

# THEME CHAPTER: INSURING AGAINST ASIA'S NATURAL CATASTROPHES

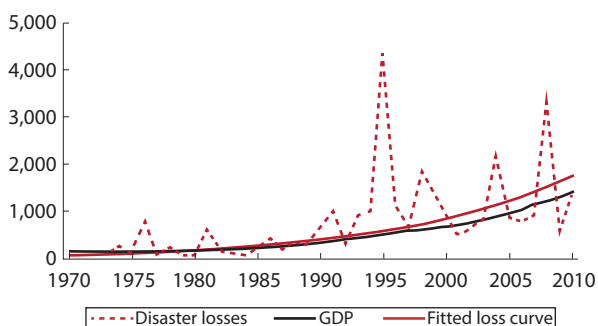
**Over the past 20 years, Asia has borne almost half the estimated global economic cost of natural disasters—around \$53 billion annually.**

Asia is more vulnerable to natural disasters than any other part of the world. According to the *Annual Global Climate and Catastrophe Report 2013*, total economic losses from natural catastrophes worldwide totaled \$192 billion in 2013—with insured losses a mere \$45 billion. While 67% of economic losses in the United States (US) were insured, just 7.6% were insured in Asia. Over the past 20 years, Asia has borne almost half of the estimated global economic cost of natural disasters—roughly \$53 billion annually. And over the past 4 decades, direct physical losses from disasters in the region significantly outpaced growth in gross domestic product (GDP) (Figure 26).

**Despite large-scale destruction, the insurance industry has dodged the bullet of a region-wide catastrophe due to low insurance penetration in Asia.**

For most of Asia, insurance is expensive. And aside from the scant awareness of the full economic impact of disasters, there is widespread mistrust of the industry itself. From the supply side, there are few appropriate insurance solutions to address people's real needs and

**Figure 26: Real GDP and Natural Disaster Losses—Asia (1970=100)**



GDP = gross domestic product.

Note: Annual GDP and direct physical losses were both set at a base value of 100 in 1970 and growth indexes in subsequent years calculated relative to 1970 to facilitate a comparison of growth rates.

Source: ADB. 2013. *Investing in Resilience: Ensuring a Disaster-Resistant Future*. Manila.

concerns. Distribution systems are less sophisticated, and in many cases, simply suffer from poor regulation. Given the concentration of catastrophic risk throughout the region—and the expected increase in both frequency and intensity of climate-related disasters—developing workable insurance and disaster risk financing solutions must become a key policy priority.

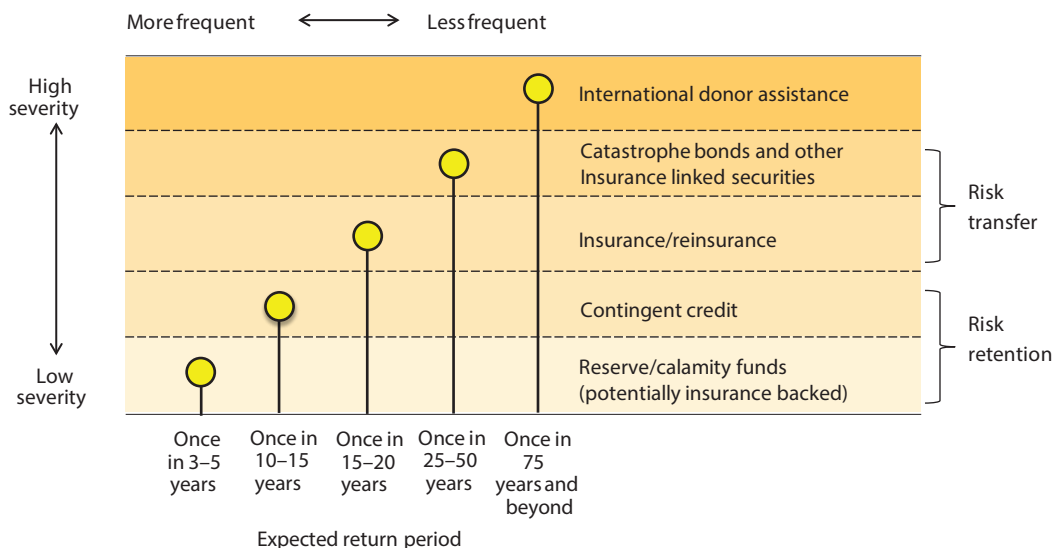
For example, agricultural insurance contributes to food security by stabilizing farmers' access to food by compensating for losses when a major hazard destroys crops or livestock. Similarly, governments can use agricultural insurance to ensure contingent funding is available for emergency food supplies when disaster strikes.

The economic impact of natural catastrophes can be devastating. Damage to infrastructure, crops, and housing are accompanied by loss of revenue, rising unemployment, disruptions in trade and commerce, and market destabilization. But the social impact of disasters on the quality of life in already vulnerable communities is far more profound—aside from lives lost during the immediate onslaught, entire households become refugees and poverty can engulf entire communities. This is particularly true in smaller developing economies with less diversified economic structures and high fiscal imbalances. In Myanmar, for example, more than 5 years after cyclone Nargis killed 146,000 people and severely affected 2.4 million others, inhabitants of the Ayeyarwady Delta have yet to fully recover (Impact Forecasting, 2009; United Nations, 2011).

**An array of disaster risk financing instruments can be offered based on the severity and frequency of previous natural calamities.**

Disaster risk financing (DRF) reduces country exposure to disaster-related losses by transferring or sharing risk through specifically designed financial instruments. There are two types of DRF: *ex ante* finance and *ex post* finance. *Ex ante* finance includes setting aside reserves; establishing contingent credit; and developing various kinds of risk transfer products involving insurance, reinsurance and parametric insurance, along with capital market solutions such as catastrophe bonds. *Ex post*

**Figure 27: Range of Financial Instruments to Deal with Different Degrees of Risk**



Source: J.D. Cummins and O. Mahul. 2009. *Catastrophe Risk Financing in Developing Countries: Principles for Public Intervention—Overview*. Washington, D.C.: World Bank. Quoted in ADB. 2013. *Investing in Resilience: Ensuring a Disaster-Resistant Future*. Manila. p. 128.

finance—or post-disaster response funding—includes budget reallocation, domestic and external credit, tax increases, and donor assistance. The main advantage of the *ex ante* approach is that it is secured before disaster strikes, thus making available immediate liquidity for emergency response, recovery or reconstruction through quick disbursements. On the other hand, *ex post* instruments can take time to mobilize or cannot be quickly accessed. The choice of risk financing and transfer instruments should be based on cost-benefit analysis.

The most effective application of *ex ante* financial solutions employs a “bottom-up” approach in segmenting disaster risk. A rigorous analysis of the underlying hazard measures the severity and frequency and then matches risk characteristics with the most cost-effective financial instrument, based on economic and social considerations. Thus, a menu of *ex ante* financial instruments can be crafted (Figure 27). Reserves are the least expensive and generally cover recurrent low-risk losses (the low risk layer). Other financing sources, such as contingent credit—and possibly insurance—should be used only once reserves and budget contingencies are exhausted or cannot be quickly accessed (the medium risk layer). Finally, less frequent but more severe disasters can be financed through risk transfer instruments, such as catastrophe risk reinsurance or catastrophe (cat) bonds (the high risk layer).

This process is based on two important principles. The first is that DRF tools are more effective when the

underlying risk assessment is more robust. The second is that by determining the break points for frequency and severity of loss, it is possible to deploy finance mechanisms more selectively and strategically. Thus, linking specific DRF instruments with the way disaster risk management is handled not only provides the added resilience financial protection offers, but simultaneously boosts resilience as a result of risk reduction. When linked to risk management in this way, DRF instruments can also provide price signals that can help guide other resilience-related decisions when the marginal cost of further disaster preparedness or reduction exceeds risk transfer costs.

**In the wake of a disaster, the gap between total economic losses and insured losses can be so wide that it may outstrip the government’s ability to act as insurer of last resort.**

Asia lags behind the rest of the world in developing insurance and capital market solutions that enable workable risk transfer markets that serve local governments, businesses, and homeowners. This reduces the region’s resilience. Most worrying is that the gap between economic and insured losses can be so severe that it may outstrip the government’s ability to act as insurer of last resort (The Society of Lloyd’s, 2012). For example, in Japan, only \$35 billion of the estimated \$210 billion of total damage wrought by the March 2011 earthquake and tsunami was insured

(Impact Forecasting, 2012). The low- to middle-income economies most at risk combine a high likelihood of natural catastrophes with low levels of insurance penetration—as well as other sources of DRF. Inevitably, it is the taxpayer who picks up most of the tab for disaster losses. When insurance is unavailable, the cost of reconstruction falls on the shoulders of governments, non-governmental organizations, charities and—all too frequently—the affected households and companies.

In most emerging markets, when netted out, the portfolio mix of non-life insurance is highly skewed toward automobile or health lines—compared with commercial lines such as energy, fire, and engineering. Generally, insurance against loss by fire, lightning, windstorms, tornados, earthquakes and allied risks like typhoons and floods are covered under fire insurance. In most cases they have high deductibles—and thus are not very popular. A 2012 study of the Society of Lloyd's (Lloyd's) covering 42 economies worldwide—accounting for over 90% of non-life premiums written in 2011—found 17 of them underinsured by an estimated \$168 billion. Eight of these economies are in Asia, underinsured by \$122.5 billion (**Table 13**). This suggests the region is highly vulnerable to excessive uninsured losses. As a proportion of GDP, Bangladesh is by far the most underinsured, while Hong Kong, China is the only high-income economy (as measured by GDP per capita) identified as underinsured. The People's Republic of China (PRC) accounts for 47% of the underinsurance

gap—and thus the most underinsured economy in monetary terms. It appears that the economies at greatest risk from natural catastrophes are the least insured.

A 2012 Marsh report says Asia's telecommunications, energy, and petrochemical firms underinsure their industrial assets by 30% to 60%. It suggests two reasons for this: (i) inaccurate valuations of loss potential, and (ii) the cost of premiums against perceived risk exposure. There is also an inclination in Asia toward self-insurance—viewing savings as a form of contingent capital and assuming balance sheets are sufficiently robust to cover their own risks. This makes marketing insurance far more difficult.

Whatever the reason, rising insurance penetration is a key indicator of improved risk transfer—the higher the insurance gap, the higher the cost to the taxpayer. The 2012 Lloyd's study analyzing seven recent natural catastrophes in five economies—the PRC, Japan, Thailand, the United Kingdom, and the US—found that an increase in insurance penetration of 1 percentage point reduces the damage borne by taxpayers by approximately 22%. It also found that economic activity returned to pre-catastrophe levels long before reconstruction was completed. Using non-life insurance in economies underinsured for natural disasters will significantly reduce both damages themselves and recovery costs—costs which governments bear and taxpayers pay.

**Table 13: Benchmarked Insurance Coverage and Underinsurance Gap (2011)**

<b>Economy</b>	<b>Non Life Insurance Penetration</b> (premium as % of GDP)	<b>Benchmarked insurance coverage</b> (% of nominal GDP)	<b>Underinsurance</b> (\$ billion)
Bangladesh	0.2	-2.6	3.0
China, People's Rep. of	1.2	-1.1	79.6
Hong Kong, China	1.4	0.0	0.1
India	0.7	-1.2	19.7
Indonesia	0.6	-1.7	14.1
Korea, Rep. of	4.6	2.6	–
Philippines	0.4	-1.4	2.9
Singapore	1.5	0.1	–
Taipei, China	3.1	1.0	–
Thailand	1.7	-0.4	1.4
Viet Nam	0.9	-1.4	1.7
<b>Total</b>			<b>122.5</b>

Source: The Society of Lloyd's (Lloyd's). 2012. *Lloyd's Global Underinsurance Report 2012*. Prepared by Centre for Economics and Business Research Ltd (Cebr). London.

## Market Solutions and the Role of Government

### From a commercial standpoint, there is substantial market interest for developing risk transfer mechanisms for the region.

Asia's relatively immature non-life insurance market presents both challenges and opportunities. The lack of quality historical loss data—or data on risk exposure and asset vulnerability—particularly in urban areas—is a good starting point. An added deterrent is the high cost of risk modeling—which tends to be proprietary.

### Governments need to promote innovative disaster risk financing to help strengthen financial resilience when calamities strike.

Governments must be proactive in strengthening legislative and regulatory frameworks for the financial sector—especially insurance—to develop and implement comprehensive disaster risk financing

instruments. For example, governments could strengthen financial resilience by enacting special regulatory regimes for parametric products, micro-insurance schemes or catastrophe-linked securities; introducing tax incentives for private insurance coverage; and enabling the use of insurance as a risk management tool for public entities.

A long menu of insurance and disaster risk financing instruments exist for protecting individuals, farmers, and governments against disaster shocks and supply chain disruptions (**Table 14, Box 5**).

Catastrophe risk transfer programs in conjunction with comprehensive disaster risk management strategies can transfer natural catastrophe risks to traditional insurance and reinsurance as well as global capital markets. Public private partnerships (PPPs) backed by international expertise and capital need to be explored with governments. PPPs can handle major disasters and can operate in countries with weak financial and regulatory institutions. At the same time they provide cover to those who cannot afford risk-based premiums. They can be publicly funded insurance schemes for target groups (such as small and medium enterprise suppliers) offering

**Table 14: A Menu of Insurance Solutions**

Instruments	Problems	Examples
Catastrophe Insurance Pools (national or regional)	<ul style="list-style-type: none"> <li>• Low catastrophe insurance penetration</li> <li>• Costs of insurance premium</li> <li>• Low quality of insurance coverage due to limited funding</li> <li>• Inadequate risk pricing (too high or low)</li> <li>• Lack of insurance access for households as well as small and medium enterprises</li> </ul>	<ul style="list-style-type: none"> <li>• Turkish Catastrophe Insurance Pool</li> <li>• Caribbean Catastrophe Insurance Facility</li> </ul>
Traditional private insurance contracts	<ul style="list-style-type: none"> <li>• Inadequate risk assessment/ management</li> <li>• Non availability of risk based pricing</li> <li>• Lack of access to insurance and its usage by utilizing innovative channels</li> <li>• Moral hazard</li> <li>• Adverse selection</li> <li>• Long loss settlement time</li> </ul>	<ul style="list-style-type: none"> <li>• Insurance covering the structure and contents of as well as operations within residential, commercial, industrial or agricultural properties</li> <li>• Liability insurance</li> <li>• Marine insurance (hull and cargo)</li> </ul>
Innovative private insurance contracts	<ul style="list-style-type: none"> <li>• Similar to the problems faced by traditional private insurance contracts</li> </ul>	<ul style="list-style-type: none"> <li>• Weather-based crop index insurance</li> <li>• Indemnity-based micro-insurance</li> </ul>
Reinsurance	<ul style="list-style-type: none"> <li>• Spatially and inter-temporal diversification of risk across portfolios</li> </ul>	
Insurance derivatives	<ul style="list-style-type: none"> <li>• Long loss settlement time</li> <li>• Moral hazard</li> <li>• Lack of reliable data</li> </ul>	<ul style="list-style-type: none"> <li>• Catastrophe bonds (Mexican CAT Bond)</li> <li>• Risk swaps</li> <li>• Options</li> </ul>

Source: ADB.

## Box 5: Building Resilience against Supply Chain Disruption

Complex logistics and “Just in Time” supply chains make Asian companies increasingly interdependent and globally integrated. And as production bases, supplier networks and distribution channels consolidate, so does the potential accumulation of risk. A single catastrophic event has the potential to trigger multiple supply chain-related losses and liabilities when production assets and public infrastructure are damaged.

The 2011 earthquake and tsunami in Japan, the floods in Thailand late that year, and the recent typhoon in the Philippines show just how vulnerable global supply chains are when linking component manufacturing in several economies with product assembly in others. Overnight, firms were left without crucial components or raw materials. This not only disrupted sourcing and manufacturing, but also reduced profits and the reputation of firms geographically remote from the actual catastrophes.

For example, in 2010, Indonesia, Malaysia, the Philippines, and Thailand together were among the most dependent economies on parts, components, and industrial materials sourced from or sold to Japan (imports 22% and exports 18%).<sup>1</sup> Disruptions that followed the Great Tohoku Earthquake and Tsunami in 2011 caused automotive components production in Japan to contract 47.7% in March 2011. Production also fell in the Philippines (-24%), Thailand (-19.1%), and Indonesia (-6.1%) from April to June 2011. Electrical component production in Japan contracted 8.3% in March 2011; in the Philippines (-17.5%) and Malaysia (-8.4%) from April to May 2011. Similarly, disruptions caused by the Thai floods later that year not only disrupted 2011 Thai exports in electronics (-47.4%) and electrical appliances (-21.9%), they also hurt Japan, where the manufacturing production index fell 2.4% (from October 2011 to January 2012), led by a 3.7% contraction in electrical component production.<sup>2</sup>

These natural catastrophes delivered a wake-up call to businesses that suddenly found their supply chains compromised through events very much out of their control. In addition, heavy reliance on set logistics and transportation for cross-border production further increases the probability of supply disruptions when production assets and public infrastructure are damaged.

As the size and demands of industry continue to evolve both in Asia and globally, it is difficult to stay up to date on emerging or existing risks, and the potential losses posed by supply disruptions.

<sup>1</sup>Ministry of Economy, Trade and Industry (METI). 2011. *Japanese Industry—Lasting Change in Manufacturing Industry*. Tokyo.

<sup>2</sup>M. Liu and S. Hossain. 2013. Regional Cooperation: Natural Disasters and Production Networks in the Asia and Pacific Region. *Asia Pathways*. Asian Development Bank Institute. 5 February. <http://www.asiapathways-adbi.org/2013/02/natural-disasters-and-production-networks-in-the-asia-and-pacific-region/>

There are three main reasons for this:

- (i) *Accumulation of risk* occurs when a series of shipments are in the same place at the same time, whether in a warehouse, vessel, or port. Accumulation issues do not stop once cargo is unloaded. As trade volumes continue to expand, especially to and from the PRC, gathering and distribution points become more congested and/or capacity increases. Flooding, earthquakes, or typhoons will destroy, damage, or disrupt operations of numerous policyholders supplying a group of policyholders in the same industry. If that cluster of suppliers supports a large segment of an insurer’s policyholders, that accumulation of risk will mean a huge loss for the insurer;
- (ii) *Business interruption* occurs when economic losses and increased operation costs result from damage to the insured business operations caused by a specified peril at the insured’s own premises; or
- (iii) *Contingent business interruption* and contingent extra expense coverage occurs when there are lost profits and extra expenses resulting from business interruption at a supplier’s, customer’s, or other business partner’s premises.

Among the different generic consequences of disruption—some of which have immediate financial impact while others hold the potential for long-term damage—are loss of productivity, increased working costs, loss of revenue, damage to brand and reputation, product release delays, payment of service credits, a drop in share price, stakeholder/shareholder concerns, delayed cash flow, and loss of regular customers (**Box table**). These factors can deteriorate a firm’s financial health, in turn further inhibiting development and creating job loss. It may even affect their global competitiveness and loss of confidence among foreign investors. For small and medium-sized enterprises (SMEs) involved in the global supply chain, the risks of natural catastrophes is particularly high given their small market share, weak bargaining power, and poor disaster preparedness.

Based on a survey of over 400 corporate insurance experts from 33 economies, insurance is seen as one important tool for managing losses and common supply chain business interruption.<sup>3</sup> These typically account for 50% to 70% of insured property catastrophe losses. Firms can address this risk through either business interruption (BI) or contingent business interruption (CBI) insurance or supply chain insurance. BI and CBI cover these economic losses and increased costs of operation caused by any event or circumstance that result in disruption to normal business operations of the insured. All these forms of insurance cover external risks as well, including natural catastrophes—such as typhoons, earthquakes, flooding and landslides—and fire.

<sup>3</sup>Allianz SE and Allianz Global Corporate & Specialty SE. 2014. *Allianz Risk Barometer on Business Risks 2014*. Germany: Munich.

## Box 5 continued

### Supply Chain Risks and Availability of Insurance Coverage

Coverage Risks	Insurance	Supply chain	Contingent Business Interruption	Marine and Marine Business Interruption	Trade Credit	Political Risk	Product Liability
Supplier insolvency		X			X		
Failure of fuel supply or utilities		X					
Communication system failure		X					
Transport failures or port blockage		X		X			
Raw materials or component delays		X					
Delays caused by supplier's supplier		X					
Supplier staff illness or strike		X					
Cyber risks, viruses		X					
Denied access to supplier's premises		X					
Physical damage		X	X	X			
Political risk		X				X	
Expropriation		X				X	
Product quality/recall							X

Source: Zurich American Insurance Corporation. 2013. *Your Supply Chain at Risk: Why an Effective Contingent Business Interruption (CBI) Program is Critical*. US: Illinois.

They also cover some continual policyholder costs such as wages, building leases or mortgage costs, and other fixed costs.

Standard BI insurance policies do not cover disruptive events without accompanying physical loss—such as power and telecommunication outages or information and technology problems. Also, standard insurance cannot restore an eroded market position after a policyholder's customers turn

away to competitors that avoided production curtailment afterward; nor can it re-inflate sagging share values. While all property insurance policyholders can expect the basic elements of business interruption and CBI coverage, the breadth of policyholder coverage under either policy type will depend on various factors, including the nature of the insured's operations and where the policyholder is based. Therefore, firms also must build resilience into their supply chains to mitigate the risk to business continuity.

innovative microinsurance services and products. Microinsurance products cover against disaster impact on low-income households, businesses, and farmers. Field evidence suggests that if carefully implemented, index-based crop and livestock insurance can be a cost-effective alternative to indemnity-based insurance, and avoids moral hazard and adverse selection.

### Regional cooperation is needed to develop a risk pool for natural calamities.

Each economy has its own set of variables—specific local disaster risk exposures, the historical development of private insurance, reinsurance and financial markets, the insurance culture, legal and administrative frameworks, levels of economic development and financial capacity—that shape domestic and regional risk financing strategies.

Asia could emulate examples of small island nations who worked together in creating a regional catastrophe risk pool. The Caribbean Catastrophe Risk Insurance Facility (CCRIF), the Pacific Catastrophe Risk Insurance Pilot (PCRIP), and the African Risk Capacity (ARC) were formed with technical assistance from the international development community. Beyond domestic pools, these allow countries to obtain catastrophe reinsurance coverage at more competitive rates by spreading catastrophe risk across much wider geographic areas. However, it would be considerably more difficult to establish a catastrophe risk pool among ASEAN economies, for example, as over half have higher GDPs than the CCRIF and PCRIP combined. As a result, the modeling and funding requirements for the pool would be far larger. Moreover, risks are not homogeneous—for example, typhoon and earthquake risks tend to be more concentrated than widespread flooding, which historically has been far more difficult to model and insure.



## Data availability on hazards, exposure, vulnerabilities, and losses is key for strengthening financial resilience and disaster preparedness.

Another priority is to develop and promote a regional platform for collecting and disseminating data on assessing and modeling risks. These are useful tools for developing a common regional perspective of disaster risk. It will enhance understanding of different calamity risk financing strategies and tools—along with their potential benefits and limitations, including preconditions—that support the development of disaster risk financing instruments.

## Key priorities for developing disaster risk financing markets and strengthening financial resilience should include business continuity planning, enhancing technical and institutional capacities, and coordinating various governmental authorities across all levels.

In a difficult economic environment, financial exposure to natural disasters has a clear impact on recovery. Economies across Asia urgently need to address their financial disaster readiness if they are to cope with the fallout from events that are both more frequent and more costly. Insurance coverage is a powerful component of disaster risk management, ensuring that firms have sufficient liquidity to manage any disruption. But this is only one component of a wider risk management plan to support corporate recovery from a supply chain disruption. While insurance can cover some of the losses, insurance alone is a costly strategy and should not be seen as a panacea.

## References

- Allianz Global Corporate & Specialty SE. 2014. *Allianz Risk Pulse—Allianz Risk Barometer on Business Risks*. Munich.
- ADB. 2009. *Natural Catastrophe: Risk Insurance Mechanisms for Asia and the Pacific (Main Report)*. Manila.
- ADB. 2013. *Investing in Resilience: Ensuring a Disaster-Resistant Future*. Manila.
- ADB and Asian Development Bank Institute. 2013. *Disaster Risk Management in Asia and the Pacific. Issues Paper*. Tokyo.
- Impact Forecasting. 2014. *Annual Global Climate and Catastrophe Report 2013*. Chicago.
- Impact Forecasting. 2012. *Annual Global Climate and Catastrophe Report 2011*. Chicago.
- Impact Forecasting. 2009. *Annual Global Climate and Catastrophe Report 2008*. Chicago.
- J.D. Cummins and O. Mahul. 2009. *Catastrophe Risk Financing in Developing Countries: Principles for Public Intervention—Overview*. Washington, DC: World Bank.
- Marsh LLC. 2012. *Closing The Gap: Underinsurance in Asia's Industrial Sector*. New York.
- Organisation for Economic Co-operation and Development. 2014. *Disaster Risk Financing in APEC Economies: Practices and Challenges*. Paris.
- The Society of Lloyd's. 2012. *Lloyd's Global Underinsurance Report 2012*. Prepared by Centre for Economics and Business Research Ltd (Cebr). London.
- United Nations. 2011. *Myanmar: UN helps Government Devise Disaster Mitigation Plans*. UN News Center. New York.
- World Bank. 2011. *Sovereign Disaster Risk Financing. Global Facility for Disaster Reduction and Recovery*. Washington, DC.