

**Network of Asian River Basin Organizations (NARBO)**  
**Thematic Workshop on Water-related Disaster and its Management in Asian Countries**  
**Yogyakarta, Indonesia**  
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**Special Presentation on Sharing ADB's Experience in Disaster Management**

**A. ADB's Disaster Management Policies**

ADB has had dedicated disaster policies since 1987. A summary illustrating the evolution of ADB's disaster-related policies is given in Table 1, while Box 1 illustrates how these policies have changed over the period. Through these and other related activities the ADB has been a major influencer in the Asia-Pacific, not only in post-disaster assistance, but also in developing country and regional disaster risk management<sup>1</sup> strategy and implementation. A summary of ADB's major DRM activities is provided in Appendix 1. ADB recognized early on that a major rationale for its involvement in disaster rehabilitation assistance was because timely intervention could allow an impacted Member Country to maintain development momentum, while no, or inappropriate, intervention typically results in scarce national resources being diverted, sometimes permanently, from important development programs.

**Table 1: Summary of ADB's Three Disaster-Related Policies**

Date	Code	Title	Brief Description	Trigger
17 Jun 1987	R74-87	<i>Rehabilitation Assistance to Small Member Countries Affected by Natural Disasters</i>	Simple repair activities intended to return a country to its pre-disaster status. Projects to be completed 3 years after a disaster	South Pacific Member Countries proposed that ADB establish a special facility to assist those affected by cyclones or other natural disasters
2 Feb 1989	R191-88	<i>Rehabilitation Assistance After Disasters</i>	Implemented in parallel with 1987 policy and extended to all Member Countries. Rehabilitation projects should essentially be to reestablish services in key infrastructure sectors, stressing simple repair-related designs	Floods in Bangladesh, earthquake in Nepal, typhoons in Philippines, ethnic conflicts in Sri Lanka; IDNDR, which started in 1990
1 Jun 2004	R71-04	<i>Disaster and Emergency Assistance Policy</i>	Strategic intervention in emergency preparedness and impact response in line with prevention, transition, and recovery from natural and non-natural disasters and post-conflict situations	ADB's long-term strategic framework (2001–2015), which places poverty reduction at the forefront

IDNDR – International Decade for Natural Disaster Reduction.

<sup>1</sup> Disaster risk management is the systematic process of using administrative decisions, organizations, operational skills, and capacities to implement policies, strategies, and coping capacities to reduce the impacts of disasters.

### Box 1: Policies in Practice

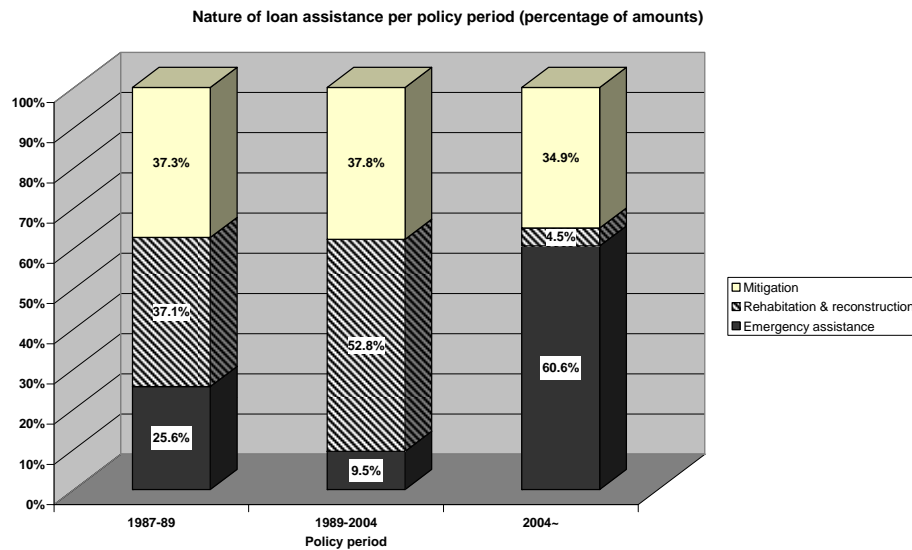
As the figure below shows, ADB's disaster and emergency assistance exhibits a distinctive characteristic for each of the three policy periods, which in turn reflect Member Country needs at the time as well as the thinking and practices of the international community.

**The first period – 1987-1989:** The 1987 policy was program-focused and centered on immediate rehabilitation of infrastructure in small developing member island states such as Maldives and the Pacific Islands. Its first free-standing disaster rehabilitation loan was awarded to Sri Lanka in November 1987 for an Emergency Road Restoration Project. The 1987 policy adopted 'abbreviated procedures' to process loans. Program assistance was almost exclusively on restoring the situation to pre-disaster conditions. Loans were still provided for pre- and post-disaster needs under normal conditions - loan totals were higher for hazard mitigation and longer-term rehabilitation than for immediate emergency restoration works. Most of the former were for flood protection and rehabilitation works in Pakistan and Bangladesh. ADB's first post-conflict rehabilitation loan project also went to Sri Lanka in 1987.

**The second period – 1989-2004:** This was implemented to parallel the 1987 policy, extending post-disaster assistance to all Member Countries. A project and sector approach was adopted. This was a period of heightened natural disaster activity. Emergency restoration loans were highest in 1991 and 2000. ADB loaned the People's Republic of China \$330 million for the Northeast Flood Damage Rehabilitation project. Amidst annual cyclones and floods, a major earthquake struck Gujarat, India. The Gujarat Earthquake Rehabilitation and Reconstruction project, costing \$500 million, took a large portion of disaster-related loans in 2001. Hazard mitigation projects were also evident: during this period loans and technical assistance projects for Dhaka Integrated Flood Protection were approved for Bangladesh. In the post-conflict area, loans went to Afghanistan, Cook Islands, Cambodia, Tajikistan, Solomon Islands. Afghanistan also received capacity building Technical assistance. East Timor, which gained independence in 2000, obtained technical assistance to rehabilitate transport and communications. Four Regional Technical Assistance projects were ALSO undertaken.

**The third period – from 2004:** Established an Emergency Assistance Loan (EAL) facility. Mitigation-oriented projects dominated 2004, but changed with the December 2005 Indian Ocean Tsunami when grant funds established under the Asian Tsunami Fund (ATF) were mobilized for emergency rehabilitation. Five countries – India, Indonesia, Maldives, Sri Lanka, and Thailand were major recipients. In October 2005, an earthquake affecting Pakistan, India and Afghanistan established the Pakistan Earthquake Fund (PEF) modeled on ATF. This became a dedicated source of funds to support multi-sector priority rehabilitation and reconstruction needs. Recent examples of EAL and/or Asian Disaster Fund (ADF) assistance are Philippines (2005-typhoons/landslides), Vietnam (2006 – typhoons/storms), Solomon Islands (2007- earthquake/tsunami), Pakistan (2007-cyclone/storms), Bangladesh (2007-floods).

**Figure 1: Nature of Loan Assistance per Policy Period (Percentage of Amounts)**



From June 1987 through September 2007, 25 of our borrowing Member Countries (representing 57% of the current borrowing members) have received disaster or post-conflict assistance<sup>2</sup> in the form of loans, technical assistance and grants, totaling just under \$6 billion,<sup>3</sup> financing some

<sup>2</sup> ADB's current *Disaster and Emergency Assistance Policy* (2004)

<sup>3</sup> Figures are derived from ADB 2007. *Review of Disaster-related Projects Under ADB's Three Disaster Policies*. Consultant Report. January 2007. RSCG-RSDD. Manila. In this document, the term 'disaster-related projects' includes ADB assistance provided to Member Countries for mitigation, rehabilitation and reconstruction associated with natural hazards, technological hazards, conflict, health emergencies and environmental threats.

235 disaster-related projects. These figures mean that, on average, ADB has been engaged in at least one new disaster and/or hazard, or conflict related project every month for the past two decades. A further breakdown reveals that of these projects, 75 were provided as loans (\$4.8 billion), 50 as grants (\$1.1 billion) and 110 provided as technical assistance (\$119 million). Disregarding funding source, 32.8% of projects focused primarily on mitigation<sup>4</sup>, while 27.5% dealt with emergency response and 39.7% related to rehabilitation and/or reconstruction.<sup>5</sup> A breakdown against hazard type is provided in Table 2.

**Table 2 ADB Disaster Assistance by Hazard Type (June 1987 – August 2007)**

	Amount	% of Total
Acid Rain	147,000,000	2.60
Civil Unrest	612,700,000	10.84
Coastal Erosion	76,800,000	1.36
Cyclone	79,500,000	1.41
Drought	160,000,000	2.83
Earthquake	1,267,600,000	22.42
Ecosystem/Environmental Degradation	156,000,000	2.76
Fire/Arson	24,500,000	0.43
Flood	2,947,040,000	52.13
Landslide	10,300,000	0.18
Post-Conflict	26,000,000	0.46
Tsunami	108,800,000	1.92
Volcano	37,500,000	0.66
<b>Total</b>	<b>5,653,740,000</b>	<b>100.00</b>

ADB's current disaster policy, the *2004 Disaster and Emergency Assistance Policy*, is a comprehensive statement encompassing natural and technological hazards, environmental hazards, health emergencies and country conflict situations. Helping countries prepare for and avoid worst impacts of natural disasters is a primary goal of the policy. The policy sets out a series of objectives that focuses attention on: (i) strengthening support for reducing disaster risk in Member Countries; (ii) providing rehabilitation and reconstruction assistance following disaster; and (iii) leverage its activities through developing partnerships. The policy recognizes vulnerability as the link between hazards, disasters, conflict and economic development; and similarly acknowledges that disaster risk management and disaster risk reduction is based on the premise that natural hazards do not necessarily lead to disaster, but may do so when they affect vulnerable populations. The policy provides for emergency assistance and the principal funding mechanism is the Emergency Assistance Loan, which focuses on immediate short-term assistance to rebuild high-priority physical assets and restore capacity and productive activities.

A related activity is the evolving practice of conducting disaster impact damage and need assessments, which ADB typically undertakes jointly with the World Bank, and often with partners such as the Japan Bank for International Cooperation and the United Nations Development Programme. Eleven principles guide the assessment, including principles with a

<sup>4</sup> In the report cited above, projects were classified as having a mitigation component if the document provided evidence of the project being linked to long-term hazard management, was part of a national plan, or where reference was made to some aspect of development.

<sup>5</sup> These figures include selective environmental funds or activities, but do not include health emergencies.

specific focus on mainstreaming disaster risk reduction<sup>6</sup>. Mainstreaming disaster risk reduction in the reconstruction and recovery period is a critical issue, and several lessons have been learned which have been transferred from one disaster situation to the next. Since the post-impact period is often the time when disaster-prone governments are the most attuned to disaster risk management issues, the ADB, like most development partners, encourage governments at these times to introduce disaster management strategies and mitigation plans, and to review and update existing local, provincial and national arrangements.

A new ADB action plan is being prepared that will assist with the operationalization of the 2004 disaster policy. The action plan has three inter-related objectives which, over the next 3–5 years, will support the disaster risk management and disaster risk reduction agenda, namely to: (i) strengthen ADB effectiveness in supporting Member Countries to identify and manage risks from natural hazard through risk assessment, vulnerability reduction and risk reduction strategies, and to strengthen key institutions involved in disaster risk management and disaster risk reduction; (ii) facilitate assistance to Member Countries following disaster impact to help address immediate impact needs, assist early recovery measures, building-in greater resilience to post-impact reconstruction efforts, and identify relocation efforts to safer sites for critical infrastructure; and (iii) encourage and participate as a full partner in actions that assist greater regional disaster risk management cooperation, coordination, and institutionalization.

## **B. Disaster Risk Management is a Central Element in Inclusive Growth**

Disaster risk management is based on the premise that natural hazards do not necessarily lead to disasters, but may do so when they affect vulnerable populations. Consequently, disaster risk management, poverty reduction and inclusive growth strategies need to develop hand-in-hand. To emphasize this connection, the concept of disaster risk reduction reinforces the idea that vulnerability can be reduced in large part by controlling disaster risk. This is a proactive approach that emphasizes actions taken before a hazard results in disaster rather than on post-disaster recovery. It is an approach that seeks to make risk reduction an integral part of governance. A disaster risk management approach at the Member Country level could include, but not be limited to: (i) development of a legal, institutional and operational framework that legitimizes, consolidates, and coordinates disaster risk reduction; (ii) risk assessment to identify, analyze, and evaluate the types and magnitude of potential impacts and how these could impact development investments; (iii) design of risk reduction actions to lessen, if not remove, causes of disasters; (iv) financial protection that could include risk transfer and financial options to spread financial risks over time and among various stakeholders; (v) emergency preparedness and responses to enhance a country's readiness to cope quickly and effectively with an disaster; and (vi) post disaster rehabilitation and reconstruction.

A first step in reducing disaster losses and managing disaster risk is to acknowledge that disasters are not random and unpredictable events - most natural disasters are foreseeable to the extent that it is possible to predict generally where an event is likely to occur at some time in the near future (but not precisely when or its magnitude). We already know where in the Asia-Pacific region disasters are likely to occur, and what communities are in danger. The World Bank-Columbia University's recent 'hotspot' report,<sup>7</sup> allows ADB to catalog in general terms the vulnerability of its Member Countries along specific criteria (Table 3).<sup>8</sup> Moreover, disaster-

<sup>6</sup> Disaster risk reduction defines a series of interconnected actions to minimize disaster vulnerability by avoiding (prevention) or limiting (mitigation and preparedness) the adverse effects of hazards within the broad context of sustainable development.

<sup>7</sup> World Bank (2005). *Natural Disaster Hotspots. A Global Risk Analysis*. Washington DC.

<sup>8</sup> While the 'hotspot' report is the best available and provides both a reactive element (i.e. interpreting historical data) and a proactive element (looking at potential risk), there are several aspects that limit its overall utility, which

resilient techniques for all types of infrastructure and environmental conditions have been proven by decades of experience. Disasters and the management of their associated risks, therefore, can be anticipated as more predictable events, with human and financial risks calculated in advance, and practice solutions estimated ahead of times.

<b>'Top 60' (land area)</b>	<b>Name of Country</b>	<b>% of Total Area Exposed</b>	<b>% of Population Exposed</b>	<b>Number of Major Hazards</b>
5	Taipei, China	99.1	98.9	4
6	Vanuatu	80.8	75.6	3
8	Philippines	62.2	73.8	5
9	Nepal	60.5	51.6	3
11	Republic of Korea	53.0	53.6	2
14	Viet Nam	45.1	38.7	3
19	Bangladesh	35.6	32.9	4
21	Cambodia	27.9	4.4	3
23	Thailand	25.2	17.7	1
24	Fiji	23.2	29.0	2
25	Tajikistan	23.2	9.5	3
26	Solomon Islands	22.8	16.6	3
34	Lao, People's Dem Rep of	15.2	12.6	3
39	Afghanistan	11.1	29.5	3
40	Myanmar	10.7	10.4	4
41	India	10.5	10.9	4
45	China	8.4	15.7	3
46	Kyrgyz Republic	8.3	5.8	2
51	Papua New Guinea	5.9	6.4	3
53	Pakistan	5.6	18.2	2
54	Indonesia	4.5	14.1	3
57	Armenia	3.1	1.5	3
58	Mongolia	2.8	0.7	2

Source: World Bank (2005). *Natural Disaster Hotspots. A Global Risk Analysis*. Washington.

Since natural hazard risks have spatial determinants, greater attention is needed to planning for disasters and reducing long-term vulnerability in countries at higher risk. An analysis of what transforms a natural hazard into a disaster reveals similar fundamental issues that development programs deal with such as: (i) persistence of widespread urban and rural poverty; (ii) degradation of the environment; (iii) persistent poverty among certain groups; (iv) lagging investments in infrastructure; and (v) weak governance.

At the same time, absolute levels of disaster risk are increasing due to other pressures such as climate change. This factor is significant because approximately two-thirds of disasters in the Asia-Pacific are caused by climate hazards. The likelihood of considerable losses for Member Countries was reinforced in the Stern Review<sup>9</sup> on the economics of climate change. In particular, the following observations were made: (i) melting glaciers will initially increase flood risk and then strongly reduce water supplies, eventually threatening one-sixth of the world's population, predominantly in the Indian sub-continent and parts of China; (ii) rising sea levels will result in tens to hundreds of millions more people exposed to floods each year with warming of 3-4°C. There will be serious risks and increasing pressures for coastal protection in South East Asia (Bangladesh and Viet Nam) and the Pacific; (iii) warming may induce shifts in regional weather

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pertain to the current state-of-the-art in hazard mapping, data coverage and chronology, and data interpretation including analyzing multiple hazard risk propensity.

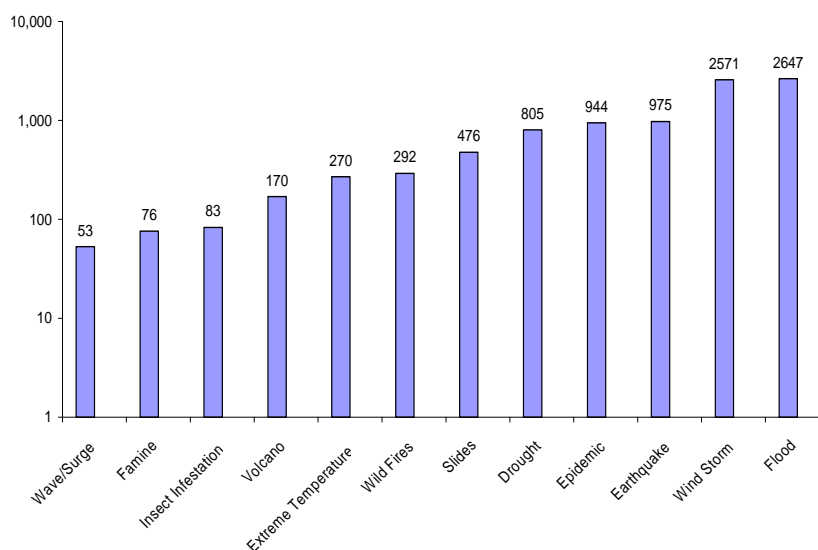
<sup>9</sup> HM Treasury 2006. *Stern Review on the Economics of Climate Change*. HM Treasury. London

patterns such as the monsoon rains in South Asia or the El Niño phenomenon—changes that would have severe consequences for water availability and flooding in tropical regions.

### C. Water-Related Disaster Risk in Asia

From a global perspective, during the past century floods<sup>10</sup> have been the most frequent and devastating of the natural hazards. The number of reported natural disasters in the world reached 9,632 during the period 1905-2004<sup>11</sup>, with floods accounting for about 28% of the total (Figure 1). The last century's floods killed nearly the same number of people as all other natural disasters combined.<sup>12</sup> The prognosis for the future is hardly better - by 2050, two billion people are expected to be especially vulnerable to floods due in large part to growing populations, indiscriminate logging and other environmentally degrading practices, rapid urbanization and inappropriate land-use planning and management, and increasing development along coastal areas.

Figure 1: Number of Natural Disasters Worldwide, 1905-2004



Source: ADB, 2007. *Flood Insurance as a Flood Management Tool: An Economic Perspective*. ERD Working Paper 99. Economics and Research Department. Manila. Page 2.

Research undertaken by ADB's Economics and Research Department (ERD) indicates that floods affect Asia more than any other continent. Asia experienced a total of 1,229 flood disasters, or 41% of the world's total during the last 100 years (Table 4). The study indicated that for the period 2000-2004 the frequency of floods in Asia has increased rapidly, with an annual average of 58 flood disasters. South Asia is the most affected region in Asia (and globally), with a reported incidence of 427 flood disasters. India is the most affected country in Asia, followed closely by the People's Republic of China. Completing the 'top ten' countries are Indonesia, Bangladesh, Philippines, Iran, Thailand, Pakistan, Japan, and Viet Nam.

**Table 4: Human Casualties and Cost of Flood Damage Worldwide, 1900-2006**

<sup>10</sup> Floods are caused by climate-influenced phenomena including dam/embankment failure or overtopping, excessive rainfall, riverine or seawater inundation, severe storms, snowmelt, storm surge, tsunami, and waterway blockages.

<sup>11</sup> Figures extracted from Centre for Research in the Epidemiology of Disasters (CRED) datasets. Refer [www.cred.beem-dat.net](http://www.cred.beem-dat.net).

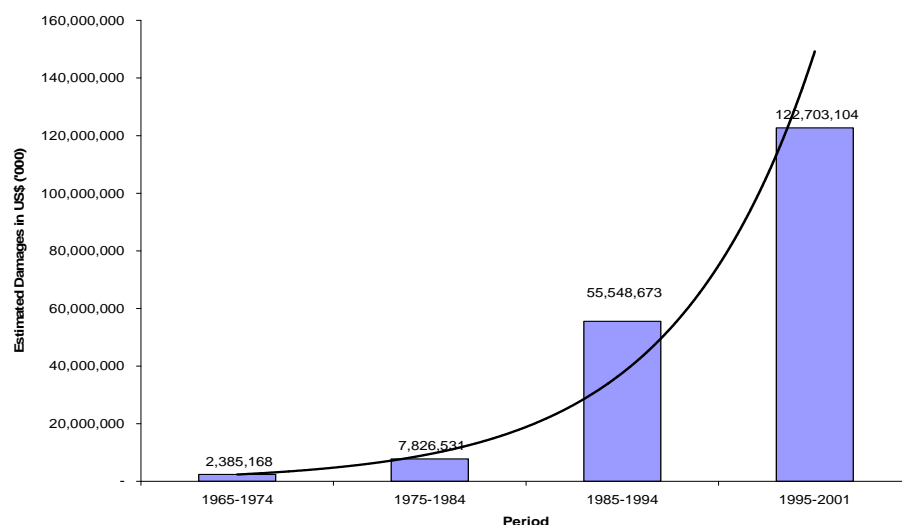
<sup>12</sup> ADB, 2007. *Flood Insurance as a Flood Management Tool: An Economic Perspective*. ERD Working Paper 99. Economics and Research Department. Manila. Refer page 2.

	# of Events	Killed	Injured	Homeless	Affected	Total Affected	Damage (US\$ 000's)
<b>Asia</b>	1,229	6,765,544	1,199,680	99,497,893	2,695,378,959	2,796,076,532	205,047,004
<i>Av per event</i>		5,505	976	80,958	2,193,148	2,275,083	166,841
<b>Americas</b>	749	100,768	41,805	3,316,543	49,934,423	53,292,771	61,539,314
<i>av per event</i>		135	56	4,428	66,668	71,152	82,162
<b>Africa</b>	526	20,186	22,636	4,665,522	35,134,801	39,822,959	3,941,585
<i>av per event</i>		38	43	8,870	66,796	75,709	7,494
<b>Europe</b>	422	9,244	21,775	1,969,976	12,615,623	14,607,374	80,805,760
<i>av per event</i>		22	52	4,668	29,895	34,615	191,483
<b>Oceania</b>	99	370	91	107,400	465,785	573,276	2,384,911
<i>av per event</i>		4	1	1,085	4,705	5,791	24,090

Source: ADB, 2007. *Flood Insurance as a Flood Management Tool: An Economic Perspective*. ERD Working Paper 99. Economics and Research Department. Manila. Page 3.

Economic losses in Asia caused by floods have increased exponentially over the past four decades, with losses in 1995-2004 being more than 60 times higher than in 1965-1974 (Figure 2). Damage to infrastructure, crops, housing and other critical societal components account for about 40% of the economic damage brought by all types of natural disasters.

**Figure 2: Economic Losses Due to Flood Disasters, 1965-2004**



The changing landscape of water-related hazard risk in Asia is significant. The imminent transformation of Asia from a predominantly rural to an urban majority with many of the urban megapolises located in vulnerable coastal areas fundamentally reshapes the risk landscapes of these regions in ways that are significantly different from historical risks. The absolute growth in urban population of Asian countries from 1975 to 2005 is 978 million. This is 180 million more than the total urban population of Europe and North America. Considering how long it has taken Europe and North America to reach the level of urbanization they now have, the urbanization

that is taking place in Asia today is at a remarkably rapid pace and one that has not been witnessed before in human history. What is extraordinary is that in the next 25 years the urban population in Asia is expected to grow by an even larger number of 1.08 billion<sup>13</sup>. Moreover, most of these urban agglomerations in Asia are on coastal areas or are situated on low-lying estuaries of large river systems near the coast (Beijing and Delhi being the exceptions – see Table 5).

**Table 5: Population of Urban Agglomerations with Populations over 10 Million**

Population of Urban Agglomerates (in millions)							
1950		1975		2005		2015	
Urban Agglomerates	Population	Urban Agglomerates	Population	Urban Agglomerates	Population	Urban Agglomerates	Population
New York	12.3	1 Tokyo	26.6	1 Tokyo	35.2	1 Tokyo	35.5
Tokyo	11.3	2 New York	15.9	2 Mexico City	19.4	2 Mumbai	21.9
		3 Shanghai	11.4	3 New York	18.7	3 Mexico City	21.6
		4 Mexico City	10.7	4 São Paulo	18.3	4 São Paulo	20.5
				5 Mumbai	18.2	5 New York	19.9
				6 Delhi	15	6 Delhi	18.6
				7 Shanghai	14.5	7 Shanghai	17.2
				8 Kolkata	14.3	8 Kolkatta	17
				9 Jakarta	13.2	9 Dhaka	16.8
				10 Buenos Aires	12.6	10 Jakarta	16.8
				11 Dhaka	12.4	11 Lagos	16.1
				12 Los Angeles	12.3	12 Karachi	15.2
				13 Karachi	11.6	13 Buenos Aires	13.4
				14 Rio de Janeiro	11.5	14 Cairo	13.1
				15 Osaka-Kobe	11.2	15 Los Angeles	13.1
				16 Cairo	11.1	16 Metro Manila	12.9
				17 Lagos	10.9	17 Beijing	12.9
				18 Beijing	10.8	18 Rio de Janeiro	12.8
				19 Metro Manila	10.4	19 Osaka-Kobe	11.3
				20 Moscow	10.5	20 Istanbul	11.2
						21 Moscow	11
						22 Paris	10.4

Note: Asian cities are shaded.

Source: M Sharma. 2007. Evolving Risk landscape in Asia with emphasis on Flood Risks. In, *Managing the Changing Landscape of Catastrophe Risk*. Proceedings of a Conference sponsored by Aon Re Australia limited. Southwood Press, Sydney.

#### D. Learning from Disaster

ADB's three successive disaster policies over the past 20 years reflect both the lessons learned and the evolving nature of disaster management. With such active involvement in disaster risk management, ADB has learned a number of general lessons as well as some specific ones. Two important general lessons warrant mention. The first is that an effective disaster risk reduction strategy for any country needs to be a comprehensive one. Such a strategy needs to be mainstreamed into the national development policy and needs to be linked specifically to

<sup>13</sup> M Sharma. 2007. Evolving Risk landscape in Asia with emphasis on Flood Risks. In, *Managing the Changing Landscape of Catastrophe Risk*. Proceedings of a Conference sponsored by Aon Re Australia limited. Southwood Press, Sydney.



various policies on infrastructure, agriculture, housing, natural resource management, social welfare, education, health, governance, and so on. A second general lesson is that there needs to be a clear linkage among the international agreements, national strategies, local actions, and support from various partners. Too often, there is a lack of clear coordination among the various institutions in the disaster field.

The key message here is that effective disaster risk management is not exclusively a technical issue: equally important is capacity building at the institutional and organizational levels. In particular, this is about horizontal and vertical integration, which requires communication, cooperation and coordination together with a willingness by all parties to understand not only their own programs but those of others. These elements are important because most disaster response thinking in the Asia-Pacific region is still top down, with administrators, scholars and politicians at the top determining a national strategy that is often dictated to regional and local level authorities, often without considering the capacity, experiences or efforts of the community. This last point is critical because the reality is that a nation's capacity for disaster risk management is the sum of its component parts; hence the essential building blocks are to be found at the community/local level. The 'three C's' of communication, cooperation and coordination seem to be especially important for river basin management which is characterized by a diverse range of governance styles with varying degrees of centralization and public participation and, according to some observers, is plagued by administrative infighting, sectoral and vested interests, lack of understanding of the natural complexity, and insufficient attention given to the diversity of uses and values of water users.<sup>14</sup>

Picking up on the technical component mentioned at the beginning of the paragraph above, for water-related disaster management issues it is also important to remember that 'technical' should not be regarded as being synonymous with engineering, since an optimal combination of multi-disciplinary structural and nonstructural measures brought together in a comprehensive management approach is best.

Since the introduction of the 2004 policy, ADB has followed its underlying principles in dealing with the disasters and conflicts that have occurred in the region, as well as with routine projects dealing with hazard mitigation. Several lessons are identified in Appendix 2. The 2004 Indian Ocean tsunami<sup>15</sup> and the 2005 Pakistan earthquake disasters, in particular, provided substantial opportunities to apply and assess the 2004 policy. Important lessons from the 2004 tsunami included (i) the value of community consultations, especially for livelihood and community infrastructure projects; (ii) coordination with development partners; and (iii) incorporation of local capacity building for local government agencies and communities into project designs. For the 2005 Pakistan earthquake, key lessons included (i) giving the lead function to (strong) government agencies rather than establishing ad hoc systems; (ii) establishing a steering committee within the national government with key players, including international and national civil society organizations; (iii) keeping all coordination groups to a manageable size and meeting regularly; and (iv) initiating joint damage and needs assessments under government leadership.

ADB has also learned several lessons in mainstreaming disaster risk management into its overarching poverty alleviation and inclusive growth programs. In the past, recovery planning

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<sup>14</sup> F Molle. 2006. *Planning and Managing Water Resources at the River-Basin Level: Emergence and Evolution of a Concept*. Research Report 16. International Water Management Institute.

<sup>15</sup> For a wider discussion on lessons learnt the tsunami ADB's experience please see *Background Paper #3: Lessons from ADB's Indian Ocean Tsunami Experience*, which was produced for the Small Group Workshop on Preparing for Large-Scale Emergencies, 5-6 July 2007, at ADB Headquarters, Manila. The paper can be obtained through the following link: <http://adbweb/Documents/Events/2007/Small-Group-Workshop/default.asp>

was not always focused on pro-poor and poverty reduction; and ADB has learned that careful poverty targeting and sensitive project design can lead to major poverty reduction impacts even under difficult post-disaster or post-conflict circumstances. Lessons include understanding how disasters can shift gender roles, as what happened following the 2005 earthquake in Pakistan, when the loss of a substantial number of male partners increased the responsibilities of surviving women to become heads of households while caring for orphaned children and persons with disabilities. This new reality created the need to rethink social conditioning and the type of contributions that members of a household and a community can make, and how they can be supported. This resulted in the preparation of a Gender and Vulnerability Action Plan to assist rehabilitation programs ensure the critical needs, constraints and priorities voiced by women and extremely vulnerable individuals and families were reflected in the design of the program and monitored during implementation.

Another general lesson from ADB's disaster experience is that a livelihood support strategy is best if it is geared toward a series of broad objectives including: (i) protecting the most vulnerable in the short term; (ii) rejuvenating economic activity on the affected areas, including reviving small businesses and trade and replacing lost agricultural assets like damaged crop lands and livestock; and (iii) improving disaster preparedness for future risk mitigation. A third broad lesson is that pro-poor economic growth, as well as improvements in social and health indicators, frequently depends on recovery of the rural economy. This means closing the large infrastructure deficit. Better transportation infrastructure and services such as reliable electricity and safe drinking water are essential to removing barriers to market access, promoting rural production, strengthening public capacity to deliver services, promoting tourism, and reducing poverty. Improved infrastructure will also be less vulnerable to changing climatic conditions.

When considering flood management, for hazard mitigation projects as well as following emergency periods, ADB continues to learn from its experiences throughout the Asia-Pacific. The following are examples of lessons that have been extracted from operational documents:

- Flexible approaches, procedures and consultations with, and the involvement of, affected communities are necessary during preparation and implementation to ensure the speedy processing and timely completion of flood rehabilitation projects.
- The long-term sustainability of projects requires adequate routine and preventive maintenance of repaired infrastructure. Beneficiary participation in this component is important.
- The Government should ensure that local governments and public utilities responsible for the rehabilitated or newly constructed facilities provide adequate funds for maintenance so as to avoid rapid deterioration of the facilities, and that these are operate adequately. Past maintenance, the state of disrepair of facilities, and vulnerability to hazards are interdependent – disaster relief assistance cannot remedy a situation of deferred maintenance.
- Wider environmental and social issues related to a specific project need to be incorporated. These components should also be considered for flood emergency projects even though the need for a rapid response may not permit detailed treatment of the issues prior to the approval of assistance.
- Taking a holistic approach to irrigation scheme upgrading and development is important. Such an approach would assess the need for lower level irrigation and drainage system upgrading as well as the headworks and main system work often financed by multilateral lending institutions. This approach should define lower level requirements at the outset and outline a program to address the most critical constraints. It would allow irrigation scheme upgrading to proceed in an ordered and participatory manner, rather than the ad hoc and top-down approach dictated by the project design.

- Irrigation system design and development should be participatory. The application of a mainly engineering solution may not allow desired outcomes to be achieved. It is not enough to rehabilitate the main system, even if it is done well, and to ignore water distribution and drainage at the tertiary on-farm level. All schemes proposed for rehabilitation should have zoning plans prepared, and the constraints to diversified cropping should be assessed on a participatory basis.
- A national strategy for disaster risk reduction would be helpful, especially for early estimation of infrastructural damage and identification of sub-projects.
- Education is a key to disaster protection. Large numbers of lives can be saved by the power of knowledge. National school curriculum could be revisited to incorporate modules on disaster preparedness. Disaster training sessions covering basic preparation measures, early warning signals, and emergency procedures should be offered to schools and communities.
- ADB and the government should encourage disaster preparation and preventive measures. More conscious effort should be put toward raising public awareness (through community, schools, media, and local authorities), putting in place sound environmental protection and better ecological management, and encouraging relocation rather than rehabilitation.
- Efforts should be made to ensure ADB's rapid response to disasters is matched by equally quick action by Government.
- Rehabilitation after an emergency such as a flood should consider upgrading the infrastructure rather than merely restoring it to pre-flood levels. Current ADB policy for emergency assistance loans requires that the immediate short-term recovery phase be followed by long-term rehabilitation and reconstruction programs. These programs should consider upgrading infrastructure facilities. In effect, a specific link needs to be provided between the recovery and reconstruction phases; such a link could be by way of including Project Preparatory Technical Assistance in the recovery phase.
- Response time appears to be a key aspect of effective emergency assistance. Future appraisals could look at standardizing measures, which could include creating procedures at resident missions for collecting information immediately after a disaster and feeding it into a standardized template for approval.
- The immediate emergency intervention should focus on transitional emergency assistance addressing immediate needs of the population, while an accompanying Project Preparatory Technical Assistance project should identify infrastructure facilities eligible for comprehensive reconstruction and prepare a loan project for implementation when the emergency situation has passed. Capacity building for maintenance management and financing should be pursued along with the proposed loan project.
- Planners of emergency assistance projects should be aware of factors such as the onset of rainy seasons and other environmental factors so as to ensure more realistic implementation schedules.

## **E. Concluding Remarks**

The most common natural disasters, floods in particular, are recurrent rather than single events - they repeatedly impact the same localities within countries. Both the typically recurrent nature of the disasters and the availability of technological, social, and organizational remedies make disaster risk management an essential part of a nation's larger development program. Disaster risk management is not a luxury – it is a basic necessity, a prerequisite for development. While the consequences of disasters are not entirely preventable, it is often possible to mitigate – to reduce the likelihood of occurrence and/or to reduce the social and economic effects of occurrence – so that fewer lives are lost and fewer livelihoods are imperiled. Over the next two decades, the Asia-Pacific region faces unprecedented challenges in water management

because of climate change, urbanization, decentralization, environmental degradation, governance reforms and other profound changes in society.<sup>16</sup> Apart from other concerns, all these factors have the potential to increase flood risk. Virtually any place on land where water can be introduced faster than it drains away may be flooded, and where populations increase dramatically, as is expected in many Asia-Pacific locations, particularly at a time when weather patterns are changing, management of the flood risk has to be regarded as a priority.

A proactive stance to reduce the effects of disaster requires a comprehensive approach with an emphasis on actions taken before a hazard results in disaster. This is a risk management approach that seeks to make disaster risk reduction an integral part of governance. On the whole, disaster risk management in the Asia-Pacific has been neglected: ADB estimates that 1% (about \$40 billion) of the entire Asia-Pacific region's gross national income (GNI) of \$4 trillion is required to put needed disaster management infrastructure in place.<sup>17</sup> An additional \$15 billion is required to restore the infrastructure and economic momentum of countries in the region that are continuously devastated, much due to lack of appropriate risk reduction measures. However, a recent World Bank evaluation report<sup>18</sup> identified that the types of activities that have the greatest impact on reducing vulnerability, such as building code development or revision, land-use planning and management, and development of hazard risk management institutions, are precisely those for which borrowers are least likely to borrow.

Disaster risk management is a challenging proposition, conceptually and practically, and there are powerful incentives favoring the conventional reactive approach rather than the proactive policies espoused by this more comprehensive approach. However, there are compelling reasons to manage the risks from natural disasters with a view to reducing losses. The international community is now mindful of the implications that disasters have on development, and disaster risk management is emerging as a field in development work, although it has yet to cohere around concrete best practices. Similarly, ADB's strategic orientation which is articulated in the Poverty Reduction Strategy (1999), the Long-Term Strategy (2001–1015) and the Medium-Term Strategy II (2006–2008) identify disaster as a source that disrupts progress on poverty alleviation and sustainable development. Its 2004 Disaster and Emergency Assistance Policy mainstreams disaster risk management into the development process, and with each application of the policy, either as a response to a particular disaster impact or as a hazard mitigation project, it is gaining new insights.

ADB will continue to learn lessons from its disaster risk management experiences. After taking into account the unique circumstances of every locality, the lessons learnt from one experience can be transferred elsewhere. This is the value of being a regional organization where the diversity of events and circumstances enables a vast repertoire of know-how to be accumulated. ADB's disaster and emergency assistance policy, and the new action plan that is being developed, will enable ADB to focus its accumulated knowledge and channel it so as to better serve its member countries achieve their respective development goals.

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<sup>16</sup> Cited from the summary findings and recommendations from the Regional Consultation Meeting for Candidate Water Knowledge Hubs in the Asia-Pacific region. 29-31 October, 2007. Singapore.

<sup>10</sup> Cited in ESCAP 2006. *Enhancing Regional Cooperation in Infrastructure Development Including That Related to Disaster Management*. UN. Economic and Social Commission for Asia and the Pacific. New York. Page 129. Source quoted as ADB. 2005. *Key Indicators of Developing Asian and Pacific Countries*. Manila.

<sup>18</sup> World Bank (2006). *Hazards of Nature, Risks to Development. An IEG Evaluation of World Bank Assistance for Natural Disasters*. Operations Evaluation Department. Washington DC.

## APPENDIX 1: MILESTONES IN DISASTER RISK MANAGEMENT: THE ADB EXPERIENCE

Year	Event	Outline
1987	<i>Rehabilitation Assistance to Small DMCs Affected by Natural Disaster</i>	Addressed the special needs of small Pacific DMCs and the Maldives, following representations to establish a special facility to expedite assistance to Pacific islands affected by tropical cyclones and other natural disasters. Previously, ADB addressed reconstruction requirements through normal project lending.
1989	<i>Rehabilitation Assistance After Disasters</i>	Recognized the need for ADB to formalize its involvement in assisting DMCs in their disaster rehabilitation efforts; acknowledged that timely intervention would allow DMCs to maintain normal development momentum, which otherwise would be disrupted by reallocating budget from development to disaster needs.
1990	Technical Assistance for Regional Study on Disaster Mitigation	Funded a pioneering study in the Asia and Pacific region directed at helping DMCs become aware of their disaster management responsibilities, and identifying reliable state-of-art disaster mitigation techniques and methods for hazard mitigation. The study also provided a forum for exchanging experiences and views on designing and implementing national mitigation strategies.
1991	Publication of Disaster Mitigation in Asia and the Pacific	An output of the 1990 TA, this was the first purpose-designed textbook focused on the Asia and Pacific region, and one of the first books to address disaster management from a developing nation perspective. Provided technical background papers and country case studies.
1991	Publication of Disaster Management – A Disaster Manager's Handbook	The second output of the 1990 TA, and the first reference guide specifically designed for personnel in DMCs tasked with the management of natural disasters.
1993	Strengthening the Asian Disaster Preparedness Center	ADB funds a regional technical assistance project to help Asia's first disaster-specific center evolve into a stronger regional presence by enhancing its capacity to help the region meet the demands of operational disaster management.
1998	Technical assistance for transboundary hazard mitigation	ADB provides assistance to strengthen the capacity of ASEAN to prevent and mitigate transboundary atmospheric pollution.
2000	ADB joins ProVention	World Bank created ProVention in 2000 as a dedicated trust fund to address the increasing frequency and severity of natural disasters and their social, economic, and environmental impacts on developing countries. ProVention functions as a network to share knowledge, and connect and leverage resources aimed at reducing disaster risk in developing countries.
2004	<i>Disaster and Emergency Assistance Policy</i>	An integrated disaster and post-conflict policy that supersedes earlier courses of action, the DEAP seeks to (i) adopt a systematic disaster risk management approach; (ii) mainstream DRM as an integral part of the development process; (iii) strengthen partnerships to maximize synergies among development and specialized relief organizations to enhance effectiveness of emergency aid to DMCs; (iv) use resources more efficiently and effectively to better support pre- and post-disaster activities; and (v) improve organizational arrangements within ADB for planning, implementing, and communicating disaster and emergency-related assistance. An operations manual also was produced
2005	ADB signs the Hyogo Framework of Action 2005–2015	The Hyogo Declaration and the Hyogo Framework of Action are outcomes of the UN World Conference on Disaster Reduction, held in Kobe, Japan, in January 2005. They represent landmarks in worldwide understanding and commitment to implementing a

Year	Event	Outline
		disaster-reduction agenda—168 states and institutions resolved to pursue the substantial reduction in disaster losses of communities and countries within (2005–2015) in conformity with the Millennium Development Goals.
2005	Establishment of the Asian Tsunami Fund	The Asian Tsunami Fund is the first ADB facility to channel funds targeted specifically at regional disaster relief and reconstruction. It was established following the destructive earthquake and tsunami in December 2004, which affected 14 countries bordering the Indian Ocean.
2006	Revision of Procurement Guidelines	Streamlines ADB's business processes to better accommodate the realities of disaster, including reducing processing time, flexible interpretation of procedures, special audit procedures for emergency assistance, relaxed procurement requirements, rapid disbursement, retroactive and supplementary financing, and relaxed consultant recruitment requirements.
2006	Appointment of disaster risk management focal point	ADB employs a specialist to coordinate and monitor policies and strategies associated with the 2004 DEAP.

ASEAN = Association of South East Asian Nations, DEAP = Disaster and Emergency Assistance Policy, DMC = Developing Member Country, TA = technical assistance.

## APPENDIX 2: OPERATIONAL LESSONS FROM RECENT DISASTER AND EMERGENCY ASSISTANCE

Issue	Lesson	Possible Solution
<b>Disaster</b>		
Following the Pakistan earthquake, the poor were disadvantaged in recovery by limited access to resources, and fewer options for recovery.	Recovery programming is not always focused on pro-poor and poverty reduction and is not systematically tracked, so poor people end up losing out.	Careful poverty targeting and sensitive project design can lead to major poverty-reduction impacts even under difficult post-disaster circumstances. Inclusive growth policies that challenge the underlying causes of poverty, vulnerability, and livelihood impairment should be advocated.
In Pakistan, the earthquake shifted gender roles.	Rethink social conditioning and type of contributions household members make.	Develop a gender and vulnerability reduction action plan that incorporates livelihood improvement.
In Pakistan, the broad collection of actors supporting recovery increases the complexity of planning.	Integrated and multisector programming is needed to significantly facilitate planning and implementation.	Phasing of response and recovery should follow where possible the expressed needs of the affected population, rather than the timetable of outside agencies.
While the DEAP suggests flexibility, it is not necessarily evident from a DMC perspective.	Greater clarity and allocation in the execution of authority for disaster actions is needed.	Perhaps certain authorities need to be delegated to country directors.
In Pakistan, most knowledge gained during the DNA has been lost to the project team.	By focusing on speed, openings may have been missed to identify a project team that would deliver, certainly for the first year.	Ideally, the project delivery team leader should be either the DNA team leader or deputy team leader.
In Pakistan, perhaps 80% of the work in 2007 is institutional and organizational rather than technical.	This aspect is underestimated, and as a result organizational risk is not adequately addressed.	Arrange DNA and project teams accordingly. Mainstream capacity development into DRM, including capacity development assessment.
In the Indian Ocean tsunami, targeting development and reconstruction of tsunami-affected areas opens a set of equity issues regarding surrounding areas. It is politically difficult to spend vast sums of money to redevelop one village (or part of) and then leave immediate neighbors in poverty with deficient essential infrastructure and services.	An enlarged agenda will lengthen the time and resources required to recover and develop the wider region.	National policy, with respect to land use, disaster compensation, and other politically charged issues, needs to be thought out before disaster strikes. These policies must be in place to guide decision makers as disaster occurs. Determining national policy in the midst of disaster relief and recovery operations is difficult.
(Tsunami) Recovery demands a high degree of local participation in decision making, which is time-consuming, but necessary.	Local capacity for disaster management must be developed.	Given the weak local capacity in conflict-affected areas, ADB should recognize likely problems and factor them into planning, funding, and implementation processes.
(Tsunami) Recovery costs of operations are inflated due to rising rents for administrative staff, rapidly rising wages for local skilled (and scarce) people, increased insurance premiums, and danger money required in some areas.	Post-disaster conditions can skew costs and operating conditions.	Supply constraints must be dealt with on a priority basis, because failure to do so will enervate other activities.
The tsunami triggered offers of support from various sources and resulted in some players providing assistance, including NGOs and humanitarian aid organizations with which ADB has not had much interaction.	Some ADB staff are uncertain how to deal with the many organizations. Regular dialogue with key organizations could provide helpful insights for future involvement of ADB.	Assign an ADB staff as the DEAP focal point at resident missions. This can also strengthen ADB's response capacity during early recovery. A roster could be drawn up of on-call experts (country and subject specialists) in and outside of ADB able to provide advice or be involved.
During the tsunami, ADB staff had to	Being familiar with country disaster	A resident mission and regional

Issue	Lesson	Possible Solution
deal with government agencies it had previously not dealt with. Also, DMC disaster organizations are not part of normal operational relationships of resident missions or regional departments.	organizations is important. In addition, it is wise to be familiar with the risk profile of a country since key information and technical resources depend on what hazards are most likely to cause problems.	development staffer could be tasked as liaison with disaster-related agencies in high-risk DMCs.
Infrastructure projects form the basis of much that ADB could claim as its comparative advantage. Loans and technical assistance are the main modes of assistance, with grants given to countries that are eligible for ADF support, as well as others such as the Japan Fund for Poverty Reduction. Reputation risk emerges if a DMC requests a grant instead of a loan. Multidonor trust funds managed by other multilateral development banks have become an option.	On the whole, the mode of assistance might need to be patterned according to the activities or components to be undertaken in the project. For example, risk-reduction elements in the project might serve as conditions for providing a grant instead of loan.	Disaster funding options could be studied. ADB might consider the type of concessions that could be made for specific modes. Conditions favoring multidonor trust funds could be reviewed.
<b>Conflict</b>		
In Nepal, delivering development assistance effectively in a conflict setting is a major challenge	(i) Promote local service delivery and active participation of key stakeholders to ensure projects are demand-driven and sustainable. (ii) Work to enhance public policy and institutional performance that can result in a more enabling environment for private initiatives.	(i) More sector-wide and programmatic approaches should be used. (ii) Participation of a wider spectrum of stakeholders and institutions in the design and implementation of all projects will be encouraged.
(Nepal) Conflict and chronic poverty are major issues.	Ensure development assistance delivers quick and tangible benefits to those who have been excluded from economic and social progress.	Spread the benefits of development by addressing the exclusion of women and disadvantaged groups, and by addressing other key impediments to poverty reduction
(Nepal) The low level of disbursements is an issue.	Financial performance is essential to development work.	(i) Reduce start-up delays of new projects. (ii) Maintain project staff in place during implementation. (iii) Design fewer projects that are less complex, are more closely integrated with government sector programs, are more process oriented, have more realistic conditions and covenants, and reflect local knowledge in project design and implementation.
In Afghanistan, some policy and institutional structures are unsuitable, and aid coordination is fragmented.	Policy and institutional issues need to be specifically addressed.	Follow-up projects should be prepared in parallel with the implementation of program assistance and quick-impact pilot projects to provide supplementary support that addresses policy and institutional issues.
In Timor-Leste, low institutional capability and absorptive capacity are issues. Inexperienced government managers and under-resourced offices are unable to absorb technical training. The Government is unable to fully execute its own budget	Capacity development is a major component if interventions are to be successful.	Capacity development programs should target the most essential skills and competencies.

ADB = Asian Development Bank, ADF = Asian Development Fund, DEAP = Disaster and Emergency Assistance Policy, DNA = damage and needs assessment, DRM = disaster risk management, NGOs = nongovernment organizations.



