

## Climate Risk Management workshop- Background notes

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### **The Disaster Risk Management Process: Notes for a Discussion**

by Allan Lavell  
FLACSO and LA RED

“Risk”, considered in the framework of disaster and adaptation to climate change, may be simply defined as the probability of future adverse effects, loss and damage to humans, their livelihoods, their cultural and historical heritage and infrastructures. Risk is the product of a physical hazard(s) interacting with exposed and vulnerable elements. It is latent, location specific and socially constructed on the basis of existing or expected future physical conditions. These physical conditions may relate to weather and climate, hydrology, geology, geomorphology, oceanography, biology and technology.

Disaster risk implies probable future adverse conditions, loss and damage which severely affects the normal routine functioning of the affected area and society. As such, it constitutes an extreme manifestation of risk in general. That is to say, different areas and social units can suffer levels of loss on a continuous basis which do not incite disaster conditions as defined above. However, a continuous process of smaller scale loss can lead to a greater probability of large scale disaster in the future due to the continual erosion of livelihood assets, coping capacity and resilience of affected groups.

Disaster Risk Management-DRM comprises a process and method for dealing with disaster risk and its derivatives. It's specific objectives are first, to reduce existing risk through actions that reduce hazards, exposure or vulnerability. Second, to anticipate future risk by preventing the construction of new hazards, exposure and vulnerability. Third, to deal with remanent risk that has not been reduced or eliminated, responding to imminent disaster and disaster impacts once these occur.

The reduction of existing and the anticipation of future risk are jointly referred to as Disaster Risk Reduction-DRR. Preparing for and responding to disaster once it occurs is referred to as Disaster Management-DM. Disaster Risk Reduction and Disaster Management together comprise the practice of Disaster Risk Management

Employing additional taxonomies, reducing existing risk is referred to as Corrective Disaster Risk Reduction and avoidance of future risk is referred to as Prospective Disaster Risk Reduction. And, preparing for and dealing with disaster once it materializes is increasingly referred to as Compensatory Disaster Management.

Reconstruction and recovery post impact may be seen in part to be a component of DM and also a component of DRR, if recovery practice incorporates risk prevention processes and actions. Disaster preparedness may also be considered to be part of both DM or DRR.

The processes and practices summarized above signify that DRM operates in a context where risk is constantly evolving and changing its nature and form, from preimpact risk conditions, to post impact risk and finally to the risk that should be avoided with the recovery and reconstruction of affected societies.

Disaster Risk Reduction is increasingly considered a component of sector, territorial, social or economic development planning practice. This signifies that the traditional division of DRR strategies and instruments into “structural (engineering based)” and “non structural (behaviour changing)” has been redefined to a good extent and classifications of actions are more likely today to mirror development parameters and planning practices. These include land use planning and territorial organization, environmental management, livelihood security and poverty reduction and improved governance. Each of these may include structural and non structural instruments as required.

An essential aspect of DRM is the decision as to acceptable levels of risk and the design of appropriate strategies and instruments for dealing with the wide range of levels of risk that may exist, from extreme, intensive and infrequent to lower scale, extensive and recurrent. Risk transfer or sharing mechanisms become of more and more significance in high, intensive risk contexts where significant risk mitigation or reduction is difficult due to the magnitude of probable events or exposure and vulnerability.

A further significant aspect relates to the institutional location of DRM practice, given the increasing importance conceded DRR practice and its clear development planning basis.

Climate change is predicted to modify the parameters of many hydrometeorological hazards, influence the levels and types of exposure to these and even indirectly influence patterns of human vulnerability. As such it has and will introduce a new dynamic into disaster risk and disaster risk management practice. Managing different and even greater levels of uncertainty than those existing under conditions of stable climate variability, dealing with potentially higher energy extreme events and more prevalent and recurrent smaller and medium scale events, dealing with risk in new locations not formerly exposed to hazard, and adjusting to new multi hazard management needs are some of the challenges climate change will bring.

However, despite the probable changes in hazard parameters and occurrence, DRM and its associated adaptation to climate change goals must be most concerned with avoiding exposure and vulnerability, as part of a development planning based vision of these practices.

**Intergovernmental Panel on Climate Change (IPCC)**  
**"Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation  
(SREX)"**  
by Matilde Rusticucci

In its Fourth Assessment Report (AR4), the IPCC had found that climate change was being manifested in the nature of changed frequency, intensity and length of many extreme events, such as floods, droughts, storms and extreme temperatures. This special report will generate knowledge on these extreme events and their characteristics, whereby the global community can prepare more effectively for adapting to future risks posed by the hazards that these occurrences will present. Communities at the local level and national governments can deal with such extreme events by adopting a range of disaster risk reduction strategies, and prevent some of the worst humanitarian consequences that they are projected to give rise to” says Mr Rajendra Pachauri, the Chairman of the IPCC “Extreme events are one of the direct consequences of climate change, with severe economic repercussions. There’s new and relevant scientific literature subsequent to the AR4, in particular on disaster risk management, most of which is grey literature, which will make the effort to assess. The report will be an extremely useful tool for governments to learn how to manage disasters, and it is also a very important support to the United Nations Framework Convention on Climate Change (UNFCCC) work, in particular the Nairobi work program to help parties make informed decisions on practical adaptation actions”. Mr Vicente Barros, WG II Co-Chair.

**Caribbean Risk Management Guidelines**  
**Caribbean Community Climate Change Centre**  
*by Carlos Fuller, Regional and International Liaison Officer*

The Caribbean Community Climate Change Centre (CCCCC) is an intergovernmental organization established by the Caribbean Community (CARICOM) in 2002 to coordinate the region's response to climate change. It evolved from the implementation of a series of regional climate change projects. A component of one of these projects, the "Adaptation to Climate Change in the Caribbean (ACCC) Project" produced the "Caribbean Risk Management Guidelines for Climate Change Adaptation Decision Making".

While global warming is accepted as a physical reality, there is considerable uncertainty on its magnitude and impacts on the Caribbean. As a result climate scientists have a serious challenge in providing advice to policymakers on the level of adaptation required and the options that should be considered. A risk management approach is a useful tool to employ in the decision making process for deciding on the adaptation solutions to be implemented.

These guidelines were to be employed on the following regional climate change projects, "Mainstreaming Adaptation to Climate Change (MACC)" and "Special Programme on Adaptation to Climate Change (SPACC)". The CCCCC has been further mandated under the CARICOM Climate Change Implementation Plan, "Delivering transformational change 2011-21", which was recently approved by the CARICOM Council on Trade and Economic Development (COTED), to revise the risk management framework taking into account the latest developments in climate risk management techniques. It further recommended that the initial entry points for creating a risk ethic across the Caribbean should be in the areas of coastal zone management, disaster risk reduction and national strategic and budgetary planning.

**Secretariat of the Pacific Regional Environment Programme**

by Espen Ronneberg

Joint climate change adaptation and disaster risk management work

While climate change adaptation and disaster risk management have many similarities and synergies, their implementation in the Pacific Island Countries has been driven by different national, regional and international policy drivers. There has been a tendency to consider these issues as separate “silos” and consequently the synergies in implementation have not been realised. In order to overcome these obstacles SPREP and SPC have been working cooperatively with individual countries to tailor national level joint action plans (JNAPs) that seek to bring together planning, preparation and implementation of CCA and DRM. The presentation will explain the policy frameworks and the process taken to link the relevant areas and promote synergies in implementation. It will also consider some of the persistent challenges and provide recommendations for further work and assistance to developing countries.

UNFCCC Workshop on Risk Management Approaches

10-12 October, 2011

Lima Peru

**Climate Change Adaptation and Disaster Risk Reduction: *Intent and Practice***

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The recent and increasing disaster experiences in Small Island Developing States (SIDS) and Landlocked Developing Countries (LLDCs) have fuelled the dialogue on the need for better exploitation of the synergies between climate change adaptation and disaster risk reduction goals.

It is agreed that the effective management of current risks and the adaptation for future variability related to climate change are essential for sustainable development and a critical platform for resilient development.

The presentation outlines the inherent synergetic potential in DRR and CCA, examines efforts at strategic engagements and how challenges for these may be overcome.

It calls for a revisit of engagement approaches and assumptions and offers engagements that empower the transformation actors and agents to effect action towards risk management outcomes.

*Jeremy Collymore*

## **The Application of Risk Management Tools in Canada**

*by Pam Kertland, manager of the Tools for Adaptation programming at the Climate Change Impacts and Adaptation Division of Natural Resources Canada.*

Over the past five years, the Canadian government has facilitated the development of tools to assist communities and practitioners address climate change through risk management. One of these tools, the "PIEVC Engineering Protocol for Climate Change Infrastructure Vulnerability Assessment", has been applied in 27 locations across Canada with a focus on water supply, stormwater management and transportation. The tool has also been successfully applied in Costa Rica, with plans in place to expand usage to other developing countries. The presentation will discuss lessons learned in the application of the tool in Canada, the ways that findings have been incorporated in decision, as well as the importance of building a community of practice to support its use.

## **THWARTING THE THREAT:**

### **A participatory game on risk reduction in a changing climate**

*by Pablo Suarez and Maarten van Aalst, Red Cross / Red Crescent Climate Centre*

Session 3 - Risk reduction - participatory session

Why do people continue to suffer and die due to climate-related hazards? The remarkable progress in science, technology and wealth accumulation over recent decades allows us to anticipate future conditions, communicate early warnings and take early action to avoid losses, as well as reduce key vulnerabilities and even address their root causes... Yet many recent disasters are evidence of a dreadful gap between our concrete decisions and our latent ability to reduce risks. This applies at many geographic scales, from rural households to national budgets to global climate change policies. What can UNFCCC do to help governments address this challenge?

In this session we will experience the challenges confronted by various decision makers (including subsistence farmers, national ministers, and funders) through a seriously fun, dynamic game that combines collaboration and competition. Participants will have to make individual and group decisions about disaster relief, development, and risk reduction - with limited resources. Your decisions will have consequences that mimic what we observe in the real world: There will be winners and losers, with prizes. After game play we will identify and discuss the gaps and challenges in implementing risk management approaches, with an emphasis on climate change.

The natural and social systems affecting our work have dynamic elements that are not easy to grasp through conventional, linear educational approaches. How to devise a communication platform that can successfully convey the existence and relevance of system complexity? Trade-offs, feedbacks, non-linearities, delays and unanticipated “side effects” are inherent in risk management decisions, and should be part of the learning experience of government officials and illiterate farmers alike. Well-designed games, like adaptation measures, involve choices with different outcomes depending on things beyond our control. In this session we will experience how games can help people and organizations concerned with climate change engage in shared learning and dialogue on risk reduction.

## **Munich Climate Insurance Initiative (MCII)**

*by Koko Warner, Executive Director of the Munich Climate Insurance Initiative (MCII)*

Session 4 - risk sharing, pooling and transfer

**Session description:** This session will explore risk sharing, transfer, and regional pooling approaches to manage weather-related risks in the context of climate change. Part 1 allows the experts to provide a frame for more in-depth discussions about risk transfer. After a framing of the tools and major concepts by Professor Jerry Skees, a world renowned expert on agricultural insurance and risk transfer, the session will explore possible roles for public and private sector in risk transfer. Following this, two regional risk pooling initiatives—one well-known and established pool in the Caribbean, and a new initiative in Africa to address drought risk—will be examined and discussed. The experts in part 1 will engage in a more in-depth discussion where the moderator will bring out their particular and recent work experiences (part 2). Part 2 will feature an expert panel and discussion with audience members of key questions about risk transfer and pooling approaches. The overarching goal of the session is to enhance basic understanding of risk sharing measures, explore delegate questions about how these measures work, and put forward ideas about how processes like the climate negotiations could play a catalytic role in the management and transfer of weather-related risks.

Date: Tuesday, 11 October  
Time: 14:00 – 17:30 (*see programme below*)  
Location: tbc  
Format: Presentations (ca 10 minutes), panel & audience discussion  
Topic: Risk sharing, pooling and transfer: Relevance to Adaptation & Examples of current experience  
Moderator: Koko Warner, Executive Director of the Munich Climate Insurance Initiative (MCII)

### **Objectives**

The purpose of this side event is threefold:

1. **To explore** Delegate questions on implementation of risk sharing, pooling and transfer which are relevant to elements like the Cancun Adaptation Framework.
2. **To discuss** innovations in risk sharing, pooling and transfer in countries and regions vulnerable to climate change. Two regional initiatives complemented by private sector perspectives.
3. **To put forward ideas and options** for feasible, catalytic COP decisions that could be made on risk management including risk sharing, pooling and transfer.

## **Program**

### **Part 1 Presentations, Q & A (14:00 to 15:00)**

- Introduction to risk sharing and risk transfer with examples from practice  
Jerry Skees / Global AgRisk
- Roles for public and private sector in risk sharing, pooling & transfer  
Manuel Almenara, Chairman, Latin America & Caribbean, Willis Re
- Regional risk pooling for natural hazard risks in the Caribbean  
Simon Young / CCRIF
- Regional financial risk management & food security in Africa  
Fatima Kassam / WFP
- Moderated audience discussion

### **Part 2: Panel discussion, audience discussion (15:00 to 16:00)**

- Moderated audience discussion

Discuss audience and expert views on the use of risk transfer tools including insurance in the context of adaptation to climate change. See discussion questions below.

## **Discussion questions for session**

### **Risk transfer and risk sharing**

- What is risk transfer? Is it the same as risk sharing? (examples)
- What is the idea behind risk pooling, how does it work?
- What are possible roles for the private and public sector in risk transfer and risk sharing?
- In what ways does risk sharing and risk transfer fit into the risk management cycle? Can these tools be used to help vulnerable countries adapt to climate change? Does risk transfer and risk sharing contribute to community resilience, or do these tools “only” build financial capacity?
- Is risk transfer cost effective? What are ways to finance risk transfer and sharing, especially since vulnerable countries that may need these tools tend to be low-income?
- How to operationalize risk transfer tools under the Convention?

### **Regional risk pooling as a kind of measure to share and transfer risk**

- What is regional risk pooling, how does the CCRIF facility work?
- How much does it cost to start a risk pool?
- What are the effects of having a risk pool in place when a disaster does occur?
- Can risk pooling enhance disaster risk reduction? How?
- What are the top 3-5 advantages and challenges of risk pooling in the context of risk management?
- What are the most important gaps that would need to be filling to bring risk pooling solutions to vulnerable countries and people ( such as capacity, data, regulatory frameworks, technical requirements, etc.)
- What is the role of regional political leadership in facilitating regional risk pool approaches? How was momentum created in the experience of the Caribbean and Africa?
- What kinds of things could the international climate discussions do to catalyze risk pooling initiatives?
- What organizations and what activities are going on in different regions of the world on risk pooling? Risk transfer?



## **WORKSHOP ON THE IDENTIFICATION OF GAPS AND CHALLENGES IN THE IMPLEMENTATION OF RISK MANAGEMENT APPROACHES TO THE ADVERSE EFFECTS OF CLIMATE CHANGE**

*10–12 October 2011, Lima, Peru*

*Session 4 - Risk sharing, pooling and transfer*

### ***CCRIF: Sovereign climate risk management in practice***

The Caribbean Catastrophe Risk Insurance Facility was launched in June 2007 and provides an innovative catastrophe risk management tool for CARICOM governments. CCRIF operates as an insurance company, issuing annual policies to governments who, through a membership fee, have helped to capitalise the company alongside initial donors. CCRIF offers parametric policies, which use the modelled impact of a catastrophe event as a basis for payouts, enabling cost-efficiencies and rapid payouts (2-3 weeks after an event.) Coverage is designed to meet the short- to medium-term liquidity needs of governments after a major catastrophe event, which in the Caribbean region can cause up to 200% of GDP in economic impact. Early post-disaster flow of funds provides not only short term benefits to the population but also has been shown to reduce the overall economic impacts of a disaster through maintaining basic public-sector functions facilitating more rapid recovery.

Governments pay an annual premium for the coverage level that they have chosen; coverage is priced on a strictly per-risk basis so there is no cross-subsidisation between countries. CCRIF premiums are not subsidised; CCRIF buys reinsurance on the international markets and passes the value of pooling risks across the Caribbean region to its policy-holders. Initial donor funding reduced the cost of capital (a significant element of premium costs in conventional catastrophe insurance programmes) so allowing lower premium pricing, but CCRIF operates on a fully sustainable basis and indeed provides significantly greater security to its policy-holders than any commercial insurer.

In addition to its role as a financial service provider, CCRIF has also filled a gap in technical capacity for catastrophe risk management. It shares the technical data required for underwriting, including real-time hurricane impact forecasting, and supports partner institutions through commissioned research and development projects and through its Technical Assistance programme, particularly in the area of disaster risk reduction. The TA programme also provides scholarships and professional development support, sponsors workshops and conferences in the region, and has funded a multi-territory Economics of Climate Adaptation study which quantifies climate change risks and provides cost-benefit analysis of potential adaptation tools, including risk transfer.



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# African Risk Capacity

## Sovereign Disaster Risk Solutions : A Project of the African Union



### ***Africa Transitioning from Managing Crises to Managing Risks***

The increased frequency of extreme weather events driven by climate change will result in increased risk of hunger and malnutrition in Africa's most vulnerable populations. As currently structured, the system for responding to natural disasters is not as timely or equitable as it could be. Funding is secured on a largely *ad hoc* basis after disaster strikes and only then can relief be mobilized toward the people who need it most. In the meantime, lives are lost, assets are depleted, and development gains experience significant setbacks – forcing more people into chronic destitution across the continent.

Establishing contingency funding, or monies that become available automatically if an extreme drought, flood or cyclone occurs in a vulnerable area, ensures a more timely, appropriate, objective and transparent response. Because extreme weather events do not happen in the same year all across the continent, **pan-African solidarity in the creation of a disaster risk pool could be financially effective. Such a facility would provide participating Member States readily available cash in the event of a natural disaster.**

### ***Support from the Policy Organs of the African Union***

On 16 April 2010 African Ministers charged with Disaster Risk Reduction passed a declaration which [“Calls Upon Member States to explore the feasibility of continental financial risk pooling in working towards the creation of an African-owned, pan-African Disaster Risk Pool for Food Security.”](#)<sup>1</sup> The Conference of African Finance Ministers gathered on 29-30 March 2010 in Lilongwe, Malawi adopted a similar endorsement in Resolution L-7 in which they resolved to [“Support efforts towards enhancing national and regional capacities to mitigate exposure to disaster risk through institutionalizing effective financial and other instruments such as strategic grain reserves, budgeted contingency funds as well as through sharing risk across regions.”](#) The latter was adopted by the Executive Council in its report of the Ministerial<sup>2</sup> and subsequently approved by Heads of State at the July 2010 AU Summit in Kampala, Uganda.

### ***Africa RiskView Fund Management Software***

The first step towards establishing such a pool is quantifying the risk in dollar terms. Climate and Disaster Risk Solutions, funded by the Rockefeller Foundation at the UN World Food Programme (WFP), has developed a methodology using leading technologies to assess the impact of weather events on food security across Africa – information critical to financial preparedness for natural disasters.

One of the endeavour's principal products is *Africa RiskView*, a software application that translates satellite-based rainfall information into near real-time needs estimates. ***Africa RiskView provides decision-makers with expected and probable maximum costs of weather-related responses before an agricultural season begins and as the season progresses for every first-level administrative district for every country in sub-Saharan Africa.*** To date the software has focused on drought, but other weather risks can be included in the future. The software enables management of Africa's weather risk as a whole in one financially optimized continent-wide risk portfolio. ***The Africa RiskView model performs well against historical***

<sup>1</sup> See Report of the Experts' Meeting Preceding The Second African Ministerial Conference on Disaster Risk Reduction (DRR), which took place in Nairobi, Kenya 16 April 2010

<sup>2</sup> See Executive Council Report (EX.CL/596(XVII)) of the Third Joint AU Conference of African Ministers of Economy and Finance and ECA Conference of African Ministers of Finance, Planning and Economic Development, which took place in Lilongwe, Malawi 25-30 March 2010

**drought-related assistance in Africa, with loss estimates correlating at nearly 90% to actual WFP responses over the past decade.** The model is flexible and can be customized and refined for each country, using the best data available.

### ***Aggregating Risks Across Regions Creates Savings***

While each country may use this information to build a national risk profile and contingency financing strategy, there is a clear financial incentive to pool different types of weather risk across countries and regions. National contingency funds or national weather insurance contracts, such as those pioneered by Ethiopia and Malawi, can be expensive propositions for a single national government. Evidence suggests that a scheme involving several governments using a single instrument, pooling their risk and then approaching donors and/or the market as a collective to manage this risk stands to save African governments significant amounts in risk management and emergency response costs.

It is unlikely that extreme weather events will happen simultaneously or in the same year in every country. This diversification means risks do not accrue in an additive fashion, lowering the probable maximum costs that a *group* of countries may incur together to a more manageable amount than the sum of each country's individual probable maximum cost. **Preliminary findings indicate a 50% savings from diversification of drought-related losses across Africa. This means that if African countries were to pool their drought risk, the pool's capital requirement would be half the sum of each country creating their own reserves – making a Pan-African Disaster Risk Pool an attractive financing mechanism in support of African food security.**

### ***African Risk Capacity***

The *concept* for African Risk Capacity (ARC) is roughly based on the Caribbean Catastrophe Risk Insurance Facility (CCRIF). Modified for the particularities of African multi-seasonal weather risk in its financial design and based on *Africa RiskView*, the pool's governance structure could mirror the CCRIF as an **African-owned, AU-led stand-alone entity**. The AUC, with technical assistance from WFP, has undertaken a study of design options including the institutional, legal and financial architecture of such an entity and participation guidelines. The structure, size and scope of an initial ARC entity, the role of stakeholders in the pool and the requirements for participation will be determined through this design and consultation process.

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## **Introduction to risk sharing and risk transfer with examples from practice**

by Mr. Jerry Skees, Global AgRisk

Insurance involves collecting many small payments (premiums) that can be used to prefinance large losses. Traditional insurance works best when individual losses are uncorrelated (“independent” in the language of statistics). Under these conditions, the variance of the individual losses will always be greater than the variance of the pooled losses, a fundamental principle of statistical aggregation. If the variance of the pooled losses is less than the variance of the individual losses, insurance companies can provide significant social value in society by pooling insurance premiums, even after taking a fee for that service. Considering a practical example of automobile insurance, as long as car accidents are only occurring for a small percentage of a given insurance company’s insured within a year, the premiums they collect from all insured will be more than adequate to pay for these relatively few losses, even though individuals having accidents will almost always collect more than the premium they paid. Consequently, it is easier and more efficient to insure a group in which accidents will occur at a roughly constant rate than it is to insure only one person to whom an accident will probably happen rarely or with unknown frequency. In short, with independent risks, such as auto accidents, an insurance company is simply funnelling the payments of some clients to those of others and charging a small fee for their services.

Natural disasters represent fundamentally different risks than those insured by traditional insurance because losses created by natural disasters are geographically concentrated — meaning that either everyone facing a given risk is paying a premium or everyone is receiving a payment, but there is no simple opportunity to funnel the payments from some clients to others. Classic insurance theory emphasizes that correlated risk is ‘uninsurable’; an insurance company can’t collect enough premium to pay losses that may occur within a single year. However, if natural disaster risk can be effectively “transferred” into the global markets, risks that were uninsurable (due to high correlations) become insurable. By pooling many premiums from other natural disaster risks around the world, these risks become insurable because natural disasters

on a global basis are geographically different or spread wide enough to represent largely independent risk. Premiums collected for hurricanes may go unused to pay for hurricane losses in the year when a major earthquake creates large losses. Nonetheless, reinsurance markets have their own challenges as the pricing is not transparent and the underlying price for reinsurance against natural disasters is driven by recent large disasters (e.g., prices increased after 9-11 and hurricane Katrina). The convergence of insurance and capital markets holds some promise to change these dynamics. A number of financial innovations are being used to develop the funding needed to pay the large losses created by natural disasters (catastrophe bonds, insurance-linked securities, etc.). However, most natural disaster risk is still financed by reinsurance companies. As the name implies, these global companies “reinsure” risk underwritten by local, in-country insurance companies. For example a common arrangement is what is referred to as a “stop loss agreement.” In this arrangement, the primary insurance company shares a part of the premium with the reinsurer and the reinsurer agrees to accept all losses beyond a certain percentage of the premium (e.g., losses beyond 90 percent of premium).

# National Experience on Tools/Approaches on Disaster Risk Reduction and Climate Change Adaptation: The Philippines Experience<sup>1</sup>

## Abstract

As global climate change escalates, the risk of floods, droughts and severe storms increases. In the Philippines, one of the countries in the world that is highly prone to natural hazards, the situation is further aggravated by the effects of climate change. While natural hazards and climate change cannot be prevented from happening, the vicious cycle of disasters and underdevelopment can be reversed. This can be done through “mainstreaming” disaster risk reduction (DRR) and climate change adaptation (CCA) in the development planning and decision-making processes.

While mainstreaming efforts are being strengthened, institutional mechanisms are likewise being reinforced. This is manifested with the creation of *Climate Change Commission (CCC)* in 2009 to mainstream climate change, in synergy with disaster risk reduction, into national, sectoral and local development plans and programs among its other functions. In 2010, the *National Disaster Risk Reduction and Management Council (NDRRMC)* was created to deal specifically with disaster risks.

In 2008, the National Economic and Development Authority (NEDA) formulated the mainstreaming framework that involves two processes. The first is *disaster risk assessment (DRA)* which analyzes the natural hazards of a place together with the risks to exposed elements. The DRA model consists of four steps: hazard characterization and frequency analysis, consequence analysis, risk estimation, and risk evaluation. The second process concerns how the results of risk assessment enhance the development planning analysis leading to better design and prioritization of interventions that are intended to reduce risks to and vulnerability of exposed population and property. The framework and the DRA are contained in the DRR Guidelines that was officially adopted with the issuance of Executive Order No. 1 directing the local government units to adopt and use the guidelines and the DRA in their planning activities.

The DRA model is being refined to incorporate climate change considerations and the sectoral impacts and vulnerability assessments. Together with other projects and activities, these initiatives supports the two long term objectives of adaptation and mitigation as embodied in the seven strategic priorities of the National Climate Change Action Plan (NCCAP) of food security, water sufficiency, ecosystem and environmental stability, human security, climate-smart industries and services, sustainable energy, and knowledge and capacity development.

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<sup>1</sup> A paper presented in the UNFCCC Workshop on the identification of gaps and challenges in the implementation of risk management approaches to the adverse effects of climate change, 10 – 12 October 2011, Lima, Peru by Dr. Jacob Tio (Philippine Representative)

## 1.0 INTRODUCTION

As global climate change escalates, the risk of floods, droughts and severe storms increases. At the global level, disasters have become more expensive. The Philippines is one of the countries in the world that is prone to natural hazards. It recorded a total of 310 disaster events from 1980 to 2008. The average annual cost of direct damage from natural disasters from 1970 to 2006 is estimated at PhP15 billion (US\$ 333M) at 2000 prices. Declines in gross domestic product (GDP) were estimated at: 0.5 percent average due to typhoons alone every year.

Disasters set back social and economic growth as development efforts are disrupted by natural disasters. The situation is further aggravated by the effects of climate change. While natural hazards and climate change cannot be prevented from happening, the vicious cycle of disasters and underdevelopment can be reversed. This can be done through “mainstreaming” disaster risk reduction (DRR) and climate change adaptation (CCA) in the development planning and decision-making processes. This approach is essentially based on the recognition that the poor are disproportionately affected by natural hazards and climate change. As such, for both CCA and DRR, poverty reduction is an essential component for reducing vulnerability to both natural hazards and climate change.

## 2.0 LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

The Philippines signed the UN Framework Convention on Climate Change (UNFCCC) in 12 June 1992. Since then, various institutional entities have coordinated and monitored the country’s participation and initiatives on climate change and related issues – culminating with the creation of the *Climate Change Commission* (CCC) with the enactment of Republic Act No. 9729 (RA 9729) in 23 October 2009. The law, *Climate Change Act of 2009*, mandated the CCC to mainstream climate change, in synergy with disaster risk reduction, into national, sectoral and local development plans and programs.

In 27 May 2010, Congress also enacted Republic Act No. 10121 (RA 10121), *Philippine Disaster Risk Reduction and Management Act of 2010*, to deal specifically with disaster risks. The *National Disaster Risk Reduction and Management Council* (NDRRMC) was created to oversee the implementation of the law.

The *Strengthening Disaster Risk Reduction in the Philippines: Strategic National Action Plan (SNAP) 2009-2019*, detailing the DRR roadmap in based on the Hyogo Framework of Action (HFA), was adopted by Executive Order 888 in 7 June 2010. This was substantiated with a *National Disaster Risk Reduction and Management Framework (NDRRMF)* which was adopted in June 2011.

The *National Framework Strategy on Climate Change (NFSCC)* was adopted in 29 April 2010, and the *National Climate Change Action Plan* is awaiting the formal signature of the President. On the aspect of risk management, the 2010 NFSCC envisioned a climate risk-resilient country using a knowledge system and capability program that are science-based as well as risk-based to support decision-making processes.

The NCCAP outlines the agenda for adaptation and mitigation in the near future. Consistent with the Framework, the ultimate goal is to build the adaptive capacities of

women and men in their communities, increase the resilience of vulnerable sectors and natural ecosystems to climate change, and optimize mitigation opportunities towards gender-responsive and rights-based sustainable development.

On the other hand, the national DRM framework as contained in the NDRRMF calls for the strengthening of system including risk assessment and hazard/vulnerability mapping among others. It also encourages mainstreaming DRM in local development plans and sectoral development plans.

Predating all of these initiatives, the National Land Use Committee (NLUC) in 2006 saw the need for hazard maps and other technical information to be made available to local government and other agencies. The NLUC also calls for the consideration of natural hazards to be integrated into preparation of sub-national and local development plans to ensure the appropriate use of land.

The next section discusses current initiatives and efforts to mainstream DRR and CCA concerns using risk assessment as the platform.

### **3.0 MAINSTREAMING DRR AND CCA**

DRR and CCA must be “*mainstreamed*” or made integral part of the development planning and implementation process in order to insure its sustainability. Hazard studies in DRR should be complemented by the wider perspective of CCA. And, the effectiveness of this approach can be maximized if implemented within the broader context of sustainable development. The main convergence is the long range of analytical tools and methodologies, in both DRR and CCA, based on risk management approaches to assess risk and vulnerability as well as to identify opportunities for action.

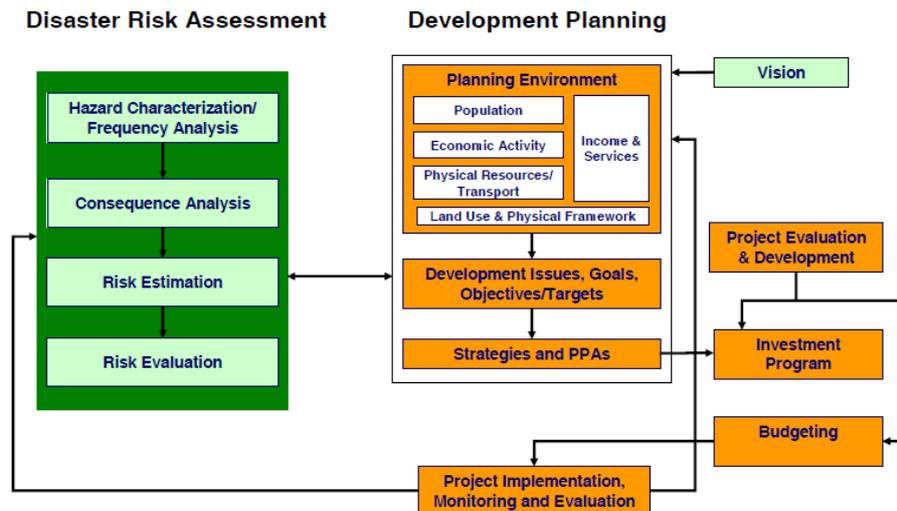
#### **3.1 Mainstreaming DRR in Development Planning**

In 2008, the National Economic and Development Authority (NEDA) was granted a Technical Assistance (TA) on Mainstreaming DRR Management in Subnational Development and Physical Planning in the Philippines with funding assistance from European Commission – Humanitarian Aid Department Disaster Preparedness Program (EC-DIPECHO) and United Nations Development Programme (UNDP).

The mainstreaming framework involves two processes. The first is *disaster risk assessment* (DRA) which analyzes the natural hazards of a place together with the risks to exposed elements. The second process concerns how the results of risk assessment enhance the development planning analysis leading to better design and prioritization of interventions that are intended to reduce risks to and vulnerability of exposed population and property.

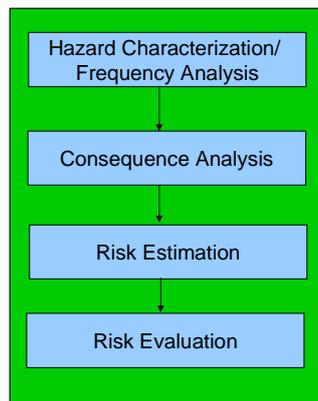
The mainstreaming framework (see figure below) illustrates how DRA is undertaken and how the results of the assessment are used to enhance all aspects of the planning process: from visioning, analysis of the planning environment, derivation of development potential and challenges and their translation into the corresponding goals, objectives and targets, and finally to the specification of the appropriate strategies and programs, projects and activities (PPAs). The PPAs derived from the plan formulation stage are the main inputs into the succeeding phases of the development planning process, namely, investment programming, budgeting, project evaluation and development, project implementation and monitoring and evaluation. PPA outcomes and impacts that are determined during and post implementation

should be able to reveal reduction in risks to population and property by increasing resilience or reducing vulnerability of these elements at risk.



Source: Mainstreaming DRR Guidelines, NEDA. 2009

Based on internationally recognized approaches, the DRA model is used to estimate (or quantify) risks from natural hazards. The DRA methodology that was adopted was formulated as follows:



Source: Mainstreaming DRR Guidelines, NEDA. 2009

The guidelines were pilot-demonstrated in the formulation of the Regional Physical Framework Plan (RPFPP) of Ilocos and Caraga Regions, and the Provincial Development and Physical Framework Plan (PDPFP) of Surigao del Norte. The pilot-demonstrations were essentially used to demonstrate the DRA methodology, using the details of the computational and GIS techniques recommended in the guidelines. Indicative look-up tables for return period and factors for fatality and property damage for various hazard events as well as a methodology for estimating cost of property damage per type of land use developed for the guidelines were used in the pilot-demonstration. The hazard maps used were those produced under the *Hazards Mapping and Assessment for Effective Community-Based Disaster Risk Management (READY) Project*.

The DRR Guidelines was officially adopted by the government with the issuance of Executive Order No. 1 which directs the local government units, particularly provinces, to adopt and use the guidelines and the DRA in their planning activities.

### 3.2 Current Initiatives on Risk Management

There are several assisted projects that are working on risk management and related initiatives. These projects are envisioned to improve resiliency and reduce vulnerabilities with the use of science-based risk assessment and management strategies.

NEDA, in partnership with the UNDP and the Australian Agency for International Development (AusAID), is currently implementing a Technical Assistance (TA) on *Integrating Disaster Risk Reduction and Climate Change Adaptation in Local Development Planning and Decision-making Processes (Integrating DRR/CCA Project)*. Two of the several key deliverables of the Project are enrichment of the DRA process and the formulation of DRR/CCA-Enhanced PDPFPs.

Another NEDA initiative is the *MDG-F Project: Millennium Development Goal Achievement Fund 1656: Strengthening the Philippines' Institutional Capacity to Adapt to Climate Change (MDG-F 1656 Programme)*, a Joint Programme of the Philippines (through NEDA) and the UNDP with funding from the Spanish Government. The Programme is designed to assist the country in addressing key strategic issues directly affecting the achievement of the MDGs by pursuing the following three (3) outcomes: Climate risk reduction (CRR) mainstreamed into key national & selected local development plans & processes; Enhanced national and local capacity to develop, manage and administer plans, programmes & projects addressing climate change risks; and Coping mechanisms improved through pilot demonstration adaptation projects. Among its outputs are the conduct of vulnerability assessment for 43 provinces and the formulation of development plans with CRR measures among others.

Another ongoing activity is the WB-GEF project (Special Climate Change Fund) provided to the DA, DENR, CCC and PAGASA-DOST to improve resiliency of target communities, and reduce economic losses attributable to climate change, by demonstration of cost-effective adaptation strategies in agriculture and natural resources management, and supported through strengthened institutions, holistic planning, and improved access to information especially on climate risk.

Executed by the UNDP, the CIDA-funded *Building Community Resilience and Strengthening Local Government Capacities for DRR Project* supports the overall efforts to improve social and economic life following the devastation caused by the 2009 floods in Metro Manila. It supports capacity development on DRR in 3 LGUs of Marikina, Pasig and Cainta in building community resilience to disasters and reducing vulnerability to natural hazards and climate change impacts. The project also strengthens policy environment for DRR and helps create partnerships.

Another UNDP-AusAID Project, *Enhancing Greater MetroManila's Institutional Capacities for Effective Disaster/Climate Risk Management towards Sustainable Development*, aims to decrease the vulnerability of the Greater MetroManila Area to natural hazards & increase its resilience, by strengthening the institutional capacities of the local government units, concerned national government agencies, academic institutions and civil society organizations to manage disaster and climate change risks. One of the key strategies is to mainstream DRM/CRM into local planning and regulatory processes as well as establishing a knowledge management system, including a vigorous Community of Practice, on Disaster/Climate Risk Management.

## 4.0 LOOKING TO THE FUTURE

Together with other projects and activities, the various initiatives supports the two long term objectives of adaptation and mitigation as embodied in the seven strategic priorities of the NCCAP:

- Food Security
- Water sufficiency
- Ecosystem and Environmental Stability
- Human Security
- Climate-smart Industries and Services
- Sustainable Energy
- Knowledge and Capacity Development

Looking towards the future, the challenges facing the Philippines can be summarized as follows:

- Access and availability of strategic knowledge
  - Having access to relevant information and localizing it from the Philippine perspective
  - Creating a good data management and reporting system
  - Disseminating relevant information
- Capacity Development
  - The need for key stakeholders and institutions to formulate their respective DRR/CCA agenda to serve as a guide to effectively address disaster risks as well as climate change adaptation and mitigation
  - The need for “relevant, timely and accessible data and information” is critical for the planning and implementation of DRR/CCA measures.
  - The need to build knowledge and capacities of staff and officers of agencies on DRR as well as climate change adaptation and mitigation

Finally, to support all their priorities and plans, access to resources must be ensured. The external flows from both bilateral and multilateral sources for direct and indirect climate change adaptation and mitigation as well as disaster risk reductions may be considered limited when compared to the budgetary appropriations by the national government. In addition to the regular appropriation, the Congress is currently drafting legislations for a *People’s Survival Fund* that is specifically intended for adaptation activities. In addition to regular government financing, there is a need to identify additional sources as well as explore innovative financing schemes.

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**Overview of the risk assessment landscape:  
Risk Assessment and Stratification using the Hybrid Loss Exceedance Curve  
(Abstract from GAR 2011)**

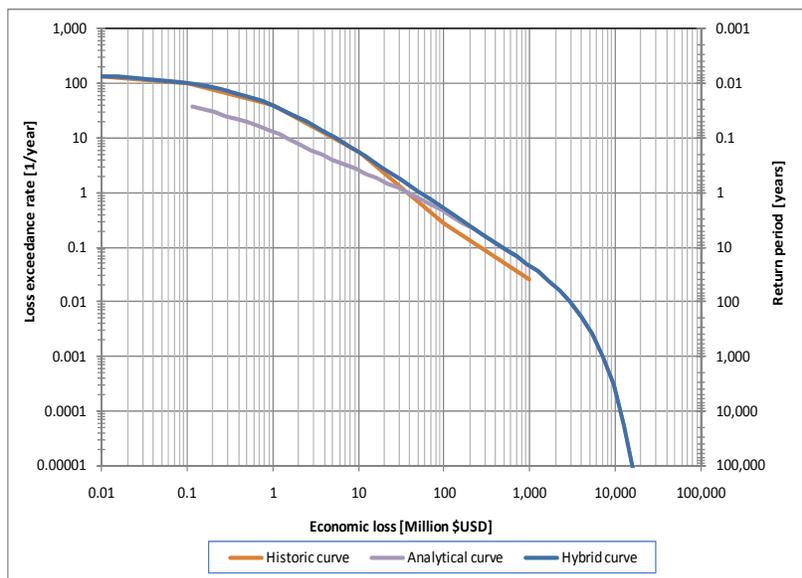
Omar-Dario Cardona  
Consortium ERN-AL

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. 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. 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 vulnerability curves are used for buildings with different construction systems. The analytical loss curve represents the fiscal or sovereign risk associated with major hazards.

When the two curves are integrated as presented in Figure 1 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, therefore, can enable governments to estimate the full spectrum of disaster risks they face.

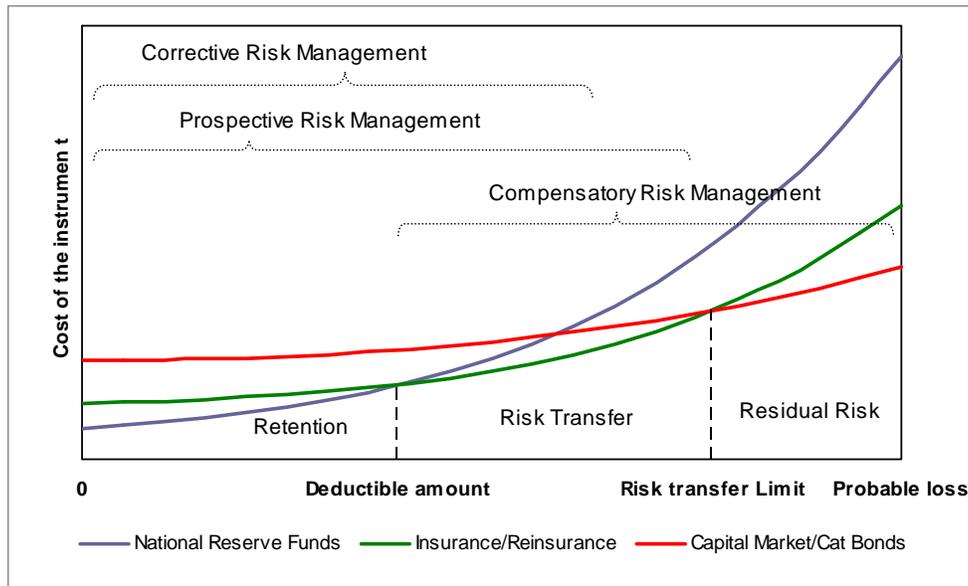
**Figure 1. The hybrid loss exceedance curve for Colombia**



## Identifying risk strata

Governments typically have three strategic DRM instruments at their disposal: prospective, corrective and compensatory. 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.<sup>1</sup> 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 ensure extensive risks below the deductible amount (Figure 2). From an insurance perspective, this stratum would normally be considered as a deductible, which governments would have to cover from their own resources.<sup>2</sup>

**Figure 2. Cost of different risk financing strategies for dealing with different strata of disaster risk**



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 capital markets, rather than to retain them. Beyond the risk transfer limit, risks cannot be insured, can only to be transferred to capital markets through Cat Bonds and similar instruments, and are residual. Beyond this point, countries are likely to face the range of very low-probability emerging risks.

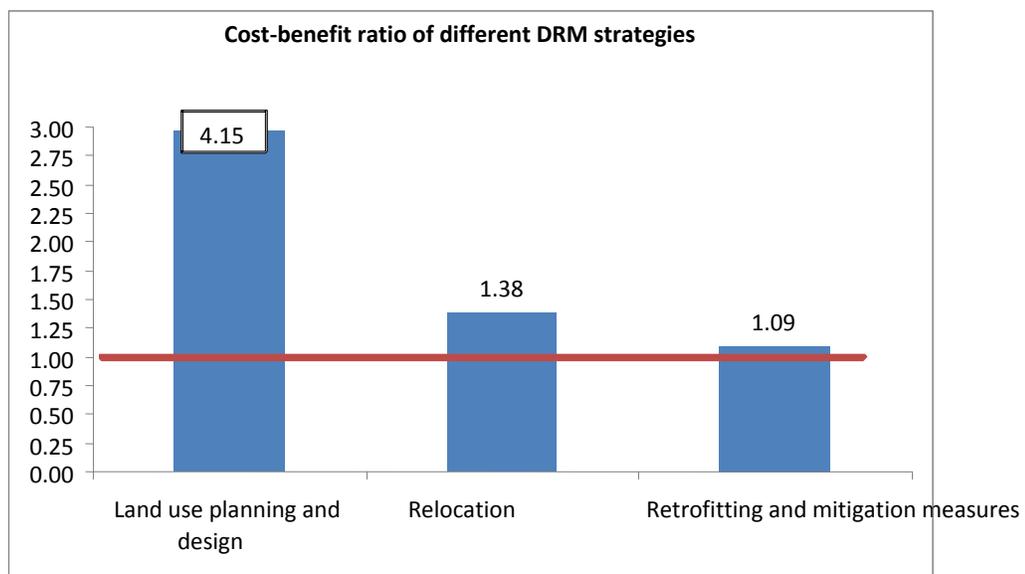
<sup>1</sup> Insurance is a form of risk transfer, but insurance and reinsurance companies as well as countries, increasingly transfer their risk to capital and derivatives markets, to cover major losses through alternative risk transfer (ART) instruments such as Catastrophe Bonds.

<sup>2</sup> 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.

### Reducing the retained risks

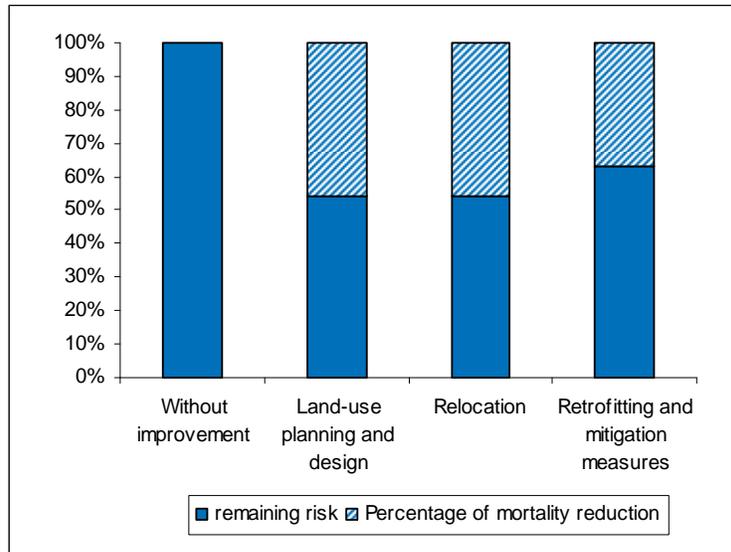
In general, it is much more cost-effective for governments to invest in reducing the more extensive risk strata (i.e., below the deductible amount) using a mix of prospective and corrective disaster risk management strategies, rather than absorbing the losses. To assess the costs, benefits and trade-offs internalized in these different strategies, the cost-effectiveness of prospective and corrective risk management strategies need 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 to less hazardous locations, or construction of mitigation and control works (corrective). In Colombia, land use planning provided the best ration (Figure 3).

**Figure 3. Comparison of the cost-benefit ratios of improved land use planning, construction of mitigation and control works, relocating exposed settlements, and building retrofitting in Colombia**



In Colombia as in the other 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. 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. 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 in schools, for example, may be a more powerful incentive for DRM than pure cost-effectiveness. In Colombia (Figure 4), better prospective and corrective investments in risk management would both lead to significant reductions in mortality.

**Figure 4. The percentage reduction of mortality in Colombia due to different risk reduction strategies**



Although illustrative, these calculations of costs and benefits are likely to be too conservative. They do not take into account the cost of downstream outcomes, such as increased poverty, reduced human development, increased unemployment and inequality. There might also be other more cost-effective ways of reducing risk.

As a conclusion, to define the disaster risk management and adaptation measures and strategies it is necessary to evaluate disaster risk at different levels and for different sectors. At present one of the main gaps in the region and in the world is the lack of appropriate stationary and non-stationary risk studies from probabilistic point of view. Public and private sectors need to use robust risk assessment models to deal with extensive and intensive risks and to inform policy and decision making regarding disaster risk reduction and transfer, and climate change adaptation.