

A catastrophe risk insurance program for public assets could be established in Pakistan to promote disaster insurance of public assets in collaboration with the private 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 private insurance industry that would assist public managers in identifying their risk exposure and their insurance needs. The program could also structure a national insurance portfolio of public assets to be then placed in the private (re)insurance market. A national approach to insuring public assets would allow for economies of scale and diversification benefits, and thus, lower reinsurance premiums.

In preparation of such a catastrophe risk program, a centralized database of public buildings, their contents, and nationwide infrastructure could be developed (as part of the activity to develop a national, geo-referenced database of national assets) as well as a database of current insurance policies in-force²⁷. Analysis of both will help identify current blind-spots and inefficiencies in the overall process of insuring public assets. In addition to better understanding of inclusions and exclusions of policies regarding natural catastrophe risk coverage by NICL, a detailed Dynamic Financial Analysis (DFA) of the portfolio of risks insured by NICL would provide key information and insight regarding portfolio optimization and evaluation of reinsurance structures.

²⁷ Similar initiatives have recently been undertaken in Colombia and Peru.

Option 7: Promote property catastrophe insurance for private dwellings

The current penetration of residential catastrophe property insurance is very low in Pakistan. Less than 1% of the residential property stock is currently insured against natural disasters. This low penetration is a direct result of the relatively poor development of the private non-life insurance market in Pakistan. However, other factors such as affordability of families to purchase insurance and general aversion to the concept of insurance also are key factors in the lower insurance penetration in Pakistan.

The GoP may want to promote catastrophe insurance for private residential properties. A developed domestic property catastrophe insurance market would reduce the GoP's implicit contingent exposure to major natural disasters. To help stimulate market development, the GoP could finance and distribute exposure and loss models to private insurers. The government could also support information and awareness campaigns.

Turkey provides an international case study of the development of a national homeowners' catastrophe insurance program. The Turkish Catastrophe Insurance Pool (TCIP) was established in 2000 to help address issues of market failure in the country, specifically a lack of local market earthquake insurance capacity and lack of demand for policies. The World Bank provided technical and financial assistance during the design stage of the TCIP to help model and rate the earthquake exposure as well as making available a contingent loan in the start-up implementation stage to cover claims as part of the risk financing program. A key feature of the coverage is that it is simple property, earthquake only, policy that is provided at affordable rates. Given the very low voluntary demand by Turkish homeowners for insurance, earthquake insurance was made compulsory for registered houses in urban centers. See Box 5.5 for a short description of the TCIP program.

BOX 5.5. The Turkish Catastrophe Insurance Pool (TCIP)

The Turkish Catastrophe Insurance Pool (TCIP) is a public sector insurance company which is managed on sound technical and commercial insurance principles. The TCIP purchases commercial reinsurance and the Government of Turkey acts as a catastrophe reinsurer of last resort for claims arising from an earthquake with a return period loss of greater than 300 years.

The TCIP policy is a standalone property earthquake policy with a maximum sum insured per policy of US\$65,000, an average premium rate of US\$46, and a two percent of sum insured deductible. Premium rates are based on construction types (two types) and property location (differentiating between five different earthquake 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 located in the highest risk zone. Since its inception the TCIP has achieved a penetration rate of approximately 20 percent, or three million domestic dwellings. See Annex 5 for additional details.

Should the GoP decide to establish a private residential catastrophe insurance program, a number of key decisions would have to be made, including whether:

- to form a public sector catastrophe insurance fund (as in the case of Turkey) or to promote some form of 'coinsurance pool' through the involvement of the existing non-life commercial insurers.

- to make homeowners' property insurance compulsory or to market the coverage on a voluntary basis. In the case of Turkey, the demand by homeowners for property insurance was very low due to the lack of an insurance culture and it was deemed necessary to make coverage compulsory.
- to bundle property catastrophe insurance with mortgages at least as an initial step for homeowners or to keep it as a standalone coverage. Mortgage-linked catastrophe insurance could be made compulsory; alternatively, coverage could be bundled with property taxes. Since mortgage coverage usually extends over a longer time period, any short fall later on could be covered by the sufficient capitalization of an insurance scheme
- to target the product at urban property owners alone or to target all households. In Turkey, earthquake insurance is only compulsory in urban areas. In Pakistan, much of the rural building stock is unlikely to meet the minimum building standards required by local insurers and their respective reinsurance markets.
- to involve government in the program through public-private partnership. This could include the provision of start-up funding (such as research and development costs) or early phase risk-bearing capital.

Improved coverage of insurance supervision would be required to effectively promote catastrophe risk coverage among private insurers. The quality of insurance supervision in Pakistan could be further improved through the use of a risk-based assessment of insurers' retention capacity and reinsurance strategies based on catastrophe risk modeling and actuarial tools. To that effect, World Bank, First Initiative and SECP have begun a project to harmonize the overall insurance legal and regulatory framework and to incorporate risk-based supervision. Risk Based Capital offers guidance to insurance companies to better manage risks. For example it requires an insurance company with a higher risk to hold a larger amount of capital. There are also options for the market to adopt Dynamic Financial Analysis (DFA) tools which complement actuarial models to further refine the commercial earthquake premium rates and to assess the impact of natural disasters on the insurers' portfolio. A scoring tool to assess the quality and adequacy of the insurers' reinsurance strategies could also be developed.

Annexes

1. Historical Natural Disaster Database for Pakistan
2. World Bank Development Policy Loan with Catastrophe Deferred Drawdown Option
3. Mexican Natural Disaster Fund FONDEN
4. The Turkish Catastrophe Insurance Pool TCIP
5. Post-Disaster Operational Phases
6. Operational Framework for Implementing Disaster Risk Financing and Insurance Solutions

Annex 1. Historical Natural Disaster Database for Pakistan

A historical disaster database has been compiled of the natural disasters that have impacted Pakistan since 1973. The historical disaster database data was constructed following a review of the available data at the NDMA and PDMA's across all the provinces and regions in Pakistan. While this data was available for the major disasters in the recent past, for older events, the records of the Provincial Relief Commissioner housed in the Provincial Revenue Departments were reviewed and the data extracted from the archives. The data collector met with the NDMA at the federal level while at the provincial levels, meetings were held with the PDMA's, provincial finance departments and provincial revenue departments. In some cases, records of the districts affected by various disasters were also analyzed to validate the numbers available at the provincial and national levels.

Figure A1.1: Historical natural disaster impact database compiled for this report.

Event	Year	Month	Peril	Region	Population affected (trended to 2012)
1	1973	-	Floods	Punjab	12,752,422
2	1975	-	Floods	Punjab	4,848,593
3	1976	-	Floods	Punjab	16,453,384
4	1977	-	Floods	Punjab	1,461,504
5	1978	-	Floods	Punjab	3,967,616
6	1979	-	Floods	Punjab	96,313
7	1980	-	Floods	Punjab	9,859
8	1981	Mar	Windstorm/Tornado	Punjab	9,847
9	1981	-	Floods	Punjab	1,431,192
10	1982	-	Floods	Punjab	54,815
11	1983	-	Floods	Punjab	134,961
12	1984	-	Floods	Punjab	105,594
13	1985	-	Floods	Punjab	37,764
14	1986	-	Floods	Punjab	1,480,123
15	1988	-	Floods	Punjab	5,031,270
16	1989	-	Floods	Punjab	247,290
17	1990	-	Floods	Punjab	24,088
18	1991	Feb	Floods	Balochistan	1,087
19	1992	May	Earthquake	KPK	13,764
20	1992	Aug	Floods	Punjab, Sindh and AJK	6,755,409

21	1993	Mar	Avalanche	KPK	619
22	1993	Jul	Floods	Punjab	400,677
23	1993	Nov	Windstorm	Sindh	6,285
24	1994	May	Windstorm	Punjab	302
25	1994	-	Floods	Punjab	373,103
26	1994	-	Floods and Rains	Sindh	1,020,772
27	1995	-	Floods	Punjab and Sindh	3,088,514
28	1996	Aug	Floods	Punjab	1,786,433
29	1997	Jun	Windstorm	KPK	204
30	1997	Oct	Windstorm	Sindh	177
31	1997	-	Floods	Punjab	2,850,899
32	1997	-	Cyclone Makran	Balochistan	136,695
33	1998	Mar	Floods	Balochistan	36,221
34	1998	Aug	Windstorm	Punjab	842
35	1998	-	Floods	Punjab	1,529
36	1999	May	Cyclone	Sindh	776,162
37	1999	-	Floods	Punjab	322
38	2000	-	Floods	Punjab	890
39	2000	-	Drought	Balochistan	1,523,624
40	2001	Jan	Earthquake	Sindh	1,119,180
41	2001	Mar	Windstorm/Tornado	Punjab	34
42	2001	-	Drought	Punjab	10,293,468
43	2001	-	Floods	KPK	1,129
44	2002	May	Windstorm	Punjab	216
45	2002	Nov	Earthquake	GB	104,378
46	2002	-	Cyclone	Punjab	20,495
47	2002	-	Drought	Punjab	10,227,242
48	2003	Feb	Rains	Sindh	10,999
49	2003	Feb	Heavy Rains	Balochistan	4,481
50	2003	Feb	Heavy Rains	AJ&K	41
51	2003	Feb	Heavy Rains	KPK	220
52	2003	Jul	Rains	Balochistan	283,721
53	2003	-	Floods	Punjab	9,681
54	2003	-	Drought	Punjab	89,142
55	2003	-	Rains	Sindh	1,030,318
56	2004	Feb	Earthquake	KPK	45,463
57	2004	-	Drought	Punjab	884,203
58	2005	Feb	Snow Fall and Rains	KPK	3,468,126

59	2005	Feb	Snow Fall and Rains	Balochistan	80,923
60	2005	Feb	Snow Fall and Rains	AJ&K	118
61	2005	Jul	Floods	Punjab and KPK	423,005
62	2005	Oct	Earthquake	KPK and AJ&K	4,046,147
63	2005	Dec	Avalanche	KPK	189
64	2006	Jul	Monsoon	Sindh, KPK and AJ&K	2,133,403
65	2006	Sep	Floods	Punjab	342,119
66	2007	Mar	Land Slide	AJ&K	235
67	2007	Apr	Avalanche	Gilgit Baltistan	220
68	2007	Sep	Cyclone Yemyin	Sindh and Balochistan	2,377,813
69	2007	Nov	Floods	Punjab	5,762
70	2007	-	Heavy Rain	Sindh	318
71	2007	-	Cloudburst	KPK	379
72	2008	Sep	Floods	Punjab	120,621
73	2008	Oct	Earthquake	Balochistan	437,396
74	2008	Oct	Earthquake	KPK	74,576
75	2009	Feb	Earthquake	AJ&K	-
76	2009	May	Avalanche	AJ&K	175
77	2009	Jul	Heavy Rains	Balochistan	139
78	2009	Aug	Flash Floods	KPK	3,285
79	2009	Oct	Floods	Punjab	223
80	2010	Jan	Landslides and Floods	Gilgit Baltistan	316
81	2010	Feb	Breach of Zalzal Lake	AJ&K	14
82	2010	Feb	Avalanche	KPK	3,832
83	2010	May	Floods	Gilgit Baltistan	13,711
84	2010	-	Cyclone	Sindh	72
85	2010	-	Floods	Punjab, Sindh, GB, FATA, Balochistan and AJ&K	19,094,527
86	2011	Mar	Tornado	Punjab	62
87	2011	Apr	Landslide	AJ&K	1,348
88	2011	Aug	Floods	Punjab, Sindh and Balochistan	9,642,812
89	2012	Feb	Avalanche	AJ&K	97
90	2012	Mar	Avalanche	AJ&K	-
91	2012	Mar	Wind Storm	AJ&K	1
92	2012	Mar	Wind Storm	AJ&K	-
93	2012	Mar	Wind Storm	AJ&K	-
94	2012	Mar	Avalanche	AJ&K	35

95	2012	Mar	Avalanche	AJ&K	1
96	2012	Apr	Avalanche	Gilgit Baltistan	936
97	2012	Sep	Lightning	AJ&K	2
98	2012	Sep	Flash Flood	AJ&K	90
99	2012	Sep	Landslide	AJ&K	1
100	2012	Oct	Monsoon	AJ&K	451
101	2012	-	Floods	Punjab, Sindh and Balochistan	4,964,154
102	2012	-	Torrential Rain/Flood	KPK	46,847

Annex 2. World Bank Development Policy Loan with Catastrophe Deferred Drawdown Option

The Development Policy Loan with Catastrophe Deferred Drawdown Option (Cat DDO) is a contingent credit line that provides immediate liquidity to IBRD member countries in the aftermath of a natural disaster. It is part of a broad spectrum of World Bank Group disaster risk financing instruments available to assist borrowers in planning efficient responses to catastrophic events.

The Cat DDO helps develop a country's capacity to manage the risk of natural disasters and should be part of a broader preventive disaster risk management strategy. The Cat DDO complements existing market-based disaster risk financing instruments such as insurance, catastrophe bonds, reserve funds, etc.

In order to gain access to financing, the borrower must implement a disaster risk management program, which the Bank will monitor on a periodic basis.

Key Features

The Cat DDO offers a source of immediate liquidity that can serve as bridge financing while other sources (e.g. concessional funding, bilateral aid or reconstruction loans) are being mobilized after a natural disaster. The Cat DDO ensures that the government will have immediate access to bridge financing following a disaster, which is when a government's post-disaster liquidity constraints are highest.

Borrowers have access to financing in amounts up to US\$500 million or 0.25 percent of GDP (whichever is less). The Cat DDO has a "soft" trigger, as opposed to "parametric" trigger, which means that funds become available for disbursement upon the occurrence of a natural disaster resulting in the declaration of a state of emergency.

The Cat DDO has a revolving feature; amounts repaid during the drawdown period are available for subsequent withdrawal. The three-year drawdown period may be renewed up to four times, for a total maximum period of 15 years.

Pricing Considerations

The Cat DDO carries a LIBOR-based interest rate that is charged on disbursed and outstanding amounts. The interest rate will be the prevailing rate for IBRD loans at time of drawdown. A front-end fee of 0.50 percent on the approved loan amount and a renewal fee of 0.25 percent also applies.

The Cat DDO provides an affordable source of contingent credit for governments to finance recurrent losses caused by natural disasters. The expected net present value of the cost of the Cat DDO is estimated to be at least 30 percent lower than the cost of insurance for medium risk layers (that is, a disaster occurring once every three years). This cost saving can be even higher when the country's opportunity cost of capital is greater.

Major Terms and Conditions of the Catastrophe Risk Deferred Drawdown Option	
Purpose	To enhance/develop the capacity of borrowers to manage catastrophe risk. To provide immediate liquidity to fill the budget gap after a natural disaster. To safeguard on-going development programs.
Eligibility	All IBRD-eligible borrowers (upon meeting pre-approval criteria)
Pre-approval criteria	Appropriate macroeconomic policy framework. The preparation or existence of a disaster risk management program.
Loan Currency	EUR, JPY and USD.
Drawdown	Up to the full loan amount is available for disbursement at any time within three years from loan signing. Drawdown period may be renewed up to a maximum of four extensions.
Repayment Terms	Must be determined upon commitment and may be modified upon drawdown within prevailing maturity policy limits.
Lending Rate	Like regular IBRD loans, the lending rate consists of a variable base rate plus a spread. The lending rate is reset semi-annually, on each interest payment date, and applies to interest periods beginning on those dates. The base rate is the value of the 6-Month LIBOR at the start of an interest period for most currencies, or a recognized commercial bank floating rate reference for others.
Lending Rate Spread	The prevailing spread, either fixed or variable, for regular IBRD loans at time of each drawdown. 1. Fixed for the life of the loan: Consists of IBRD's projected funding cost margin relative to LIBOR, plus IBRD's contractual spread of 0.50%, a risk premium, a maturity premium for loans with average maturities greater than 12 years, and a basis swap adjustment for non-USD loans. 2. Variable resets semi-annually: Consists of IBRD's average cost margin on related funding relative to LIBOR plus IBRD's contractual spread of 0.50% and a maturity premium for loans with average maturities greater than 12 years. The variable spread is recalculated on January 1 and July 1 of each year. The calculation of the average maturity of DDOs begins at loan effectiveness for the determination of the applicable maturity premium, but at withdrawal for the remaining components of the spread.
Front-End Fee	0.50% of the loan amount is due within 60 days of effectiveness date; may be financed out of loan proceeds.
Renewal Fee	0.25% of the undisbursed balance
Currency Conversions, Interest Rate Conversions, Caps, Collars, Payment Dates, Conversion Fees, Prepayments	Same as regular IBRD loans.
Other Features	Country Limit: Maximum size of 0.25% of GDP or the equivalent of US\$500 million, whichever is smaller. Limits for small states are considered on a case-by-case basis.
	Revolving Features: Amounts repaid by the borrower are available for drawdown, provided that the closing date has not expired.

Table A2.1: Major terms and conditions of the Catastrophe Risk Deferred Drawdown Option.

Annex 3. Mexican Natural Disaster Fund FONDEN

Mexico has a long history of, and broad exposure to, natural disasters. Located on the 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. The earthquake 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 societal loss and essential functions caused by disasters. Responsibility for SINAPROC lies with the Interior Ministry. Also within the Ministry of the Interior, the National Center for Disaster Prevention (CENAPRED) was 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 Fund for Natural Disasters (FONDEN)

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

FONDEN is an instrument for the coordination of intergovernmental and inter-institutional entities to quickly provide funds in response to natural disasters. FONDEN's main purpose is to provide immediate financial support to federal agencies and local governments recovering from a disaster, and in particular for the: i) provision of relief supplies; and, ii) 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 of FONDEN

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

Financial support is directed towards public infrastructure and low-income households who, due to their poverty status, require government assistance. The adverse natural events covered by the FONDEN

consist of geological perils including earthquake, volcanic eruption, tsunami, landslide and hydrological perils including drought, hurricane, excess rainfall, hail storm, flood, tornado, wildfire.

The 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.

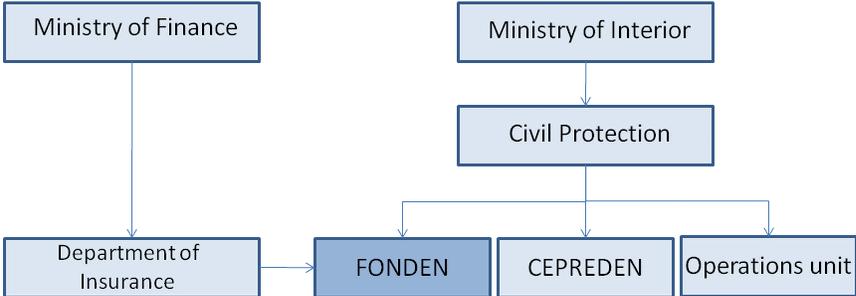
- *Revolving Fund:* This fund finances emergency supplies to be provided in the aftermath of a natural disaster, such as shelters, food, primary health care, etc. In the case of high probability of a disaster, or imminent danger, the local governments can declare a situation of emergency and obtain resources 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 municipalities, state governments and federal governments), and the restoration of natural areas and private dwellings of low-income households following a natural disaster.
- *FONDEN Trust:* This Trust Fund manages the assets of the FONDEN, including its risk transfer strategy (reinsurance and/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.

FONDEN Institutional Structure

Located within the Civil Protection unit of the Ministry of the Interior, FONDEN is a trust managed by one of Mexico’s main development banks (Banobras). The structure of FONDEN includes a counterparty in each of the 32 Mexican states, including Mexico City, in order 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 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 Cat bonds, the FONDEN Trust places excess risk first with the public insurer AGROASEMEX. This entity passes on the risk to the markets.

Figure A3.1. Organizational Structure of FONDEN



Source: FONDEN (2010)

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 co-financed by the 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:

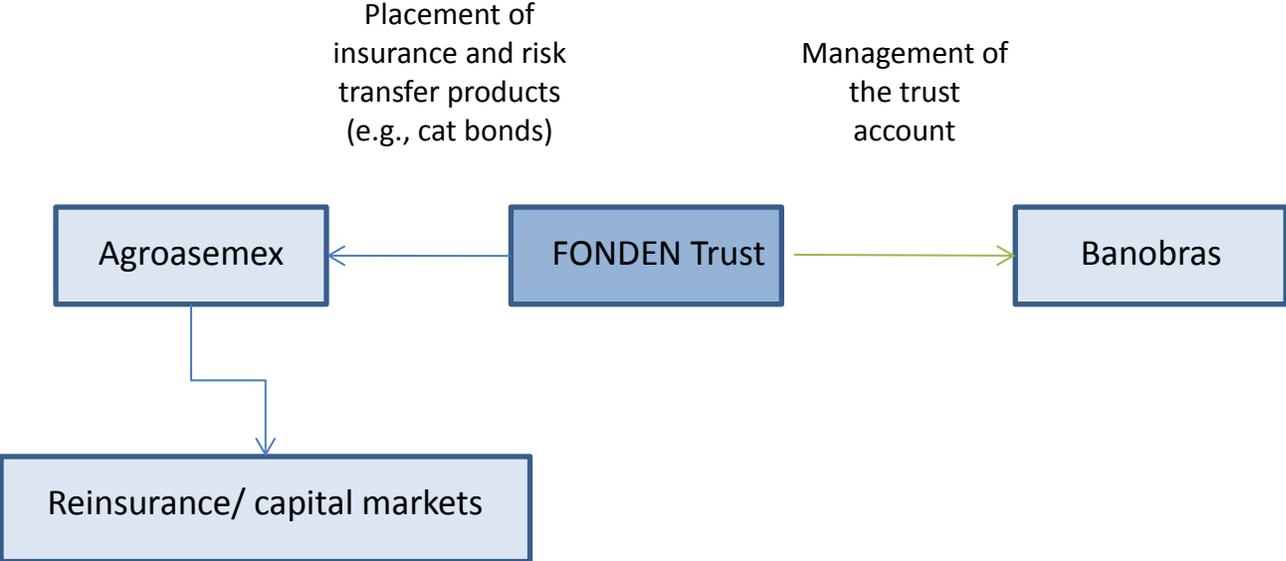
1. In the aftermath of a disaster, a specialized federal or state agency (e.g., meteorological department, geosciences department) certifies the occurrence of a natural disaster and informs the State Government;
2. Within 4 days after the occurrence of a disaster, the State Government sets up a technical committee to identify and assess the damage caused by the natural disaster;
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 Interior issues a declaration of state of natural disaster. Meanwhile, the Ministry of Finance authorizes the FONDEN to release early partial contribution to the State;
5. Within the following 2 days, the Ministry of Interior should: i) ensure that the requested assistance is related to the natural disaster; ii) verify that the damaged infrastructure has not benefited from the FONDEN in the past; if this is the case, the proof of insurance of the damage infrastructure is requested; and iii) formally approve the co-financing of the reconstruction of the damaged assets.
6. The claims are authorized to be financed by the FONDEN. In case of federal assets, the Federal FONDEN Trust pays directly the contractor. In 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 the FONDEN in case of a natural disaster. The Federal Government has empowered the FONDEN to develop a catastrophe risk financing strategy, relying on private risk transfer instruments such as reinsurance and catastrophe bonds. This helps the FONDEN to increase its financial independence and overcome some political economy issues.

The financial structure of the FONDEN is depicted in Figure A3.2. The public bank Banogras 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 A3.2. Financial Structure of FONDEN



Source: FONDEN 2010.

The FONDEN Disaster Risk Financing Strategy for 2011

The disaster risk financing strategy of the FONDEN relies on a combination of risk retention and risk transfer. To execute this strategy, the 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. In order to purchase insurance coverage the Federal law was modified to allow the 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 are intermediated by the public reinsurance company Agroasemex. Below, Figure A3.3 describes the FONDEN’s disaster risk financing strategy for 2011.

Figure A3.3. FONDEN Disaster Risk Financing Strategy of the Federal Government in 2011



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 includes a budget line of 0.4 percent of the government expenditures for the financing of public assets and the FONDEN, which corresponds to MXN10 billion in 2011. In case this annual budget allocation is insufficient, the FONDEN has the ability to receive an exceptional budget allocation from the Federal government reserve funds (such as the oil fund).

For the first time, in 2011, the FONDEN is placing an indemnity-based excess-of-loss (XL) reinsurance treaty on the international reinsurance market. Reinsurance payouts are based on the losses reported by the 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/municipal assets and low-income housing). The losses reported to FONDEN include 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 is expecting to place a XL reinsurance treaty of MXN 6 billion in excess of MXN 12.5 billion.

The FONDEN has also secured the protection of a catastrophe bond. In 2006, FONDEN 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 multi-peril 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 provides (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 will repay the principal to investors unless an earthquake or hurricane triggers a transfer of the funds to the Mexican government.

Annex 4. Turkish Catastrophe Insurance Pool

Bridging the contents of Europe and Asia, Turkey is highly exposed to severe earthquakes. Despite their common occurrence, Turkey's private insurance market was previously 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 post-disaster reconstruction of private property.

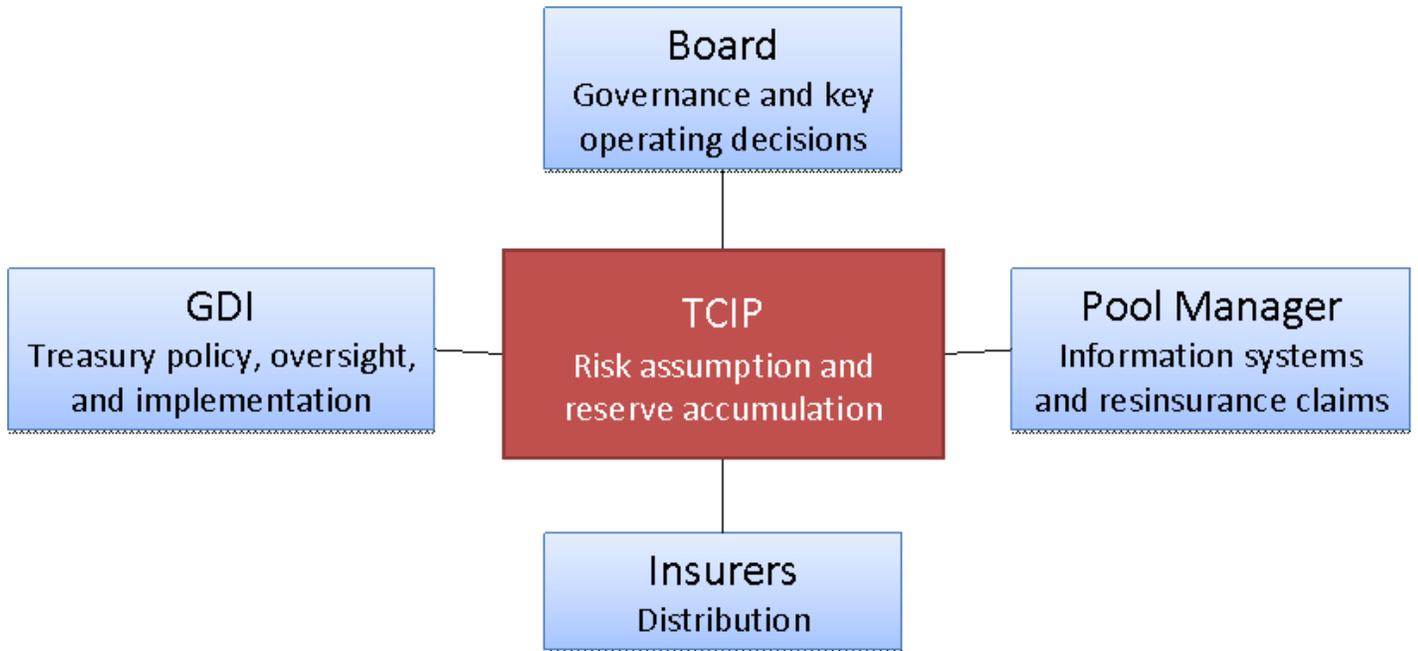
In the aftermath of the Marmara earthquake in 2000, in cooperation with the World Bank the Government worked to limit its financial exposure to the residential housing market through the establishment of the Turkish Catastrophe Insurance Pool (TCIP). The pool enables the Government of Turkey to ensure that owners who pay property taxes on domestic dwellings can purchase affordable and cost effective coverage. In doing so, 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 post disaster housing subsidies.

TCIP is a public sector insurance company which is managed on sound technical and commercial insurance principles. The Pool operates as a genuine public-private partnership with most, if not all, operational functions outsourced to the private sector. 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 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 (2 types) and property location (differentiating between 5 earthquake risk zones) and vary from less than 0.05 percent for a concrete reinforced house in a low risk zone to 0.60 percent for a house located in the highest risk zone.

The TCIP sold more than 3 million policies at market-based premium rates (i.e., 23 percent penetration) in 2009, compared to 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 home-owners on registered land in urban centers. The legal framework for the program envisages compulsion enforcement mechanisms in urban settings, while coverage is voluntary for homeowners in rural areas.

Figure A4.1 Operational Structure of the TCIP



Annex 5. The Post-Disaster Operational Phases

The role of disaster risk financing and insurance for the post-disaster operational phases is further detailed in the paper: *Financial Protection Against Disasters: An Operational Framework for Disaster Risk Financing and Insurance (World Bank, 2014)*. A summary is provided below.

Emergency response/relief operations include emergency assistance provided to the affected population to ensure basic needs, such as the need for shelters, food and medical attention. This is the provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected. This phase aims at stabilizing the society, with termination of further loss. Such costs can be difficult to estimate ex-ante, as 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), etc.), but are relatively small compared to the subsequent recovery and reconstruction operations. While relief costs are limited, they need to be financed in a matter of hours after a disaster event. The capacity of governments to mobilize resources for relief operation at short notice should be a key component of its risk financing strategy.

Recovery operations following the initial relief efforts are crucial to limit secondary losses and ensure that reconstruction can start as soon as possible. They are the restoration and improvement, where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. That is, the society's functions are restored, such as re-opening of schools, businesses, etc, even if only in temporary shelters. They include, among other things, the emergency restoration of lifeline infrastructure (e.g., water, electricity and key transportation lines), the removal of debris, the financing of basic safety nets, and the provision of basic inputs (e.g., seeds, fertilizers) to restart agricultural activities. It is also during this phase that engineering firms can be mobilized to start the design of infrastructure works that will take place during the reconstruction phase. Government may also have to subsidize the basic restoration of private dwellings, particularly for low-income families, before the reconstruction phase starts.

Reconstruction operations generally center 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 comprise that community or society. These include public building and infrastructure which 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, government will have to subsidize the reconstruction of private assets and, in particular, housing for low-income families who could not otherwise afford to rebuild their homes.

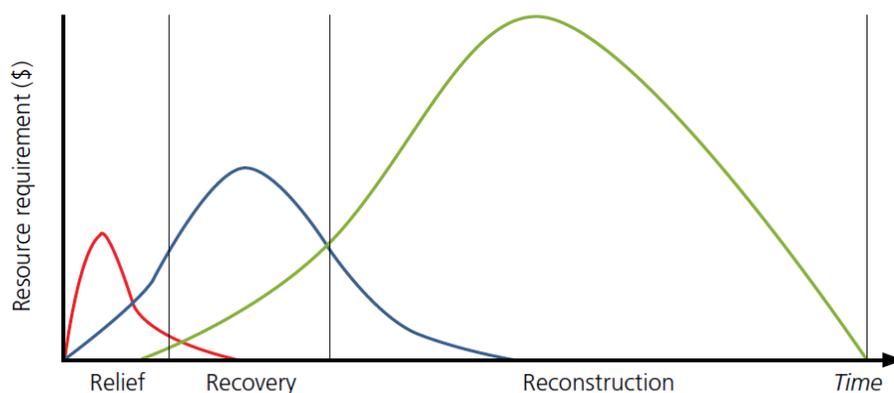


Figure A5.1: The three post-disaster phases.

Annex 6. Operational Framework for Implementing Disaster Risk Financing and Insurance Solutions

The Disaster Risk Financing and Insurance (DRFI) Operational Framework developed by the World Bank Disaster Risk Financing and Insurance Program seeks to provide governments engaging on financial protection with a framework for the development and implementation of cost-effective, sustainable DRFI solutions. This framework is laid out in the paper: *Financial Protection Against Disasters: An Operational Framework for Disaster Risk Financing and Insurance (World Bank, 2014)*. A summary of the content in this document is provided in this Annex.

The structure of the DRFI operational framework has emerged through a long sustained dialogue and many years 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 level.

This framework aims to answer basic questions and challenges usually faced by governments when they initiative or further improve their DRFI strategy. Experience has shown that a DRFI engagement is usually triggered by two main entry points. Often governments 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. On the other hand, governments may start from a particular development goal – such as protecting small farmers against drought or ensuring access to immediate post disaster liquidity for central/local governments – in which case it is necessary to identify the appropriate solutions. In both cases, the Operational DRFI Framework provides governments with an initial orientation to start the relevant discussions with all stakeholders and gain an understanding 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.

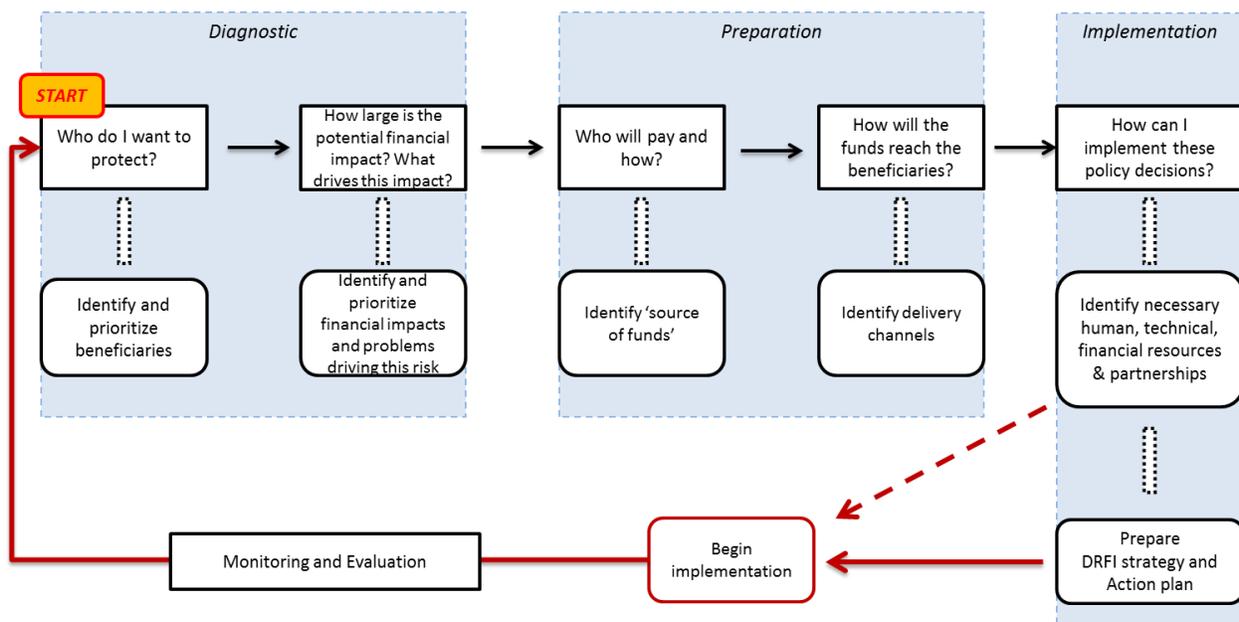
While the overall goal of DRFI - to increase the financial resilience of society to disasters – is common across all countries, a government has many options to achieve this goal, depending on its circumstances and timeframe. The Operational DRFI Framework helps governments and policy makers identify and prioritize solutions appropriate for their country. Introducing a common language also enables and strengthens the international cooperation often required between governments and their partners, as well as amongst 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. This requires sustained engagement and commitment of the countries and their partners. Countries are diverse and so are their disaster risk financing and insurance needs and solutions. Low-income countries constrained by a lack of capacity may not utilize 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 GDP face different challenges than large middle-income countries trying to safeguard low-income populations against disasters.

The Operational DRFI Framework is presented in three components which should be seen as one package and applied in an iterative way: (i) a decision tree for governments engaging in DRFI (Figure A6.1); (ii) an overview of actions taken by governments to increase financial resilience of defined beneficiaries (Figure A6.2); and (iii) illustrative examples from international experience (Figure A6.3).

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. 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 A6.1).

Figure A6.1. Operational DRFI Framework: Decision tree for Government to engage in DRFI



Source: World Bank Disaster Risk Financing and Insurance Program

At each step of the decision process, policy makers can consult the second component of the Operational DRFI Framework, the matrix of policy objectives and actions (Figure A6.2), to help answer the questions and develop and implement the DRFI Strategy. The steps in the decision process are:

- i. Identify and prioritize overarching goals and beneficiaries of planned DRFI engagement (Column in Matrix).
- ii. Carry out risk assessment to identify the impacts that are of concern and the problems driving those impacts (Top row in Matrix).
- iii. Identify and prioritize sources of funds to mitigate financial impacts (Middle row in Matrix).
- iv. Identify delivery channels of those funds to beneficiaries (Bottom row in Matrix).

- v. At each step identify policy goals and actions needed, consolidate into a Strategy and Action Plan, and begin implementation.
- vi. Monitor and evaluate implementation, refine policies and actions.

Figure A6.2. World Bank DRFI Program Operational Framework: Actions taken by Government for financial protection

Beneficiaries Actions	Actions by Governments for financial protection of the state	Actions by Government for financial protection of society		
	Government – National & Local (Sovereign DRFI)	Homeowners and SMEs (Property Cat Risk Insurance)	Farmers and Herders (Agricultural Insurance)	Low income population (Social Protection)
Assess Risks	<ul style="list-style-type: none"> Collect and manage risk and loss data Quantify potential disaster related losses from fiscal and budget perspective Assess potential post-disaster (short term and long term) funding gaps 	<ul style="list-style-type: none"> Collect and manage risk and loss data Quantify potential disaster related losses from property damage Identify proportion of losses incurred by public and private stakeholders Assess capacity of domestic insurance markets 		<ul style="list-style-type: none"> Collect and manage disaster risk and loss/impact data Quantify potential disaster related losses on low-income population Quantify fiscal impact of potential disaster related losses through social protection programs
Arrange Financial Solutions	<ul style="list-style-type: none"> Develop Financial decision making tools Develop national strategy for financial protection <ul style="list-style-type: none"> Secure immediate liquidity for budget support following disasters: risk layering including reserves, contingent credit, and catastrophe risk transfer Secure longer term reconstruction financing, e.g., insurance program for public assets 	<ul style="list-style-type: none"> Promote domestic demand for insurance <ul style="list-style-type: none"> Financial incentives through premium subsidies and/or tax breaks Compulsory vs voluntary schemes Awareness/education of consumers on insurance products Develop domestic supply of insurance <ul style="list-style-type: none"> Assess legal and regulatory environment to allow private sector to develop/test private insurance solutions while protecting consumers Risk data collection, management and sharing Product development (indemnity and index based) Insurance pools 		<ul style="list-style-type: none"> Secure contingent funding for social protection programs against disasters Complement/enhance social protection programs with insurance principles and market-based products including use of transparent for payouts
Deliver Funds to Beneficiaries	<ul style="list-style-type: none"> Establish national disaster fund Establish transparent, timely and effective post disaster loss reporting mechanisms Establish post disaster budget execution mechanisms to transfer funds from national to subnational level and from MoF to line ministries 	<ul style="list-style-type: none"> Develop risk market infrastructure to support delivery channels <ul style="list-style-type: none"> Underwriting and claims settlement process Delivery channels through insurance agents Alternative delivery channels: Banks, micro-finance Intermediaries, input providers, NGOs, etc. 		<ul style="list-style-type: none"> Improve beneficiary targeting and assessing eligibility for post-disaster payouts
Linkages to DRM	↓	Reduce Underlying Drivers of Risk		↓

Finally, the third component of the Operational DRFI Framework presents illustrative examples of how governments are implementing DRFI solutions (Figure A6.3). While this decision process is presented sequentially, governments usually begin engagement in DRF in order 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.

Figure A6.3. World Bank DRFI Program Operational Framework: Illustrative examples of financial protection

Beneficiaries	Government - National & Subnational (Sovereign DRFI)	Homeowners and SMEs (Property Catastrophe Risk Insurance)	Agricultural Producers and Herders (Agricultural Insurance)	Low Income Population (Social Protection)
Assess Risks	<p>The Government of Colombia included the assessment of contingent liabilities from disasters in the government's fiscal risk management strategy.</p> <p>In Mexico, R-FONDEN a probabilistic catastrophe risk modeling tool, creates probabilistic simulations of potential material and human losses from disasters.</p> <p>Morocco has developed a probabilistic catastrophe risk modeling tool to assist the government in prioritizing their risk mitigation investments.</p> <p>The Philippines is developing a catastrophe risk model to evaluate options for risk transfers and insurance to reduce the fiscal burden of disasters.</p> <p>The Pacific Risk Information System, under the Pacific Catastrophe Risk Assessment and Financing Initiative, includes a database of over 3.5 million geo-referenced buildings and infrastructure in 15 Pacific Island Countries. It was used to develop the Pacific catastrophe risk insurance pilot.</p>	<p>In Chinese Taipei, the Residential Earthquake Insurance Fund (TREIF) has developed an earthquake risk model to strengthen the independence and professionalism of its earthquake risk assessments.</p> <p>The preparation of the Southeast Europe and Caucasus Regional Catastrophe Risk Insurance Facility includes extensive multi-hazard country risk assessments for climate and geological hazards.</p>	<p>India has developed detailed agricultural risk assessment tools to help policymakers to better understand the economic consequences of drought, quantify such impacts, and investigate the impacts of risk coping strategies, at both the farm and state levels.</p> <p>In Mongolia, livestock census/surveys are used to inform the government about the economic and fiscal impact of adverse weather events, and in the design and pricing of index based livestock insurance policies.</p>	<p>In the Philippines a survey is mapping out the poorest communities, enabling better targeting of social welfare support to communities, including assistance related to disaster risk.</p>
Arrange Financial Solutions	<p>Contingent lines of credit provide developing countries with funds immediately following disasters. Products are offered by the World Bank, IDB and JICA.</p> <p>The first multi-country risk pool, the Caribbean Catastrophe Risk Insurance Facility, established in 2007, offers 16 small island states countries over US\$150 million in hurricane and earthquake coverage.</p> <p>In 2006, Mexico transferred US\$450 million of earthquake risk to financial markets by combining the world's first government catastrophe (cat) bond (Cat MEX – US\$160 million) and parametric reinsurance (US\$290 million).</p> <p>In Colombia, the government uses standardized terms and conditions informed by international best practices to purchase catastrophe insurance for its public buildings.</p>	<p>The Turkish Catastrophe Insurance Pool (TCIP), a public-private partnership with the domestic insurance industry, provides compulsory, affordable earthquake insurance to homeowners, increasing catastrophe insurance coverage from less than 3 percent to over 40 percent of residential buildings in urban areas.</p> <p>The Japanese public-private earthquake insurance program for homeowners relies on the Japan Earthquake Reinsurance Company (JERC), an earthquake reinsurance pool backed by the Government.</p>	<p>The Index-Based Livestock Insurance Pilot in Mongolia protects the livelihoods of 11,000 herders or 22 percent in piloted provinces in 2012.</p> <p>India's weather based crop insurance has been in place since 2007 for 11 growing seasons, with 11.6 million farmers and \$370 million covered in the most recent season. While the national crop insurance program since 2010 offers more than 1.1 million farmers a total of \$67 million coverage in yield crop insurance.</p> <p>In Morocco, the government and the agricultural mutual insurance company have established a crop insurance program for cereals which currently covers 700,000 ha and will soon be extended to fruit trees.</p>	<p>The Productive Safety Net Programme (PSNP) in Ethiopia is aimed at enabling the rural poor facing chronic food insecurity to resist shocks, create assets and become food self-sufficient.</p> <p>In 2011, reinsurance company MiCRO (Microinsurance Catastrophe Risk Organization) was established to provide insurance coverage to women-owned microenterprises in Haiti.</p> <p>Insurance products of the Center for Agriculture and Rural Development Mutual Benefit Association (CARD MBA) in the Philippines are mandatory for members of a network of institutions including CARD NGO and CARD Bank, providing scale and preventing adverse selection.</p>

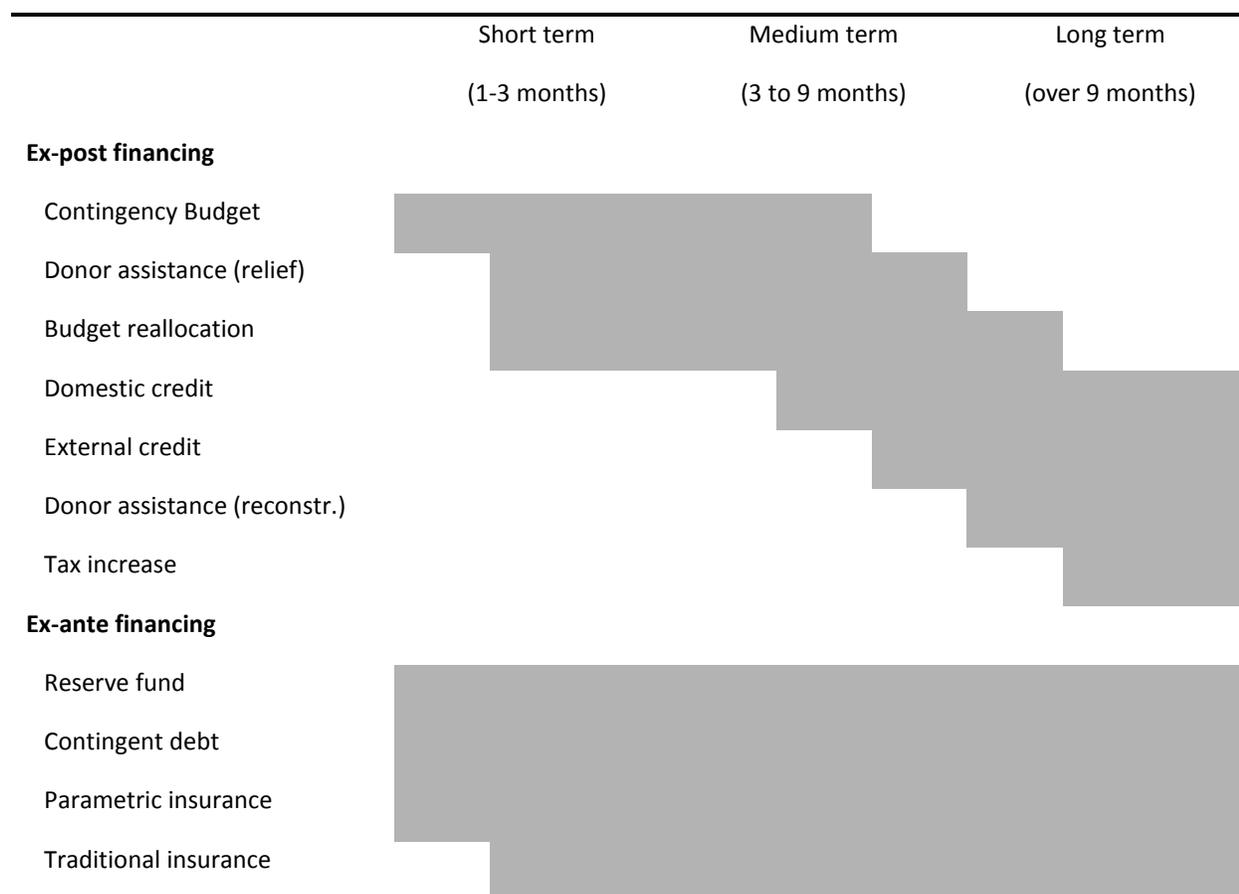
<p>Deliver Funds to Beneficiaries</p>	<p>The Government of Mexico established a post-disaster loss reporting mechanism managed by FONDEN. Affected states can therefore access timely payments from the Natural Disaster Fund (FONDEN), reducing time-consuming coordination problems.</p> <p>In the Cook Islands, the establishment of the Disaster Emergency Trust Fund has served to reduce delays in emergency response.</p>	<p>As a public private partnership the Turkish Catastrophe Insurance Pool relies on the domestic insurance market for the distribution and claims settlement.</p>	<p>Distribution in the Moroccan multi-peril crop insurance program takes place either by linkage to loans made by Crédit Agricole or by direct marketing of MAMDA, the sole provider of agriculture insurance in the country, structured as a mutual.</p> <p>The national crop insurance program in India uses GPS enabled mobile phones and video recording technology to enhance crop cutting experiments, improving the accuracy of claims assessments while reducing fraudulent claims. Claims settlement takes place through direct payment to bank accounts.</p>	<p>HARITA was launched in Ethiopia in 2007 as a pilot program to address the needs of small-scale farmers through drought insurance, credit, and risk reduction, allowing farmers to pay for insurance through labor, an idea based on “food-for-work” programs.</p> <p>MiCRO’s coverage in Haiti is bundled with loans from Fonkoze, the country’s largest microfinance institution.</p>
<p>Linkages to DRM</p> <p>↓</p>	<p>Mexico’s natural disaster fund FONDEN has evolved to include financial accounts to finance investment in risk reduction. It promotes informed decision by requiring states to complete a risk assessment (including development of a risk atlas) before being eligible for financing for risk mitigation projects</p>	<p>After setting up the TCIP, the Government of Turkey legally abolished its obligation to fund the reconstruction of residential dwellings following earthquakes, strengthened building construction codes, and enhanced supervision thereof.</p>	<p>↓</p>	<p>Members of PSNP households must participate in productive activities that will build more resilient livelihoods, such as rehabilitating land and water resources and developing community infrastructure, including rural road rehabilitation and building schools and clinics.</p>

Source of Financing Post-Disaster

Governments have access to various sources of financing following a disaster. These sources can be categorized as ex-post and ex-ante financing instruments. Ex-post instruments are sources that do not require advance planning. This includes budget reallocation, domestic credit, external credit, tax increase, and donor assistance. Ex-ante risk financing instruments require pro-active advance planning and include reserves or calamity funds, budget contingencies, contingent debt facility and risk transfer mechanisms. Risk transfer instruments are instruments through which risk is ceded to a third party, such as traditional insurance and reinsurance, parametric insurance (where insurance payouts are triggered by pre-defined parameters such as wind speed of a hurricane) and Alternative Risk Transfer (ART) instruments such as catastrophe (CAT) bonds.

The analysis of the fiscal management of natural disasters in Indonesia has identified possible post-disaster resource gaps. This time-sensitive analysis supports the design of a cost-effective disaster risk financing strategy, as different financial instruments are available at different periods after a disaster (Figure A6.4).

Figure A6.4. Availability of Financial Instruments Over Time



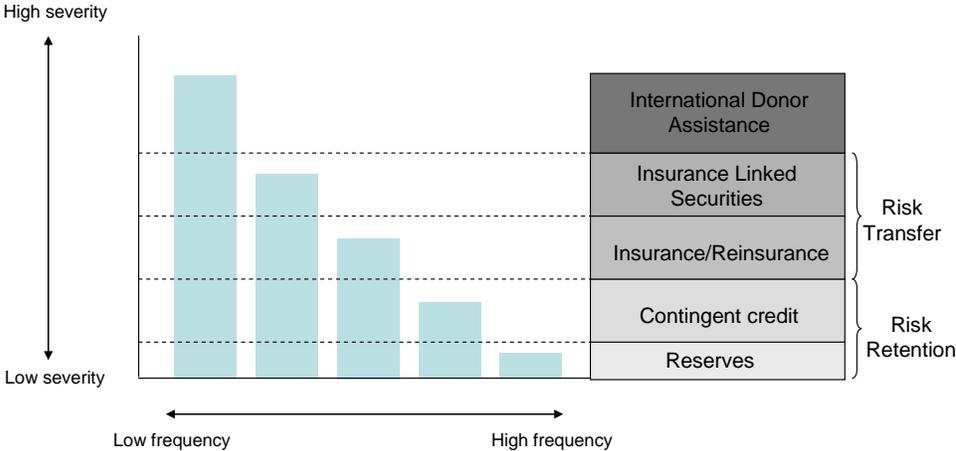
Source: Ghesquiere and Mahul (2007)

Among the ex post (post-disaster) financing tools, contingency budget is the first to be immediately available after a disaster. Other ex-post financing tools usually take more time to mobilize and are mainly available for the reconstruction phase. These include emergency recovery loans and post-disaster reconstruction loans from international financial institutions, such as the World Bank.

Ex ante financing instruments can provide immediate liquidity after a natural disaster. These instruments are designed and implemented before a disaster occurs. These instruments include national disaster reserve funds, contingent credit and insurance. Small but recurrent losses can be retained through reserves and/or contingent credit. More severe but less frequent events, occurring for example once every 7 years or more, can be transferred to the insurance or capital markets. Finally, international post-disaster donor assistance plays a role after the occurrence of an extreme natural disaster.

Catastrophe risk layering can be used to design a risk financing strategy (see Figure A6.5). Budget contingencies together with reserves are the cheapest source of ex-ante risk financing and will generally be used to cover the recurrent losses. Other sources of financing such as contingent credit, emergency loans and possibly insurance should enter into play only once reserves and budget contingencies are exhausted or cannot be accessed fast enough. A “bottom-up” approach is recommended: the government first secures funds for recurrent disaster events and then increases its post-disaster financial capacity to finance less frequent but more severe events. The level of fiscal resilience to natural disasters, which drives the optimal financial strategies against natural disasters, is a decision to be taken by the government based on economic and social considerations.

Figure A6.5. Catastrophe risk layering



Source: Authors from World Bank Disaster Risk Financing and Insurance Program framework.

A comparative analysis of the ex ante risk financing and risk transfer instruments is provided in Table A6.1.

Table A6.1. Contingent financing instruments for natural disaster.

Product	Benefits	Costs/Risks/Constraints
Risk Transfer		
Indemnity CAT (Re)Insurance	<p>No basis risk</p> <p>Less technical work/investments involved in product design (follow the fortune approach)</p> <p>Technology transfer expertise from international markets being replicated worldwide for decades</p> <p>Less restriction of geography/peril for a specific contract</p> <p>Liability is transferred from gov't balance sheet to financial markets</p>	<p>Works better in mature markets with solid local delivery systems and insurance regulatory framework</p> <p>Market focused on asset based approach (concepts of interest for sovereigns like emergency relief, low income housing, safety nets are considered usually non insurable)</p> <p>Difficult to create investor confidence on potential moral hazard when sovereign risk is involved</p> <p>Up front premium</p> <p>One year protection is the norm</p> <p>Counterparty credit risk</p> <p>Settlement of claims can take a long time</p>
Parametric (Re)Insurance	<p>No moral hazard, and more transparent for risk-assuming counterparty</p> <p>Rapid disbursement of funds</p> <p>Multi-annual protection may be feasible²⁸</p> <p>Less insurance market infrastructure required (e.g. claims verification)</p>	<p>Basis risk</p> <p>Extensive and high-quality data sets are required to model the hazard and quantify probability of a loss to the contract</p> <p>High up-front costs (including cost of product development and premium)</p> <p>Counterparty credit risk</p>
CAT Bonds	<p>Limited credit risk. Vehicle is fully collateralized, but collateral is invested introducing some credit risk.²⁹</p> <p>Access to a broader source of funding (Capital Markets + Insurance)</p>	<p>Basis risk for parametric and modeled loss CAT bond triggers</p> <p>High up-front costs</p> <p>Investors' appetite for only very low probability events (rarely below 1 in 75 year triggering events)</p>

²⁸ Parametric insurance is a relatively new concept, demonstrated for example by the Caribbean Catastrophe Risk Insurance Facility (CCRIF) established in 2007. These covers are more bespoke, and counterparties may be open to multi-year contracts such as that seen between Swiss Re and the Dominican Republic. The CCRIF paid out within 2 weeks of the devastating earthquake that hit Haiti in 2010.

²⁹ The Total Return Swap structure, and permitted asset rules for collateral investment, in widespread use prior to the financial crisis exposed a number of bonds to credit issues during the crisis (largely due to the collapse of Lehman brothers). Since then, rules on permitted investments have tightened considerably and the current trend is to invest all proceeds in US Treasury Money Market funds.

	<p>No moral hazard (depending on trigger type – indemnity trigger cat bonds still present moral hazard)</p> <p>Multi-annual protection (lock pricing for a period of 3 years usually)</p> <p>Variety in options for triggers (indemnity, modeled loss, parametric and industry-loss linked products are possible)</p> <p>Parametric and modeled loss triggers can disburse rapidly</p> <p>Liability is transferred from gov't balance sheet to financial markets</p>	<p>Limited geography/perils by transaction</p> <p>Historically has traded above CAT Reinsurance for similar risk layer</p> <p>It is regulated as an investment security (not insurance) and therefore the legal framework can be complicated for sovereigns</p>
CAT Derivatives (ex. Industry Loss Warranties)	<p>Limited basis risk for large diversified portfolios of assets (settled on third party industry loss indices or tailor made indices)</p> <p>Attractive to risk-assuming counterparty as there is no moral hazard, and product is easy to understand</p> <p>Liability is transferred from gov't balance sheet to financial markets</p>	<p>Works only when there is a mature, credible methodology to generate an aggregate industry loss estimation which is not currently available outside of developed insurance markets³⁰</p> <p>Typically only annual protection is offered</p> <p>Counterparty credit risk (depending on where trade occurs – many contracts are negotiated directly between counterparties)</p>
Weather Derivatives	<p>Flexibility with regards to incorporate tailor made indices</p> <p>Multi-annual protection available</p> <p>Flexibility with regards to perils/geography of protection</p> <p>Rapid payout</p>	<p>Sufficient historic data and ground measurement tends to be limited in LIC</p> <p>Basis risk</p> <p>High up-front costs</p> <p>Counterparty credit risk</p>
Risk Financing		
Contingent Credit Multilaterals (Ex. Cat DDO)	<p>Lower costs</p> <p>No basis risk (Use of softer triggers that can be linked to gov't actions like Declaration of Disaster)</p> <p>Flexibility on financial terms (including a longer term than any of the other risk financing alternatives)</p> <p>Funds are ring-fenced and are not at risk of depletion as a result of political pressure for purposes other than disaster response</p> <p>No counterparty credit risk (where the counterparty is the World</p>	<p>Financial impact is retained in gov't balance sheet</p> <p>Institutions like the World Bank have an absolute size limit of 0.25% of GDP, which is very limiting in LIC because the potential impact of natural disasters can usually be substantially higher</p>

³⁰ ILWs trade for US perils, European windstorm and to a lesser extent Japanese earthquake. Third party industry loss providers recognized and accepted by the market include US Property Claims Services (PCS) and European companies (PERILS AG, Swiss Re Sigma, Munich NatCat services)

	Bank as per the Cat DDO)	
Structured Financing Vehicles	Limited credit risk (fully funded vehicles) Possibility to generate positive cost of carry (service of debt repaid through the vehicle) Multi-annual availability	Basis risk (triggers/risks are usually limited on a similar fashion as done in the CAT Bond space) Financial impact is retained in gov't balance sheet
Structured Risk Financing		
Finite Risk Contracts	Can be used to combine risk retention (through reserving), risk financing and risk transfer elements into the program Provides flexibility to include a wider spectrum of risks (from lower to higher probability events) and flexibility in how much of the risk is transferred versus retained Can combine both soft and tighter parametric triggers Multi-annual contracts (5 year terms are not uncommon) Contract includes cancellable clauses	These are 'next generation instruments' intended to complement existing risk retention and transfer strategies. Therefore instruments are only suitable for institutions that already have a sophisticated risk financing strategy in place, and that have technical capacity to accurately assess their risk in detail Few countries have legislation in place to regulate these instruments Lack of supervision has led some financial intermediaries in developed countries to use these tools to hide liabilities Legal language is sophisticated

Source: World Bank Disaster Risk Financing and Insurance Program

Annex 7. Examples of World Bank Initiatives to build Financial Resilience to Disasters (taken from World Bank Disaster Risk Financing and Insurance Program review)

Sovereign Disaster Risk Financing and Insurance for middle-income countries

SECO Initiative supporting Colombia, Indonesia, Morocco, Peru, South Africa, Vietnam, Azerbaijan

Supported by the Swiss State Secretariat for Economic Affairs (SECO), a sovereign DRFI initiative through the World Bank-GFDRR Disaster Risk Financing and Insurance Program (DRFIP) is supporting selected middle-income countries to strengthen financial resilience and protect fiscal balance. With the help of the program, Colombia, for example, implemented international best practices insuring its investments worth US\$38 billion in road infrastructure concessions.

Disaster risk financing and insurance for small island states

Pacific Catastrophe Risk Insurance Pilot

In response to requests from 15 countries, the World Bank, GFDRR, and other partners formed the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) in 2007 to help mitigate disaster and climate change risk. Under this initiative the countries worked together to implement the Pacific Catastrophe Risk Insurance Pilot, the first parametric catastrophe risk transfer transaction in the Pacific region. In early 2014 Tonga was the first country to benefit from a payout (US\$1.2 million) following cyclone Ian.

Developing large scale PPPs in agriculture insurance for smallholders

Kenya

The Government of Kenya (GoK) has confirmed its intention to develop and launch a large scale PPP in agricultural insurance, building on appraisal work finalized in 2014 with the support of the World Bank-GFDRR DRFIP. This program will have two components: (i) an area-yield index insurance program linked to crop credit for small semi-commercial and commercial maize and wheat growers, and; (ii) a livestock drought index insurance program for vulnerable pastoralists in four counties of northern Kenya. Expected to start by October 2015, the program is expected to reach on average 140,000 producers over the first five years. GoK committed fiscal and human resources to the program. The DRFIP is also supporting the government to consider the integration of these agricultural liabilities in an overall sovereign disaster risk financing and insurance strategy.

Supporting enhancements to ongoing PPPs in agriculture insurance

India

Since 2006, the World Bank-GFDRR DRFI team has provided advisory services to the Government of India to move from a largely publicly implemented compensation scheme for farmers towards a public private partnership in agricultural insurance. The initial scheme suffered from slow claims settlement, high basis risk due to challenges with data collection, and unintended disincentives distorting agricultural production decisions. The World Bank GFDRR-DRFIP has worked with the relevant ministries and the public

crop insurance company to provide technical and policy advice in support of transitioning towards a public private partnership. This has significantly reduced the basis risk, claims settlement time, and improved actuarial risk pricing leading to more equitable subsidies distribution to farmers.

Improving insurance of public assets and insurance supervision in middle income countries

Philippines

In the Philippines the World Bank-GFDRR DRFIP is helping build capacity in local insurance markets through improving the insurance of local government assets. Working with GSIS the state owned monopoly insurer for public assets the program will also help to introduce insurance policies based on international best practice, support access to reinsurance at better terms, and improve risk information and risk based pricing. The project will also investigate the possibility of setting up a risk pool for homeowners and small business, an initiative strongly backed by domestic insurance companies.

Developing Property Catastrophe Risk Insurance Markets

Countries: Albania, Macedonia, Montenegro, and Serbia, to be expanded to the whole SEEC region

South East Europe and Caucasus Catastrophe Risk Insurance Facility (SEEC CRIF):

SEEC CRIF is a catastrophe and weather-risk re-insurance program with the objective of increasing the number of homeowners, farmers, enterprises and government organizations that are insured against weather-related risks and climate change. To implement the SEEC CRIF program, Europa Reinsurance Facility Ltd. (Europa RE), a non-profit, government-owned organization, has been established as a specialized regional reinsurer. The Facility targets the entire SEEC region, but with an initial focus on the Balkans and the Caucasus. The Program will continue to support the technical work for countries to join the facility and will work with the Bank and other donor partners to finance country membership contributions.

Disaster Linked Social Protection

Kenya

The Hunger Safety Net Program (HSNP), implemented by the Government of Kenya with support from the UK DFID, provides unconditional cash transfers to chronically food insecure households in the four poorest and most vulnerable counties in Kenya (Turkana, Marsabit, Mandera and Wajir). Under Phase 1 of the program, approximately 100,000 households throughout these counties receive regular bi-monthly payments to enable them to meet their daily consumption needs. In 2013 the program began looking into adding a disaster linked component to the HSNP to enable rapid scale-up of transfers to a possible 400,000+ households during acute drought crises. Alongside Social Protection colleagues, the World Bank-GFDRR DRFIP has been advising key counterparts in GoK on the key benefits, including more rapid response and increased transparency, and investments required including insurable quality data, in order to use insurance principals to execute the scale up of the cash transfers.