



# GFDRR Programs: Disaster Risk Reduction Building Resilience in Changing Climate



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Global Facility for Disaster Reduction and Recovery

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Since its establishment in September 2006, the Global Facility for Disaster Reduction and Recovery (GFDRR) has evolved into a partnership of 25 countries and international organizations that are committed to helping developing countries reduce their vulnerability to natural hazards and adapt to climate change.

Special thanks and appreciation are extended to the partners who support GFDRR's work to protect livelihood and improve lives: ACP Secretariat, Australia, Belgium, Brazil, Canada, Denmark, European Commission, Finland, France, Germany, India, Ireland, Italy, Japan, Luxembourg, the Netherlands, Norway, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States, UN International Strategy for Disaster Reduction, and the World Bank.



## CLEAR AND PRESENT DANGER

**Every year, natural disasters from climate-related hazards cause substantial loss of life, produce economic damage, and reverse gains from past economic and social development.** Between 1991 and 2005, hydrometeorological hazards, such as floods, storms, and droughts, accounted for more than three-quarters of all natural disasters.<sup>1</sup> In the same period, these climate-related disasters were responsible for 98 percent of the cumulative number of people affected by natural disasters and 77 percent of total reported economic damage. In the least developing countries (LDCs) in particular, climate-related disasters accounted for 89 percent of the total economic damages.

**In the developing world, the majority of the population depends on climate-sensitive sectors, such as agriculture and forestry, for livelihood and sustenance.** Their vulnerability is further compounded by their limited capacity to assess climate risks and by lack of available weather information required to plan adaptive responses. People in these countries are more likely to be severely affected by climate-related diseases, such as influenza, diarrhea, cholera, meningitis, dengue, and malaria. Weak infrastructure, poor communication networks, intermittent electricity supply, low public awareness, and insufficient resources hamper provision of timely advice on climate and early warning. Without such information, a proactive approach to risk management cannot be fully implemented.

<sup>1</sup> Sources of data in this paragraph include International Strategy for Disaster Reduction (ISDR): [www.unisdr.org/disaster-statistics/occurrence-type-disas.htm](http://www.unisdr.org/disaster-statistics/occurrence-type-disas.htm) and Centre for Research on the Epidemiology of Disasters (CRED) EM-DAT: [www.em-dat.net](http://www.em-dat.net).

**Climate change is projected to increase disaster risks by altering average climatic conditions, exacerbating greater climate variability, increasing extreme weather events, and posing greater overall risks for people in developing countries.** This includes the possible occurrence of new threats in regions where they did not previously exist. Climate change is projected to result in decreased water availability and crop productivity in many parts of the world, as well as loss of plant and animal species and associated ecosystem services. Climate change-induced food insecurity, inundation, asset losses, and population displacement could generate conflict and insecurity from the competition for land, housing, water, and other resources.

## COLLECTIVE RESPONSE

**A number of international frameworks and strategies call for an integrated approach to disaster risk reduction (DRR) and climate change adaptation (CCA).** Under the Hyogo Framework for Action (HFA) endorsed by the United Nations General Assembly, member states are expected to promote the integration of risk reduction and adaptation to climate change strategies. The 2007 Bali Action Plan acknowledged the linkages between DRR and CCA through its calls for enhanced actions on adaptation, including disaster reduction strategy consideration and means to address loss and damage associated with climate change impacts in developing countries.

**Based on these frameworks, the World Bank Group supports its clients to address these risks in developing countries.** The World Bank Group's *Strategic Framework for Development and Climate Change* (SFDDC) recognizes that adaptation will require more resilient infrastructure, broader disaster relief and preparedness measures, and new agricultural technologies and practices to counter increased climate risks. SFDDC's guiding principles promote the synergies between disaster risk reduction and climate risk management.

## GFDRR's ROLES

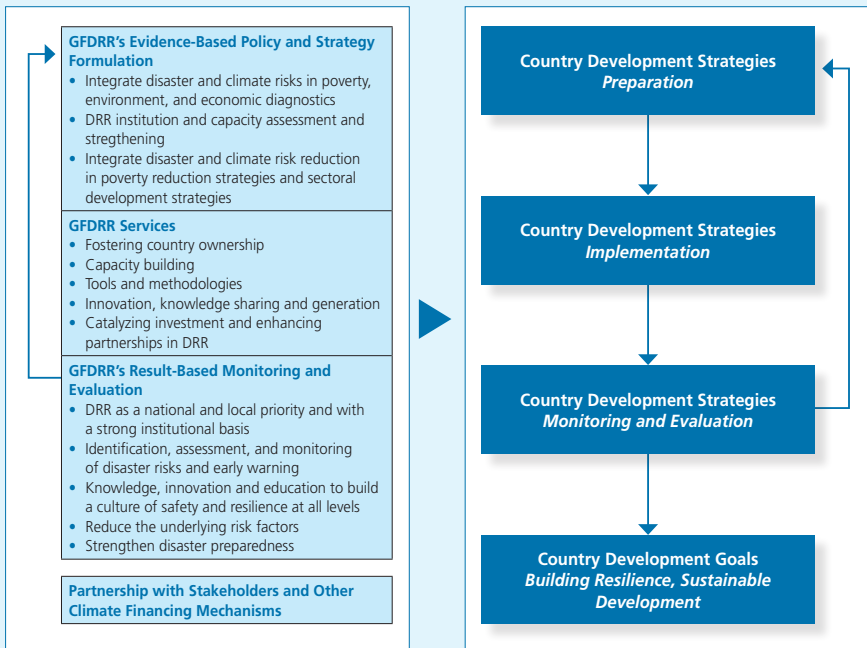
**To complement international frameworks and to strengthen actions that reduce climate change risks, the Global Facility for Disaster Reduction and Recovery (GFDRR) supports developing countries' efforts to build disaster risk resilience—both present and future.** Since its establishment in September 2006, the GFDRR's mission has been to mainstream disaster reduction and climate change adaptation in country development strategies in order to minimize vulnerabilities to natural hazards.

## GFDRR'S APPROACH

**GFDRR recognizes that natural disasters are a key concern for sustainable development particularly in a changing climate. GFDRR serves as a vehicle for integrated delivery of adaptation support and disaster risk reduction.** Just as climate change is amplifying disaster risks, the urgency of the climate change agenda provides an opportunity to amplify key adaptation messages and mobilize actors to support and empower developing countries to better manage risk.

International Frameworks and World Bank Strategy: HFA, UNFCCC, SFDCC

**GFDRR's Approach: Build resilience now in order to adapt better to the changing climate**  
Business Lines: Global and Regional Partnerships; Mainstreaming DRR; Making Recovery Resilient



**Disaster risk reduction is the first line of defense in adapting to climate change. Accordingly GFDRR's basic approach is to build resilience now for better adaptation to a changing climate.** Through its services and engagement with developing countries, GFDRR fosters partner ownership, strengthens capacities, provides tools and methodologies to address DRR and CCA issues, promotes innovation and knowledge sharing, and catalyzes additional investment for disaster risk reduction. Building on its unique and broadly-based partnerships, GFDRR works with relevant departments within the World Bank Group and with governments to operationalize an integrated approach to DRR and CCA and to help developing countries build resilience to disaster and climate risks.

## PROGRESS MADE

The following table highlights a summary of the progress on the *Stockholm Plan of Action for Integrating Disaster Risk and Climate Change Impacts in Poverty Reduction*. Adopted in the Stockholm Forum for Disaster Reduction and Recovery in October 2007, the plan calls for action in five priority areas: (i) institutional and policy coordination, (ii) identification and measurement of disaster risks, (iii) integration of disaster and climate change risks into national planning processes, (iv) factoring disaster risk reduction and climate change adaptation in key sectors, and (v) capacity building at local, national, regional, and global levels.

Priority Actions	Progress
<b>1. Enhance institutional and policy coordination at the level of individual countries, regions, and global institutions</b>	<ul style="list-style-type: none"> <li>• An approach for integrating disaster risk reduction, climate change adaptation, and poverty reduction strategies was developed and is being refined.</li> <li>• GFDRR is collaborating with more than 20 global and regional organizations to enhance institutional and policy coordination.<sup>2</sup></li> </ul>
<b>2. Identification and measurement of risks stemming from disasters and climate change</b>	<ul style="list-style-type: none"> <li>• Tools and guidelines developed to assess common country risks from natural disasters and the impacts of climate change.</li> <li>• 18 GFDRR priority countries completed common assessments of disaster risks and climate change impacts.</li> </ul>
<b>3. Integration of disaster and climate change risk analysis into national planning processes</b>	<ul style="list-style-type: none"> <li>• Medium-term disaster risk management programs incorporating climate risk management developed for 31 priority countries through multi-stakeholder consultations.</li> <li>• GFDRR conducted more than 130 upstream reviews of country strategies to incorporate climate change adaptation aspects.</li> <li>• 34 countries mainstream DRM/CCA aspects in their national strategies.</li> </ul>
<b>4. Factoring disaster risk reduction and climate change adaptation in key sectors</b>	<ul style="list-style-type: none"> <li>• GFDRR provided evidence-based policy inputs to Development Policy Lendings (DPLS) and Poverty Reduction Support Credits (PRSCs), which are cross-sectoral, policy-level operations.</li> <li>• GFDRR contributed to the formation of information and communication technology, education, and urban sector strategies, as well as the World Development Report.</li> </ul>
<b>5. Capacity building at local, national, regional, and global levels</b>	<ul style="list-style-type: none"> <li>• GFDRR assistance enabled disaster-prone, low- and middle-income countries to build their capacity for disaster risk reduction and climate change adaptation.</li> <li>• More than 150 learning events and capacity building programs on disaster risk reduction, risk financing, and risk transfer delivered to over 6,000 participants.</li> <li>• Post-Disaster Needs Assessments in recent disasters provided an opportunity to strengthen in-country capacity to assess disaster and climate risks for climate-resilient recovery.</li> </ul>

<sup>2</sup> Including ACP Secretariat, African Union (AU), Arab Academy, Association of Southeast Asian Nations (ASEAN), Economic Community of West African States (ECOWAS), Gulf Cooperation Council (GCC), IGAD Climate Prediction and Applications Centre (ICPAC), League of Arab States, Organization of American States (OAS), South Asian Association for Regional Cooperation (SAARC), Pacific Islands Applied Geoscience Commission (SOPAC), and World Meteorological Organization (WMO).

**GFDRR is strengthening its partnership with global, regional, and research organizations to foster regional approaches to disaster and climate risk management.**

For instance, GFDRR works closely with the World Meteorological Organization (WMO), supporting countries to assemble necessary climate observations and climate modeling capacity to design adaptation policies. GFDRR's partnership with the Intergovernmental Authority on Development's Climate Prediction and Applications Centre (IGAD's ICPAC) helps to build climate observation and climate modeling capacities among the national meteorological and hydrological agencies in East Africa. Such partnerships encourage global and region-wide sharing of information and good practices, and they promote actions to build resilience to natural disaster risks—many of which are global or regional public goods.

**GFDRR's up-stream, evidence-based policy and strategy formulation contributes to mainstream DRR and CCA aspects in Country Assistance Strategies (CASs) and Poverty Reduction Strategy Papers (PRSPs) of a significant number of countries.**

GFDRR provides strategic inputs to highlight disaster and climate risks in over 130 country strategies, the importance of which is increasingly being recognized. For example, disaster risk reduction, in conjunction with climate change adaptation, appears as a pillar or a sub-pillar in Bolivia, Costa Rica, Indonesia, the Philippines, and Uzbekistan. They are a part of strategic pillars in country strategies in Armenia, Burkina Faso, Guyana, India, Niger, Romania, Rwanda, Togo, Tunisia, Turkey, and Yemen. In other country strategies, they are recognized as a risk factor that could hinder the achievement of goals stipulated in strategies.

**GFDRR has been deepening its operations in 31 disaster-prone priority countries to support long-term comprehensive national strategies for disaster risk management in climate-sensitive ways.**

These countries combine the highest vulnerability to natural hazards with low economic resilience for disaster impacts, including those anticipated from the effects of climate change. The country programs are prepared with extensive participation from multiple stakeholders, ensuring agenda ownership by governments. Ghana's country program, for example, was prepared with the participation of more than ten agencies, including the National Disaster Management Organization (NADMO) and the Environmental Protection Agency (EPA), urging an integrated approach to DRR and CCA. In program follow up, GFDRR supports activities in vulnerable areas in the north.

**Close to two-thirds of all projects supported by GFDRR's work on mainstreaming DRR promote formulation and implementation of climate change adaptation strategies and plans.**

There are over 75 GFDRR Track II projects worth more than US\$33 million that focus primarily on climate change adaptation. These include various types of projects: probabilistic assessment of natural disaster risks and losses; building and integration of regional climate models into national hydrometeorological services (NHMSs); modernization of NHMSs including the improvements of observation points and hydro-meteorological modeling; preparation of innovative risk finance instruments; creation of guidelines for city managers and decision makers; development of action plans to adapt better to changing climate; and capacity building of stakeholders on climate-associated disaster risk management. The boxes illustrate some concrete examples

## AFRICA



### **Economic Vulnerability and Disaster Risk Assessments in Malawi and Mozambique**

Understanding the extent of an economy's vulnerability to natural hazards is a critical step to identify DRR priority actions and to adapt to changing climate. In Malawi and Mozambique, GFDRR financed and conducted economic vulnerability and disaster risk assessments. These studies applied probabilistic risk modeling of droughts and floods, and examined their potential impacts, as well as spatial characteristics. The assessments will help the governments develop forward-looking anticipatory strategies to adapt to drought and flood risks. In Mozambique, GFDRR also provided inputs into the study on the Impact of Climate Change on Disaster Risk led by the National Institute for Disaster Management (INGC).

### **Building Cyclone-Resistant Housing in Madagascar**

Madagascar is the African country most exposed to cyclone risks, averaging 3-4 cyclones a year with an average of 250,000 people affected. Due to insufficient public funds, many key public assets, such as community schools and health centers, are not rebuilt after cyclone damage. In 2008, the Meteorology Department determined that by 2100 the most intensive cyclones were likely to increase in strength by 46% and shift northwards, highlighting the risks of climate change. Against this background, GFDRR supported the development of cyclone-resistant national building codes. An innovative feature of the new regulation is the provision for civil penalties both for builders and inspectors in case of a public building failure. Moreover, the new codes are fully owned and developed by a national interministerial team. The codes are expected to become mandatory for public buildings and recommended for traditional houses in high-risk areas.

## EAST ASIA AND THE PACIFIC



### Disaster and Climate Risk Reduction in the Pacific Islands

Pacific Island countries are among the most vulnerable in the world to climate-associated natural disasters. In partnership with the Pacific Islands Applied Geoscience Commission (SOPAC), GFDRR contributed to the production of a disasters and climate variability regional stock-take report in the Pacific, as well as DRR assessment reports in seven countries in the region: Fiji, Kiribati, Marshall Islands, Papua New Guinea, Solomon Islands, Timor-Leste, and Vanuatu. The detailed country assessments helped identify major gaps in countries' preparedness for DRR/CCA and opportunities for investment. The project contributed to the merging of DRR and CCA agendas under a single institution in some countries, such as Vanuatu and Solomon Islands. GFDRR also supports the Pacific Catastrophe Risk Pool Financing Project in the region.

### Climate Resilient Cities Primer

Urban centers in the East Asia region where people and assets are concentrated already suffer from frequent floods and hurricanes. On top of these existing challenges, city managers need to be equipped with specialized tools to deal with the potential impacts of climate change. In this context, GFDRR-supported Climate Resilient Cities is a guide for the region's local governments to better understand the concepts and consequences of climate change. It discusses good practices through sound urban planning to address climate challenges and to reduce vulnerabilities, highlighting low-hanging fruit and "no or low regrets" options. The report extracts cross-cutting institutional, policy, and process lessons with sector-specific insights.

## LATIN AMERICA AND THE CARIBBEAN



### Central America Probabilistic Risk Assessment (CAPRA)

Multi-hazard disaster risk evaluation and communication tools are effective in managing climate risks and their impacts on people and assets. In partnership with CEPREDENAC, UNISDR, and IDB, GFDRR supports Central American countries (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama) to develop a disaster risk information platform for decision making called CAPRA, using a common methodology and tools for evaluating and expressing disaster risk. CAPRA includes applications that utilize data for the creation and visualization of hazard and risk maps, cost-benefit analysis tools for risk mitigation investments, and the development of financial risk transfer strategies. The system can incorporate climate change studies that allow the estimation of possible damages and losses, as well as the preparation of adaptation plans.

### Catastrophe Bond Insurance Platform in Mexico

In emerging countries, the number of people affected by natural disasters continues to increase. Yet only 3 percent of potential losses in developing countries are insured compared to 45 percent in developed countries. A catastrophe bond is an important and innovative market-based instrument for climate change adaptation. GFDRR financed the risk modeling analysis needed to assess probability and severity of catastrophic events in Mexico. Building on the risk methodologies, databases, and reports completed, Mexico issued a US\$290 million series of notes, which was very well received by the market. This led to the launch of the MultiCat Program in October 2009 that gives governments and other public entities access to international capital markets to insure themselves against the risk of natural disasters.

## EUROPE AND CENTRAL ASIA



### **Disaster Risk Mitigation and Adaptation Program in Southeastern Europe**

Southeastern Europe is affected by a variety of natural hazards, and climate change is expected to add considerable adverse impacts to natural and human systems. GFDRR funding supported studies on national and regional risk assessments, strengthening regional and national hydrometeorological services (NHMSs), transfer of financial risks from natural hazards, and the role of civil protection in DRR. These studies contribute to the development of a regional framework program for DRR and CCA, which also serves as a coordinating mechanism for bilateral and multilateral DRR assistance. Moreover, the framework program has led to the establishment of Catastrophe Risk Insurance Facility for Southeastern and Central Europe to pool disaster risks, as well as to prepare comprehensive DRR/CCA projects supported by the World Bank in Albania, Croatia, and Moldova. These initiatives will help countries in the region to cope with climate risks.

### **Modernizing Hydrometeorological Services in Central Asia**

In Central Asia, the annual economic losses caused by weather hazards can be several percent of national GDPs, and climate change is expected to exacerbate the impacts in this water-scarce region. After the collapse of the Soviet Union, however, many countries in the region experienced degradation of NHMSs, which are essential for dealing with climate change. Against this background, GFDRR supported a study on modernizing NHMSs in Kyrgyz Republic, Tajikistan, and Turkmenistan. The study identified possible modernization programs and assessed their economic benefits. GFDRR also supports follow-up actions in these countries to implement the proposed measures.

## MIDDLE EAST AND NORTH AFRICA



### North Africa Adaptation Action Plans in Alexandria, Casablanca, and Tunis

The three major North African coastal cities of Alexandria, Casablanca, and Tunis are prone to natural disasters that will be exacerbated by climate change impacts, such as the sea-level rise, with a potential impact on all urban and peri-urban infrastructure, housing, and services. GFDRR supports the national and local government assessments of coastal cities' vulnerability in face of climate change. In the study, a climatic scenario to 2030 is used to assess risks and to propose adaptation and preparedness action plans. A Memorandum of Understanding was signed between the World Bank and the Arab Academy that will implement the Alexandria study.

### Collaborating for Integrated Climate and Disaster Risk Management in Djibouti

Djibouti is already vulnerable to fluvial flooding and inundation by high sea levels, and statistical downscaling of regional climate models generally point to increased flood risk due to climate change. Improved integration of climate risk information in the country's development programs will depend on greater access and uptake of high-quality, hydro-meteorological data to characterize climate variability and change. In this context, GFDRR supported the assessment of the national institutional DRM setting and the establishment of the conceptual framework for Comprehensive Approach to Risk Assessment in Djibouti (CARAD) in extensive collaboration with five governmental and academic institutions in the country. Building on this initial work, GFDRR is taking a programmatic approach to build resilience to natural disasters and climate change in the country.

## SOUTH ASIA



### Climate Change and Future Flood Risks in Bangladesh

Bangladesh is prone to recurrent flooding due to its low topography and location at the confluence of three large rivers. It is also one of the most vulnerable countries to climate risks. Preliminary results from global circulation models suggest that climate change may increase monsoon precipitation in the South Asia region and exacerbate the flooding in Bangladesh. Moreover, the expected sea-level rise could reduce the drainage capacity of its rivers. Against this background, GFDRR supported a study and modeling works to investigate the long-term impacts of climate change on monsoon flooding in Bangladesh. The study assessed the impact of climate change on agriculture and food security due to increase in flood risk during monsoon, assessed the inundation pattern at sub-region due to increase in flooding due to climate change, and identified sixteen adaptation options.

### Insuring Farmers against Climatic Risks in Nepal

The Nepalese economy is primarily dependent on agriculture, and a vast majority of farmers grow rain-fed crops exposed to the risks of changing rainfall patterns. Climate change is expected to exacerbate this challenging environment. Accordingly managing climate and disaster risks in this sector is a key priority for the Government of Nepal. In this context, GFDRR funded a comprehensive agricultural risk assessment, including an evaluation of the institutional, financial, technical, and operational challenges. The study identified several options for developing agricultural insurance pilots, such as area-yield index program, weather index-based crop insurance, and livestock insurance programs. Key findings from the study and options for the implementation were discussed, and the Government has requested the World Bank to design and implement crop and livestock insurance schemes. Follow-up actions are underway.

**During 2008-09, GFDRR conducted Post Disaster Needs Assessments (PDNAs) in 20 countries, many of which assist recovering nations with a framework for disaster and climate resilience.** GFDRR promotes sustainable and resilient recovery in cooperation with client governments and key partners. For example, in Bangladesh following a comprehensive Joint Damage Loss and Needs Assessment on Cyclone Sidr funded by GFDRR and undertaken by a team of government and international experts, GFDRR supported the Government's effort to build resilience in its agricultural sector, as well as to improve multipurpose shelters. In Namibia after the 2009 floods and the PDNA supported by the World Bank and GFDRR, the Government has been strengthening satellite-based flood forecasting, mapping, and early warning with external support. This effort has the potential to become a regional node for satellite-based forecasting to other neighboring countries in the Zambezi basin, such as Zambia, Botswana, and Angola.

## MOVING FORWARD

**Moving forward, GFDRR will harness its unique partnerships and distinct business model to continue to support disaster risk reduction programs that build adaptive capacities particularly in priority countries.** To further enhance and guide GFDRR's strategic direction, a new study was launched on how to strengthen the links between DRR and CCA in partnership with experts. GFDRR will facilitate development of common approaches to disaster risk assessment, coordinated implementation of national disaster risk reduction and climate change adaptation programs, and design of risk transfer mechanisms, including insurance schemes. GFDRR is further strengthening its own capacity to engage with climate change teams working on financing the climate change mitigation and adaptation agenda, both within the World Bank and in close partnership with other key players in the ISDR system. In collaboration with the World Bank's Climate Change for Development Professionals (CCDP), GFDRR has initiated joint training programs and integrated approaches to address natural disasters and climate change.



## LINKS

GFDRR <http://gfdr.org/>

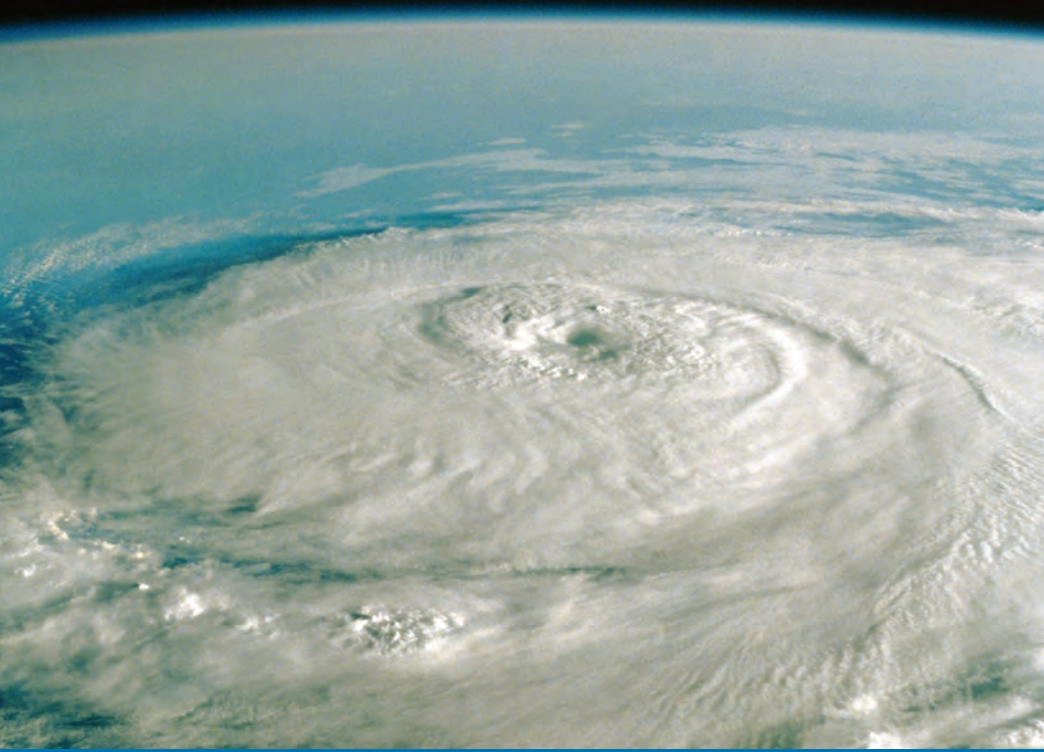
GFDRR Partnership Charter <http://gfdr.org/index.cfm?Page=Partnership%20Charter&ItemID=7>

GFDRR Partnership Strategy (2009-2012) [http://gfdr.org/docs/GFDRR\\_Partnership\\_Strategy\\_2009-2012.pdf](http://gfdr.org/docs/GFDRR_Partnership_Strategy_2009-2012.pdf)

Hyogo Framework for Action (HFA) <http://www.unisdr.org/eng/hfa/hfa.htm>

Bali Action Plan 2007 <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=3>

World Bank Strategic Framework for Development and Climate Change (SFDCC) <http://beta.worldbank.org/overview/strategic-framework>



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