

# Mitigating and Financing Catastrophic Risks: Principles and Action Framework

This paper was prepared by Paul Kleindorfer, Howard Kunreuther, Erwann Michel-Kerjan and Richard Zeckhauser<sup>1</sup>, members of the High-Level Advisory Board to the OECD International Network on the Financial Management of Large-Scale Catastrophes.

The paper is being released for information and comment solely under the responsibility of the High-Level Advisory Board.

Comments are welcome and should be sent to  
Sophie Saltré at [sophie.saltre@oecd.org](mailto:sophie.saltre@oecd.org)

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<sup>1</sup> Alphabetical order. Kleindorfer: INSEAD; Kunreuther: Wharton School, UPenn; Michel-Kerjan: Wharton School, UPenn; Zeckhauser: Kennedy School, Harvard

## **SUMMARY**

This white paper articulates a framework based on principles, values and objectives for governments, NGOs and the private sector to systematically reduce losses and better cope with the financial impacts of large-scale disasters. These principles are set against the background of a trend of larger-scale catastrophes due to increased assets and population in vulnerable areas, more intense weather-related events that may be due to climate change and greater interdependencies across countries and business sectors as illustrated by longer and more complex supply chains. These principles highlight the importance of public and private sector collaboration in identifying and quantifying risks from large-scale catastrophes and designing mitigation and residual risk financing mechanisms to cope with them. While these risks will directly impact private individuals and businesses, companies in the insurance and reinsurance industries, and national governments, the OECD can play an important role in addressing them. More specifically, the OECD can employ these principles to develop and share best practices across countries, and to promote regional and international cooperation in data collection and modeling the nature of these risks and the uncertainties surrounding them.

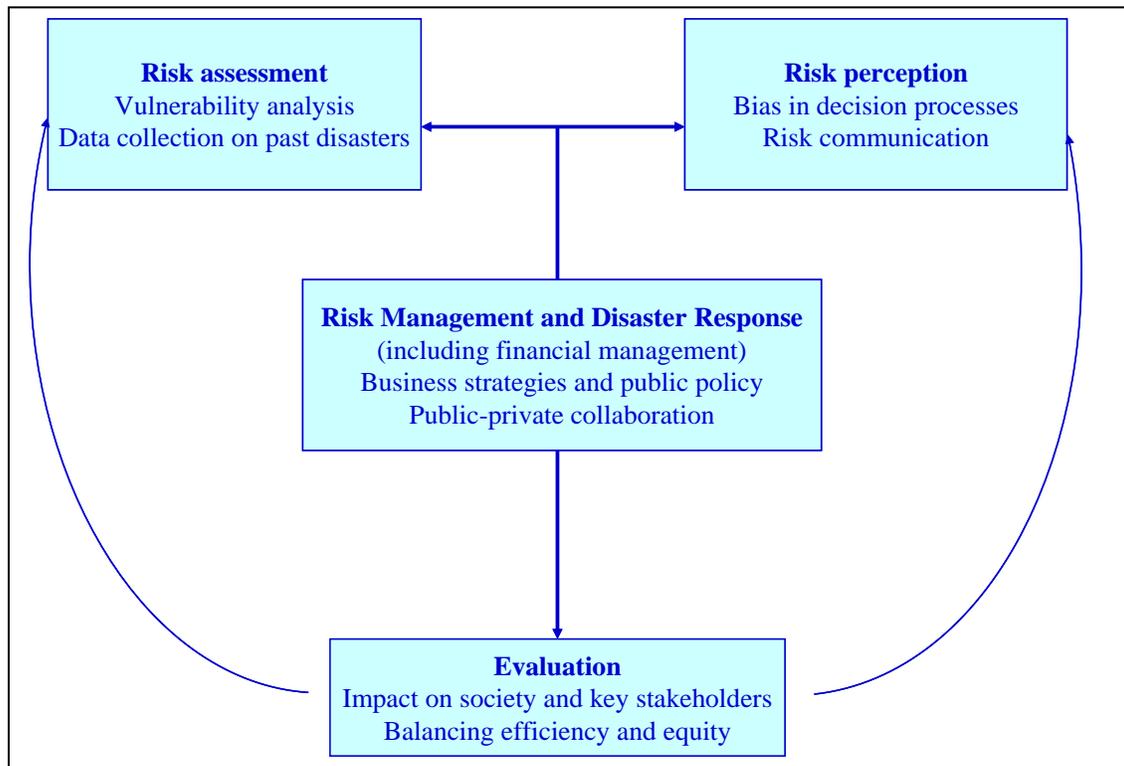
## FRAMEWORK

The principles noted below for sustainable risk management are based on the general framework for catastrophic risks depicted in Figure 1 below and are intended to cover events such as:

- Large-scale natural hazards, including storms, flood, earthquakes, heat waves, and droughts
- Industrial accidents with potentially catastrophic outcomes
- Pandemics
- Mega-terrorism

This framework highlights the central link between assessing the risks, how these catastrophic risks are perceived by the public and the strategies for managing catastrophe risks. It also emphasizes the importance of considering optimal resource allocation (efficiency) from a societal perspective and distributional issues (equity) with respect to the affected stakeholders.

**Figure 1: The Critical Components for Managing Catastrophic Risks**



Given this framework, the first and most basic principle that should govern the design of effective policies for managing the financial consequences of large-scale catastrophes is that strategies must be grounded in the sound science surrounding the field of risk.

**Basic Principle: Integration of Risk Elements Based on Sound Science**

Strategies for coping with large-scale catastrophes should be anchored in an integrated framework of risk assessment, risk perception, risk management and disaster response.

- *Risk assessment*: modeling risks and characterizing the uncertainties surrounding the likelihood of certain events occurring and the direct and indirect consequences on affected stakeholders.
- *Risk perception*: how individuals and organizations process information on the likelihood and consequences of events (e.g., some individuals residing in hazard-prone areas may behave as if the event “cannot happen to me”) and evaluate alternative options for dealing with the risk (e.g., importance of goals/plans in the decision making process). Stakeholders are likely to have different values, goals and priorities and hence perceiving risks differently.
- *Risk management and disaster response*: alternative strategies involving the private market and public policies for reducing the likelihood of occurrence of a catastrophe risk and/or its consequences (e.g., financial protection, economic incentives to invest in risk-reduction measures, pre-positioning of assets and the design of effective logistics and relief efforts to respond to particular events, well enforced standards and regulations, legal environment).

Any framework, such as the one depicted in Figure 1, needs to be specific to the particular risk in question. Indeed, differences are to be expected in the nature of the hazard, the uncertainties about its level of threat and the assets at risk, and the amount of information available to stakeholders and their awareness of the hazard. In focusing on a specific risk one needs to identify:

- Key *stakeholders* who are likely to be involved in assessing, managing and financing disasters. Their culture, values, objectives, short-and long-term goals and priorities will determine how vulnerable they are with respect to specific events and their decisions with respect to mitigating the risks.
- Nature of *the institutional arrangements* and performance of specific markets related to investments in protection that include mitigation measures, insurance and other risk financing mechanisms.
- Relevant *public-private sector collaborations* that directly or indirectly affect risk assessment, risk perception and risk management.

## 1- PRINCIPLES FOR DISASTER MANAGEMENT STRATEGIES

Beyond the foundational principle of employing sound science for integrating risk elements a set of more detailed principles are delineated here as they relate to risk assessment, risk perception and risk management

### Risk Assessment

**Creating a Culture of Risk Assessment:** The prime tasks in assessing the risk are to measure the likelihoods of possible disasters, the distributions of their consequences across different stakeholders and the uncertainties surrounding these estimates. A public national disaster risk assessment and vulnerability assessment should be undertaken by countries and reevaluated every 5 years. For each type of risk and level of severity, government should be able to quantify the costs it would have to bear under current programs as well as proposed strategies should one or more of these disasters occur tomorrow (e.g. costs of protecting infrastructure, expected financial relief to victims of the disasters - people, communities and businesses)

**Quantifying Primary and Secondary Effects:** Risk assessment should not be limited to the direct and immediate potential effects of a catastrophe (destroyed and damaged assets and affected victims) but also integrate secondary and indirect effects through geographical interdependencies and over time. Indeed, given growing interconnectedness of activities, a catastrophe that occurs in area A can have ripple effects on many other regions and global markets. Some of these effects can be enduring so the total effect and greatly exceed the immediate physical loss.

**Developing National Data Collection:** A sound foundation for risk assessment requires a national data collection on relevant hazards and asset vulnerabilities. Drawing on the lessons and data of other countries will prove useful in this regard, a task the OECD can facilitate. In countries where insurance is well-developed, the government should facilitate a national data collection effort to measure insurance penetration at firm and individual level. Doing so would give a nation's decision makers better knowledge of the level of financial protection in place for recovery and restoration activities.

### Risk Perception

**Recognizing the Behavioral Biases and Heuristics Used by Individuals and Groups:** Risk perception and management strategies should address behavioral biases and heuristics (rules of thumb) utilized by both decision makers, groups and the general public. This implies understanding individual decision processes (including misperceptions of probability--*the disaster won't happen to me*-- and myopia, a focus on short-term actions rather than on long-term strategies) as well as social interactions and short-term goals/priorities.

## Risk Management

**Promoting Cost-Effective Mitigation Measures:** Efficient mitigation where the expected long-term discounted benefits in reduced losses exceed the costs must be a fundamental building block of disaster management strategies. To achieve efficient mitigation requires well-designed risk assessments (i.e. the use of good data and catastrophe modeling) to understand how expected losses will be reduced. One can examine the role of incentive systems including the use of insurance (e.g. premium reductions) to encourage mitigation.

**Developing Relief and Recovery Strategies** is also a prerequisite for determining ways to provide emergency relief and to finance recovery should a disaster occur. These recovery strategies need to be linked to alternative mitigation measures to better understand the relationship between actions taken before a disaster (*ex ante* measures) and those required after a catastrophe occurs (*ex post* actions).

**Equity and Affordability:** The costs of mitigation measures and insurance should be commensurate with the means and abilities of individuals and companies to undertake or pay them. If costs of insurance truly reflect risks, one might need to consider providing financial assistance to individuals in hazard-prone areas needing special treatment (e.g., low-income uninsured or inadequately insured residents and businesses). Financial support should come from general public funding and not through artificially low insurance premiums (e.g. government can provide insurance vouchers). Grants or low interest loans from the public sector could be provided to these individuals to encourage them to invest in cost-effective mitigation measures. In poor countries, this effort might require financial support from the international community and international organizations (e.g., World Bank, International Monetary Fund). This principle is not intended as a proposal for a vast shift in resources toward low income residents or poor countries. If such entities do not engage in appropriate mitigation measures, or purchase adequate insurance, relief efforts following a disaster will cost donor sources considerable amounts. The transfers contemplated should be measured against those amounts.

**Who Will Pay For Disasters:** The design of a disaster management strategy needs to consider how losses after a disaster are allocated among victims (people and firms), and private sector businesses that insure against risk (e.g., financial institutions, insurers, reinsurers and the businesses themselves through reserves), and all levels of government (local, state, federal; i.e. present and future generations of taxpayers). Before a disaster occurs, careful consideration must be given to financial arrangements that allocates resources efficiently given equity considerations, and that is also politically realistic.

**Equal Treatment:** In developing a disaster management strategy, all citizens of a given country should be treated equally regardless of sex, race, ethnicity and class.

## Disaster Response

If the responses to disasters are to be effective, there must be pre-positioning of post-disaster capabilities and responsibilities before the fact. As the development and deployment of these capabilities is costly and will affect ultimate outcomes in the event of a

disaster, the design of response capabilities must be subject to the same dictates of efficiency, equity and behavioral realism as noted above. Two challenges for undertaking these actions in advance of a disaster are noted below.

**Recognizing the Samaritan's Dilemma:** Government relief, while often necessary, might also contribute to the *Samaritan's Dilemma*. If one knows in advance of a disaster that the government will provide ample assistance after hardship to those who were not protected, there will be less of an economic incentive for those in hazard-prone areas either to engage in loss reduction measures prior to the next disaster or to purchase adequate insurance coverage (when available).

**Recognizing the Politician's Dilemma:** Politicians can benefit from their generous actions following a disaster which may discourage elected representatives at the local, state and federal levels from inducing people to adopt protection measures before the next disaster. Indeed, given short-term re-election considerations, a city representative is likely to vote for measures that allocate taxpayers' money elsewhere that yield more political capital. It is another example where little consideration is given to supporting mitigation measures prior to a disaster (*ex ante*) because they believe that their constituencies are not worried about these events occurring, knowing there is likely to be a groundswell of support for generous assistance to victims from the public sector after a disaster (*ex post*) to aid their recovery. The difficulty in enforcing these mitigation measures has been characterized as the *politician's dilemma*. The one silver lining to this behavior is that following a natural disaster when residents and the media focus on the magnitude of the losses, politicians will respond by favoring stronger building codes and other loss reduction measures, but only when there is a consensus among her/his constituencies that this is a good thing to do.

## **2 - PRINCIPLES FOR THE USE OF INSURANCE AND OTHER FINANCIAL INSTRUMENTS AS A POLICY TOOL**

Several country and regional models now exist across OECD countries that embody various tradeoffs in designing programs that attempt to comply with the following principles with respect to providing insurance protection.

**Insurance premiums should be based on risk in order to provide signals to individuals as to the hazards they face, and thereby encourage them to engage in cost-effective mitigation measures to reduce their vulnerability to catastrophes.** In particular, governments should not require insurers to set premiums artificially low because of other local economic considerations.

**Government should use the existing insurance infrastructure for distribution of insurance products even if these are backed by the government.** To illustrate, flood insurance in the United States is provided to homeowners in hazard-prone areas under the National Flood Insurance Program with private companies marketing policies. In the UK, floods are covered by the private sector but there is a role for the government to assure that proper mitigation measures are in place.

**Insurance coverage should be available, either privately or publicly, to enable all citizens to avoid *ex post* catastrophic losses through prudent *ex ante* planning.** All households at risk should be strongly encouraged through economic incentives or legally required to carry catastrophic insurance at some appropriate level. Micro-insurance schemes can be developed to assist affected individuals and businesses in developing countries. Where the national strategy calls for reliance on such insurance for covering catastrophic losses, no rescue or bailouts should be given to those who fail to purchase insurance. This policy should be made explicit publicly *ex ante* (prior to the disaster) and adhered to *ex post* (following a disaster).

### **3 - PRINCIPLES GOVERNING PUBLIC AWARENESS AND INDIVIDUAL RESPONSIBILITY FOR THE CONSEQUENCES OF CATASTROPHIC RISKS**

**Options for protecting against catastrophic losses should be widely discussed and clearly understood before a major disaster.** Risk management strategies should help inform a citizenry of the risks they face and the available cost-effective mitigation and recovery options.

Each country/national government should articulate a **clear social contract** identifying the expected behavior of their citizens and the role of the public sector in reducing losses and dealing with the losses from natural and man-made disasters.

#### **POSSIBLE INNOVATIONS TO BE DEVELOPED UNDER OECD LEADERSHIP**

**The OECD could support comparative studies to understand relevant constraints and institutional arrangements in developed and developing countries that are likely to affect the availability of catastrophe coverage and the roles of government and the private sector in catastrophe risk management** (e.g., nature and potential development of insurance markets, availability of mortgages, defining the respective roles of local and national governments). In this regard, based on the stocktaking and comparative review already performed by the OECD during the past years, it will be important to examine alternative strategies practiced by different countries for dealing with specific risks with a view to understanding their relationship (either explicit or implicit) to a set of underlying guidelines and principles such as those noted above. This exercise could be done for a series of specific risks.

Obtaining relevant data, assessing risk and understanding risk perceptions of the relevant stakeholders are key ingredients for developing and evaluation alternative risk management strategies. In conjunction with other organizations in the public and private sectors that already collect relevant data, **a specific structure within the OECD might be developed that could act as an international information-sharing platform providing data publicly available on large-scale catastrophes.**

**The OECD should consider developing a survey instrument to be administered annually in OECD countries** for better understanding risk perception and the way specific policies are viewed by key stakeholders (the general public, private and public sector organizations). In this same vein, case studies and examples could be developed to showcase innovations in catastrophe risk assessment, management and financing in OECD member countries. (The Appendix provides examples of such innovations)

Given growing **interdependencies** between countries and industries due to globalization of social and economic activities, **top decision makers of non-OECD countries should be able to turn more systematically toward the OECD for advice on their disaster management issues and the development of new strategies.** It is also in the interest of developed countries to assure that the citizenry and businesses of poor- and middle income countries are less vulnerable to future disasters. Losses in these countries could have ripple effects on global supply chains, markets and international security world wide as well as making demands on relief and multinational lending organizations more pressing.

## **APPENDIX**

### **Illustrative Innovations in Catastrophe Risk Management**

- Long-term insurance for providing protection against disasters (rather than the current widely employed one-year format)
- Long-term loans for encouraging mitigation measures coupled with economic incentives for undertaking these actions (e.g., insurance premium reductions)
- Better organizational solutions to assure well-enforced standards and regulations (e.g., building codes; land-use regulations)
- Better warning systems to reduce loss of lives, injuries and damage
- Well designed emergency plans that can be implemented following a disaster
- Development of financial solutions enhancing micro-finance/micro-insurance (protecting individuals and small businesses locally) as well as macro-finance/insurance (protecting government)