GAR 2011

Chapter 5

Investing today for a safer tomorrow

The Mount Elgon Labour-based Training Centre builds a new building in Mbale, Uganda.
Photo: Mikkel Ostergaard/Panos Pictures

Chapter 5 Investing today for a safer tomorrow

Both individuals and governments tend to discount low-probability future losses and seem reluctant to invest in disaster risk management (DRM). Governments often cite a lack of financial resources as a constraint, but the allocation of available public resources reflects political priorities. The imperative to invest in DRM is likely to be greater in countries with effective institutions, and where a strong civil society can hold governments and other stakeholders to account for poor decisions. Despite the magnitude of disaster costs, reducing disaster risks is often perceived as less of a priority than fiscal stability, unemployment or inflation.

Evidence from Colombia, Mexico and Nepal indicates that this judgement is short-sighted. Country risk profiling and stratification can provide the basis for unexpected development and growth dividends. The data highlights that disasters and their downstream impacts represent major losses for governments, who are responsible not just for public assets, but implicitly at least, also for the uninsured assets of low-income households and communities. As the HFA Progress Review highlighted, few countries systematically account for their disaster losses, and invisible impacts do not generate incentives to invest.

Conducting a comprehensive risk assessment and systematically accounting for disaster losses do not guarantee that governments will invest more. They can, however, encourage governments to take ownership over their stock of risk and identify strategic trade-offs when making policy decisions for or against investing in DRM. Although economic costs and benefits are never the only criteria for investment, making the trade-offs transparent offers two significant advantages for governments. They would then be able to assess the liabilities implicit in the full spectrum of risk in their country, important for fiscal and fiduciary planning, and make more informed decisions concerning the most cost-effective portfolio of risk management and financing strategies.

5.1 The opportunity cost of DRM

The decision to invest in DRM is clearly not technical or administrative – it is fundamentally political. However, it is far less clear how governments identify the political and economic incentives to invest.

Japan has more people and GDP exposed to earthquakes and tropical cyclones than any other country in the world (UNISDR, 2009). Its risk-aware population has experience dealing with disasters, but even in Japan it is difficult to persuade citizens to invest in risk reduction. As Box 5.1 highlights, only a small minority of risk-prone households have participated in a government-sponsored earthquake retrofitting programme despite government cost-sharing, subsidized loans and tax breaks (Okazaki, 2010).

Difficulties persuading people to make rational choices have been observed in California (Stallings, 1995) and Romania,[1] confirming that even in high-risk contexts, individuals heavily discount future risks and are reluctant to invest today for a safer tomorrow (Kahneman and Tversky, 1979; Loewenstein and Prelec, 1992; Kunreuther and Useem, 2010). Despite evidence that DRM investments are cost-effective, politically expedient and socially sustainable (ECA, 2009; UNISDR, 2009; World Bank, 2010b; Campos and Narváez, 2011), given short political time horizons, governments are likely to overly discount future risks. As the HFA Progress Review highlighted, few governments have a dedicated budget line for DRM, and many are unable to quantify their investments.

The decision to invest in DRM is clearly not technical or administrative – it is fundamentally political.[2] However, it is far less clear how governments identify the political and economic incentives to invest. During financial crises, governments often act quickly to provide public resources to save banking systems and protect wealth. During the 1995 financial crisis in Mexico, for example, the public resources used to protect private assets amounted to approximately 20 percent of the country's

Box 5.1 Incentives for safer building: lessons from Japan

In Japan, traditional wooden houses are vulnerable to earthquakes. During the 1995 Great Hanshin-Awaji Earthquake which claimed more than 6,000 lives, 80 percent of the mortality occurred in collapsed houses. While new buildings are earthquake resistant, about 25 percent of Japan's total housing stock was still vulnerable (Japan, 2008), representing a significant risk to household budgets and public finances.

In 2003, a major retrofitting initiative was launched to reduce the vulnerability of the housing stock to 10 percent by 2013. Two thirds of the cost of evaluating houses and 23 percent of the cost of retrofitting houses constructed before 1981 has been subsidized by the government. Those who retrofit their houses are eligible for a 10 percent income tax deduction and low-interest loans from the Housing Finance Corporation.

Despite these subsidies, only 31,000 homes and 15,000 other buildings had been retrofitted by 2009, far less than the 50-60,000 homes which were being renovated annually before the programme began. A 2005 poll showed that although two thirds of households believed their homes could be hit by a strong earthquake within the next 10 years, only a tenth of those polled had evaluated vulnerability and invested in retrofitting. So despite a well-targeted and generous set of policy measures and subsidies, and a high awareness of disaster risk, persuading households to invest in DRR remains a challenge.

(Source: Okazaki, 2010)

GDP. By comparison, between 1997 and 2009, accumulated allocations to Mexico's disaster management fund added up to only 2.3 percent of the GDP in 1995. In Mexico, annual DRM investment has been decreasing since 1999, and in 2007 it was equivalent to only 0.01 percent of the government's income and 0.04 percent of total public investment (Moreno and Cardona, 2011). In Colombia, DRM investment has been increasing, but it was still only 0.08 percent of government income and 0.07 percent of public spending in 2009.

Governments indicate that a lack of financial resources constrains investment in DRM, but how available public resources are invested tends to reflect other political priorities. Figure 5.1 shows that government investment in DRM in Colombia and Mexico is significantly less than the amount of money the governments give out in the form of tax exemptions. In Mexico, for example, tax exemptions represented 6 percent of GDP and 50 percent of potential tax income in 2007, while cumulative DRM investment over eight years (1999–2007) amounted to less than 0.2 percent of GDP in 2007. These governments do not lack the resources to invest in DRM – they have not identified it as a priority.

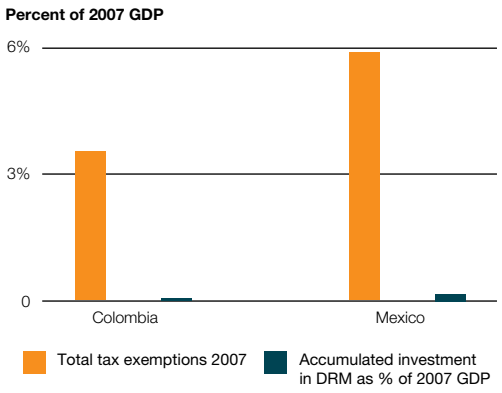
In contrast, there is usually a strong political imperative for disaster relief. Leaders have always understood the power of symbolic and real responses to disasters. Saving lives and assisting disaster victims is a moral, humanitarian and political paradigm that few would contest. As such, disaster relief can be a powerful tool for leaders, enhancing their political profile and facilitating patronage. As Box 5.2 highlights, electoral considerations certainly influence disaster responses (Sen, 1981; Bueno de Mesquita et al., 2004).

In contrast, the incentives for DRM, a public good, are far less obvious. If governments patronize the powerful private interests often internalized in sectors such as urban development, construction, agribusiness and tourism, there may be a disincentive to invest in DRM. As discussed in Chapter 3, the privatization of water resources by the agribusiness sector may increase agricultural productivity and generate foreign exchange but simultaneously transfer agricultural drought risk to subsistence farmers. Seriously addressing underlying risk drivers involves trade-offs which may represent an important political opportunity cost for governments.

5.1.1 Can disasters provide a political and economic incentive for DRM investment?

Major disasters can sometimes provide a political imperative, given a real or perceived social demand for improvements in DRM. The evidence, however, is mixed. In some

Figure 5.1 Comparing the annual cost of tax exemptions with accumulated investments in DRM over almost a decade



(Source: Moreno and Cardona, 2011)

Box 5.2 Political incentives in disasters

In the United States of America, electorally critical, hazard-prone states are twice as likely to have disasters officially declared than non-critical states, and for each disaster declaration, a US president can expect a one point increase in votes in a state-wide contest (Reeves, 2010). The reverse is also true, however, and leaders can also be punished for major disaster losses. Between 1976 and 2007, 40 percent of countries with democratically elected governments replaced their leaders in any two-year period, but in countries that experienced a major earthquake (defined as having more than 200 casualties) this figure rose to 91 percent.

(Source: Smith and Quiroz Flores, 2010)

countries the window of opportunity for DRM opens wider than in others. Unfortunately, the mechanisms through which large disasters can provide a political incentive, and under what conditions, have not been systematically studied. Despite huge investments,[3] post-disaster recovery programmes are rarely assessed from the perspective of DRM improvement. The post-tsunami TRIAMS process represents one effort to address that gap, marking an important breakthrough by proposing a framework of core indicators to monitor DRR progress and assess impact across different countries, at different scales, and for a number of key sectors.[4]

There are further examples of real change. In Iran (Islamic Republic of), the 7.2 magnitude earthquake in Bueen Zahra in 1962, which resulted in the death of 12,000 people (EM-DAT, 2011b), enabled a national consensus on building codes that had long been debated (Aon Benfield, 2010). In Colombia, the 1983 Popayan earthquake and the 1985 eruption of the Nevado del Ruiz volcano led to the establishment of a comprehensive DRM system. The 1999 Orissa super-cyclone and the 2001 Gujarat earthquake in India, the 2001 floods in Mozambique and the 2004 tsunami in Indonesia are other examples of large disasters that highlighted DRM capacity gaps and led to institutional and legislative changes. Following the 2004 tsunami, Indonesia also enacted comprehensive legislation and established a National Disaster Management Agency (BNPB) tasked with coordinating risk reduction (Llosa and Zodrow, 2011; Scott and Tarazona, 2011). In many of these cases, including in Colombia and Mozambique, the emergence of individual champions also played a decisive role (Llosa and Zodrow, 2011; Williams, 2011).

For each success story, there are others where the social demand was either weak or ignored, the strengthening of DRM was cosmetic, or the initial impetus was difficult to sustain. Rarely does the recognized need for a revision of land use planning after disasters lead to a full reform of land use and tenure systems (Barnes and Riverstone, 2009). In the HFA Progress Review, less than half of the countries reported that they had DRM provisions in their recovery and reconstruction budgets.

Countries with stronger governance are better placed to use the political window of opportunity following a major disaster, building on existing institutions, risk assessments, expertise and professional networks (Ievers and Bhatia, 2011). Weak governance linked with low institutional, financial and human capacities, and a lack of information on the costs and benefits of risk reduction, mean that governments are often unable to measure the opportunity costs of investing in DRM (Karayalcin and Thompson, 2010).

In general, countries that experience more frequent major disasters are more likely to invest in risk reduction due to lower opportunity costs (Keefer et al., 2010). Predictable disasters, such as recurring tropical cyclones, stimulate more social demand for DRM, because a failure to reduce foreseeable risks will expose government negligence. In contrast, when confronted with low-probability events, governments are more able to discharge their responsibilities and blame external forces such as God, nature and, more recently, climate change.

In addition, disasters that affect marginal groups with little voice in national politics are less likely to catalyse investment than those that affect strategic economic or political sectors (Maskrey, 1996; Smith and Quiroz Flores, 2010). Extensive disasters, for example, rarely create the concentrated citizen pressure necessary to stimulate a national political and economic imperative (Williams, 2011).

It has remained difficult to justify DRM investments based on estimates of their avoided impacts on medium- and long-term economic growth. The conflicting evidence provided by macro-economic studies (Kahn, 2005; Jaramillo, 2009; Noy, 2009; Cavallo et al., 2010; Keefer et al., 2010) may be due to the different econometric methods used and countries analysed. In Colombia, for example, most large disaster events did not produce lasting effects on economic growth but did affect inflation, per capita income, unemployment rates and inequality in the short term (Moreno and Cardona, 2011). Such effects, however, were heavily conditioned by how each individual disaster was managed. For example, the 1994

Tierradentro earthquake devastated a remote indigenous region in southern Colombia. After the disaster, unemployment increased and stabilized at a higher rate, and inequality also increased to rates that persist today. In contrast, the major investments in reconstruction after a 1999 earthquake devastated Colombia's central and economically important coffee-growing region actually led to reduced inequality.

5.2. Revealing risk and identifying development trade-offs

If governments were to account for recurrent disaster losses and for their future liabilities, they may begin to make more considered decisions based on an assessment of the costs, benefits and trade-offs internalized in risk-sensitive public investment.

In nationally reported disasters in the 21 countries in Africa, Asia and Latin America analysed in Chapter 2, there were 63,667 schools and 4,873 health facilities damaged or destroyed since 1989. During this period, 73,000 kilometres of roads were also damaged, and 3,605 municipal water systems, 4,400 sewer systems and 6,980 power installations were reported damaged and destroyed. Of these total losses, 46 percent of the schools, 54 percent of the health facilities, 80 percent of the roads and more than 90 percent of the water, sewer and power installations were damaged or destroyed in frequently occurring extensive disasters rather than in occasional and intensive catastrophes.[5]

These losses are massive, and they indicate how public investments in social and economic development are in practice often investments in risk construction and contingent liability (Cardona, 2009). This large loss of publicly owned assets remains largely invisible and unaccounted for (Gall et al., 2009), and impacts are transferred to affected low-income households and communities. This invisibility represents a major political barrier to investing in DRM. Revealing these impacts will not automatically lead to greater investment, but if governments were to account for these recurrent losses and for their future liabilities, they may begin to make more considered decisions based on assessments of the costs, benefits and trade-offs internalized in public investment.

As explained in Chapter 1, a country's stock of risk comprises a combination of high-severity, low-frequency intensive risks, and low-severity, high-frequency extensive risks. Normally, neither conventional catastrophe risk models nor risk models based on historical disaster-loss data are able to comprehensively estimate both of these risk strata. Fortunately, national disaster loss reporting (see Box 2.5 in Chapter 2) and the growing availability of open-source probabilistic models, such as CAPRA,[6] have facilitated the development of innovative hybrid models that can estimate both extensive and intensive risks. One such hybrid model (Box 5.3), which combines historical disaster loss data and probabilistic catastrophe risk modelling, has been piloted in Colombia, Mexico and Nepal (ERN-AL, 2011). By integrating assessments of both extensive and intensive risks, the real scale of recurrent loss and future risk begins to emerge.

Estimates of disaster impacts are normally made only after large events,[8] meaning that recurrent disaster loss is often unaccounted for. The evidence produced by applying the hybrid model in Colombia, Mexico and Nepal indicates that the scale of recurrent losses may be far higher than most governments realize (Figure 5.3). Estimated average annual disaster losses reach US$2.24 billion in Mexico, US$490 million in Colombia and US$253 million in Nepal.

Analysis based on the hybrid loss exceedance calculation for Colombia shows that the government may have to address losses in publicly owned assets as well as the uninsured private assets of low-income groups, ranging from US$100,000 (100 times per year) to US$1 billion (at least once every 30 years). In Mexico, and excluding impacts from drought and in the agriculture sector, the government

Box 5.3 The hybrid risk model

Loss exceedance curves are normally used to express the probable maximum losses (PML) that can occur in a given period, or the probability of exceeding a given level of loss in a given period. For example, an exceedance rate of 0.1 means there is a 10 percent probability of a given loss occurring in a year, formally representing a return period of 10 years for that loss. An exceedence rate of 10 means that it is probable that the loss is exceeded 10 times in a year. The curves can also be used to estimate annual average loss, being the expected annual loss over the long term.

The hybrid risk model is built by constructing two loss exceedance curves: one derived empirically from recorded disaster losses for all the hazards to which the country is exposed, and the other derived analytically for major hazards, such as earthquakes and tropical cyclones.

The empirical loss exceedance curve is constructed by assigning monetary values to recorded disaster losses for all weather-related and geological hazards in national disaster databases, applying parameters widely used in disaster impact assessments.[7] The resulting curve models probable maximum losses up to a return period of approximately 40–50 years, accounting for most extensive risk.

The analytical loss exceedance curve is constructed by measuring the quantity and value of a proxy of the exposed assets to hazards of different intensities in each sector (e.g., housing, energy, health, transportation). These are assigned to vulnerability functions in order to estimate probable losses, e.g. different earthquake vulnerability curves are used for buildings with different construction systems. The analytical loss curve represents the fiscal or sovereign risk associated with major hazards, such as earthquakes in Colombia and Nepal, and both earthquakes and tropical cyclones in Mexico.

When the two curves are integrated as presented in Figure 5.2 for the case of Colombia, the empirical curve estimates higher probable maximum losses than the analytical curve for the strata of extensive risks, with direct losses of up to US$30 million occurring once a year. This confirms that the analytical loss curve does not accurately capture extensive risks. However, the analytical curve estimates higher probable maximum losses for longer return periods, confirming that the empirical loss curve underestimates intensive risks, particularly those with very long return periods. By combining both, the hybrid loss exceedance curve enables governments to estimate the full spectrum of disaster risks they face.

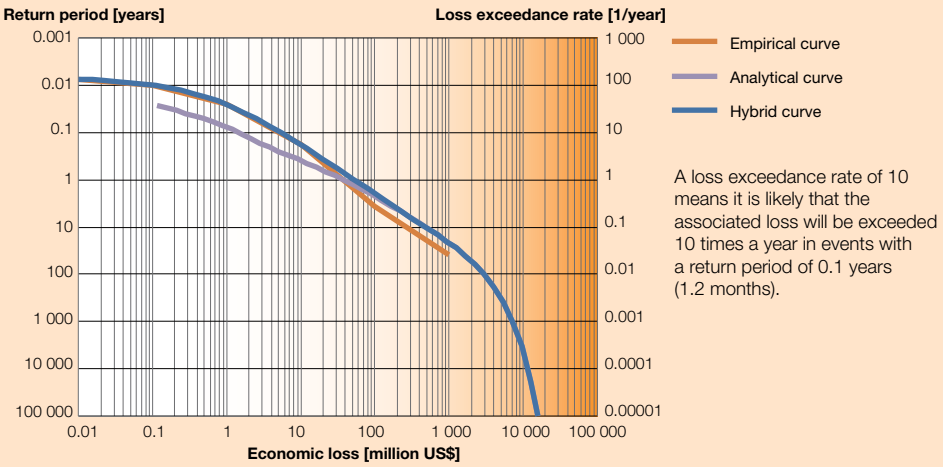
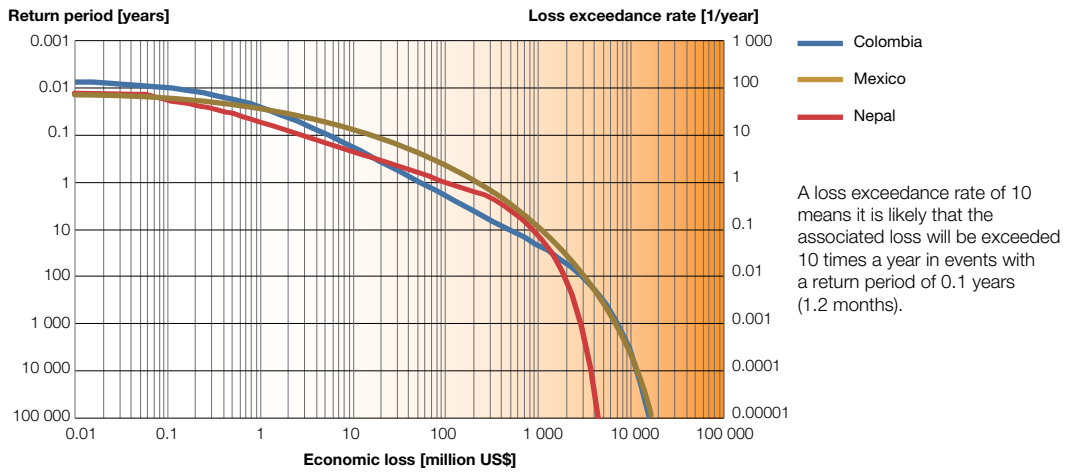


Figure 5.2
The hybrid loss exceedance curve for Colombia

(Source: ERN-AL, 2011)

Figure 5.3
Hybrid loss exceedence curves for Colombia, Mexico and Nepal



(Source: adapted from ERN-AL, 2011)

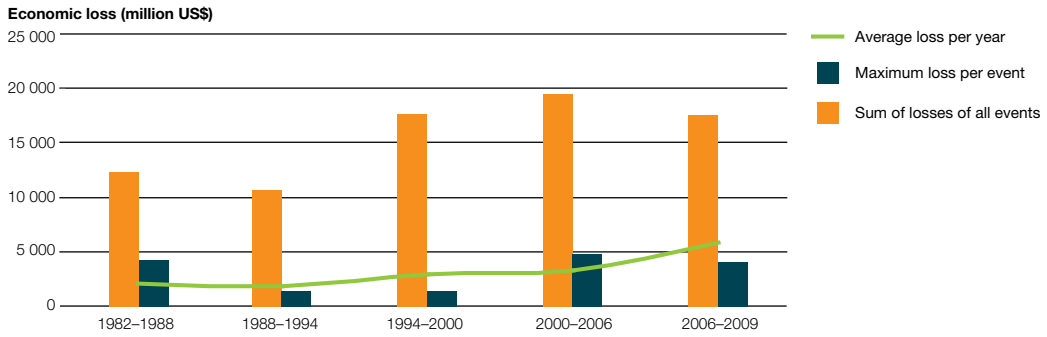
is likely to incur weather-related disaster losses of over US$1 million at least 50 times a year, of more than US$15 million at least 10 times a year, more than US$300 million at least once a year, and more than US$1 billion at least once every 6 years. In Nepal, the government is implicitly liable for losses amounting to US$1 million almost 10 times each year, and of US$100 million almost every second year.

This is the real scale of disaster loss in these countries. It gives an idea of the magnitude of the public funds required if a government were to compensate for and replace public assets, and support the recovery of low-income households and communities. Also, it is not just recurrent losses that governments are ill prepared to deal with. With some notable exceptions, governments are rarely adequately prepared, by either contingent financing or insurance, to cover the probable maximum losses from a low-probability intensive event. Taken by surprise by liabilities that they have never assessed, governments are then forced to rely on slow and often unreliable international assistance for recovery and reconstruction.

To put these losses into a political perspective, Figure 5.4 shows the value of nationally recorded losses for five successive presidential periods in Mexico from 1982 to 2009. All Mexican governments since 1982 have had to absorb disaster losses of over US$10 billion during their period in power, rising to almost US$20 billion in the new millennium. This is the scale of loss any incoming government is likely to have to deal with unless serious investments are made in DRM.

From an economic perspective, the losses are significant in all three countries studied. In Colombia, for example, as Figure 5.5 shows, the estimated annual loss from disasters represents approximately 1 percent of GDP. Although this

Figure 5.4
Economic losses by presidential period, Mexico



(Source: ERN-AL, 2011)

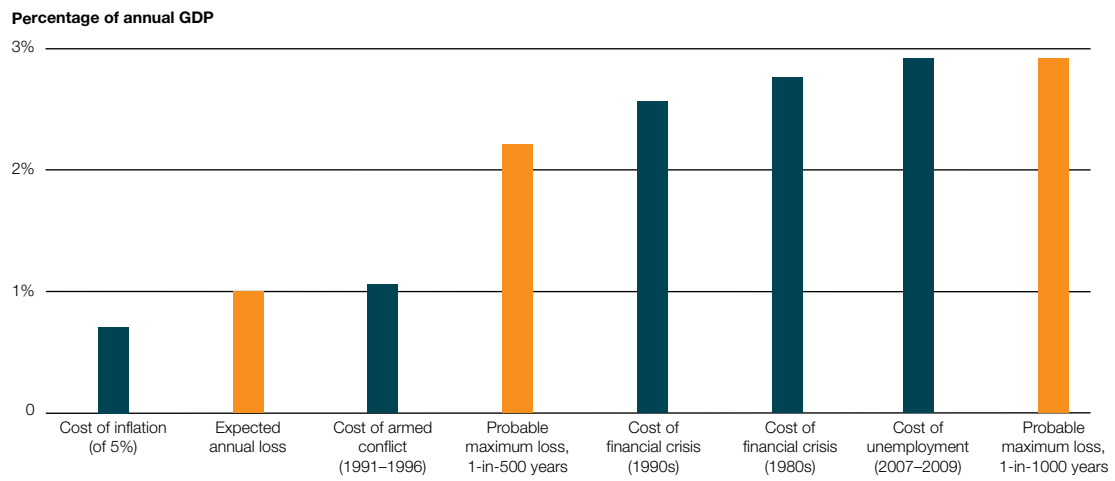


Figure 5.5
Costs of disasters and macroeconomic events as a percentage of annual GDP in Colombia

(Source: Moreno and Cardona, 2011)

is less than the cost of cyclical unemployment, disaster losses are higher than the cost of 5 percent inflation, and are comparable to the cost of armed conflict, which was estimated at 1.1 percent of GDP for the period of 1991 to 1996. Furthermore, the maximum probable disaster loss with return periods of 500 and 1,000 years, represent costs of 2.3 percent and 2.9 percent of GDP, respectively, equivalent to the losses caused by the financial crises of the 1980s and 1990s (Moreno and Cardona, 2011).

These figures indicate that if decision-making were based on a realistic assessment of the social and economic costs and benefits, DRM should have a similar public policy importance as controlling inflation or resolving armed conflict. In other words, a larger share of the national budget should be allocated to reducing disaster risks. Making these costs visible is also a key step towards identifying the trade-offs in DRM investment.

These figures on disaster loss do not include the cost of indirect disaster impacts documented in the *2009 Global Assessment Report* (de la Fuente and Dercon, 2008; UNISDR, 2009), for example increasing poverty and declines in human development. Moreover, disasters reduce the savings level in society and thus the amount of capital and product per person. As a result, recurrent disasters, even though they may be small-scale, affect per capita income rates in the long term (IDEA, 2005; Cavallo et al., 2010; Moreno and Cardona, 2011).

5.3 Tailoring DRM strategies

Governments will need a range of different DRM strategies to address the different risk strata. It may be more cost-effective to reduce the more extensive risks using a mix of prospective and corrective risk management strategies. For some of the more intensive risks, corrective disaster risk management will not be cost-effective, although compensatory risk management could address them through insurance, reinsurance, transfer to capital markets, and contingent financing.

5.3.1 Identifying risk strata

Governments typically have three strategic DRM instruments at their disposal: prospective, corrective and compensatory.[9] The portfolio of resources and their financial costs are very different for each. By assessing the full spectrum of risks they face, governments will be able to identify the most appropriate and cost-effective DRM strategies for each risk strata. Applying probabilistic risk modelling and cost–benefit analysis to develop a composite profile for each

country can assist in defining a pragmatic mix of instruments depending on the economic and development status of a country.

From a risk-financing perspective, there are three possible strategies that a government can adopt to manage disaster risk: retaining the risk, insuring the risk and transferring the risk to capital markets.[10] The decision how much risk to retain and how much to transfer is ultimately a government policy decision, based on considerations such as the value of the annual average and probable maximum loss, the fiscal space or capacity to invest in risk reduction, social and political acceptance of risk, and access to risk financing.

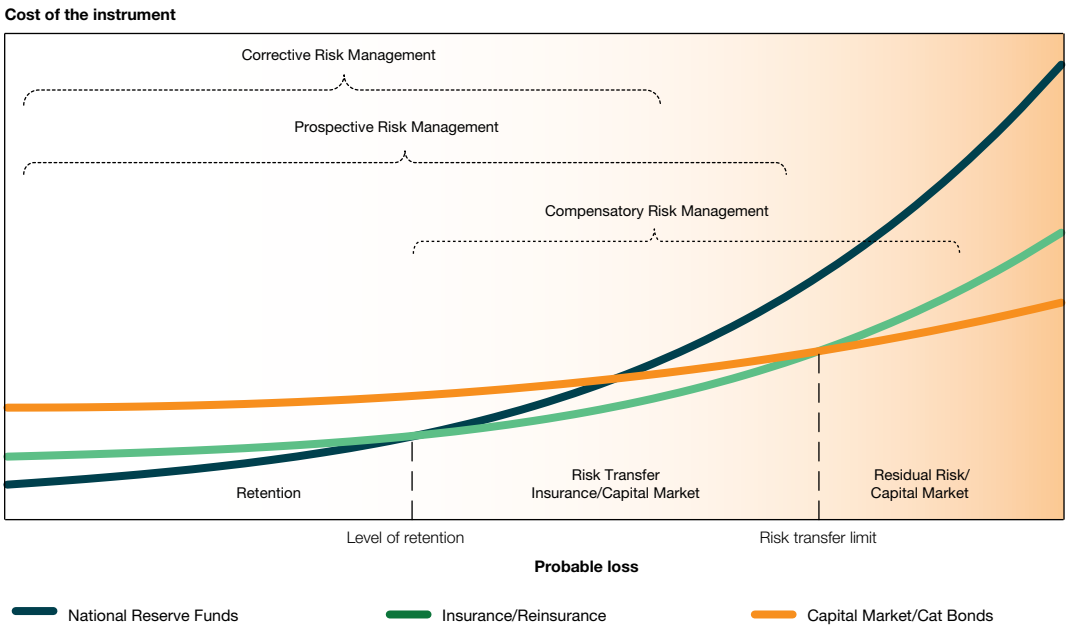
In general, it is more cost effective for governments to retain rather than insure extensive risks below the level of retention (Figure 5.6). From an insurance perspective, this stratum would normally be considered as a deductible, which governments would have to cover from their own resources.[11]

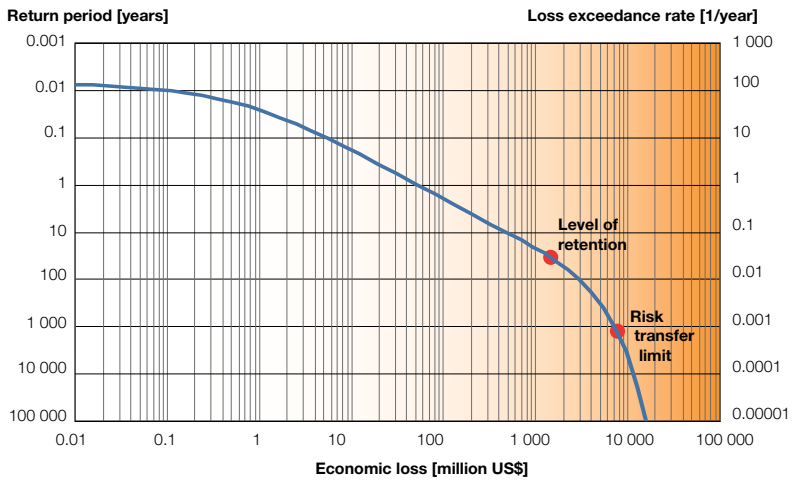
It is more cost effective for a government to transfer intensive risks, between the deductible amount and the risk transfer limit, through insurance, reinsurance and through contingent credit and similar instruments, rather than to retain them. Beyond the risk transfer limit, risks cannot be insured, and can only be transferred to capital markets through instruments such as Cat Bonds, or are residual. Beyond this point, countries are likely to face the range of very low-probability emerging risks as described in Chapter 2.

In Colombia, for example, national insurance regulators have established that all insurers should have reserves, including reinsurance, to cover the probable maximum loss associated with a return period of 1500 years. This would be the risk transfer limit if the insurer decides to establish an excess loss threshold at that level, above which losses are not insured: a probable maximum loss of US$7.6 billion in the case of Colombia (Figure 5.7). If the deductible was established at 1 percent, the government would have to retain probable maximum losses of up to US$1.5 billion and cover annual average losses of approximately US$200 million with its own resources, below the level of retention.

Similar findings are seen in cost–benefit analyses of different climate adaptation options (ECA, 2009). Studies in 15 diverse countries including China, India, Mali, the United Kingdom, the United States of America and seven Caribbean countries showed that countries with a balanced portfolio of prospective, corrective and compensatory risk management measures were best positioned to proactively manage the total spectrum of climate risk.

Figure 5.6
Cost of different risk financing strategies for dealing with different strata of disaster risk





A loss exceedance rate of 10 means it is likely that the associated loss will be exceeded 10 times a year in events with a return period of 0.1 years (1.2 months).

Figure 5.7
Hybrid loss exceedance curve for Colombia locating the deductible amount and risk transfer limit

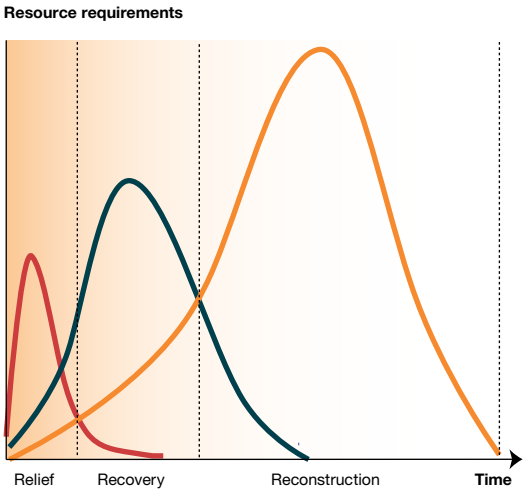
5.3.2 Compensatory DRM

Many low- and middle-income countries are vulnerable to post-disaster resource deficits. In such circumstances governments have to divert funds from already tight budgets, re-allocate development loans to relief, and/or take on new loans from other states and the international community. Unless special conditions are granted, these sources of post-disaster finance are often slow and too expensive. When governments are unable to mobilize timely resources for recovery and reconstruction, the direct costs and impacts of the disaster can cascade into a range of other negative social and economic outcomes (Suarez and Linnerooth-Bayer, 2011). For example, Honduras experienced a severe delay in economic growth due to difficulties repairing public infrastructure and assisting private sector recovery after the devastation of Hurricane Mitch in 1998. Five years after Mitch, its GDP was still 6 percent below pre-disaster projections (Mechler, 2004).

Following intensive disasters, a lack of financial liquidity often leads to serious delays in recovery. In Haiti, of the almost US$6 billion pledged for the first two years after the January 2010 earthquake, only about US$0.5 billion or less than 10 percent had been transferred as of August 2010 (Ferris, 2010). This financing gap occurs after most major disasters and severely affects not only recovery itself, but also future investments in DRM.

Figure 5.8 shows the relative costs of relief, recovery and reconstruction, the three phases of post-disaster funding in the case of intensive disasters. Whereas the humanitarian community and the media tend to focus on relief, most post-disaster funding requirements are normally for reconstruction. In the case of extensive disasters, the amplitude of the curves may be inverted. Although governments may spend on relief (and to a lesser extent on recovery), the large initial costs of relief, and even of subsequent reconstruction, are usually absorbed by low-income households and communities.

The cost of financial instruments that could address the needs of each of the funding phases varies considerably (Ghesquiere and Mahul,



(Source: Adapted from Ghesquiere and Mahul, 2010)

Figure 5.8
Post-disaster funding process for intensive disaster events

2010). A government's own contingency funds and grant financing from donors will always be the cheapest source of funding, but they have limitations in terms of quantity, predictability, speed of disbursement, and hidden costs, for example when funds are diverted from previously allocated development budgets and grants (Mahul and Skees, 2006; Ghesquiere and Mahul, 2010). As highlighted by Box 5.4, contingency funds rarely provide more than a fraction of the funds required, and they may be exhausted by the cost of extensive disasters. The implication is that countries have to divert development resources to cover recovery and reconstruction costs, or transfer losses and impacts to affected households and communities. In both cases, the development deficit increases.

Insurance and risk-sharing approaches can enable governments to complement other risk management strategies. They do this by ensuring or accelerating financing for relief, recovery and reconstruction, while at the same time guiding investment decisions that also contribute to reduce risks (Suarez and Linnerooth-Bayer, 2011).

Two factors contribute to the cost of risk transfer: the entry level of risk transfer where the deductible amount is fixed, and the value of risk to be transferred between the deductible amount and the risk transfer limit. The cost of risk transfer can be significantly reduced if governments decide to retain and reduce part of their risk. For example, the cost of risk transfer with a deductible of 1 percent could be only a tenth of the cost of the transfer were no deductible established (ERN-AL, 2011).[13] In the example of Colombia, using the hybrid curve, the cost of insuring the catastrophic risk between a level of retention of US$1.5 billion and a limit of risk transfer of US$7.6 billion would be calculated at approximately US$30–40 million per year.

New and innovative market-based instruments that promote DRM (Cardona, 2009; Hess and Hazell, 2009) are now being developed and piloted throughout the world. In Peru for example, new contingent insurance policies are being developed that ensure payouts a month ahead of forecasted floods resulting from an El Niño event (Box 5.5). These instruments have been developed for individual micro-insurance schemes, but this is one of the first attempts to apply them to a government client. In Manizales, Colombia, an innovative collective insurance policy protects both public and private assets by cross-subsidising coverage for low-income groups from voluntary payments. Using the kind of sophisticated catastrophic risk models presented above enabled the municipal government to design a collective risk transfer instrument and promote an insurance culture in the city (Marulanda et al., 2010).

By 'pricing' not only risk, but also the benefits of risk reduction, insurance instruments provide incentives for DRM. With such contingent insurance policies, a government could, for example, calculate the expected costs of risk reduction for a specific hazard, estimate unavoidable losses and then decide on the premium it can pay.

Other market-based instruments provide built-in incentives and an appropriate pricing of premiums according to previous risk reducing investments (Box 5.6). Whereas these are mostly designed for individual and business customers, the incentive and pricing principles can also be adopted for macro-level schemes.

Box 5.4 Mexico's disaster contingency fund

In 2010, Mexico's disaster contingency fund (FONDEN) ran out of money. With an annual budget of 7 billion pesos, FONDEN had already spent 12 billion pesos by September and it estimated that it needed 25 billion by the end of the year due to non-assessed losses.[12] FONDEN should have been in a better position given that Mexico issued a catastrophe bond for earthquakes and hurricanes, but extensive disasters, such as recurring floods and mudslides, led to FONDEN's multi-billion pesos bill (rather than high-intensity hurricanes which could trigger the bond's payouts). To make up the shortfall other government revenues had to be diverted.

Box 5.5 Contingent insurance in Peru to reduce losses associated with El Niño forecasts

In Peru's northern coastal region of Piura, seasons with extreme rainfall are often associated with El Niño-Southern Oscillation (ENSO) events, characterized by a warming of the tropical Pacific Ocean that can be observed and measured with a lead time of months.

Local, regional and national governments, and private stakeholders are cooperating to develop a financial instrument that triggers a payment when an ENSO event is predicted. This means that payments can be received before an event occurs so that the insured entity, usually local or sub-national governments, can mitigate losses that would likely occur in the absence of the insurance policy.

This type of insurance is potentially useful for three reasons: the payout takes place before the event, enabling protective and proactive measures to mitigate loss; the premium is not directly tied to the value of the asset protected; and the payout is dependent on the premium rather than estimated losses. The idea is that the insurance is taken out according to estimates of what needs to be invested to protect a certain asset, rather than replace (or repair) it, although accurately pricing the premium would depend on estimates of risks and of the costs of protection.

The most significant progress is a request in the Piura Regional Government budget to purchase the El Niño insurance in January 2011 to protect against the possibility of catastrophic flooding that could begin in early 2012 with a severe ENSO event. This project has led to new thinking and opportunities regarding the potential for 'forecast index insurance', in particular regarding ENSO events, which can affect seasonal patterns of rainfall, temperature and cause tropical cyclones in parts of Africa, Asia/Pacific and the Americas.

(Source: Skees, 2010)

The prohibitive cost of some insurance and risk financing instruments means that a conservative fiscal policy and the use of contingency funds and contingent lines of credit from development banks may be the most efficient way to deal with intensive risks (Ghesquiere and Mahul, 2010). Insuring a large part of the potential loss is equivalent to multiplying the loss, considering that insurance always costs more than potential loss. The fact that in 2011, only 5 out of 82 countries reporting to HFA on disaster financing mechanisms have issued catastrophe bonds (whereas 41 rely on national contingency funds) is reflective of this.

Unlike insurance and catastrophe bonds, contingent credit ensures access to loans in times of crisis, a safe option for governments with limited post-disaster financing choices. This was the case in Mongolia where, by accessing contingent credit, the government secured liquidity in the aftermath of severe winter storms to provide relief and as a re-insurer to its livestock insurance programme (Box 5.7).

Importantly, contingent credit can be linked to DRM as shown by the World Bank's CAT Deferred Drawdown Option, which requires eligible countries to have a DRM programme in place. The loan may be 'drawn down' after a disaster, unless the government has received prior notification that their DRM programme is not being implemented in accordance with the agreement. The fact that the lines of credit are contingent on the development of DRM strategies means that Ministries of Finance get directly involved in a dialogue on risk reduction.

Different country contexts create different distributions of risk strata, and correspondingly, different 'optimal' portfolios of prospective, corrective and compensatory risk management. For example, in countries with high levels of drought risk and large agricultural economies, such as China, India or Mali, prospective and corrective risk management measures such as irrigation control, improved soil management and improved fertilizer use are less expensive

Box 5.6 Incentives for disaster risk reduction through new risk financing instruments

Examples of new approaches and instruments in the insurance sector reflect a growing concern for creating incentives to reduce disaster risk. A pilot insurance project in Ethiopia supported by the World Food Programme was designed to pay claims to the government based on a drought index, in the time window between observed lack of rain and actual materialization of losses. This allows stakeholders to address threats to food security in ways that prevent the depletion of farmers' productive assets. This reduces future demand for humanitarian aid by enabling households to produce more food during subsequent seasons.

Governments that join regional risk pools can negotiate lower-cost insurance contracts, as they require the implementation of risk reduction measures for pool eligibility. The African Risk Capacity (ARC), for example, aims to provide African governments with financial weather risk management tools and funds to manage extreme events, while creating incentives for disaster risk reduction, planning and response. It intends to do this through a regional contingency funding mechanism for planned responses to weather emergencies and the establishment of an Africa-owned risk pooling entity.

With small economies and high debt levels, Caribbean states are highly dependent on unpredictable donor support to finance post-disaster needs. The Caribbean Catastrophe Risk Insurance Facility (CCRIF), set up in 2007, is a parametric risk transfer scheme owned by 16 countries, which provides short-term liquidity in the event of hurricanes and earthquakes. After the magnitude 7.4 earthquake that shook the eastern Caribbean in late 2007, the Saint Lucian and Dominican governments received CCRIF's first payouts; a total of US$0.9 billion to finance urgent post-earthquake recovery efforts. In early 2010 when Haiti was struck by a massive earthquake, the government received the full policy amount of only US$8 million, highlighting both the advantages as well as the inherent limitations of the instrument when governments are severely underinsured.

Catastrophe bonds, such as the recent issue in Mexico, have not yet been linked directly to disaster risk reduction. Indirectly, however, the Mexican bond will provide immediate and reliable post-disaster payments to the government, though as highlighted in Box 5.4, it has clear limitations. Though it is a novel idea, a more direct link might be possible if instruments are designed to fund the incremental costs of adding risk reduction measures to reconstruction efforts.

(Source: Suarez and Linnerooth-Bayer, 2011)

than risk transfer. In the case of small island states threatened by rising sea levels, such as Samoa, relatively low-cost measures such as planting mangroves and using mobile flood barriers are more cost-effective than building sea walls, but risk transfer is the most efficient solution (ECA, 2009).

5.3.3 Reducing the retained risks

As highlighted in the case of Colombia, even if it had insured its catastrophic risk the government would have to invest approximately US$200 million per year if it were to compensate for the losses for which it is responsible.[14] In general, therefore it is much more cost-effective for governments to invest in reducing the more extensive risk strata (i.e., below the deductible amount) using a mix of prospective and corrective disaster risk management strategies.

To assess the costs, benefits and trade-offs internalized in these different strategies, their cost-effectiveness needs to be compared. Thus for example, using land use planning to reduce hazard exposure or designing according to building codes (prospective) could be compared with the reinforcement of unsafe buildings, relocation of exposed settlements

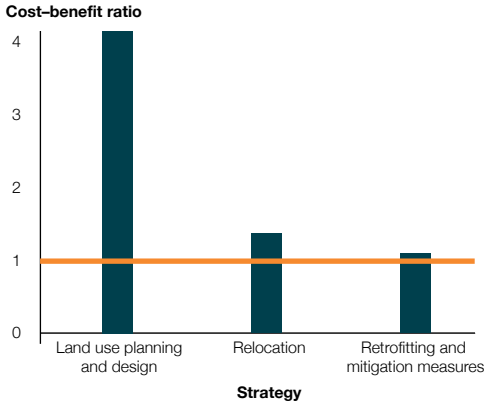
Box 5.7 Financing Mongolian index-based livestock insurance through distributing risk layers

In 2006, an index-based livestock insurance (IBLI) programme was introduced on a pilot basis in three Mongolian provinces. The insurance system was made affordable to herders and viable to insurers by a layered system of responsibility and payment. Herders retain small losses that do not affect the viability of their business. The next layer of losses is transferred to the private insurance industry through risk-based premium payments on the part of herders. A third layer of risk is absorbed by taxpayers, and the financing of the government's potential losses during the pilot phase relies on a combination of reserves and, as a fourth layer, a contingent credit is provided by the World Bank and international reinsurance.

(Source: Suarez and Linnerooth-Bayer, 2011, citing Mahul and Skees, 2006)

to less hazardous locations, or construction of mitigation works (corrective).

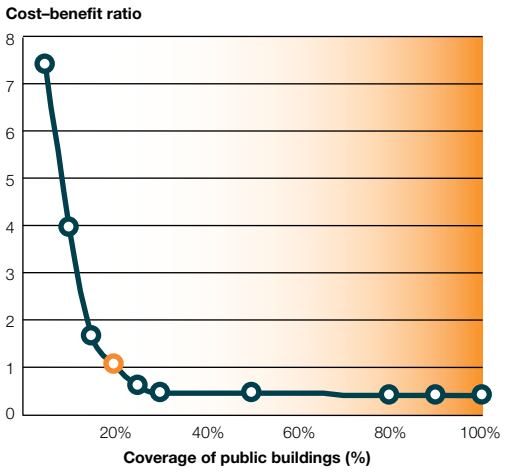
In Colombia, as in the other pilot countries, land use planning and improved building standards generate the largest ratio of benefits to costs (approximately 4 to 1). Although corrective risk management produces a positive benefit to cost ratio, it is clear that it is far more cost-effective to anticipate and avoid the build-up of risk than to correct it (Figure 5.9).



(Source: adapted from ERN-AL, 2011)

Figure 5.9
Comparison of the cost–benefit ratios of improved land use planning, relocating exposed settlements, and retrofitting and mitigation measures in Colombia

Corrective risk management, however, is far more cost-effective when it is concentrated on the most vulnerable part of a portfolio of risk prone assets. In Mexico, for example, the ratio of benefits to costs when investing in strengthening risk-prone public buildings is far more attractive when it is focused on the most vulnerable 20 percent of the portfolio (Figure 5.10).



(Source: ERN-AL, 2011)

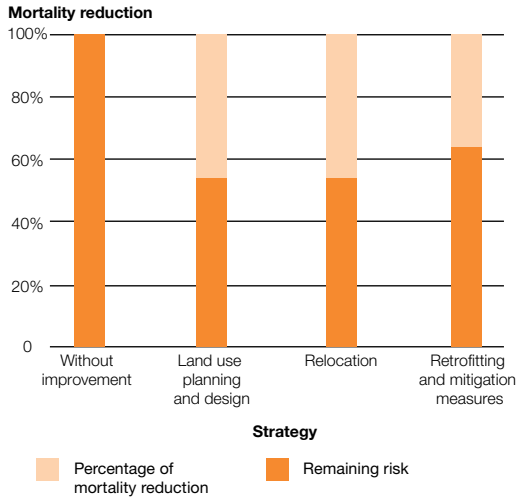
Figure 5.10
Cost–benefit ratio of reinforcing the portfolio of public buildings in Mexico

This carries a powerful message and opportunity for governments. Corrective risk management investments can be very cost-effective if they concentrate on retrofitting the most vulnerable and critical facilities rather than being spread widely over many risk-prone assets.

These measures can be even more attractive when the political and economic benefits of avoiding loss of life and injury, decreasing poverty and increasing human development, are taken into account. Saving human lives, for example, may be a more powerful incentive for DRM than pure cost-effectiveness. In Colombia, better prospective and corrective investments in risk management would both lead to significant reductions in mortality (Figure 5.11).

Although illustrative, these calculations of costs and benefits are likely to be too conservative.

Figure 5.11
The percentage reduction of mortality in Colombia due to different risk reduction strategies



(Source: ERN-AL, 2011)

They do not take into account the cost of downstream outcomes, such as increased poverty, reduced human development, increased unemployment and inequality.

Schools are a politically attractive target for investment in risk reduction. However, if direct economic costs were the only consideration, only four countries in Latin America would opt to retrofit schools for earthquake safety (Box 5.8). Whereas decisions to invest in retrofitting schools should be relatively easy to defend, they are nevertheless made against a backdrop of complex political, social and financial dynamics. Structural reinforcement alone may be costly, and programmes that include both infrastructure and equipment upgrading, and involve the local community, can be more attractive.

When the costs of retrofitting different building types are taken into account, the three countries where retrofitting would be most cost-effective are Costa Rica, El Salvador and Peru. In Bolivia, Honduras and Nicaragua, the estimated retrofitting costs are greater than the costs of replacing the schools. In Argentina, Colombia, Mexico and Venezuela, the expected reduction of average annual loss would not justify the investment.

These calculations of cost-effectiveness did not take into account injury and loss of life, nor did they value education and its loss. When children's lives are at stake, there may be a strong imperative to retrofit, even when the expected savings in lost educational infrastructure do not match the costs. In addition, given the effects of education on well-being and economic growth, demands for child safety, and the protection of public investments in education, the reduction of seismic vulnerability of educational facilities becomes a matter of priority.

Box 5.8 The costs and benefits of school retrofitting in Latin America

Damage and destruction of schools by earthquakes, floods and tropical cyclones leads to an unacceptable loss of children's and teachers' lives, wasting valuable public investment in social infrastructure and interrupting the education of those who need it most.[15] In the 2010 earthquake in Haiti, it was estimated that 97 percent of the schools in Port-au-Prince collapsed (Fierro and Perry, 2010). In the earthquake in south Sumatra in 2009 more than 90,000 students were left without a school. As highlighted at the beginning of this chapter, although the destruction of schools in major earthquakes tends to attract media coverage, almost as many schools are damaged and destroyed in extensive disasters.

School safety has been established as a disaster risk reduction priority,[16] but it is simply not cost-effective to retrofit all vulnerable schools. For example, in Bogota, Colombia, an assessment identified 710 schools built before 1960, of which 434 had a high vulnerability to earthquakes. Limited budgets meant that not all schools could be retrofitted and priority was given to the 201 schools that showed a positive cost–benefit ratio (Coca, 2007).

A recent study (ERN-AL, 2010) of earthquake vulnerability of schools in Latin America calculated the probable average annual loss for each country, taking into account earthquake hazard, the number of exposed schools, and their structural vulnerability both with and without retrofitting (Figure 5.12). In Bolivia, Honduras and Nicaragua, the retrofitting costs are greater than the value of exposed schools. In countries like Argentina, Colombia, Mexico and Venezuela, the expected reduction in average annual loss is not significant. Costa Rica, El Salvador and Peru are the countries with higher expected reductions in average annual loss and relatively low costs of retrofitting.

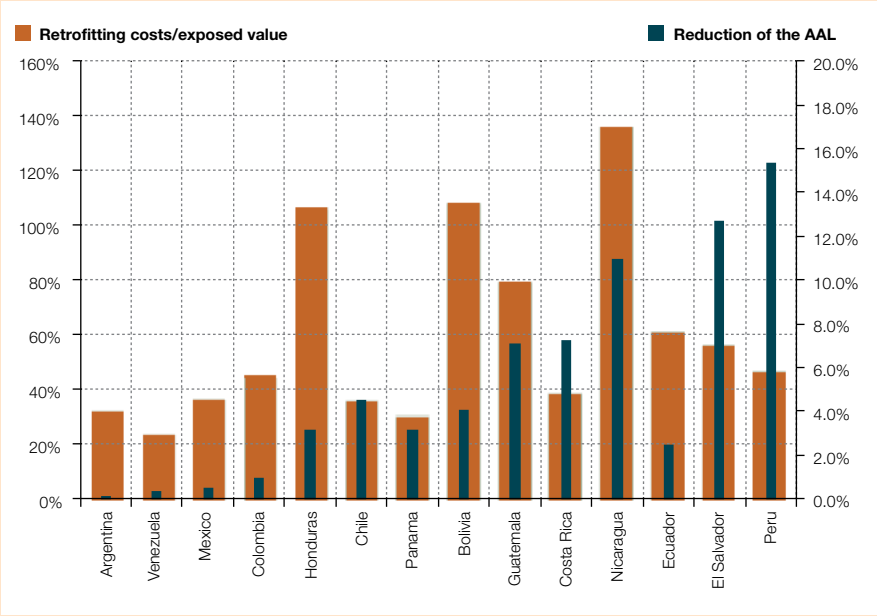


Figure 5.12
The costs and savings associated with retrofitting schools in Latin America

(Source: ERN-AL, 2010; Valcarcel et al., 2011)

Notes

1 Romania national progress report on the implementation of the Hyogo Framework for Action Interim Report, November 2010.

2 The importance of 'political will' for DRR both at national and local level is repeatedly cited as a crucial element for national strategies as well as a local enabling environment. This is described in various ways, often as local government commitment to effective DRR (Pelling, 2007; ProVention, 2009). Some resources recognize that political will for DRR has to be created and actively maintained, often via a range of incentive mechanisms (Christopolos, 2008; Trohanis et al., 2009).

3 From 1980 to 2003, the World Bank alone financed US$12.5 billion in post-disaster recovery projects.

4 The Tsunami Recovery Impact Assessment and Monitoring System (TRIAMS) is a common system to monitor recovery progress and long-term impacts in Indonesia, Maldives, Sri Lanka and Thailand.

5 All figures are taken from UNISDR's Global Assessment Report Data Universe, available at www.preventionweb.net/gar.

6 Comprehensive Approach for Probabilistic Risk Assessment. For more information on CAPRA please see www.ecapra.org.

7 The parameters used are derived from methodology developed by the Economic Commission for Latin America and the Caribbean (ECLAC) for evaluating disaster impacts (ECLAC, 2002). This methodology is widely used following major disasters throughout the world by the World Bank, regional development banks and the United Nations. This, however, does not take account of indirect impacts and costs, for example, in terms of increasing poverty or deteriorating education and health.

8 For example in the post disaster loss and impact assessments produced after the Haiti earthquake in January 2010, the Chile earthquake in February 2010, and the El Salvador tropical storm in November 2009, using methodology developed by ECLAC (2002).

9 See Preface and Chapter 1 for definitions of these strategies.

10 Insurance is a form of risk transfer, but insurance and reinsurance companies, as well as countries, increasingly transfer their risk to capital and derivatives markets to cover major losses through alternative risk transfer (ART) instruments such as Catastrophe Bonds.

11 In insurance terminology, the deductible is the part of the claim that is not covered by the insurance company and that will have to be borne by the insured party.

The value of the deductible depends on several factors; nonetheless, each small event (extensive risk) usually incurs losses lower than the deductible, and therefore, is not covered by the insurance but instead needs to be covered by the government.

12 See www.artemis.bm/blog/2010/09/16/fonden-mexicos-disaster-fund-exceeds-its-annual-budget/ and Ruben Hofliger, Ministry of the Interior of Mexico, UN General Assembly Informal Debate on Disaster Risk Reduction, 9 February 2011, New York, USA.

13 The costs of transferring risks of a specific layer can be calculated from the expected annual loss, incorporating the expected loss and the probability of occurrence by event (the technical estimation of basic risk premium). This means that the higher the deductible amount (i.e., the more the cost of the risk is retained by the premium holder), the lower the premium or the cost of insurance (see ERN-AL, 2011, Chapter 7, Tables 7.1 and 7.2). This level of retention is established depending on the solvency and financial convenience of the party or government. In addition, investing in DRR (e.g. reducing the level of exposure and vulnerability through retrofitting) has direct implications for the calculation of the premium. If the amount and frequency of expected losses is reduced, this will lower the premium for catastrophe insurance cover or other risk transfer solutions.

14 In fact the losses due to extensive disasters affecting more than 700 municipalities in Colombia during the 2010–2011 rainy season have been estimated in US$5.4 billion (Cardona, 2011) far exceeding available contingency funds and lines of credit. As a result the government has had to consider selling 10 percent of the capital of national energy company ECOPETROL to cover the gap (for more information see www.unperiodico.unal.edu.co/dper/article/anticiparse-al-peligro-no-es-una-opcion-es-una-obligacion).

15 An empirical analysis on a panel of 19 OECD countries observed from 1971 to 1998 has found a robust positive correlation between expenditures on health and education and GDP growth (Beraldo et al., 2009). Evidence also suggests that public expenditures influence GDP growth more than private expenditures. In particular, estimates show that a 1 percent increase in total educational expenditure growth rate would increase the per-capita GDP growth rate by 0.03 percent, with most of this effect coming from public expenditure (Ibid.)

16 Global UN campaigns on safe schools are evidence of this, such as the 2006–2007 'Disaster Risk Reduction begins at School' campaign, or the more recent 'A million schools and hospitals safe from disaster' initiative within UNISDR's 'Making Cities Resilient' campaign.

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Chapter 6

Opportunities and incentives for disaster risk reduction

A public road destroyed by a landslide.
Photo: iStockphoto®, © ollrig

Chapter 6 Opportunities and incentives for disaster risk reduction

Runaway increases in exposure and risk are pushing up the costs of disasters, while at the same time, countries and communities are struggling to reduce their vulnerabilities. The link between this rapid increase in costs and certain development policies – such as liberalization of trade and financial markets, privatization of public utilities and services, and deregulation – has not been explored sufficiently.

Aside from reducing disaster mortality, existing risk governance capacities and arrangements generally fail to achieve their aims. A new paradigm for risk governance is required, one that must address the disaster risk internalized in, and sometimes generated by, development processes.

Whereas disaster risk management (DRM) has conventionally been delivered through stand-alone projects and programmes, a number of governments are now adapting development mechanisms and instruments designed to reduce risks and strengthen resilience. These include public investment planning, ecosystem-based approaches and social protection.[1] Although many of these innovations are still incipient, they promise to address underlying risk drivers and generate important co-benefits for the people and organizations involved. These innovations often build on existing institutional capacities and thus offer powerful incentives for governments to adopt them.

There are likely to be greater incentives for DRM when such instruments simultaneously address the needs of a number of stakeholders and competing priorities. For example, improved water management not only addresses drought risk but may also increase generation of hydroelectricity, water-storage capacity for agricultural use, and the availability of domestic drinking water. In general, these incentives are stronger when DRM contributes visibly to improved economic and social well-being and choice for each citizen. Governments often go unrecognized for reduced disaster losses, or when good risk reduction prevents extreme weather events causing a disaster. To overcome the perception that DRM budgets compete with other priorities for scarce resources, disaster risk reduction must be seen as an integral part of local development.

These innovative instruments can help define a new approach to risk governance, especially if they are supported by political commitment, policy coherence among different levels of government, competent and accountable local governments, and partnerships with civil society and low-income households and communities. At the same time, effective risk governance must become an essential component of development in general.

6.1 Integrating disaster risk reduction into public investment decisions

Global public investments dwarf international aid. If national public investment systems truly account for disaster risk, they can reduce potential losses at a scale impossible to achieve through stand-alone DRM.

In 2008 alone, Peru's National Public Investment System approved investment of approximately US$10 billion, about half of which was to be executed by local governments. In comparison, official development assistance received by Peru in 2008 was US$266 million. As such, the decision to evaluate the disaster risks internalized in public investment, and to ensure that cost-effective measures to reduce risks are included in all projects, has huge implications for whether the stock of risk goes up or down.

Public investment that is based on sound needs and risk analysis promotes growth. At the same time, investments in transport, communications and education have a particularly large effect on economic growth and poverty reduction (Barro, 1991; Easterly and Rebelo, 1993; Aschauer, 2000; Milbourne et al., 2003; Anderson et al., 2006). If public investment becomes a vehicle for DRM, not only is the quality and sustainability of public spending enhanced, but disaster-related losses and costs are also reduced and social and economic development stimulated. This can be a powerful incentive for governments. Upgrading and expanding inefficient, ageing water and drainage infrastructure, if planned from a risk reduction perspective, can reduce vulnerability to droughts and floods while improving the quality of water and sanitation. Building earthquake-resistant schools can improve education while saving children's lives.

Public investment projects are normally shaped through a number of parallel and interconnected planning processes that include land use planning and management, development planning, sector investment planning and investment projects. Ideally, these would occur in a sequential order with one building on the other (Figure 6.1), but in reality this is rarely the case (see also Section 6.5).

In the 2009–2011 HFA Progress Review, approximately half of the reporting countries and territories stated that they use cost–benefit analyses to incorporate disaster risk reduction measures into the planning of public investment, and almost two-thirds assessed the impact of disaster risk on productive infrastructure, including dams, irrigation and transport systems. Although progress has been reported from different regions, the main impetus for formally incorporating DRM into this sequence has come from Latin America, where the modernization of public investment systems has been promoted by the Economic Commission for Latin America and the Caribbean.[2]

Peru was the first country to include disaster risk into its evaluation criteria for public investment projects, followed by Costa Rica and Guatemala (Box 6.1). In Peru, it is now a legal requirement that all public investment projects be evaluated for disaster risks. If the risks are not addressed, the project is not financed.

The systems developed so far, however, are only a beginning. At least three challenges must be overcome if the tremendous potential is to be realized.

(Source: adapted from Campos and Narváez, 2011)

Figure 6.1
Sequential planning from broader land use systems to specific project investment

Box 6.1 Integrating disaster risk reduction into public investment in Latin America

The use of public investment systems to reduce disaster risk reflects a new approach to planning in Latin America. In the 1990s, many countries weakened or dismantled their planning and regulation mechanisms as part of a broader wave of reforms that promoted economic deregulation and trade liberalization. Whereas these reforms may have stimulated economic growth (and hence also increased hazard exposure), weaker planning and regulation almost certainly increased vulnerability. Since the early 2000s, public investment systems anchored in finance ministries have been developed by a new generation of planners aiming for efficiency, sustainability and equity in the investment of public resources.

In Peru, the National System for Public Investment was created in 2000, and by 2008 had approved 72,000 projects. Disaster risk was formally incorporated into the system between 2004 and 2007. This was achieved by developing risk concepts and assessment methods, convening a large number of actors from different levels of government and across departments, training more than 900 professionals, implementing new standards and instruments, and developing a long-term vision of investment. These have all proved to be critical success factors.

Costa Rica has built on the lessons learned in Peru, incorporating disaster risk into its new public investment system from its inception in 2007. A comparative analysis of other public investment systems helped generate political and bureaucratic support and enabled the country to fine-tune and improve upon the Peruvian model. Unlike Peru, where planning institutions were dismantled in the 1990s, Costa Rica benefited from a 30-year-old tradition that allowed investment decisions to be aligned with strategic development plans.

Learning from one another's experiences has helped countries save time and avoid mistakes as they embark on similar processes. Added to this, strategic alliances with training and academic institutions and international support have enabled legislation, supporting regulation and planning systems to be developed in a sequential process in which one step builds on what was achieved previously.

(Source: Campos and Narváez, 2011)

First, although disaster risks are evaluated in the design of public investment projects, there is no analogous process earlier in the planning sequence. As a consequence, higher-level planning decisions, or a lack thereof, may actually create risks that are not evaluated and addressed until the project stage.

Second, the evaluation of risks in public investments, and of the costs and benefits of reducing risks, require detailed comprehensive probabilistic risk assessments. As the HFA Progress Review highlighted, these assessments are not available in many countries, implying that there may be no objective basis for evaluation.

Third, new mechanisms for planning and budgeting at the local level, as well as stronger partnerships with civil society and local governments, are essential if public investment is to be effective, sustainable and relevant to local needs. Examples, such as participatory budgeting in Porto Alegre, Brazil (Menegat, 2002; UNISDR, 2009), Local Coordinating Councils in Peru (Venton, 2011), and the coordination of development, environmental management and disaster risk reduction in Manizales, Colombia (Velasquez, 2010), demonstrate that many countries are adopting innovative approaches to public investment.

6.2 Social protection: strengthening resilience to disasters

Existing social protection mechanisms can be adapted to protect vulnerable people before, during and after crises. Conditional transfers, temporary employment programmes and micro-insurance schemes are examples of such mechanisms, which can increase household resilience and buffer against the impacts of disasters. Reaching out to the vulnerable non-poor helps avoid the creation of more poverty, and has multiple benefits in terms of asset building and protection of human capital.

Social protection, including support payments and insurance against risk, does not reduce disaster risk in itself. Nor is it an alternative to development investments in public infrastructure and services, but there are two compelling reasons why social protection can be part of strategic DRM.

First, social protection instruments can enhance individuals' and households' disaster resilience, reduce poverty and stimulate human capital development (de Janvry et al., 2010; Siegel and de la Fuente, 2010). Successful social protection thus provides buffers that smooth consumption not only during and after, but also before disasters, and it protects household and community assets. This helps to avoid disaster losses cascading into other household impacts and outcomes, such as taking children out of school and sending them to work, or selling off productive assets (de Janvry et al., 2006; ERD, 2010; Guarcello et al., 2010) – coping strategies that have long-term negative consequences (López-Calva and Ortiz-Juárez 2009; Fernandez et al., 2011).

Second, many of these instruments are already being delivered on a large scale. They can be used to reach very large numbers of disaster-prone households and communities through relatively minor adaptations of targeting criteria and timeframes, and often with comparably low additional costs.

The countries best able to take advantage of this opportunity are those that already have social policies supported by a wide range of legislative provisions (ERD, 2010), such as labour market laws (including the regulation of unemployment benefits), workplace health and safety regulations, basic entitlements and welfare payments, and support for marginal groups. Countries that have strongly developed social legislation, corresponding regulation and up-to-date public registries find it easier to employ both targeted and universal social protection as instruments for DRM.

6.2.1 Conditional transfers

Almost 114 million people in Latin America and the Caribbean are receiving, or have received, conditional cash transfers as a means to reduce structural poverty over the past two decades (Table 6.1 and Box 6.2). Brazil's Bolsa Familia and Bolsa Escola, well-known examples of conditional transfers, reach more than 12 million households (as of June 2010). In these schemes, households receive a monthly payment from the government, conditional on sending children to school (Behrman et al., 2005), attending health check-ups and ensuring vaccination (Gertler, 2004; Levy and Ohls, 2007), taking children out of work (ILO, 2007), and improving nutrition (Leroy et al., 2009). Several countries, such as Bangladesh and Ethiopia, also employ food-based or combinations of food- and cash-based conditional transfers as part of their social protection systems (del Ninno et al., 2009).

These instruments potentially leverage multiple incentives. They contribute indirectly to household resilience by enabling the accumulation of assets to buffer disaster losses. In Mexico, for example, Oportunidades

Table 6.1 Structural conditional transfers in Latin America and the Caribbean

Country	Social Assistance Programme	Start year	Beneficiaries (as of)
Honduras	Programa de Asignación Familiar-PRAF I/PRAF-BID II/PRAF-BID III	1990/ 1998/2007	150,000 households (2008)
Mexico	PROGRESA/Oportunidades	1997	5.8 million households (2010)
Nicaragua	Red de Protección Social-RPS	2000	30,000 households (2006)
Costa Rica	Superémonos/Avancemos	2000/2006	165,749 persons (2009)
Colombia	Familia en Acción-FA	2001	2.5 million households (2010)
Jamaica	Program of Advancement through Health and Education-PATH	2001	341,000 persons (2009)
Brazil	Bolsa Escola/Bolsa Familia	2001/2003	>12 million households (2010)
Argentina	Programa Jefes de Hogar	2002	1.5 million persons (2005)
Chile	Chile Solidario-CHS	2002	1.15 million persons (2008)
Ecuador	Bono de Desarollo Humano-BDH	2004	1.74 million persons (2010)
El Salvador	Red Solidaria	2005	120,000 households (2009)
Dominican Republic	Programa Solidaridad	2005	463,544 households (2010)
Paraguay	Tekoporâ	2005	109,692 households (2009)
Peru	Juntos	2005	420,574 households (2009)
Trinidad and Tobago	Targeted Conditional Cash Transfer Programme (TCCTP)	2005	22,000 households (2007)
Panama	Red de Oportunidades-RO	2006	63,245 households (2010)
Suriname	Suriname´s Social Safety Net	2006	Unrecorded
Uruguay	Ingreso Ciudadano/Plan de Equidad	2007	74,500 households (2009)
Bolivia	Bono Juancito Pinto	2007	1.8 million persons (2009)
Guatemala	Mi Familia Progresa	2008	591,570 households (2010)
TOTAL			Approximately 114 million people [based on 4.8 persons per household (Bongaarts, 2001)]

(Source: Fernandez et al., 2011)

(formerly known as PROGRESA) protects education, particularly that of girls, and thus fosters the formation of human capital, offsetting shocks such as parental unemployment or illness (de Janvry et al., 2006). Similar successes have been confirmed in Indonesia (Cameron, 2002; Sparrow, 2007), Côte d'Ivoire (Jensen, 2000) and Peru (Schady, 2004). In addition, social protection that ensures income replacement during crises has a major, positive effect on the economy by stabilizing aggregate demand while having no negative effect on economic growth (ILO, 2010).

Given that in many countries disasters undermine the effectiveness of conditional transfers in addressing structural poverty, enhancing these instruments to strengthen disaster resilience increases their power to reduce poverty. Although such transfers were not designed to deal with disaster impacts, experience shows that they can be adapted to reach those at risk of losing their assets in a disaster, which prevents significant medium- to long-term increases in the number of recipients after disasters (Siegel and de la Fuente, 2010; Fernandez et al., 2011). The advantage of using conditional transfers in this way is that social protection for disasters can be built into existing large-scale programmes without the need to construct a new administrative structure. Whereas conditional transfers have been used this way in Latin America and the Caribbean, the HFA Progress Review indicates that only a handful of countries in Africa and Asia have them in place.

Box 6.2 Using structural conditional transfers to strengthen disaster resilience — experience from Latin America and the Caribbean

Chile and Ecuador have made provisions in their conditional transfer programmes that allow for supplemental payments in exceptional circumstances. For example, the Chilean Government extended payments from the country's social assistance programmes, Chile Solidario and Programa Puente, to households affected by the February 2010 earthquake. This came in the form of a lump-sum transfer of 40,000 Chilean pesos (approximately $US73 at the time), which went to all affected households regardless of wealth or whether they were previous members of the programmes.

In Nicaragua, *Atención a Crisis* was implemented from 2005 to 2006 as part of the national *Red de Protección Social* to provide short-run social safety payments to households in six municipalities repeatedly affected by drought. The short-term objective was to protect human capital and physical assets of affected households (through cash transfers). The long-term objective was to create productive assets through conditional cash transfers coupled with scholarships for vocational training or productive investment grants for small-scale non-agricultural activity. The programme's evaluation revealed that after nine months, participating households had not only protected but also improved their asset base, and subsequently they were better able to engage in productive activities.

Two other countries, Jamaica and Mexico, have also introduced protective buffers to their respective programmes in response to the 2008 global economic downturn in an effort to safeguard beneficiaries' purchasing power. Together, these experiences show that existing conditional transfers can be adapted to efficiently accommodate timely additional payments to disaster-affected households.

(Source: Fernandez et al., 2011)

The use of conditional transfers to strengthen disaster resilience also poses challenges, because transfers are sometimes used in a way that undermines their principal objective to reduce structural poverty (Box 6.3). Furthermore, in many low- and middle-income countries, the poverty line is deliberately set very low, to reduce the cost of poverty reduction programmes and to broaden the tax base as much as possible (Box 6.4). As such, many non-poor but risk-prone households are not included in such transfer programmes.

Another issue is to what extent conditional transfers and other social protection instruments should be targeted. On the one hand, the high cost of targeted programmes may reduce the impact of each individual transfer (ERD, 2010), reinforcing the argument for a universal minimum level of social protection. However, the example of community-led identification of beneficiaries in Rwanda (Box 6.5) shows that targeting can be effective when organized in partnership with risk-prone households and communities. Evidence to date suggests that Rwanda's approach has been successful, particularly for households dependent on the informal economy (i.e., the part of an economy that is not taxed or monitored by governments) for their income (ERD, 2010). Such examples show that even low-income countries can set up fairly simple, non-contributory programmes that are administratively feasible and fiscally sustainable. These programmes can then serve as a first step to developing more complex and coordinated packages.

6.2.2 Temporary employment programmes

Employment strengthens individual and household resilience through secure income and gives households the opportunity to build assets. As such, employment is closely linked to disaster risk reduction (Krishnamurty, 2011). The ability of households to recover to pre-disaster income levels is higher when their pre-disaster income is higher

Box 6.3 Conditional cash transfer programmes in Mexico

The conditional cash transfer programme PROGRESA was introduced by the Government of Mexico in 1997 and re-launched as Oportunidades in 2002. With the basic objective of improving the education, health and nutrition of poor families, it provides cash transfers to families in exchange for regular school attendance and visits to health clinics. It reaches six million poor households nationwide and payments are provided directly to mothers or female heads of households.

In addition to its designed goals, Oportunidades has reduced household vulnerability through asset accumulation and more stable income flows. This allows households to better plan expenses and pay debts, and more easily access credit, resulting in increased consumption of goods and services. Other studies have also found that Oportunidades performs an unofficial safety-net function through its cash transfers (de Janvry et al., 2006), though sometimes imperfectly and at the expense of its designed objectives (de la Fuente et al., 2008). The transfers are often used to address small-scale losses that occur around the dates that the cash transfers arrive. Although this protects household assets, such safety-net functions may divert resources from their primary goal. For example, parents may use the cash earmarked for educational expenses to buffer the failure of a maize harvest. The programme is currently being evaluated with a view to reinforcing its function in strengthening resilience to disasters and other shocks without losing its principal focus on structural poverty reduction.

(Source: Arnold and de la Fuente, 2010)

Box 6.4 Are poverty lines too low?

A low poverty line means that a significant percentage of the people just above it may have high enough income and consumption levels to qualify as non-poor, but may not generate enough surplus income during relatively good periods, and so quickly fall under the poverty line following disasters.

There is a strong case for raising poverty lines or replacing them with a 'vulnerability line' based on individual and household resilience, and the likelihood that they will fall below the poverty line due to a disaster. Although in most cases, this would mean a substantial increase in the scope and cost of social protection programmes, they would subsequently reach those households at risk of becoming poor as a result of unmanaged disaster impacts.

Such a vulnerability line could be flexible, adjusted according to the reserves households need to meet contingencies arising from disaster impacts. Measures that reduce disaster risk and household losses would allow governments to lower the vulnerability line, as would the existence of far-reaching social safety nets.

(Source: Krishnamurty, 2011)

(Muqtada, 2010). Furthermore, when growth in employment is accompanied by social protection, it is possible to avoid sharp declines in income following disasters.

Unlike conditional transfers, temporary employment programmes are intended to help individuals and communities smooth consumption in times of disaster by supplementing income. This is usually achieved through labour-intensive public service and infrastructure programmes, such as building rural roads, street cleaning and reforestation (Fernandez et al., 2011). Where these programmes are focused on building community assets that reduce risk, they have the potential to contribute to risk reduction (del Ninno et al., 2009). Examples from

Box 6.5 Community-led identification of beneficiaries in Rwanda

Rwanda's highly decentralized administrative structure has allowed the country to develop an innovative community-led system for targeting social protection programmes. Rwanda has a good track record in social protection, including the provision of universal health insurance to 91 percent of the population, free education and several social transfers, including pension benefits. The new targeted approach, based on a traditional practice of collective action known as *ubudehe*, allows communities to identify beneficiaries of social protection based on locally relevant criteria, such as the size of land holding. Communities also suggest and lead area-specific programmes. Preliminary evidence shows that poor households can be directly involved in the planning and execution of social protection instruments and that even those usually without access to formal support can participate.

Prohibitive costs of community-led or universal programmes are often cited as a barrier to implementation, though this is determined by political priorities. The Rwandan Government allocated 4.7 percent of its total budget to the social protection sector in 2009–2010. This amount is expected to increase to 4.9 percent and 5.1 percent of the total budget in 2010–2011 and 2011–2012, respectively, with support from international donors.

(Source: ERD, 2010)

Bangladesh, Ethiopia, India and Malawi demonstrate how food- or cash-for-work programmes can significantly improve flood control, water conservation and irrigation infrastructure, and reverse land degradation (del Ninno et al., 2009; Pelham et al., 2011).

When conditional transfers cannot be adapted to target non-poor households before a disaster, temporary employment programmes may offer a way of providing additional or substitute income, though such schemes are not widely used. In the HFA Progress Review, only 18 out of 82 countries reported having employment guarantee schemes, but examples from Ethiopia, India and South Africa show that temporary employment programmes can have positive impacts if adapted to target risk-prone households and communities (see Box 6.6 for examples from Latin America).

Many existing employment programmes, though originally designed as temporary measures, have developed into permanent schemes with millions of people participating annually. The Mahatma Gandhi National Employment Guarantee Scheme, for example, reached around 68 million people in 41 million households in the 2009–2010 financial year alone, providing each of the employed with an average of 24 days work. The public works component of Ethiopia's Productive Safety Net Programme covered approximately 7.6 million people by early 2011, almost 10 percent of the entire population. South Africa's Expanded Public Works Programme, in operation since 2004, provides work for roughly 11 percent of the country's unemployed, and by 2013–2014 it aims to create 1.5 million jobs that will each provide 100 days of work while ensuring minimum wages (Krishnamurty, 2011).

The 2008 crisis in Ethiopia, precipitated by drought, food shortages and high food prices, provided a testing ground for the Productive Safety Net Programme, which became a major part of the government's response in rural areas. Using the programme's contingency budget of US$40 million, urgent assistance was provided to almost 1.5 million individuals who had not previously participated in the programme (Krishnamurty 2011).

Apart from challenges related to targeting, temporary employment and conditional transfer programmes also struggle with corruption and bureaucracy. However, the potential of these instruments to reduce disaster risks is enormous if they are explicitly linked to strengthening disaster resilience and supported by governance

Box 6.6 Temporary employment programmes in Latin America

Temporary employment schemes exist in Mexico, Bolivia, Argentina and Chile to help people buffer macroeconomic crises or disasters, but with mixed results. In general, targeting has been successful. In Argentina for example, the majority of beneficiaries in several programmes (A Trabajar and Programa Jefes) are from the country's poorest families.

Such schemes also increase income for women and reduce extreme poverty, at least in the short term. For example, in Argentina's Programa Jefes y Jefas de Hogar, the proportion of participants considered to be living in poverty dropped from 82 percent to 70 percent, while the proportion living in extreme poverty fell from 51 percent to 29 percent. In Mexico, 60 percent of the participants in the Programa de Empleo Temporal have moved out of extreme poverty.

Temporary employment schemes have had mixed success in improving infrastructure. After four years of operation (1988–1991), Bolivia's Special Emergency Fund completed 3,300 projects at a cost of US$194 million. The programme constructed and refurbished 550 schools and 417 health centres, improved 8,800 kilometres of roads, built 9,974 houses, and serviced 980 kilometres of sanitary sewerage networks and 320 kilometres of potable water system networks (Fernandez et al., 2011). The fund generated approximately 60,000 direct jobs and 45,000 indirect jobs during the four years of operation. In 1990, the number of jobs created was equivalent to nearly a third of the number of unemployed people in the country. The investments contributed 1.1 percent to GDP growth in 1990, thus without the Special Emergency Fund, GDP growth in Bolivia in 1990 would have been only 1.5 percent rather than 2.6 percent.

(Source: Fernandez et al., 2011)

arrangements based on local partnerships and community participation.

6.2.3 Micro-insurance

Government-led social protection schemes increasingly work together with market-based micro- credit and insurance. By providing timely capital following disasters, such instruments can also help protect households from losses and subsequently recover. By pricing risk, insurance-related instruments also raise awareness and may act as an incentive for disaster risk reduction. By buffering losses in a predictable way, insurance can also enable risk-prone households to take on higher-risk and higher-return activities that increase these households' chances of moving out of poverty (Suarez and Linnerooth-Bayer, 2011).

At the micro level, households and businesses in low- and middle-income countries are gaining access to new index-based insurance instruments that link payouts to a measurable hazard event, for example a particular amount of rain or cyclone strength, thereby reducing transaction costs. These schemes can also reduce the danger of moral hazards (when guaranteed compensation for losses encourages risk-taking behaviour, leading in turn to higher premiums), and adverse selection (when only high-risk households sign up for the insurance, while insurers cannot compensate for their increased overall risk by increasing the price of the premium).

Micro-insurance can support DRM in a variety of ways. One approach is to bundle the insurance with loans to promote investments in risk reduction. In Saint Lucia, for example, a programme offering home improvement loans aimed at reducing risks required owners to join a micro-insurance scheme. Bundling micro-insurance with a loan package can also promote productive investments that help the most vulnerable escape disaster-related poverty traps. In Malawi, farmers taking part in a drought-indexed insurance scheme can access loans for

improved seeds, thus increasing agricultural productivity and reducing their vulnerability. If the premiums in such schemes were set to reflect long-term climate forecasts, they would also provide signals for planting crops suited to expected rainfall conditions (Suarez and Linnerooth-Bayer, 2011).

Index-based micro-insurance can also be linked not only to observed hazard events, but also to forecasts, providing timely funds for risk reduction activities before disasters occur. The Ethiopia Disaster Insurance programme, piloted in 2006, is now developing an Early Livelihood Protection Facility based on a sequential combination of contingency funds for very mild droughts, contingent debit and credit for mild droughts, and insurance for severe droughts (see Chapter 5). Interestingly, the target group for this new scheme comprises transiently food-insecure households, defined as food secure yet subject to acute but temporary food shortages. It was estimated that 4.5 million people would be at risk of transient food insecurity during another drought in Ethiopia, and based on this, the total cost of the facility was estimated at US$113 million in a severe drought year (ERD-EUI, 2010). Finally, micro-insurance can be adapted to the specific needs of risk-prone communities. For example, the HARITA pilot project in Ethiopia allows cash-constrained farmers to pay the micro-insurance premium with disaster risk reduction-oriented labour.

Although these developments are promising, micro-insurance currently reaches only a very small fraction of risk-prone households, and reviews of micro-insurance pilot initiatives have highlighted substantial obstacles to scaling up these systems. Therefore, micro-insurance can complement, but not substitute for, other social protection measures. There are also other important mechanisms by which low-income households increase their capacity to cope with stresses or shocks. In many nations in Africa and Asia, community-based savings groups formed mostly by women living in informal settlements have particular importance, and in some countries, federations of such savings groups have developed city or national funds on which they can draw (Mitlin, 2008).

6.3 Planning for risk reduction and climate change adaptation

Efforts to adapt to climate change must be aligned with disaster risk reduction objectives and strategies. For such integration to succeed, institutions must focus on prospective and corrective risk management, as well as building new partnerships at the local level, rather than on compensatory mechanisms.

Climate change adaption represents a new opportunity to advance DRM using another set of policy, programme and funding instruments. Regardless of the current or future impacts of climate change, adaptation has become a perceived need that has generated a politically important set of mechanisms. In December 2010, for example, the United Nations Framework Convention on Climate Change (UNFCCC) Parties agreed to the Cancún Adaptation Framework, which calls for "climate change-related disaster risk reduction strategies" and consideration of the HFA in particular (UNFCCC, 2010). Asian leaders agreed to develop joint frameworks for the integration of disaster risk reduction and climate change adaptation as part of national and regional sustainable development policies (AMCDRR, 2010). A few years earlier, in 2007, the Arab Ministerial Declaration on Climate Change also linked adaptation to risk reduction. At the national level, the Government of the Philippines has adopted climate change legislation that specifically links adaptation and DRM, recognizing the fact that successful DRM increases adaptive capacity (Philippines, 2009).

It has been suggested that the momentum to develop country-level adaptation programming owes more to the perceived opportunity to access climate change funding mechanisms, than to social demand for adaptation (Williams, 2011). Nonetheless, given that in practice

most adaptation projects address disaster risks, such mechanisms offer an additional means of implementing DRM (Box 6.7). Through December 2010, the Kyoto Protocol's Adaptation Fund had considered project proposals from 24 countries, of which 22 were DRM-related.[3] The Cook Islands, for example, proposed to implement the Joint National Action Plan on Disaster Risk Management and Climate Change Adaptation (Cook Islands, 2010).

As with DRM, the effectiveness of adaptation measures depends on their integration into mainstream development planning and public investment decisions by national and local governments (ECA, 2009). Unfortunately, many climate change adaptation initiatives are still conceived and implemented as stand-alone projects. In addition, the key role of local governments in implementing locally appropriate adaptation receives insufficient attention. Governments' failure to bring DRM and climate change adaptation into national and local development planning and investment perpetuates the misconception that climate change adaptation is purely an environmental issue, and that DRM is limited to early warning, insurance and disaster preparedness and response (Mercer, 2010).

The inability to recognize the links between adaptation, DRM and development processes leads to an inaccurate understanding of climate-related risks. As a result, adaptation can become too reliant on compensatory risk management to be able to deal with extreme events. Preferable to this is a comprehensive approach that seeks to reduce the extensive risks, which will increase in the short term as a result of climate change.

There is, however, a growing effort to factor adaptation into mainstream planning. Eight of the Adaptation Fund project proposals include provisions for fiscal and planning capacity development and for integrating adaptation into development plans. In Mozambique, for example, an integrated approach to coastal zone development in Govuro District combines risk identification for current and future climate-related hazards with the development of income opportunities for local communities and sub-district land use plans (Olhoff, 2011). In Benin, a number of municipalities have successfully integrated risk reduction and climate change adaptation into annual development and investment plans (Olhoff, 2011), thereby strengthening technical capacity within municipal governments and establishing a system for climate risk and disaster management. At the national level, Uganda has begun to integrate climate risk management into a comprehensive development and investment plan (Olhoff, 2011).

Adaptation initiatives have also struggled to address the challenge presented by climate-

Box 6.7 Reducing risk through biodiversity conservation and climate change adaptation in Rwanda

Rwanda has lost 60 percent of its forest cover since 1978. As a result, ecosystems have been severely compromised, with an observed increase in the frequency of landslides, floods and torrential rains, and corresponding increases in loss of life, damage to infrastructure and human settlements, and degradation of forests and farmland.

Rwanda now sees environmental degradation as an obstacle to its national growth objectives. The country's Vision 2020 Programme promotes adequate land, water and environmental management techniques and sustainable forestry development together with a sound biodiversity policy, including a detailed land use plan that takes future climate change into consideration. The outputs of the programme have already helped Rwanda secure US$15.9 million for adaptation activities from the UNFCCC Least Developed Country Fund.

(Source: Olhoff, 2011)

related risks in urban areas, particularly in cities in low- and middle-income countries, where low-income households are often concentrated in informal settlements in areas prone to weather-related hazards. Integrating adaptation into conventional land use planning and building regulations is unlikely to reduce the risks faced by such households (also see Section 6.5). Instead, partnerships between risk-prone households and communities, local governments and the central government should be constructed to address deficits in infrastructure and service provision and in access to safe land. Such linkages can facilitate the scaling up of investment necessary to address risks that are rapidly escalating even without climate change (Dodman, 2010).

6.4 Ecosystem-based disaster risk management

Examples from around the world show how ecosystem-based DRM can reduce disaster risk. In the absence of other forms of evidence, these cases act as a reminder of the urgent need for global and national investment in risk-sensitive environmental management.

The vital role of regulatory ecosystem services in managing disaster risk was highlighted in GAR09 (UNISDR, 2009). Although their value is difficult to measure in economic terms, estimates indicate that regulatory services may form the largest proportion of the total economic value of ecosystem services (PEDRR, 2010; TEEB, 2010). For example, a study by the World Resources Institute found that healthy coral reefs in the Caribbean provide US$0.7–2.2 billion of coastal protection from erosion and storm surges to 18,000 km of beaches[4] (Burke and Maidens, 2004). In the United States of America, coastal wetlands absorb wave energy and act as 'horizontal levees', providing US$23.2 billion per year in protection from storms (Costanza et al., 2008). The forest in Andermatt, Switzerland, provides US$2.5 million of avalanche protection each year (Teich and Bebi, 2009). At the same time, ecosystems not only provide regulatory services, they also sustain livelihoods, provide drinking water and energy, and provide a host of other benefits, from soil formation and nutrient cycling to cultural services.

The protection, restoration and enhancement of ecosystems, including forests, wetlands and mangroves thus has two important benefits for DRM. First, healthy ecosystems serve as natural protective barriers and buffers against many physical hazards. Second, they increase resilience by strengthening livelihoods and increasing the availability and quality of goods and resources. Given these important co-benefits, ecosystem-based DRM often realizes highly attractive cost–benefit ratios compared with conventional engineering solutions.

There are clear limitations to the protection that natural buffers can offer against extreme hazards such as tsunamis. However, the examples highlighted in Table 6.2 indicate that ecosystem-based disaster risk management is an increasingly attractive option for addressing problems as varied as river-basin and urban flooding, drought and wildfires.

Ecosystem-based DRM has the advantage of building on existing ecosystem management principles, strategies and tools, including a range of methodologies for environmental, risk and vulnerability assessments, protected area management, integrated ecosystem management and community-based sustainable natural resource management (PEDRR, 2010).

Experience to date shows that ecosystem-based DRM has a greater chance of success when it is based on a number of core elements (PEDRR, 2010):

- recognizing the multiple functions and services provided by ecosystems, including natural hazard protection or mitigation;
- linking ecosystem-based risk reduction with sustainable livelihoods and development;
- combining investments in ecosystems with other effective DRM strategies, including hard engineering options;

- addressing risks associated with climate change and extreme events and reducing their impact on ecosystem services;
- expanding governance capacities for ecosystem-based DRM through multi-sector, multidisciplinary platforms; and
- involving local stakeholders in decision-making and using existing ecosystem management instruments.

However, the monetary undervaluation of ecosystem services remains an important obstacle to the adoption of ecosystem-based DRM. As a consequence, relatively few countries are taking advantage of tools such as 'payments for ecosystem services'. During the HFA Progress Review, for example, only 25 countries reported its use. Whereas undervaluation of natural capital and ecosystem services is not the only issue (TEEB, 2010), it can also highlight instances where ecosystem degradation and exploitation create public risks while producing private benefits.

6.5 Land use planning and building regulation

Conventional approaches to land use planning and implementation have failed. Affected communities must be allowed to participate in decision-making in planning, which drives disaster risk, particularly in urban areas.

The global population living in informal settlements is currently estimated at approximately 1 billion people, many of whom live in hazard-prone areas, and this population is growing at a rate of 40 million people per year (IFRC, 2010). How land is used in cities and how buildings, infrastructure and networks are designed and constructed all influence exposure to physical hazards and the rise or fall of a country's stock of risk. As such, land use planning and building regulation should be included in any list of development instruments that can be adapted for DRM.

Decisions on land use and building can push up risk significantly, especially in cities where much of the population can find accommodation only in informal settlements and where there is little willingness or capacity of local governments to manage city expansion and land use change in the public interest. Once investments in infrastructure, housing and other facilities have been made in hazardous locations, the risk is locked in place for decades or more, and once in place, it is far more expensive to correct it than it would have been to avoid its creation in the first place.

Unfortunately, land use planning and management in low- and middle-income countries have excluded a large proportion of the urban population from legal land and housing markets (Dodman, 2010), thus driving an increase in urban risk. Given their low status and lack of secure tenure, households in informal settlements are generally excluded from public investments in vital risk-reducing infrastructure and services.

Most local governments in low- and middle-income countries have no functioning land use planning or management system or have lost control over managing land use changes. Land set aside for public use is not protected, cities expand without provision for infrastructure, and powerful vested interests are engaged in land speculation and profitable but unauthorized land use changes (Satterthwaite, 2011). Many countries have established national policies for land use planning and have passed legislation assigning specific responsibilities to local governments, but many others either lack the technical capacities to plan their territory or fail to take hazards into account. For example, in Costa Rica, a small middle-income country with relatively strong governance capacities, only 20 of 89 municipalities had their own land use plans as of 2009 (Berti and Ferrufino, 2009). Although legislation exists to include risk considerations in land use planning, it is not mandatory. As a consequence, much development in hazard-prone sites has been legally authorized.

Table 6.2 Ecosystem-based disaster risk management

Risk addressed	Examples
River basin flooding	In Hubei Province, China, a wetland restoration programme reconnected lakes to the Yangtze River and rehabilitated 448 km^2 of wetlands with a capacity to store up to 285 million m^3 of floodwater. The local government subsequently reconnected a further eight lakes covering 350 km^2. Sluice gates at the lakes have been re-opened seasonally, and illegal aquaculture facilities have been removed or modified. The local administration has designated lake and marshland areas as nature reserves. In addition to contributing to flood prevention, restored lakes and floodplains have enhanced biodiversity, increased income from fisheries by 20–30 percent and improved water quality to potable levels (WWF, 2008). In 2005, the Government of the United Kingdom launched the programme Making Space for Water, an innovative strategy that uses ecosystems instead of costly engineered structures for flood and coastal erosion risk management along river banks and coastlines. The programme, triggered by severe floods in 1998, 2000 and 2005, consists of 25 nationwide pilot projects at the catchment and shoreline scales, and involves collaborative partnerships between local governments and communities. Since April 2003, the Government has invested between US$4.4 and US$7.2 billion as of March 2011. One such project covered an area of approximately 140 km^2 of the Laver and Skell Rivers west of Ripon in North Yorkshire. Activities included planting trees as shelterbelts, establishing vegetative buffer strips along riverbanks, the creation of woodland, fencing off existing woodland from livestock, hedge planting, and creation of retention ponds and wetlands for increased flood storage capacity. These activities reduced surface flow during floods by trapping, retaining or slowing down overland flow and provided other benefits such as protection of wildlife habitats and improved water quality (PEDRR, 2010).
Urban flooding	Urban development replaces vegetated ground that provides a wide range of services, including rainwater storage and filtration, evaporative cooling and shading, and greenhouse gas reduction, with asphalt and concrete, which do not. Although the functions of green spaces in urban areas are easily overlooked, local governments have started reinstating 'green infrastructure' (Gill et al., 2007) as a viable component of urban water management and as a means of combating urban heat. In New York, for example, untreated storm water and sewage regularly flood the streets because the ageing sewerage system is no longer adequate. After heavy rains, overflowing water flows directly into rivers and streams instead of reaching water treatment plants. The US Environmental Protection Agency has estimated that around US$300 billion would need to be invested over the next 20 years to upgrade sewerage infrastructure across the country. In New York city, alone, it is estimated that traditional pipe and tank improvements would cost US$6.8 billion (New York City, 2010). Instead, New York City will invest US$5.3 billion in green infrastructure on roofs, streets and sidewalks. This promises multiple benefits. The new green spaces will absorb more rainwater and reduce the burden on the city's sewage system, air quality is likely to improve, and water and energy costs may fall.
Drought	Two different but almost simultaneous agro-ecological restoration processes that started 30 years ago in southern Niger and the central plateau of Burkina Faso have increased water availability, restored soil fertility and improved agricultural yields in degraded drylands. With very little external support, local farmers experimented with low-cost adaptations of traditional agricultural and agroforestry techniques to solve local problems. Three decades later, hundreds of thousands of farmers have replicated, adapted and benefited from these techniques, transforming the once barren landscape. In Burkina Faso, more than 200,000 hectares of dryland have been rehabilitated, producing an additional 80,000 tonnes of food per year. In Niger, more than 200 million on-farm trees have been regenerated, providing 500,000 additional tonnes of food per year, as well as many other goods and services. In addition, women have particularly benefited from improved supply of water, wood fuel and other tree products (Reij et al., 2010).
Fire	Aboriginal people in northern Australia have a long history of using fire to manage habitats and food resources. Due to changes in settlement patterns and marginalization, traditional fire management was fragmented over vast areas, leading to an increase in destructive fires in fire-prone savannahs. Traditional fire management practices, such as early dry-season prescribed burning, have been revived and combined with modern knowledge, such as using satellite technology to locate fires. Aboriginal fire rangers have considerably reduced large-scale fires through fire management across 28,000 km^2 of western Arnhem Land, with subsequent reductions in greenhouse gas emissions of more than 100,000 tonnes of CO_2-equivalent per year. The Darwin Liquefied Natural Gas plant compensates aboriginal communities with approximately AU$1 million (US$1 million) per year for offsetting carbon, generating important income in disadvantaged communities. Additional fire management benefits include protection of biodiversity and indigenous culture (PEDRR, 2010).

Land use laws and regulations that prohibit or limit development in hazard-prone areas are often misused to exclude low-income households from well-located land (Box 6.8). At the same time, low-income households may be more likely to secure tenure in hazard-prone areas that should never have been occupied for housing. In other cases, regulations exist but have been bypassed to facilitate land speculation in well-located but hazardous areas.

Even when it is implemented, land use planning may be ineffective for DRM when a given risk crosses municipal or regional boundaries. National-level planning tends to be based on standards that are not designed to address specific local problems. Local planning, on the other hand, has no influence over risks that may be constructed outside of its jurisdiction. However, intermediate-level planning frameworks that could fill the gap are often missing. In the Oshana region of Namibia, for example, the lack of regional-level planning is an obstacle to flood risk reduction. The towns of Ondangwa and Oshakati each have their own flood risk management plans, but each is designed solely to reduce risks in its own locality. A proposed channel to manage floodwaters in Ondangwa drains directly into a village south of the town and worsens flooding there (Johnson, 2011).

Critically, planning is often disconnected from realities on the ground. Long, slow planning cycles are inconsistent with the rapid growth of many cities in low- and middle-income countries. Planning cycles of three years or more mean that plans, when adopted, may have already been overtaken by development. And without enforcement, even the best land use planning cannot change land use practices. Balancing the needs of low-income groups for well-located land with disaster-reduction objectives remains a difficult task (Box 6.9).

The design and enforcement of building legislation, regulation, codes and standards[5] presents similar issues, because requirements are often inappropriate for national and local conditions (Johnson, 2011). In post-disaster contexts in particular, overly complicated codes and standards that cannot be maintained over time are often introduced. The codes can be prohibitively costly for low-income households, ultimately increasing the incidence of unregulated construction. Inhabitants

Box 6.8 The unintended consequences of hazard zoning

In 1957, as a consequence of severe floods, the state of Buenos Aires, Argentina, enacted a strict law on the Conservation of Natural Drainage. The law prohibited construction within 50 metres of rivers, streams and canals and 100 metres around the perimeter of lagoons, and also prevented urban development in all areas below 3.75 metres above sea level. A 1977 law reinforced the 1957 law by prescribing that houses must be built above a certain elevation to obtain planning approval. It also established a minimum plot size of 300 square metres and provided specific regulations for urban infrastructure projects. Both laws prevent the construction of new flood risk, and their detailed specifications facilitate local implementation. However, the laws are inflexible in that they do not consider alternative solutions to flood risk reduction, and after they were introduced, the cost of urban land increased, excluding many low-income households from the land market.

By contrast, a recently amended Turkish law from 1985 requires that land use plans are informed by hazard assessments and need to address risks, without the sort of detailed specification required in Buenos Aires. This approach offers flexibility in factoring risks into planning and construction, and takes into account local-level social and environmental conditions and needs. On the downside, the flexibility can mean that municipal decisions could allow development in unsafe areas or at higher densities than the law intended.

(Source: Johnson, 2011)

Box 6.9 The ring road settlement in Cuttack, India

A settlement of approximately 1,200 households in Cuttack, in the Indian state of Orissa, is located on a flood-prone river bank with no protection against river level rises in heavy monsoon years when the area can be flooded for 10–15 days. Plans to relocate the settlement to an alternative site 20 km away, have been opposed by residents who cope with the flooding by moving their possessions onto the ring road when the waters rise. A more recent offer by the municipality to relocate the settlement to a site 7 km away is still awaiting approval by the national government, but for many inhabitants of this settlement, the housing offered is inappropriate (small apartments in five-storey blocks) and the move would increase commuting costs. Despite the risks, inhabitants would prefer to stay in their current location and cope with flooding when it happens. Meanwhile, the municipality is constrained in what it can offer the community for relocation. Moreover, this is just one of over 300 informal settlements in the city, all of which are also seeking infrastructure, services, tenure or alternative sites.

(Source: Livengood, 2011)

of informal settlements in particular find it impossible to implement codes. In other contexts, authorities may use the enforcement of strict codes as a pretext for evicting low-income households.

For example, more than half of Kenya's urban population lives in informal settlements in houses made mostly of timber and earth-based materials. Most settlements in the rapidly growing cities breach building codes, as local bylaws stipulate the use of cement, mortar and steel, in addition to electrical and sanitary installations, beyond the reach of most households (Yahya et al., 2001). In the Bangladeshi capital of Dhaka, the many families living in one-room dwellings suspended over water and with no outside space cannot hope to meet the Bangladesh National Building Code. The code defines a minimum housing size of about three times the average dwelling size in informal settlements such as Mohammadpur (Figure 6.2) and does not allow for incremental upgrading.

Even where appropriate, building codes are often inadequately supported by legislation and enforcement. Before the 2001 earthquake in Bhuj, in the Indian state of Gujarat, compliance with existing codes was not required by law except for government buildings. In Turkey, only after the devastating 1999 earthquake did the supervision of building standards become a legal requirement. However, even when building control becomes mandatory, local governments often do not have the required expertise or manpower to monitor and enforce the regulations (Johnson, 2011).

Overly lengthy processes to obtain building permits can be another serious impediment to adherence to building codes in low-income areas. Obtaining building permits in the historical centre of Lima, for example, requires an average of 222 working days under optimal conditions (Johnson, 2011). Delays and difficulties in the processing of land and

(Photo: Huraera Jabeen)

Figure 6.2
This informal settlement in Mohammadpur, Dhaka, does not conform to the Bangladesh National Building Code

housing permits in the Philippines mean that inhabitants of informal settlements and communities living in vulnerable locations may have no choice but to remain outside formal processes. Recent studies recommend that an important step towards helping communities to adopt building codes is to develop fast-track and one-step processes that are simple to follow and quickly realized (Rayos Co, 2010). For example, familiarizing the local masons who actually build housing in informal settlements with simple but effective techniques for improving building safety (Aysan and Davis, 1992), or adopting simple but achievable standards (Box 6.10), can be far more effective than adopting complex but ultimately unenforceable codes and regulations.

Innovations in local governance from around the world are showing that a new approach to planning and urban development is possible when participation from citizens, community organizations and other civil society groups is supported by a new generation of mayors and civil servants. There are now many examples of low-income communities negotiating reasonably safe and well-located land, adapting rigid zoning and building standards to local needs and possibilities, upgrading vulnerable settlements in ways that reduce risks, and participating in planning and budgeting processes (Bicknell et al., 2009; UNISDR, 2009; Satterthwaite, 2011). The governance arrangements needed to underpin such approaches are discussed further in Chapter 7.

These practices certainly contribute to reducing risks, but they also have much wider benefits, from planned urban development, enhanced citizenship and social cohesion, and greater investment. In this way, building and planning regulations can drive DRM instead of impeding it (Table 6.3).

Box 6.10 Pragmatic approaches to safety: ensuring compliance through appropriate standards

The 2001 earthquake in Bhuj, in the Indian state of Gujurat, caused the collapse of both traditional dwellings built with low-strength masonry, and modern, reinforced concrete buildings. Destruction of buildings was the major cause of death and damage. India had a long-established seismic code, first published in 1962 and periodically updated. Before the 2001 earthquake, however, applying the seismic code to private building construction was left to the discretion of owner, builder or engineer (but was compulsory for public buildings). Unsurprisingly, most of the private buildings did not conform to the code. Following the earthquake, compliance with the code has become mandatory in areas with the highest seismic risk.

However, the two worst-affected municipalities, Bhuj and Anjar, simplified the rules for reconstruction, prohibiting all construction higher than two stories (Spence, 2004). In the long term, this kind of standard may not be realistic given required urban densities, but it does illustrate the point that simple and achievable standards may be better at reducing risk than those that are too complex to be implemented properly.

(Source: Johnson, 2011)

Table 6.3 Do building and planning regulations drive or impede DRM?

Building and planning regulations facilitating DRM	Building and planning regulations impeding DRM
• Recognition on the part of the (local) government of the needs of the poor, and motivation to be accountable to them. • Mandates coming from national government, giving responsibility to local government for safe building and planning while also enabling them with the technical expertise and resources to make and implement plans and enforce building codes. • Plans, codes and standards that are developed with and include the perspectives of businesses, residents and diverse communities. • Flexible regulatory frameworks that accommodate the changing realities of economies, environments and building densities over time. • Recognition of informal building processes and encouragement of safe building practices through education and advocacy.	• Safe construction or secure land tenure is unaffordable or unobtainable by the poor. • Inequalities in access to land or housing are reinforced. • Inhabitants of informal settlements are subject to forced evictions or reduced tenure security. • Regulations fail to account for realities on the ground, e.g., existing densities in urban areas are ignored, or construction of small dwellings or workspaces, or use of more affordable alternative building materials, are prohibited.

(Source: Johnson, 2011)

Notes

1 This chapter focuses only on the application of such instruments in selective areas of public administration. Other areas, such as rural livelihoods, were discussed in GAR09. There are also similar instruments in other sectors (e.g., health), which have not been documented here and which have the potential to be adapted for DRM. For more information, see Kirch et al., 2005; WHO, 2007; IFAD, 2010; and Wisner et al., 2011.

2 For more information on how to integrate disaster risk management into public investment, refer to www.comunidadandina.org/predecan.

3 Based on UNISDR analysis of Adaptation Fund project proposals considered through December 2010.

4 The value depends upon the amount of development protected by the reef.

5 Whereas the difference between statutory building regulations and legislation on the one hand, and supporting building codes and technical standards on the other, is an important one, the overall term 'building codes' will be used in this report to cover both technical and functional standards and control.

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Chapter 7
Reforming risk governance

View over South Mumbai from the World Trade Centre showing the slum housing of Koli fishermen, the original inhabitants of the seven islands that became Mumbai. *Photo:* Mark Henley/Panos Pictures

Chapter 7 Reforming risk governance

As highlighted by the HFA Progress Review (Chapter 4), the institutional arrangements, legislation and policy for disaster risk management (DRM) focus on disaster management, preparedness and response. Even where multi-sector institutional systems have been created for DRM, responsibility and policy are still usually anchored in disaster management organizations, which often lack the political authority or technical capacities to influence important decisions related to national and sector planning and investment. Responsibility for DRM may also be mandated to local governments that often lack the necessary resources and capacities. Such conditions create barriers to civil society participation and result in weak accountability.

As the previous chapter highlighted, there are major opportunities to reduce disaster risk by adapting development instruments, such as national public investment planning systems, social protection mechanisms, and national and local infrastructure investments. In most countries, however, existing risk governance arrangements are inappropriate, and reforming them is therefore fundamental to reducing disaster risk.

In central government, this means anchoring overall responsibility for DRM in a ministry or office with adequate political authority to ensure policy coherence across development sectors. Incremental decentralization accompanied by clear mandates, budgets and systems of subsidiarity, promotes ownership and improved risk governance capacities at all levels. Scaling up community initiatives can be enabled by local planning, financing and investment that build on civil society partnerships. Improved accountability mechanisms enshrined in legislation and work processes, social audit processes, and a free press and active media, all contribute to improving the awareness of rights and obligations on all sides.

7.1 Problems with risk governance

The development instruments and mechanisms for successful DRM need to be facilitated by appropriate risk governance arrangements. This requires political commitment and policy coherence in central government, competent and accountable local governments, and an openness to work in partnership with civil society, in particular with low-income households and communities. As highlighted by the HFA Progress Review, existing arrangements are generally not appropriate.

Over the past two decades, many countries have invested in developing national policy, and strengthening and reforming institutional and legislative systems for DRM. Civil protection and civil defence agencies, often in the defence sector, have progressively been replaced by a new generation of multi-sector and multi-layered DRM systems, where responsibility is placed in each sector and decentralized to local governments. However, it has been repeatedly highlighted (Hewitt, 1983; Stallings, 1995; Lavell and Franco, 1996; Wisner et al., 2004) that both national policy and the institutional and supporting legislative systems remain fundamentally skewed to supporting disaster management, in particular preparedness and response, rather than risk reduction. At the national level, responsibility is still usually anchored in disaster management organizations, which often lack the political authority or technical capacities to influence important decisions related to national and local sector planning and investment. Whereas such systems often mandate responsibility for DRM to local governments, they may lack the necessary resources and capacities. Such conditions create major barriers to civil society participation and result in weak accountability.

In some countries, developments outside the realm of DRM have also influenced these arrangements. In the United States of America, for example, the events of 11 September 2001 shifted attention away from a broader focus on DRM, which had evolved through the 1990s, to an emphasis on crisis management and emergency preparedness and response under a newly created Department of Homeland Security (Gerber, 2007).

7.2 Locating responsibility for DRM at the centre of power

Coherent national policy for disaster risk reduction and DRM needs to be driven from the centre. This means that responsibility for national oversight and coordination needs to be located in a central ministry, and that financial planning for DRM is included in the national accounting system.

The role of a national disaster risk reduction policy cannot be overestimated. It must be clear and comprehensive, yet detailed enough to define the roles and responsibilities of different actors in development sectors as well as local governments. The HFA Progress Review highlights that about one third of the 82 countries and territories who reported have a national disaster risk reduction policy in place, and another third are currently developing one or are in the process of having it reviewed.

Where responsibility for DRM is located within central government it has an enormous positive influence on the effectiveness of policy and accompanying legislation and investment. In principle, ultimate responsibility should be vested at the highest possible political level (UNISDR, 2009). However, where DRM has been located in the Office of the President or Prime Minister, it has often been rendered politically weak, poorly resourced and, moreover, far removed from central development and

planning processes (UNESCAP and UNISDR, 2010). Also, when responsibility lies within an environment ministry or an emergency management organization, as is more common, impact and influence on national or local sector development planning and investment decisions may be minimal (Box 7.1). In South Africa, the National Disaster Management Center (NDMC) is part of the Department for Cooperative Governance and Traditional Affairs which is perceived as having a low profile (Williams, 2011), and limited links between the NDMC and local governments mean that this positioning has not been very successful. Where responsibilities have been vested in interior or defence ministries, the predominance of disaster management functions, such as preparedness and response, has generally been reinforced.

Where multi-sector, decentralized systems have been created, often with names that allude to risk reduction and management, this has tended to introduce disaster management into sectors and local governments, rather than focusing attention on using development planning and investment as opportunities for DRM (UNISDR, 2007). 'DRM focal points' within ministries and technical agencies can increase awareness of such issues within sectors but, unless they have the resources and the authority to call the sector to account for risk reduction, their impact is limited and depends on individual performance and relationships (Williams, 2011). A good example of successful leadership and mainstreaming is in Mozambique, where the Coordinating Council of Disaster Management is chaired by the Prime Minister and attended at the ministerial level (Williams, 2011).

In some countries, a national disaster risk reduction policy framework has been developed that defines an overall strategic vision for disaster risk reduction that allows for specific policies to be developed in each sector. The HFA Progress Review, however, shows that without political authority it is difficult to ensure coherence between national and sector policies, or to influence sector priorities. For example, Algeria's disaster management law of 2004 requires coordination of all relevant sectors, but it has been implemented with limited success. In contrast, in the Gambia, the National Disaster Management Council is chaired by the Vice President with several cabinet ministers as regular members, resulting in strong leadership and commitment to DRM and its successful integration into the country's national development policy, the National Vision 2020 (Lisk, 2010).

Mauritius, the Republic of Moldova, Timor-Leste and Viet Nam all reported on the challenge of implementing well-developed national policy due to the lack of corresponding legislation to enable adequate enforcement and coordination. However, specific DRM legislation is rarely the only legislation related to reducing risks. Even countries that have adopted comprehensive legislation regulate risks through myriad sector laws and orders with respect to land use, building and water management. This may lead to multiple and competing institutional responsibilities to address underlying risk drivers and contradictory policy objectives.

The incipient incorporation of DRM into national planning and public investment systems highlights an opportunity to explicitly locate political authority and policy responsibility for DRM, and for climate change adaptation,

Box 7.1 National responsibility for DRM in Bangladesh

In Bangladesh, the Ministries of Food and of Disaster Management and Relief were merged in 2003 to create a new Ministry of Food and Disaster Management (MoFDM). This has significantly improved coordination of effective disaster management, but still with a focus on disaster relief, as the MoFDM is not represented on key central government planning boards, such as the National Economic Council and the Economic Affairs Committee. It therefore does not have the necessary political influence required to drive disaster risk reduction across government departments.

(Source: Williams, 2011)

in a central planning body such as national planning departments or ministries for economy and finance. Given their role in deciding the allocation of the national budget, these ministries could have greater political leverage over planning and investment in each sector if they had policy responsibility for DRM.

There may be political resistance to moving such responsibility to a central planning or finance ministry, particularly where the existing structure is in the defence sector. However, as the focus of DRM shifts from managing disasters to reducing risks, the political incentives for strengthening the role of finance and planning ministries are likely to become more explicit.

7.3 Decentralization of DRM functions

Effective local action requires human capacity, financial resources and political authority. Central policy responsibility for disaster risk reduction must be complemented by adequately decentralized and layered risk management functions, capacities and corresponding budgets.

Across the world, central governments are quietly sharing more power with sub-national actors (O'Neill, 2005). In theory, decentralization facilitates citizen participation, more engaged decision makers, more local knowledge, more resources and more accountability, but in reality, that potential may not be always realized (Scott and Tarazona, 2011).

Over the past 20 years, many countries have adopted a decentralized approach to DRM. Most DRM functions require local-level planning and implementation, and the HFA itself calls for the decentralization of authority and resources to promote community-level disaster risk reduction. Honduras's 2010 Law on the National Disaster Management System, for example, establishes decentralization as a guiding principle, and the 2010 Philippines Disaster Risk Reduction and Management Act makes capacity strengthening of its most decentralized administrative units a state policy (IFRC, 2011). However, not all new legislation takes this approach, such as the centralized plan in Thailand's 2007 Disaster Prevention and Mitigation Act. Of the 82 countries and territories that reported progress implementing the HFA in 2010, as of February 2011 only 48 confirmed that local governments have legal responsibility and budgets for DRM.

Decentralizing responsibilities can also have negative results if local governments are unable to assign resources or dedicated staff with adequate technical expertise (Pelling, 2007; ECHO, 2008; Salazar, 2010; Scott and Tarazona, 2011). In Latin America, several countries that have invested in decentralized national systems of DRM for more than a decade, such as Colombia and Nicaragua, still struggle with inadequate local government capacity and resources (von Hesse et al., 2008; Hardoy, 2010). Some 900 of Colombia's 1,098 municipalities have mandated local committees for disaster risk reduction, but only 14 percent implemented emergency and contingency plans. A similar story is seen with South Africa's 2002 Disaster Management Act. Although DRM is supposed to be integrated into development planning in most municipalities (Botha et al., 2010), poor local government capacity has severely limited integration (IFRC, 2011; Johnson, 2011; Scott and Tarazona, 2011; Wisner et al., 2011).

Decentralization without supporting legislation has also proven very challenging in countries that have attempted it, such as Timor-Leste (IFRC, 2011). In traditionally centralized states, decentralized systems have experienced difficulties even after the enactment of new laws. For example, Indonesia's 2007 Disaster Management Act provided for the decentralization of certain powers and responsibilities for disaster risk reduction and response, and each region and city was required to create its own disaster management agencies and committees. However, as of 2009, only

18 of the 32 provinces had established such bodies, and local government resources had not yet been allocated (Kuntjoro and Jamil, 2010). In its self-assessment, India also reported that the devolution of power and financial resources to local authorities has been a major challenge, often hampered by state governments' retention of control.

More attention, therefore, needs to be paid to how DRM functions are layered and tailored to local contexts. DRM activities need to be locally grounded, and responsibilities should be devolved to the local level as much as capacities allow. Not all functions need to be fully decentralized, however, and some may be more appropriately located at higher levels, with greater capacity, political weight and decision-making power. For example, central governments should provide technical, financial and policy support, and take over responsibility for DRM when local capacities are exceeded (Scott and Tarazona, 2011). Another approach is to build up horizontal cooperation, where strong local governments support weaker ones, particularly in countries which have a number of well-resourced and relatively independent local authorities (Box 7.2).

Complete decentralization of budgeting and reporting can also generate problems. Although it may ensure that spending is in line with local priorities, it almost inevitably leads to divisions with national and sector policies and programmes (Benson, 2011).

An incremental approach to decentralization (Box 7.3) may be the best alternative. Where local government capacity and resources are particularly weak, 'deconcentration' may be a good interim step towards the full devolution of responsibilities and functions. In Mozambique, for example, responsibility for DRM is highly centralized in the National Institute for Disaster Management (INGC). Its functions, however, are implemented through deconcentrated regional offices and local committees, separate from and in parallel to the decentralized system of local administration. As disaster risk reduction has a high profile in Mozambique, these deconcentrated mechanisms are well resourced, and staff can relocate freely between central and local levels depending on needs. Given that local government capacity is weak, most risk reduction functions are undertaken by INGC staff (Scott and Tarazona, 2011). However, while improving effective delivery,

Box 7.2 An alternative resource mechanism – cities in China sharing human resources, experiences and finances

China has a twinning programme that transfers financial and technical support from one province or municipality to a disaster-affected area with less human and financial resources. The twinning agreement diverts 1 percent of the annual income plus technical capacity from the richer province to fund recovery projects in the poorer province for three years.

After the 2008 earthquake in China, one such programme allowed funds from Shandong Province and Shanghai Municipality to rebuild schools and hospitals in Beichuan County and Dujiangyan City to higher standards. Shandong and Shanghai also deployed staff to the newly rebuilt institutes to provide on-the-job guidance, and they invited teachers, doctors and managers to the donor provinces to receive training.

Twinning provides benefits to both recipients and donors, building experience, capacities and government networks within the country or region. It provides a stable source of funding and critical capacity sharing for a number of years, and encourages longer-term partnerships and risk sharing. Twinning also helps with the increased demand for skills after a disaster, as well as building these capacities. It can be agreed on before a disaster, allowing for fast and predictable deployment during recovery.

(Source: Ievers and Bhatia, 2011)[1]

Box 7.3 Towards more responsible and responsive local risk reduction

An incremental approach to decentralizing disaster risk reduction can address limited local capacities, a primary barrier to effective local governance. Other options for addressing the problem of low capacity are:

1. *Not decentralizing down to the lowest possible level*. Instead, create centres of excellence at intermediate levels so that DRM technical resources and capacities can be pooled.
2. *Taking a 'layered' approach*. Different risk reduction functions are decentralized to different layers depending on capacity, rather than wholly devolving or retaining centrally. Layering would have to take place with a good understanding of the local context and the capacities for different functions at different levels.
3. *Using academic institutions and NGOs to support weak local governments*. In Colombia, academic institutions have successfully provided technical risk reduction services to local governments, raising standards and credibility. However, municipalities with the weakest capacities often lack the resources to contract such services unless there is central government support.

(Source: Scott and Tarazona, 2011)

such arrangements may in the long term undermine local government authority and capacities.

7.4 Strengthening accountability

Access to information on disaster risk, particularly for the most vulnerable, is the first step in reducing disaster losses. Good risk governance requires disaster-prone populations to know their risks as well as their rights, and a responsive and accountable civil society engaged in constructive dialogue with governments.

The quality of national and local governance in general, and factors such as voice and accountability in particular, influence why some countries have far higher disaster mortality and relative economic loss than others (Kahn, 2005; Stromberg, 2007; UNISDR, 2009). For example, the level of corruption has a direct and statistically significant impact on government efficiency and the rule of law, two key components of risk governance (Lavell et al., 2010). Corruption also affects the level of trust that citizens have in their government, administration and services (Rose-Ackerman, 2001; Morris and Klesner, 2010). In general, more democratic, accountable states with more effective institutions tend to suffer lower mortality (Anbarci et al., 2005; Escaleras et al., 2007).

If it is true that 'political survival lies at the heart of disaster politics' (Smith and Quiroz Flores, 2010), then accountability mechanisms are particularly important in generating political and economic incentives for disaster risk reduction. The risk of being held to account for decisions that result in avoidable disaster risk can be a powerful incentive to make DRM work.

In DRM, as in many development sectors, establishing accountability is not straightforward (Olson et al., 2011). Making direct attribution and tracking of responsibility is complicated by having multiple actors involved in the construction of any specific risk. Outcomes of any one actor's decisions and actions may not become visible until years or decades later, and

inaction or symbolic actions may have greater effects than decisions and actions actually taken. Moreover, the dynamics of accountability in any single context are subject to the historical evolution of regulation and governance, of cultural values and social norms.

Nevertheless, there are examples where direct responsibility for action and inaction is monitored, and bearing personal responsibility for disaster losses can provide a powerful incentive for investing in DRM. Indonesia has enacted legislation that makes leaders directly responsible for disaster losses, and in Colombia the decentralization of DRM responsibilities has meant that mayors have been imprisoned when people were found to have died needlessly from a disaster (Scott and Tarazona, 2011).

Access to information is a key factor that drives accountability (World Bank, 2010b; Gupta, 2011). However, access to information is only effective when governments actively support the right to information, and when citizens are aware of their legal right and are willing to assert it. In addition, structural barriers, such as illiteracy, may impede access to and use of information (Gupta, 2011).

The 1883 explosion of Krakatoa, Indonesia, followed the introduction of the telegram, and so became the first globally reported disaster (Winchester, 2003). Today, most disasters are broadcast around the world in real time, through television, radio, print media, mobile social networking and the Internet. The media, therefore, plays an increasingly important role in holding governments, NGOs, international organizations and other stakeholders to account (Olson et al., 2011). This applies only when the media is free and, more importantly, responsive to disaster risk reduction perspectives, which means it looks beyond the images of catastrophe and body counts, and reports on of the causes and longer-term impacts of disasters (Radford and Wisner, 2011; Wisner et al., 2011).

The media play four different roles in the wake of disasters: observing and reporting facts such as mortality rates and the volume of assistance provided, holding governments and humanitarian actors to account, analysing the causes of the disaster and raising public awareness about potential improvements in DRM (Olson et al., 2011). Importantly, and given its global reach, the media can help create political incentives not just in the disaster-affected country, but in other countries with similar risks. As Box 7.4 shows, after the 2010 earthquakes in Haiti and Chile, media outlets in Jamaica and Peru paid increased attention to their own risks, highlighting the concern that 'it could happen here' (Olson et al., 2011).

Evidence suggests that a culture of social accountability, and specific mechanisms to ensure it, can directly improve the effectiveness of governance and service delivery (Acharya, 2010; Daikoku, 2010). Algeria's 2004 Law on the Prevention of Major Risks and on Disaster Management in the Framework of Sustainable Development now guarantees citizens a right to information about the risks and vulnerabilities of their places of residence and work, and whether there are measures in place to reduce risks and manage disasters (IFRC, 2011). Likewise, Serbia's 2009 Law on Emergency Situations and El Salvador's 2005 Law on Civil Protection, Prevention and Mitigation of Disasters, acknowledge citizens' right to be informed on disaster risks and oblige authorities to provide this information. However, in other countries information on disaster losses and impacts is not always made public.

Whereas such laws are important, they do not necessarily strengthen actual accountability unless they are supported by penalties and/or effective performance-based rewards. For example, provisions in legislation and the regulation of public office can specify the liabilities of politicians and government leaders, becoming more effective when linked to expenditure and budgets. Transparent contractual arrangements between government departments and between government and private service providers also contribute to increased accountability. Where rights and obligations are clearly articulated and tied to concrete performance measures, service delivery can improve dramatically (Box 7.5).

Box 7.4 The role of the media following the 2010 Haiti and Chile earthquakes

Following the 2010 Chile earthquake, the media identified gaps and overlaps between government agencies, central and local government, and the need to improve seismic monitoring. Following the Haiti and Chile earthquakes, the media in neighbouring countries increased their disaster reporting. Nearly 20 percent of the media reports in Jamaica and 13 percent in Peru focused on the need to identify risks and vulnerabilities in their own countries, and another 15 percent and 34 percent respectively on risk reduction measures. In Peru, for example, the press ran articles on the potential risks tsunamis posed to coastal communities (see Figure 7.1). In Haiti, Chile and neighbouring countries, the media showed that it was capable of holding governments and the international community to account. This capacity is limited however, by the media's short attention span and rapid drop-off in coverage after disasters.

(Source: El Comercio*, 18 February 2010)*

Figure 7.1
Excerpt from *El Comercio*: hypothetical tsunami striking a beach community south of Lima

(Source: Olson et al., 2011)

Box 7.5 Social audits to ensure accountability in rural employment in India

India's National Rural Employment Guarantee Act (NREGA) facilitates accountability by both governments and civil society. It includes decentralized planning and implementation, proactive disclosures and mandatory social audits of all projects. The impetus was provided by strong political will and a committed high-level bureaucracy. In 2006, the Strategy and Performance Innovation Unit (SPIU) of the Department of Rural Development, collaborated with MKSS, a civil society organization in Rajasthan that pioneered social auditing in India, to train officials and civil society activists and to design and conduct pilot social audits. This process trained 25 civil society resource persons at the state level, complemented by 660 more at the district level, with audits conducted by educated youth volunteers identified and trained by this pool of expertise.

Since the first social audit was conducted in July 2006, an average of 54 social audits have been conducted every month across all 13 NREGA districts. Whether audits have resulted in improved accountability in service delivery needs to be researched, but significant and lasting impacts are already evident, including improvements in citizens' awareness levels, their confidence and self-respect, and importantly, their ability to engage with local officials.

(Source: Acharya, 2010)

7.5 Scaling up DRM

Where communities, civil society organizations and governments enter into partnership, the scale of DRM efforts can be increased considerably. However, this requires a change in the administrative culture of many public departments: to accept that working directly with low-income communities in risk-prone areas must become the norm rather than the exception.

A strong civil society can play a critical role in creating social demand for DRM, by ensuring political responsibility and increased accountability, mostly at local levels (UNISDR, 2010; Gupta, 2011; Satterthwaite, 2011). Civil society organizations, where they have the ability and opportunity to organize and voice their positions, can reduce local risks while building political and economic imperatives for DRM. Without innovative local partnerships between civil society, local and central government and other stakeholders, instruments such as public investment planning or conditional cash transfers are unlikely to be effective. Also, as highlighted in the previous chapter, without such partnerships, land use management policies and building regulations may actually construct risk rather than reduce it.

Community-based DRM (CBDRM) has moved to centre stage within many NGOs, international organizations and some governments. The concept was originally described as a cost-effective approach to ensure greater government responsiveness and accountability to local needs, particularly those of risk-prone, low-income households and communities (Maskrey, 1989). In practice, however, it has often been limited to improvements in community preparedness and response capacities through local projects, and there are clear limits as to what risk-prone households and their organizations can achieve on their own (Satterthwaite, 2011). They only rarely control resources or influence decision-making processes in a way that could unlock access to safe land, manage complex watersheds, or undertake large-scale public works often necessary to reduce risk.

Real CBDRM occurs when risk-prone communities have been able to progressively engage and involve government and other supra-local actors to support their activities and improve accountability (Maskrey, 2011) (Box 7.6.). This approach to scale up local action implies a very different kind of engagement

Box 7.6 Community-driven disaster risk reduction in Philippine cities

Organized urban communities and government-community networks are strong vehicles for social mobilization and disaster risk reduction in the Philippines. Communities are involved in the identification and prioritization of post-disaster assistance, and in the management and monitoring of materials delivered for housing and other uses.

The community associations also used their own savings as leverage to engage municipal government in obtaining additional resources to secure land for post-disaster housing. Municipalities can access national calamity funds, as well as their own calamity funds, which can be 5 percent of their total budget. The new Disaster Risk Reduction and Management Law, passed in May 2010, now enables most such funds to be used for disaster risk reduction, with a need to reserve only 30 percent as a contingency for post-disaster interventions. Not all communities are aware of the new law and its implications, however, so funds have not yet been disbursed directly to the communities, but experience suggests that this will be the next step towards greater flexibility and community ownership.

(Source: Carcellar, 2011)

between civil society and governments than occurs in most CBDRM projects.

A number of characteristic local processes are evident where such a community-level engagement has occurred. These include risk-prone households and their organizations gaining a greater awareness of local disaster losses, impacts and risks. There is the building of partnerships with local governments and other stakeholders, which allows negotiation on priorities, public investment and support, and the implementation of measures that not only reduce disaster risk, but have other benefits such as improvements in local infrastructure and services. There is also evidence of greater cost-effectiveness and sustainability of investments (Maskrey, 1989, 2011; Satterthwaite, 2011).

Case studies from India (Livengood, 2011), the Philippines and the Caribbean (Pelling, 2010) show that local households have played an active role in increasing risk awareness in local governments, through exercises in risk mapping and vulnerability assessment. In Cuttack, India, for example, a joint government–community risk assessment process builds on more than two decades of community-led data collection and mapping. Today, the mapping includes GPS-marked boundaries and maps of informal settlements, producing digital maps at the city scale which can be presented to municipal authorities. This process of settlement identification, mapping and demarcation, encompassing all of Cuttack's informal settlements, has led to an accurate and disaggregated database on risk and vulnerability that is fed into a city-wide assessment (Livengood, 2011).

A community organization on its own rarely has the leverage to engage governments or hold them to account, but networks and consortia of expert institutions and civil society organizations can promote government support to local initiatives. This can increase their effectiveness and sustainability, improve implementation, ensure accountability, help scale up local initiatives and projects and, importantly, play a key role in strengthening local capacities (Satterthwaite, 2011; Scott and Tarazona, 2011; Venton 2011).

When communities have some ownership of contributions to risk reduction, their 'small pipes' can be combined with the 'large pipes' of public services and infrastructure, and the unit costs of both community and local government investment can be reduced significantly. Then, there is also a better chance that central resources meet local needs, and that other vulnerabilities are reduced over time (Hasan, 2010). Scaling up such experiences calls for innovative financing arrangements that merge public planning and investment with local priority-setting and decision-making, as for example, in post-disaster reconstruction (Box 7.7).

Box 7.7 Flexible financing for community-led 'building back better'

A community fund is a key tool that enables communities to participate in planning and implementing post-disaster reconstruction. This type of financing must be flexible enough to allow survivors to collectively assess their particular reconstruction and development needs. Ideally, this includes a revolving fund system that provides longer-term financial solutions, with different funds for different needs. This allows accounts to be managed by different groups and reduces the risk of creating power imbalances within the community. It also usually improves the transparency of contributions and expenditures.

In some cases, survivors are able to add their own contributions to community funds. The Homeless People's Federation in the Philippines builds on existing savings for post-disaster reconstruction planning and funding, so people's savings contribute, while giving community members a measure of independence. These savings can also provide a basis for much needed access to loans. After cyclone Nargis, for example, villages in Myanmar borrowed money to ensure that all affected households were able to rebuild.

(Source: Archer and Boonyabancha, 2010)

A culture of public administration that provides incentives for working in partnership with low-income groups, however, remains the exception rather than the rule and is a major obstacle to change in many countries. In some contexts, legal barriers may prohibit municipalities from working in informal settlements. Although legislation and regulation requiring the participation of multiple stakeholders in planning and development have become more common, such measures may unintentionally legitimize government actions rather than encourage communities to question or challenge unresponsive institutions (Gupta, 2011). In Turkey, multi-stakeholder forums for building and planning include representation from civil society, academic institutions, professional and private sector organizations. However, their recommendations are rarely implemented, the mechanisms are difficult to sustain (Johnson, 2011), and participation has been influenced by state patronage (Ganapati, 2009; Oezerdem and Jacoby, 2006; Johnson, 2011). A lack of clarity in the law on what is meant by participation or weak enforcement provisions result in ineffective consultation processes or those that exist on paper only.

Scaling up local initiatives, therefore, requires new capacities and skills in local and central government institutions. It also requires a cultural shift in the attitude of municipal governments, contractors and non-governmental organizations towards working in partnership with low-income households and their representative organizations. 'Volunteer technical communities' can also play an important role in this process, filling gaps in knowledge and technology (Blanchard, 2011). In many cases, such changes have been triggered by a new generation of elected mayors with a sincere commitment to improve conditions in informal settlements (Satterthwaite, 2011). Cities are also learning from one another about innovative approaches to planning, financing and development. In contrast to high-income countries where DRM is largely provided for by the government, risk-prone households and communities in low- and middle-income countries have always had to innovate creative solutions to manage their risks. As an increasing number of national and city governments start to put in place structures and resources to support and facilitate local efforts, a new perspective for risk governance is opening up.

Note

1 For more information, refer to www.sc.gov.cn/zt_sczt/zhcjmhxjy/cjjy/kjcj/200912/t20091217_871603.shtml and www.sc.gov.cn/zt_sczt/zhcjmhxjy/dkzy/sf/200912/t20091201_859811.shtml.

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Chapter 8

Redefining development: the way forward

The City of Chongqing, China, during the 2010 flood of the Yangtze River.
Photo: iStockphoto®, © pkujlahe

Chapter 8 Redefining development: the way forward

The preceding chapters highlight key opportunities to reduce disaster risks and facilitate implementation of the Hyogo Framework for Action (HFA). This collected evidence allows decision-makers and their constituents to quantify the costs and benefits of investments in disaster risk management (DRM), and weigh the trade-offs between action and inaction. Fundamentally, the challenge is not to protect development, but to use it to address the underlying risk drivers.

Strategic investments must be taken, often with uncertainty and incomplete information, and this report makes a compelling case for action in four areas.

1. Addressing global risk drivers

2. Taking responsibility for risks

3. Leveraging existing development instruments

4. Strengthening risk governance capacities

8.1 Address global risk drivers

Primary responsibility for reducing disaster risks rests with individual countries, but progress also depends on international cooperation to address climate change and support adaptation, particularly in developing countries where risk is concentrated. In highly vulnerable, low-income countries, DRM and adaptation financing should be used to strengthen risk governance capacities. This will leverage mainstream development investment and help meet the Millennium Development Goals.

8.1.1 Invest in risk governance for highly vulnerable countries

There is a group of vulnerable low-income countries whose development paths are diverging from those of OECD countries and other low- and middle-income countries. Major development investments are needed to assist these countries to address the structural causes of poverty, upgrade informal settlements, build risk-reducing infrastructure, improve natural resource management and strengthen governance at all levels. These are indispensible conditions for improving risk governance capacities, including those needed for climate change adaptation.

Chapter 2 illustrated that economic development generally increases hazard exposure. A country's ability to develop with accompanying reductions in vulnerability is therefore critical to managing and reducing disaster risk. However, there will always be trade-offs between economic growth and risk reduction. For example, tourism development may generate employment and foreign exchange, but if not well planned and managed, it may increase both agricultural and hydrological drought risks and lead to the degradation of hazard-regulating coastal ecosystems. Similarly, policies designed to increase certain agricultural exports may overexploit water resources and concentrate drought risks among subsistence farmers.

Investment in strengthening governance is therefore particularly important. Countries with effective institutions, low levels of corruption and strong accountability will have a far greater capacity to address underlying risk drivers. High GDP per capita alone does not guarantee strong risk governance. Countries whose economies depend on energy exports, for example, are often characterized by high GDP per capita but weak risk governance (DARA, 2011). Therefore, efforts to strengthen risk governance must go hand in hand with economic development so increases in exposure are accompanied by reductions in vulnerability.

8.1.2 Adopt low-carbon development

Since the publication of the *2009 Global Assessment Report* (GAR09) (UNISDR, 2009), the UNFCCC Parties have failed to agree on a binding multilateral framework to reduce greenhouse gas emissions. Meanwhile, atmospheric CO_2 concentrations surpassed 391 ppm, and grew by 2.42 ppm in 2010 (Tans, 2011). This was one of the largest annual increases ever recorded, despite the growing momentum to adopt low-carbon energies and technologies in a number of countries and sectors. This trend must be reversed. Mitigating climate change is one of the few means by which the frequency and intensity of certain physical hazards can be reduced.

As highlighted in GAR09, the primary means to mitigate climate change is for countries to adopt low-carbon development paths. With the exception of large, rapidly growing economies such as China, India and Brazil, most low- and middle-income countries make small contributions to the global carbon footprint, meaning that climate change mitigation is largely out of their hands. These countries have contributed least to climate change but already

have the greatest difficulty addressing existing disaster risks. As those risks become magnified by climate change and increasing climate variability, these countries will have even greater difficulty managing disaster impacts.

In major greenhouse gas-emitting countries, climate change mitigation can also provide other important risk reduction benefits. For example, urban and regional development can be planned in a way that reduces flood risk and transportation-related CO_2 emissions. The UN-Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD) has been specifically designed to reduce emissions while simultaneously regulating hazards and supporting rural livelihoods and ecosystems.

8.1.3 Capitalize on political momentum for adaptation

Climate change adaptation is one issue on which the UNFCCC Parties made significant progress in 2010. At COP 16 in December 2010, the Cancún Adaptation Framework was adopted, inviting governments to link their implementation of climate change adaptation to other policies and processes, including the HFA. The Green Climate Fund was also established to provide direct financing for adaptation to developing countries. Given that most adaptation programming has been indistinguishable from DRM, these agreements will potentially increase the resources available for risk reduction in general.

There is growing momentum towards the integration of climate change adaptation and DRM into national development planning and investment. However, in most countries, institutional and programme mechanisms are managed separately and are only weakly coordinated. Both DRM and adaptation need to be integrated into national development planning and investment, local governance should be strengthened, and partnerships with civil society facilitated.

Additional resources for climate change adaptation and for DRM should be used to strengthen risk governance capacities including those accounting for disaster loss and assessing risk. These resources could then leverage the billions of development dollars that low- and middle-income countries invest each year to better address underlying risk drivers and reduce vulnerability. Such adaptation resources can provide the critical mass needed to address increasing risks in a context of climate change and provide a 'no regrets' strategy, particularly given the inherent uncertainty of future climate scenarios.

In addition, donors that provide budget support to low- and middle-income countries through overseas development assistance could learn from countries that are starting to factor disaster risk considerations into their public investment planning. They could then incorporate this learning into their dialogue with other recipient countries, in the context of OECD-DAC as one example.

8.2 Take responsibility for risk

Further progress in risk reduction will depend on governments taking decisive steps to explicitly recognize, and take full ownership of, and responsibility for, their stock of risk. This entails political risks, as it requires acknowledging the real costs and consequences of unmanaged risk. However, without owning their risks, countries remain effectively in denial, while experiencing unexpected disasters for which they are neither prepared nor able to manage. This continuously erodes their development potential, as the stream of recurrent losses from extensive disasters either absorbs public resources or is transferred to low-income households and communities.

Key elements for successful disaster risk management (DRM) across governance scales and development sectors identified in the *2011 Global Assessment Report on Disaster Risk Reduction*

TAKE RESPONSIBILITY FOR RISK

Invest in risk reduction
Use cost–benefit analysis to target the risks which can be most efficiently reduced and which produce positive economic and social benefits

Take responsibility
Develop a national disaster inventory system to systematically monitor losses and assess risks at all scales using probabilistic models

Anticipate and share risks that cannot be reduced
Invest in risk transfer to protect against catastrophic loss, and anticipate and prepare for emerging risks that cannot be modelled

INTEGRATE DRM INTO EXISTING DEVELOPMENT INSTRUMENTS AND MECHANISMS

Regulate urban and local development
Use participatory planning and budgeting to upgrade informal settlements, allocate land and promote safe building

Protect ecosystems
Employ participatory valuation and management of ecosystem services and mainstreaming of ecosystem approaches in DRM

Offer social protection
Adapt conditional cash transfer and temporary employment schemes; bundle micro-insurance and loans; consider social floor and poverty line

Use national planning and public investment systems
Include risk assessments in national and sector development planning and investment

BUILD RISK GOVERNANCE CAPACITIES

Show political will
Place policy responsibility for DRM and climate change adaptation in a ministry with political authority over national development planning and investment

Share power
Develop decentralized, layered functions; use principle of subsidiarity and appropriate levels of devolution including budgets and to civil society

Foster partnerships
Adopt a new culture of public administration supportive of local initiatives and based on partnerships between government and civil society

Be accountable
Ensure social accountability through increased public information and transparency; use performance-based budgeting and rewards

8.2.1 Account for disaster losses

The crucial first steps of taking responsibility for risk involve the systematic recording of disaster losses and impacts, and the institutionalization of national disaster inventory systems. Countries collect statistics on demography, employment, economic activity and many other development indicators to orient economic and other public policies, but without accurate accounting for disaster losses, such indicators form an incomplete picture. Comprehensively recording disaster losses and downstream impacts will allow governments to measure and value the costs of recurrent disasters and identify the underlying drivers of risk. Unless a country can calculate the cost of these losses, it is unlikely to be able to justify significant investments in DRM in the national budget.

Accounting for drought losses and impacts is a particular gap, even in those countries that have developed systems for recording losses from other physical hazards. National disaster inventory systems need to include criteria for measuring drought losses, not only in agriculture, but also in terms of impacts related to livelihoods, health and other economic sectors.

A number of countries have already established disaster inventory systems, many within the last few years. However, there remains significant room for improvement, as 90 percent of the countries that endorsed the HFA do not currently have functioning and institutionalized systems for recording disaster losses, and downstream impacts are currently only measured in isolated small-scale studies.

8.2.2 Quantify the risks

Countries not only need to know what they are losing, they must also estimate potential future losses for which they need to be prepared. A comprehensive probabilistic risk assessment that includes drought risk is the key to developing a cost-effective portfolio of disaster risk management measures. One method, using a 'hybrid loss exceedence curve', is highlighted in Chapter 5 of this report.

The capacity to apply probabilistic risk methodologies depends on accurate historical disaster loss data, and adequate capacity to assess vulnerability, for example by maintaining a functioning network of rainfall or seismic monitoring stations. This in turn requires strong institutional frameworks for hazard and risk assessment, which in many countries remain fragmented and poorly coordinated between a number of different and often competing institutions.

The formulation and adoption of international standards for disaster loss accounting and risk estimation may provide additional incentives for countries to take ownership of their risks. This could be especially important if such standards are used to prioritize financing for climate change adaptation and DRM.

8.2.3 Use cost–benefit analysis to guide disaster risk management investments

Systematically accounting for losses and comprehensively assessing risks help governments categorize and stratify their stock of both extensive and intensive disaster risks. Cost–benefit and other analyses can then be used to assess economic and political costs and benefits of different prospective, corrective and compensatory risk management approaches. A well-balanced portfolio of DRM investments can produce powerful incentives for governments, including the enhanced quality and sustainability of public spending, increased public safety and business continuity, strengthened financial protection and fiscal stability, and avoidance of political fallout in the event of a catastrophic disaster.

A balanced portfolio is likely to include investments in prospective risk management, through effective planning for example. Corrective risk management is often less cost-effective but is necessary to address existing concentrations of risk, particularly in the case of critical services and facilities such as hospitals. Compensatory risk management may include a mix of different instruments, such as national contingency funds, contingent credit, insurance and reinsurance. These mechanisms contribute to providing financial liquidity and fiscal stability after disasters, as well as more predictable recovery and reconstruction. If risk-transfer measures are linked to specific requirements and criteria for risk reduction, they can provide a powerful incentive for other DRM investments.

At present, drought risk management currently relies on forecasting, early warning and compensatory measures, including relief and insurance. Access to early warning information that can inform decisions on what crops to plant and when, and insurance to buffer losses, can significantly reduce the vulnerability and increase the resilience of subsistence farmers. Compensatory measures play an important role, but their penetration in low- and middle-income countries is at present still incipient, and unless they are used strategically, they can reinforce poor resource management. These measures need to be complemented by prospective drought risk management to ensure that all new development takes into account current and anticipated future water availability.

As the March 2011 nuclear crisis in Japan shows, governments should also invest time and resources in anticipating emerging risks. In general, while there is widespread recognition

of the potential magnitude of such risks, few governments or international organizations currently have policies to deal with them, and even fewer have translated any such policy into operational instruments. Developing scenarios of 'what might happen' and preparing appropriately means moving away from viewing future risks merely as an extension of the past. This is especially important with climate change, which may trigger hazards that have no historical antecedent in a particular location. It involves developing anticipatory capacities and tools such as scenario development and horizon scanning, and having the adaptive capacity to factor 'what might happen' scenarios into future policies and plans. In turn, this will require overcoming an aversion to risk and innovation that often characterizes both the public sector and international organizations.

8.3 Leverage existing development instruments and mechanisms

While DRM has conventionally been delivered through stand-alone projects and programmes, a number of governments are now adapting existing development mechanisms and instruments to reduce risks and strengthen resilience. These include public investment planning, social protection and ecosystem-based approaches. Although many of these innovations are incipient, they hold the promise of addressing underlying risk drivers, and simultaneously generating co-benefits for multiple stakeholders. These mechanisms may build on existing institutional capacities, which should offer powerful incentives for governments.

8.3.1 Factor disaster risk into public investments and development plans

Factoring disaster risk considerations into national planning and public investment decisions can radically scale up risk reduction. This is due to the large scale and targeted focus of public investment in many low- and middle-income countries and many low-income communities of other countries, making them a particularly strategic entry point for addressing risk drivers.

Co-benefits include enhanced social and economic development, such as fewer schools or roads damaged in floods and earthquakes, and improvements in the quality, coherence and sustainability of public spending. Whereas a number of countries have already factored disaster risk into the evaluation of public investment projects, far greater benefits could be achieved if it is also included further upstream in the national planning cycle, i.e., development, sector and land use planning.

Above all, it is essential that drought risk be fully factored into national development, requiring a high-level policy and planning framework that addresses the many competing uses of water and the decline of available water resources. Strengthened local governance, including partnerships between governments, the water sector and water users, is similarly vital to address conflicting demands for water at the sub-national level.

8.3.2 Employ social protection to reduce vulnerability and buffer losses

Many countries are already making huge investments in social protection through instruments such as structural conditional cash transfers and temporary employment programmes. They increase the disaster resilience of risk-prone households, and the criteria for receiving such cash transfers can be modified when a disaster is forecast or in areas that are exposed to recurring hazards. They could also be given to non-poor households that are likely

to become poor if they were to suffer disaster losses. Temporary employment programmes provide additional household income and can be used after disasters or to offset predicted events such as seasonal droughts. Bundling micro-insurance with micro-finance and other loans is an additional complementary source of social protection, and they can be adapted to generate specific incentives for DRM in businesses and at the household level. These instruments can reach out to millions of risk-prone households using existing institutional structures and mechanisms, reducing poverty and vulnerability at the same time.

8.3.3 Recognize the value of healthy ecosystems

For reducing disaster risk, the protection, restoration and enhancement of ecosystems such as forests, wetlands and mangroves can be much more attractive in terms of cost–benefit ratios than 'conventional' hard engineering solutions. Also, 'greening' cities – by planting trees and roof gardens, and increasing the permeability of paved surfaces – may be a more cost-effective means of reducing urban flooding than expensive investments that increase storm drainage capacity. In addition, such 'green' solutions can also improve groundwater availability and reduce summer temperatures, generating important energy savings during peak consumption periods. Similarly, restoring wetlands can be a less expensive way to mitigate flood hazard than constructing additional river defence walls, while also increasing the supply of water, improving biodiversity and providing livelihood opportunities in fishing and tourism.

Instruments and methods for using ecosystem management for DRM include protected area legislation, integrated planning, ecosystem accounting and payment for ecosystem services. At present, the principal obstacles against more widespread adoption of such instruments remain the undervaluation of ecosystem services and associated co-benefits, partly due to data scarcity and a lack of understanding by planners and professionals in the construction and engineering sectors.

8.3.4 Adopt a participatory approach to planning and regulations

Most low- and middle-income countries have policies, legislation and capacities related to urban planning, management and building regulations. However, using such instruments for DRM has proved to be a challenge, particularly where a large proportion of urban development occurs in the informal sector. What is required is the adoption of a culture of planning and regulation based on partnerships and joint ownership, between local and central governments, risk-prone households and communities and organizations that represent them.

National laws should stipulate local government responsibility for planning and control while ensuring adequate resources to plan and regulate development. Laws can be strengthened by explicitly acknowledging and endorsing the responsibilities of civil society, community representatives, and mechanisms that can be used to promote partnership and dialogue. These mechanisms include participatory budgeting in which low-income households, their organizations and other stakeholders are involved. Processes include establishing investment priorities, negotiation of more flexible planning and building standards appropriate to the needs of low-income households, negotiated processes to identify land and secure tenure, and joint planning and implementation of settlement and infrastructure upgrading. Regulations that require less government oversight and which become engrained in local planning and building practices represent another opportunity. For example, simple building codes and processes coupled with education on safe building practices can go a long way to improve the safety of housing.

In many low- and middle-income countries, a participatory approach should be adopted by necessity and not just by conviction. It represents the most cost-effective and sustainable mechanism for reducing urban risks, while at the same time facilitating poverty reduction, and a more constructive relationship between civil society and government.

8.4 Strengthen risk governance

Using development mechanisms and instruments for DRM requires a reform of many existing risk governance arrangements. This requires increased political authority and policy coherence in central government, competent and accountable local governments, and the willingness of governments to work in partnership with civil society, particularly with low-income households and communities.

8.4.1 Place responsibility for DRM within strong central institutions

In central government, overall responsibility for DRM and also climate change adaptation should be placed in a ministry or office with the political authority to ensure policy coherence across development sectors. The full integration of DRM into all sectors and local public investment must be ensured through assessments, planning and budgeting. Such arrangements would mean that the responsible body, such as a central planning or finance ministry, for example, is not also tasked with delivery. Practical disaster management may remain a responsibility of a civil protection or emergency management office, social protection would remain anchored in a social ministry, and so on.

National disaster risk reduction policy frameworks are rarely based on comprehensive national risk assessments, and thus do not provide the kind of focused goals, targets and benchmarks that assist in implementation, monitoring and enforcement. A national policy, if based on a stratification of DRM, can provide a broader framework for development planning and public investment decisions, including risk financing, social protection strategies, and sector policies, plans and programmes. If the policy framework is owned by an office or ministry with strong political and economic leverage, it will have a better chance of delivery.

8.4.2 Decentralize responsibility, capacities and resources in tandem

Competent and accountable local government is a precondition for effective DRM. Unless local governments have the capacities and resources to fulfil their functions, decentralization of responsibilities may be counter-productive. In decentralization processes, more attention needs to be paid to the appropriate layering of functions, where higher administrative levels financially and technically support local implementation. If the decentralization of relevant functions and resources cannot be fully realized due to extremely weak local capacities, an incremental approach may be the most effective way forward.

The deconcentration of functions without wholly devolving authorities and budgets can be a pragmatic first step towards full decentralization. Twinning of capacity-rich municipalities and regions with poorer or more risk-prone ones, and strategic partnerships between technical centres and civil society organizations, further complement incremental devolution.

8.4.3 Hold decision-makers and institutions accountable

Social demand for improved accountability mechanisms can galvanize political will to invest in DRM or reform risk-governance arrangements. For national policy and local delivery to function effectively, there needs to be an awareness of rights and obligations by all sides, supported by strong and transparent accountability mechanisms. Provisions in legislation and specific regulations of public office can clearly demarcate the liabilities of leaders and government officials. Where transparent contractual arrangements both for civil servants and private service providers are agreed upon, such liabilities can be linked to expenditure and budgets. This can be done through performance reviews within and across government departments or through social audits at a local or sector level.

The media and civil society play an important role in creating the social demand for strengthened accountability mechanisms,

not just for effective DRM but for public investments overall. This report presents evidence that such social accountability brings marginalized groups into the public arena, and significantly increases development effectiveness by improving service delivery at the local level.

Citizens must be aware of disaster risks if they are to hold governments to account, but the lack of public information and education was highlighted as a significant gap in the HFA Progress Review. The limited public awareness activities that do occur focus primarily on physical hazards or on the preparedness and response aspects of disaster management. Far more resources need to be devoted to increasing public awareness of risks and risk drivers at all levels and scales, and the need for a comprehensive approach that goes beyond disaster management. An important first step would be to ensure that citizens have access to national disaster loss inventories and comprehensive risk assessments. In a number of countries public access to disaster loss and risk information is not encouraged, which undermines accountability.

8.4.4 Partner with civil society

Effective local governance relies on adopting approaches to local planning, financing and investment that build on partnerships with civil society, particularly with risk-prone households and their representative organizations. This allows for the scaling up of community initiatives. Where community organizations have only limited capacity to reduce disaster risk and to hold governments to account, meso-level partnerships with other organizations, expert institutions and government bodies can improve the success of local and community-driven disaster risk reduction.

The enabling of such partnerships is an imperative, yet it must be done in a transparent manner based on clear terms of reference for each partner, and supported by an adequate legal framework. Where the roles and responsibilities of all partners are defined and well aligned, their joint action will provide the most effective means of addressing DRM challenges across scales. However, this may require a change in the culture of public administration and the adoption of new ways of working.

8.5 Build momentum for disaster risk reduction and management

Acknowledging and understanding the existence and importance of the stock of risk is the responsibility of every government. The HFA provides a general roadmap for achieving substantial reductions in disaster losses, but countries now need to set their own specific goals and targets. To do this, a number of tools are available to facilitate a process that is inclusive and transparent, and accountable to those most affected by disasters. These include the HFA Progress Review, national disaster loss monitoring systems, probabilistic risk assessments, and cost–benefit analyses.

This report has shown that there are many reasons why countries do not invest enough in disaster risk reduction, but there are no excuses for continuing to do so. The time for taking serious action is now. Fortunately, many of the policies discussed in this report will generate net savings for governments if adapted and adopted, by producing parallel development benefits. The evidence strongly suggests that cost-effective measures, if transparently developed, will also increase political as well as economic capital.

The process of compiling this report benefitted from the participation of more governments, technical experts, international organizations and civil society groups than were able to contribute to the 2009 report, indicating a growing momentum for disaster risk reduction. This needs to be harnessed and directed toward gaps in research and current knowledge. Known gaps include seismic risk, which was omitted from this report pending the finalization of new earthquake models, and an analysis of global drought risks just initiated. Disaggregated disaster impacts by gender and age need to be better understood, and the role of the private sector requires closer examination. Feedback loops between risk drivers must be examined as well as the cost-effectiveness of additional DRM measures. Closing such gaps will help in identifying the more cost-effective means of reducing disaster risks, and further build the case for more investment in DRM.

Annex

Hyogo Framework for Action Monitor: Core indicators[1]

Priority for action 1:
Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation

Core indicator 1.1 National policy and legal framework for disaster risk reduction exists with decentralized responsibilities and capacities at all levels

Core indicator 1.2 Dedicated and adequate resources are available to implement disaster risk reduction plans and activities at all administrative levels

Core indicator 1.3 Community participation and decentralization is ensured through the delegation of authority and resources to local levels

Core indicator 1.4 A national multi-sectoral platform for disaster risk reduction is functioning

Priority for action 2:
Identify, assess and monitor disaster risks and enhance early warning

Core indicator 2.1 National and local risk assessments based on hazard data and vulnerability information are available and include risk assessments for key sectors

Core indicator 2.2 Systems are in place to monitor, archive and disseminate data on key hazards and vulnerabilities

Core indicator 2.3 Early warning systems are in place for all major hazards, with outreach to communities

Core indicator 2.4 National and local risk assessments take account of regional and trans-boundary risks, with a view to regional cooperation on risk reduction

Priority for action 3:
Use knowledge, innovation and education to build a culture of safety and resilience at all levels

Core indicator 3.1 Relevant information on disasters is available and accessible at all levels and to all stakeholders through networks, development of information sharing systems, etc.

Core indicator 3.2 School curricula, education and relevant training material include disaster risk reduction and recovery concepts and practices

Core indicator 3.3 Research methods and tools for multi-risk assessments and cost–benefit analysis are developed and strengthened

Core indicator 3.4 Country-wide public awareness strategies exist to stimulate a culture of disaster resilience, with outreach to urban and rural communities

Priority for action 4:
Reduce the underlying risk factors

Core indicator 4.1	Disaster risk reduction is an integral objective of environment related policies and plans, including land use and natural resource management and climate change adaptation
Core indicator 4.2	Social development policies and plans are being implemented to reduce the vulnerability of populations most at risk
Core indicator 4.3	Economic and productive sectorial policies and plans have been implemented to reduce the vulnerability of economic activities
Core indicator 4.4	Planning and management of human settlements incorporate disaster risk reduction elements, including enforcement of building codes
Core indicator 4.5	Disaster risk reduction measures are integrated into post disaster recovery and rehabilitation processes
Core indicator 4.6	Procedures are in place to assess the disaster risk impacts of major development projects, especially infrastructure

Priority for action 5:
Strengthen disaster preparedness for effective response at all levels

Core indicator 5.1	Strong policy, technical and institutional capacities and mechanisms for disaster risk management are in place, with a disaster risk reduction perspective
Core indicator 5.2	Disaster preparedness plans and contingency plans are in place at all administrative levels, and regular training drills and rehearsals are held to test and develop disaster response programmes
Core indicator 5.3	Financial reserves and contingency mechanisms are in place to support effective response and recovery when required
Core indicator 5.4	Procedures are in place to exchange relevant information during hazard events and disasters, and to undertake post-event reviews

Note:

1 Does not include Key Questions and Means of Verification; see HFA Monitor Template for full list: www.preventionweb.net/english/hyogo/hfa-monitoring/hfa-monitor/.

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