a Primer

# Disaster Risk Management in Asia

adpc

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The Primer for Disaster Risk Management in Asia is a 'how-to' reference manual for all stakeholders engaged in development at all levels, who in their daily work need to understand basic concepts, terminologies, methodologies and available tools to address their risks. It provides examples from various parts of the world to demonstrate the use of tools and successful methodologies. It is hoped that the Primer will support stakeholders in assessing their risks, planning for actions, and forming collaborative partnerships, to reduce risks and ultimately save human lives.

This Primer is based on consultations with and inputs from a number of local, national, regional and international experts, and stakeholders. It is published by the Asian Disaster Preparedness Center, Bangkok, Thailand. Although all efforts have been made for correctness of information provided herein, neither Asian Disaster Preparedness Center nor Office of Foreign Disaster Assistance of the U.S. Agency for International Development nor any individual(s) mentioned herein are responsible for accurateness of information. The readers are advised to further verify and obtain more information from other source(s) and individual(s). Publication of this Primer was made possible through support provided by the Office of Foreign Disaster Assistance, United States Agency for International Development, under the terms of Cooperative Agreement No. DFD-A-00-03-00077-00.

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# Disaster Risk Management in Asia

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ADPC dedicates this publication to

Late Colonel Brian Ward
(1932 - 2004)

who founded Asian Disaster Preparedness Center nearly two decades back and led it to become one of the premier centers in disaster management in Asia. ADPC will continue the work towards his vision of building safer communities with dedication and commitment.

# foreword

It is with great pleasure that ADPC presents the Primer for Disaster Risk Management in Asia.

Recent decades have witnessed rapid pace of development across developing countries, particularly in Asia. With the rapid development, there have been significant increases in risk and vulnerabilities of the population in developing countries of Asia. The disasters exposes the vulnerabilities of communities and reverses several decades of development.

Since the beginning of the International Decade for Natural Disaster Reduction (IDNDR) during 1990-2000, there have been significant advances in hazard forecasting, risk assessment, understanding sustainability and integrating risk reduction in development planning. The IDNDR and its successor International Strategy for Disaster Reduction (ISDR), the World Bank and the Asian Development Bank, and several other international and national initiatives have made significant contributions to the understanding of risks and its management and integration in development to achieve sustainable development. Most recently, the World Conference on Disaster Reduction (WCDR), Kobe in January 2005, emphasised on building the resilience of nations and communities to disasters.

ADPC, since its establishment in 1986, have been actively engaged in disaster risk management through its programmes and capacity building activities throughout Asia. Particularly, the Asian Urban Disaster Mitigation Programme (AUDMP), generously supported by the Office of Foreign Disaster Assistance (OFDA) of the United States Agency for International development (USAID) and implemented by ADPC in Bangladesh, Cambodia, India, Indonesia, Lao PDR, Nepal, the Philippines, Sri Lanka, Thailand, and Vietnam during 1995-2005, have made significant contributions to the disaster risk management efforts in the region.

There has been a long-felt need of a reference document on disaster risk management in Asia for practitioners to help them understand the recent concepts and advancements in understanding the risks and planning actions to reduce risks. The Primer has been conceived to serve as a reference manual for practitioners, who in their daily work need to understand basic concepts, terminologies, methodologies and available tools to become aware of their risks. It provides examples from various parts of the world to demonstrate the use of tools and successful methodologies. It is hoped that the Primer will help the practitioners in assessing their risks and in planning for actions, in partnerships with other stakeholders, to reduce risks and ultimately save human lives.

The Primer is a series of publications - the first volume provides an overview of disaster risk management, while the subsequent volumes are to be hazard specific. It is hoped that over a period of time, these volumes get translated to various languages and be used by a larger number of practitioners.

It has been a herculean task for ADPC to develop the Primer. Numerous local, national and international experts and practitioners have been consulted from time to time during its development. An International Advisory Group consisting of eminent experts was continuously consulted and their feedback and comments were incorporated. The Primer has been presented at several international, regional and national gatherings of experts, senior government officials, and various professional groups and their valuable inputs have been incorporated.

On behalf of ADPC, I would like to thank the members of the International Advisory Group for volunteering their time to participate in the meetings and reviewing the contents and providing valuable guidance and feedback. The ADPC Primer Team needs to be commended for working hard to meet the deadlines. Ms. Wei Choong, an 'Australian Youth Ambassadors for Development' (AYAD) Programme deserve special mention for her dedication and hard work on the Primer. Mr. Lowil Fred Espada worked hard to layout the drafts to turn it into the final publication.

It is very difficult to list and thank each and every individual who contributed to this publication. ADPC remains grateful to everyone who has contributed to this publication by providing comments, photographs and pointers to other sources of materials. The Primer has indeed been a collaborative effort of many and it would not have been possible for ADPC to publish it without the valuable inputs and comments. We see the Primer as part of an on-going process in our efforts of learning and working together to reduce disaster risks and save valuable human lives.

The recent tsunami of December 2004 reminds us how much work still needs to be done.

We sincerely hope that the Primer will be useful and that the Primer contributes to collective efforts in reducing disaster risks.

Dr. Suvit Yodmani
Executive Director
ADPC

April 2005

# acronyms

| | |
|---|---|
| **ADRC** | Asian Disaster Reduction Center |
| **AUDMP** | Asian Urban Disaster Mitigation Programme |
| **BMTPC** | Building Materials and Technology Promotions Council (India) |
| **BOOT** | Build Own, Operate and Transfer |
| **BOT** | Build, Operate and Transfer |
| **BUDMP** | Bangladesh Urban Disaster Mitigation Project |
| **CBA** | Cost-benefit Analysis |
| **CBDRM** | Community Based Disaster Risk Management |
| **CBOs** | Community Based Organisations |
| **CDMP** | Comprehensive Disaster Management Programme (UNDP) |
| **CIDA** | Canadian International Development Agency |
| **CPP** | Cyclone Preparedness Programme |
| **DFID** | Department for International Development (UK) |
| **DMB** | Disaster Management Bureau |
| **DMC** | Disaster Management Committee |
| **DNMAC** | National Disaster Management Advisory Committee |
| **DOC** | Departmental Operations Centres |
| **DPT** | Disaster Preparedness Team |
| **DRC** | Disaster Risk Communication |
| **DRM** | Disaster Risk Management |
| **DRMC** | Disaster Risk Management Committee |
| **EC** | European Commission |
| **ECHO** | European Commission Humanitarian Aid Office |
| **EIA** | Environmental Impact Assessment |
| **EOC** | Emergency Operations Centre |
| **EU** | European Union |
| **EWS** | Early Warning System |
| **GTZ** | Deutsche Gesellschaft für Technische Zusammenarbeit |
| **ICE** | Institution of Civil Engineers (UK) |
| **ICTs** | Information and Communications Technologies |
| **IDNDR** | International Decade for Natural Disaster Reduction |
| **IMDMCC** | Inter-Ministerial Disaster Management Coordination Committee |
| **ITB** | Institute of Technology Bandung (Indonesia) |
| **IUDMP** | Indonesian Urban Disaster Mitigation Project |
| **MDMR** | Ministry for Disaster Management and Relief |
| **MEERP** | Maharashtra Earthquake Emergency Rehabilitation Programme |
| **MFDM** | Ministry of Food and Disaster Management |
| **MOU** | Memorandum of Understanding |
| **NBRO** | National Building Research Organisation (Sri Lanka) |
| **NDMA** | National Disaster Management Authority |
| **NDMC** | National Disaster Management Council |
| **NDMO** | National Disaster Management Office / Organisation |
| **NGO** | Non-Government Organisation |
| **NSET** | National Society for Earthquake Technology (Nepal) |
| **OFDA** | Office of US Foreign Disaster Assistance |
| **PAGASA** | Philippine Atmospheric Geophysical and Astronomical Services Administration |

| | |
|---|---|
| **PCM** | Project Cycle Management |
| **PDRA** | Participatory Disaster Risk Assessment |
| **PLA** | Participatory Learning and Action |
| **PM&E** | Participatory Monitoring and Evaluation |
| **PMP** | Prevention, Mitigation and Preparedness Office (USAID) |
| **PRA** | Participatory Rural Appraisal |
| **RCC** | Regional Consultative Committee (ADPC) |
| **RHUDO** | Office of Housing and Urban Development (USAID) |
| **RRA** | Rapid Rural Appraisal |
| **SAR** | Search and Rescue |
| **SLUMDMP** | Sri Lanka Urban Multi-hazard Disaster Mitigation Project |
| **SOC** | Strategic Operations Centres |
| **UK** | United Kingdom |
| **UN** | United Nations |
| **UNDMTP** | United Nations Disaster Management Training Programme |
| **UNDP** | United Nations Development Programme |
| **UNEP** | United Nations Environment Programme |
| **UN-HABITAT** | United Nations Human Settlements Programme |
| **UNHCR** | United Nations High Commission for Refugees |
| **UNISDR** | United Nations International Strategy for Disaster Reduction |
| **UNOCHA** | United Nations Office for the Coordination of Humanitarian Affairs |
| **URI** | Urban Research Institute (Lao PDR) |
| **USAID** | United States Agency for International Development |
| **WHO** | World Health Organisation |
| **WWF** | World Wildlife Fund |

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# preface

## The Primer on Disaster Risk Management in Asia

> *"To survive in the world we have transformed, we must learn to think in a new way. As never before, the future of each depends on the good of all."*
>
> *Nobel Statement, December 2001*

Nations in Asia face the common challenge of securing their social, political and economic future against disasters. The region continues to be the largest, most diverse and most disaster-prone in the world. According to the World Disasters Report (IFRC, 2003), 42 per cent of the world's disasters occur in Asia. An average of 46,000 people were killed and 227 million people affected by regional disasters between 1993 and 2002. This represents nearly 75 per cent of fatalities and more than 90 per cent of the world's affected population.

> *"During the past dozen years, most Asian nations have greatly improved their capacities to monitor hazards and to warn, evacuate and provide emergency relief to victims of disasters. As a result, the number of lives lost to "predictable" disasters such as floods, storms and volcano eruptions has decreased significantly during this period. China, for example, lost 4,832 lives to floods between 1991 and 1994, but only 2,909 in the last four years (1999-2004), while Pakistan lost 1910 lives to floods in the first four years of the period but, only 286 in the last four.*
>
> *The disaster response accomplishments that these figures suggest are more remarkable for their having been achieved despite a sharp increase in the number, severity and duration of floods throughout Asia during the same 12-year period. From 1991-1994, China had 15 disastrous floods, Thailand had 8 and Vietnam 7, while in the most recent four years, China had 29 disastrous floods, Thailand had 16 and Vietnam 12" (UNISDR, 2003).*

Over the past decade, there has been a notable attempt by international agencies to shift away from post-disaster response, relief and rehabilitation efforts as the only options available to manage disaster. A new focus on changing the conditions that lead to disaster can reduce the potential post-disaster loss of life and property damage. This disaster risk management approach addresses each element of risk: hazard severity and frequency, elements at risk (eg. population, critical infrastructure) and vulnerability. Disaster risk management promotes sustainable development by reducing disaster susceptibility. Preparedness and mitigation actions have been recognised as important strategies for reducing disaster risks.

## Objectives of the Primer on Disaster Risk Management

The Primer on Disaster Risk Management in Asia is intended to share the advances in knowledge and experience gained since 1990. Most of the currently

available resource documents on disaster risk management represent the thinking and experience of the past. New emerging research now incorporates a more holistic approach to dealing with disasters. However, Asia in particular, lacks a well-resourced comprehensive reference document which could be used by professionals and practitioners for understanding disasters in their own geographical, social, economic and cultural context.

The Primer is a comprehensive, practical and updated resource on disaster risk management. The overall goal is to assure an appreciation for and common understanding of disaster risk management applied across all sectors and among all levels of current and potential participants in the disaster risk management process.

The Primer aims to:

- Provide convincing arguments on the importance of disaster risk management and the steps to be taken.
- Serve as a guide and reference on good practices in Asia.
- Present tested and sustainable disaster risk management methodologies that can be incorporated into the work of professionals.
- Contribute to the integration of disaster risk management in the development process.

## To whom the Primer is targeted?

The Primer is a practical how-to-guide for those who are working in the field of disaster risk reduction or are interested in integrating disaster risk reduction in their work. The Primer targets four groups of people, including those who (1) authorize programs; (2) formulate decisions; (3) plan, develop and implement decisions; and (4) support implementation of decisions:

- **Group I: Authorisation** (Elected Representatives - Allocate Budget)
  Eg., Prime Ministers, Ministers in Charge of Disaster Management, Chief Ministers of Province, Mayors, Chairmen of Local Authorities.
- **Group II: Policy Formulation** (Administrative Heads - Prepare Budget)
  E.g., Permanent Secretaries, Focal Points for DM, Dept. Heads of Line Ministries, Chief Secretaries (State or Provincial Governments), Municipal Commissioners.
- **Group III: Planning, Development and Implementation** (Technical Bodies, Utilities and Services)
  E.g., National Depts. Responsible for Implementation, Water Boards, Electricity Boards, Road Departments, Transport Departments, Housing Authorities, Urban Development Authorities, Provincial Depts. Responsible for Implementation, Municipal Depts. / Corporations (All Sections / Divisions), Technical Specialists.
- **Group IV: Implementation Support**
  Peripheral Ministries, NGOs, CBOs, voluntary organisations, civil society.

# Primer Design

This volume is the first of three volumes comprising the Primer.
**Volume 1:** An overview of disaster risk management concepts and processes.
**Volume 2:** Reducing risks related to slow onset floods.
**Volume 3:** Reducing risks related to earthquakes.

Each volume includes a framework, methodologies and tools for an integrated approach to disaster risk management. Case studies of disaster risk management efforts in Asia provide examples of effective applications of the concepts and strategies presented. Lessons learned drawn from the case studies have been included in each chapter to help others move forward. Challenges suggest issues that may need to be overcome to adapt disaster risk reduction efforts to the reader's particular situation.

The Primer volumes do not present methodologies and tools in great depth as they are well documented elsewhere. The reader is directed to additional resources that provide detailed knowledge about Primer topics.

## Chapter organisation

The Primer has a consistent chapter format to help the reader access material easily. An outline is provided in a standard format at the beginning of each chapter with page numbers that link the outline to corresponding chapter sections. Generally the outline is as follows except for special chapters such as *Setting the Scene*, which follows a special format as the introductory chapter.

Chapter Outline

- **Chapter brief** - provides the chapter content in point form.
- **Introduction** - provides a brief introduction of the subject matter of the chapter and its importance to disaster risk reduction.
- **Key words** - relevant to the chapter are listed with a brief definition and they are listed in the alphabetical order.
- **Concepts** - of the specific disaster risk reduction activities covered in the chapter.
- **Process** - of the specific disaster risk reduction activities covered.
- **Case Studies** - provide examples of issues presented.
- **Lessons learned** - are drawn from the case studies presented.
- **Questions** - help review chapter issues and stimulate discussion.
- **Challenges** - to implementing specific disaster risk reduction activities covered in the chapter.
- **References** - pertaining to the chapter.
- **Resources** - a list of resources to help the reader will be listed at the end of each chapter.
- **Icons** - are listed on the side of each page to indicate links to other chapters, case studies and key themes.

| section icons | navigational icons | key theme icons |
|---|---|---|
| keywords | see Box 1.1 | stakeholders |
| concepts | see Chapter 1 | policy |
| process | see Figure 1.1 | participatory approach |
| tools and techniques | see Case Study 1.1 | risk assessment |
| case study | | |
| checklist | | |
| lessons learned | | |
| discussion questions | | |
| future challenges | | |
| resources | | |
| references | | |

## The process of development of the Primer

The series of consultations on the development of the Primer was initiated by ADPC under its Asian Urban Disaster Mitigation Programme (AUDMP). The AUDMP is an nine-year program funded by USAID / OFDA. It commenced in 1995 with the goal of reducing the disaster vulnerability of urban populations, infrastructure, critical facilities and shelters in nine Asian countries - Bangladesh, Cambodia, India, Indonesia, Lao PDR, Nepal, Philippines, Sri Lanka and Thailand. More about AUDMP can be learned from *www.adpc.net/audmp/audmp.html*

ADPC drafted an outline of the Primer for discussion during the Mini-workshop on Development of the Primer on Disaster Risk Management in Asia organised in Bali, Indonesia on 27 September 2002 following the Regional Workshop on Best Practices in Disaster Mitigation on 24-26 September 2002[1]. A concept paper outlining the details such as process, timeframe, etc. on development of the Primer was subsequently prepared giving potential models that could be followed.

Since then the framework for the development of the Primer was further consolidated through discussions with a range of stakeholders including national government institutions at ADPC's Third Meeting of the Consultative Committee on Regional Cooperation in Disaster Management, in India during 29 to 31 October 2002, and with potential donor organisations.

### Funding

The Primer on Disaster Risk Management is being developed by ADPC with funding from the United States Agency for International Development's Office of Foreign Disaster Assistance (USAID / OFDA) (Volume 1) and the United Nations Development Programme (UNDP) (Volume 2).

### Advisory Group

For developing the Primer, the services of an Advisory Group comprising of leading experts from diverse professional backgrounds with extensive knowledge and experience in the relevant fields were obtained. The advisory group members provided invaluable guidance to the framework, outline and drafts at different stages.

1 **The Proceedings of the Regional Workshop on Best Practices in Disaster Mitigation, a compilation of knowledge, experiences and lessons leaned from AUDMP and other disaster mitigation initiatives in Asia is available online at *www.adpc.net/audmp/rllw/table.html***

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# setting the scene

# 1

## Chapter Brief

## Key Words

Disaster
Disaster Risk Management
Hazard
Risk
Risk Assessment / Analysis
Sustainable Development

## Introduction

Introduction to Disaster Risk Reduction

## Disaster Risk Management Concepts

Disaster Risk Management and Sustainable Development
Disaster Risk Reduction Framework
Components of Disaster Risk Management
What are the Components of Disaster Risk Reduction?
Why should Disaster Risk Reduction be Everyone's Priority?

## Disaster Risk Management Process

A Process for Incorporating Disaster Risk Management in Steps

## Common Themes and Cross-cutting Issues

Common Themes
Cross-cutting Issues

## References

## Resources

# Chapter Brief

- Not too long ago, disasters were the responsibility of the fire brigade, relief workers and the army, and the emphasis was on responding as rapidly as possible to prevent further loss of life and social, economic and political damage.

- Presently it has taken a different perspective and it addresses at the range of factors and processes that lead to the occurrence of disasters, and increasingly recognised as the result of development practices that cannot be maintained (unsustainable development).

- Risk reduction comprises components such as mitigation, preparedness, response and recovery.

- The disaster risk reduction framework is composed of risk awareness and assessment including hazard analysis and vulnerability / capacity analysis; knowledge development; public commitment and institutional frameworks; application of mitigation measures; and early warning systems.

- Disaster risk reduction should be everyone's priority and positive actions should include legal arrangements, policy formulation, planning development, implementation and implementation support.

# Key Words

## Disaster

A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.

A disaster is a function of a risk process. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk (UNISDR, 2004).

## Disaster Risk Management

The systematic process of using administrative decisions, organisation, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards (UNISDR, 2004).

## Hazard

A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydrometeorological and biological) or induced by human processes (environmental degradation and technological hazards). Hazards can be single, sequential or combined in their origin and effects. Each hazard is characterised by its location, intensity, frequency and probability (UNISDR, 2004).

## Risk

The probability of harmful consequences or expected losses (death, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

Risk depends on exposure to the consequences of uncertainty or potential deviations from what is planned or expected (disruption to everyday life). Current disaster risk reduction frameworks see ‘risk’ as a negative consequence, but positive results can also arise from probable harm.

Risk can be expressed as a *function of hazard x vulnerability.* How one copes depends on capacity.

Risk is a resultant of the interaction of three functions namely hazard, vulnerability and exposure. Beyond expressing a possibility of physical harm, it is crucial to recognise that risks are inherent or can be created or exist within social systems. It is important to consider the social contexts in which risks occur and that people do not necessarily share the same perceptions of risk and their underlying causes (combination of ADPC and UNISDR definitions).

## Risk Assessment / Analysis

A methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend.

The process of conducting a risk assessment is based on a review of both the technical features of hazards such as their location, intensity, frequency and probability; and also the analysis of the physical, social, economic and environmental dimensions of vulnerability and exposure, while taking particular account of the coping capabilities pertinent to the risk scenarios (UNISDR, 2004).

## Sustainable Development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organisation on the environment's ability to meet present and the future needs (Brundtland Commission, 1987 in UNISDR, 2004).

# Introduction

*"At first people refuse to believe that a strange new thing can be done, then they see it can be done - then it is done and all the world wonders why it was not done centuries ago."*

*Frances Hodgson Burnett, The Secret Garden*

Disaster risk management is a rapidly changing field. The view that disaster represents the consequences of a catastrophic event is being replaced by a model of disaster as the result of unsustainable development practices. Disaster risk management is an integral part of sustainable development.

This chapter sets the scene by defining the basic concepts and processes of disaster risk management, including:

- Knowing how disaster risk management links to sustainable development.
- Understanding the phases of the "disaster management cycle."
- Implementing the components of disaster risk reduction to strengthen conditions vulnerable to the occurrence of hazards.
- Being able to apply multi-level, multi-sector and multi-stakeholder approaches to disaster risk management.

Case studies at the end of the chapter illustrate the information presented in the chapter.

# Disaster Risk Management Concepts

## Disaster Risk Management and Sustainable Development

> *"… disaster risk management considerations would add marginally to the cost of the development activity. However, failure to factor disaster risk management into the planning process is usually extraordinarily costly in the long run, makes sustainable economic development more difficult to achieve and frustrates efforts to reduce poverty (especially as, in Asia, disasters tend to strike the same communities repeatedly)."*
>
> *(Brennan, 2003)*

Not too long ago, disasters were believed to be acts of God and therefore, unavoidable. Emphasis was on responding as rapidly as possible to prevent further loss of life and social, economic and political damage. However, if we take a different perspective and look at the range of factors and processes that lead to the occurrence of disasters, there is considerable evidence indicating that the process of human development is contributing to increasing vulnerability of people to disasters. Box 1.1 illustrates some examples of unsustainable development practices.

**Box 1.1**

**Examples of unsustainable development practices:**

- Hilly and mountainous areas (China, India, Nepal, Philippines, Sri Lanka and Thailand) are most prone to flash flood and landslides, which are aggravated by deforestation and cultivation that destabilises slopes.
- Roads constructed on flood plains in many Asian countries impede water flow, which contributes to and prolongs flood.
- In Wuhan, China, filling in of this so-called "city of lakes" that use to serve as water reservoirs / retention ponds have caused major floods in the area.
- Countries along or adjacent to seismic zones (Afghanistan, China, India, Iran, Nepal, Philippines and the Pacific Islands) are more vulnerable as more buildings and infrastructure that are constructed without earthquake-resistant features become exposed to earthquakes.
- Many countries in East Asia will be particularly vulnerable to climate change and associated sea-level rise as many human settlements and so much industrial infrastructure are located in coastal or lowland areas. The vulnerability of coastal settlements and infrastructure facilities have been demonstrated through the high losses and casualties due to the devastation caused by the tsunami on December 26, 2004 in about ten countries in Asia.

Integrating disaster risk reduction practices into the development process in these instances would have assured that cultivation is complemented with techniques to stabilise slopes and minimise soil erosion; that flood reduction culverts and spans across water channels were factored in road design; and that land-use systems and building codes that support risk reduction are developed and implemented.

## Disaster Risk Reduction Framework

It *"is the conceptual framework of elements considered with the possibilities to minimise vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development"(UNISDR, 2004).*

**Box 1.2**
**Disaster risk reduction framework**

This disaster risk reduction framework is composed of the following fields of action, as described in ISDR' (2004):

- Risk awareness and assessment including hazard analysis and vulnerability / capacity analysis.
- Knowledge development including education, training, research and information.
- Public commitment and institutional frameworks, including organisational, policy, legislation and community action.
- Application of measures including environmental management, land-use and urban planning, protection of critical facilities, application of science and technology, partnership and networking, and financial instruments.
- Early warning systems including forecasting, dissemination of warnings, preparedness measures and response capacities.

## Components of Disaster Risk Management

Integrating the following four aspects into all parts of the development process contributes to sustainable development and lessens post-disaster loss of life, property and financial insolvency. Successful disaster risk management requires the implementation of all these four phases of the disaster management cycle.

1. **Mitigation - measures to be taken before and after an event**
   Mitigation lessens the likelihood and severity of disaster by implementing sustained actions, such as improved construction practice, to reduce or

eliminate long-term risk to people and property. Mitigation of hazard impacts reduces the possibility of disaster and reduces the need for assistance. Actions include:

- Hazard assessment
- Vulnerability analysis
- Risk assessment
- Risk evaluation
- Vulnerability reduction / mitigation strategies (structural and non-structural)
- Integration of disaster risk reduction activities in all development activities making it mandatory, with a mechanism similar to EIA process or making it a part of the EIA process

2. **Preparedness - measures to be taken before and after an event**

Preparedness lessens the severity of disasters by preparing people for disaster, developing plans to ensure an effective response and recovery, and training people to implement plans after a disaster occurs. Preparedness includes:

- Prediction and warning for different disasters.
- Emergency preparedness (for monitoring, alert and evacuation, immediate disaster assistance to set-up medical operations, deployment of search and rescue teams and distribution of disaster supplies and equipment).
- Education, training and public awareness.

3. **Response - measures to be taken during and immediately after an event**

To be ready for response with capability to provide rapid and efficient medical, rescue and emergency supplies, and equipment to those in need.

- Mobilisation
- Assessment
- Requirement analysis
- Rescue and evacuation
- Emergency assistance (medical care, shelter, distribution of food, water and supplies).

4. **Recovery - post disaster measures (long-term after the disaster)**

Recovery is implementation of actions to promote sustainable redevelopment following a disaster, including new building code standards and land-use planning controls. Recovery consists of:

- Rehabilitation.
- Reconstruction (during reconstruction it is absolutely necessary to consider mitigation measures including relocation, land-use zoning, etc.).
  - Rebuilding of houses and buildings.
  - Financing for rebuilding.
  - Repair of roads, bridges, water system, etc.
- Psychological counseling.
- Long-term assistance to rebuild the community is critical to survival.

During the past these four aspects were represented in the form of a continuous cycle as four phases **Mitigation, Preparedness, Response** and **Recovery** to explain their relationship to development**.**

However, that concept is not being used now as it poses a danger that it may lead to certain misinterpretations, such as:

- Each are independent, unrelated activities.
- Mitigation is carried out only before a disaster.
- Reconstruction can be done without consideration for any recurrence of disasters in the future (especially in rare, but events with high consequences).
- Development activities in the country can take place irrespective of the impact of potential threat from natural hazards.
- No need to relate the relief, response and recovery activities to development planning, as in the case of mitigation and preparedness.

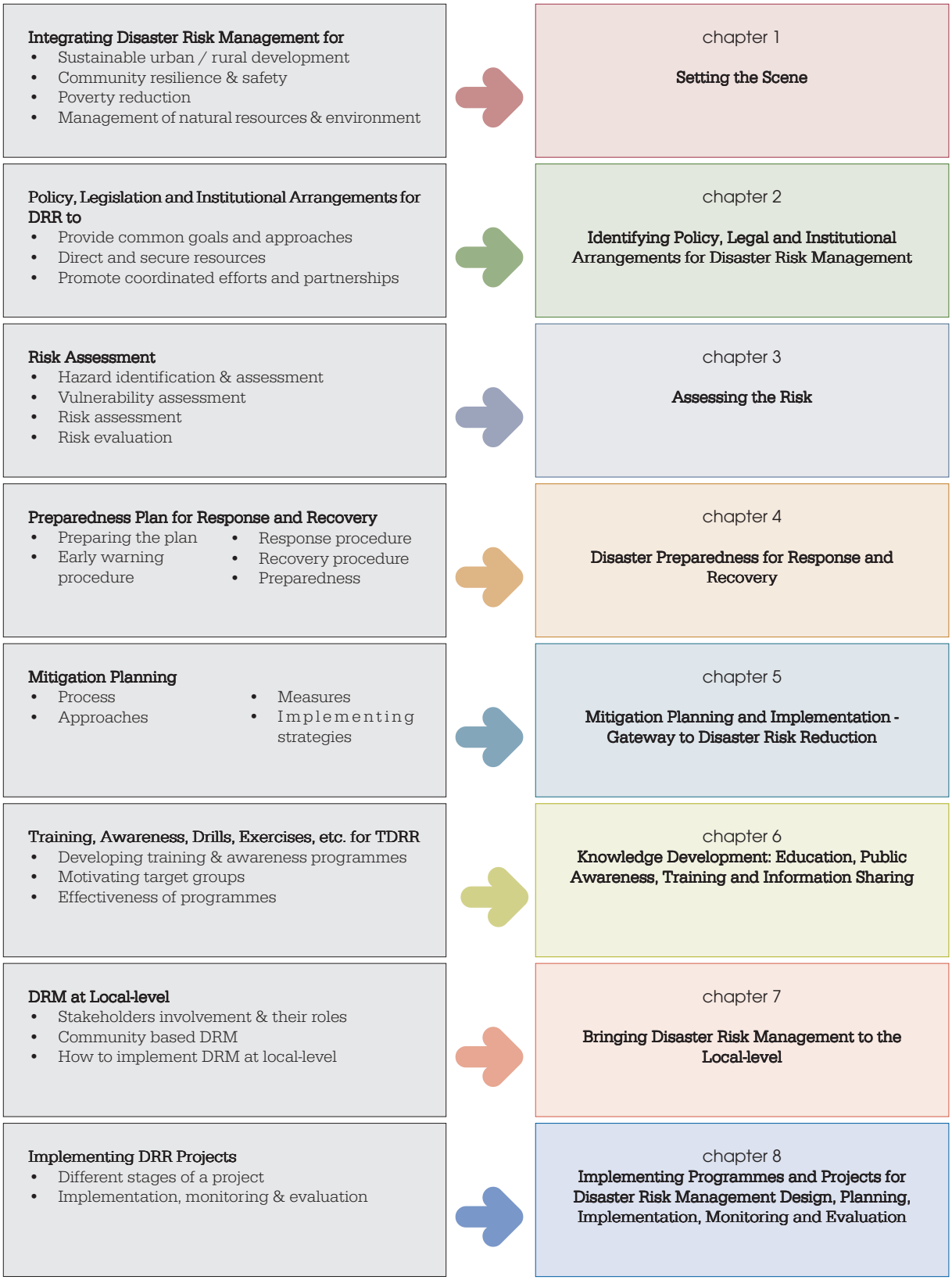
## What are the Components of Disaster Risk Reduction?

As disaster risk management encompasses a wider range of interests and abilities, there is a growing requirement for political and professional collaborations and partnerships. These inter-relationships address multi-level (national and sub-national), multi-hazard (flood, cyclone, earthquake, landslide, fire and volcano eruptions), multi-sector (utilities, health, education, planning, transportation and construction), multi-phase (preparedness, mitigation, response and recovery) and multi-stakeholder (government, NGOs, community groups, private sector, civil society) approaches.

**see Chapter 2**

The components of disaster risk reduction as included in this primer are shown illustratively in the **Primer Outline** (Figure 1.1) and in Chapter 2.

**Figure 1.1**
**Primer Outline**




**Abbreviations**: DRM - Disaster Risk Management
DRR - Disaster Risk Reduction

## Why should Disaster Risk Reduction be Everyone's Priority?

Disasters are complex problems arising from the interactions between the environment and the development of human societies. Conventional disaster preparedness activities, such as improving early warning and evacuation systems, stockpiling relief supplies and strengthening disaster response capacities, play a necessary, but incomplete role.

Integrating and mainstreaming disaster risk reduction into everyday decisions and activities contributes to sustainable development practices. Focus on short-term economic gains, the mismanagement of natural resources and the environment, uncontrolled development and other policies result in unsustainable development practices.

**see Chapter 2**

The Primer focuses on the four following components affecting the development of a more sustainable society. Each component is integral to disaster risk reduction. How these components support disaster risk reduction is explained in greater detail in Chapter 2.

### Group 1. Legal arrangements

Legal arrangements include a framework of laws, executive orders, and other legal instruments that establish basic guidelines for governmental and non-governmental actions. A prime minister, minister, mayor or a chairman of local authority is responsible for establishing legal arrangements to guide disaster risk reduction efforts. All nations in Asia are prone to at least one type of disaster and require legal guidelines to establish effective reduction programmes.

Disasters, in particular major disasters, receive worldwide media coverage. Increasingly government systems and structures have come under criticism for being unprepared and for not doing enough to reduce disaster risks.

- How can you establish disaster risk reduction as a national priority and a priority for ministries and departments?
- How can you foster collaboration and coordination among ministries and departments that share responsibility for reducing disaster risks?
- How do you ensure that the development projects you are supporting are not increasing your people's risk to disasters?
- How can you motivate all stakeholders to take responsibilities for reducing disaster risk?

### Group 2. Policy formulation

Policies and legislation are important in guiding, supporting and encouraging partnerships in finding solutions to reduce disaster risks. Without a shared disaster risk reduction framework that applies to all relevant sectors and all levels, mitigation, preparedness, response and recovery are likely to be fragmented, badly coordinated and ineffective.

- How can you promote and guide the integration of disaster risk reduction in development policy and practice across sectors and levels?
- What institutional arrangements need to be in place to ensure that development activities do not increase people's risk to disasters?

### Group 3. Planning, development and implementation

Being responsible for the planning and implementation of development projects, you may be the first person expected to do something when disaster strikes. Disasters can disrupt development programmes. Likewise, development programmes can trigger disasters.

- Is disaster risk reduction part of your department's development strategy?
- What mechanisms do you have in place to ensure that disasters will not disrupt your projects and your projects will not increase people's risk to disaster?
- What mechanisms are in place to coordinate with other departments that will be affected by the risk reduction measures you implement?

### Group 4. Implementation support

The gradual shift from a top-down relief and response approach to a more inter-sector risk management approach has begun to influence the way disaster risk reduction programmes are now being planned and implemented. Many high-level policy makers from the government sector and international agencies, including ADB, DFID, ECHO, UN agencies, USAID and the World Bank are recognising the importance of the participation of local government, NGOs, CBOs, civil society and communities in disaster risk reduction.

- Is disaster risk reduction part of your organisation's development strategy?
- Do your target groups understand the risks they face and know what they could do to reduce those risks?
- Have you established collaborative arrangements, partnerships or coalitions to address disaster risk reduction issues?

Roles and responsibilities of stakeholders (individuals and institutions) are described in detail in Tables 1.1 to 1.3 for different phases of disaster risk management and for different groups of stakeholders.

**see Tables 1.1, 1.2 & 1.3**

**Table 1.1**
**Roles and responsibilities of stakeholders**

| Themes / DM Cycle | Policies, Legislation and Institutional Arrangements | Assessments |
|---|---|---|
| Response | **All Groups:** A disaster is an opportunity to assess and amend policies, legislation and institutional arrangements to have better emergency management operations. | **All Groups:** Conduct a joint assessment on loss, damage and needs after every disaster / emergency. |
| Recovery | **Group 2:** Evaluate the effectiveness of policies, legislation and institutional arrangements for disaster recovery phase activities. | **All Groups:** Conduct a joint assessment to help identify immediate and long-term risk reduction measures to avoid construction to pre-disaster level (conduct assessment to shorten the recovery period). |

| Mitigation Planning and Implementation | Knowledge Development | Bringing Risk Management to Local Level |
|---|---|---|
| **All Groups:** Disasters are opportunities to test the effectiveness of the measures and systems developed to attend to emergencies, and respond to disasters. Emergency management and response action plan is a requirement for better coordination. | **Groups 3, 4:** Collect, collate and disseminate pre-determined disaster-related data and lessons learned in managing disaster events. | **Groups 2, 3, 4:** Work with local governments, local level NGOs, CBOs, civil society organisations in coordinating relief activities.<br><br>**Groups 3, 4:** Mobilise community volunteers during a disaster event ensuring participation of local level NGOs, CBOs, civil society organisations. |
| **All Groups:** Evaluate and improve recovery plans to integrate long term risk management.<br><br>**Groups 2, 3:** Facilitate recovery by developing a comprehensive plan to guide the process.<br><br>**Groups 2, 3, 4:** Design detail recovery plans and initiatives that will empower individuals, improve livelihood and be sustained (by targeted groups study).<br><br>**Groups 3, 4:** Promote multi-stakeholder participation in developing a recovery strategy and plan. | **Groups 3, 4:** Build on motivation and commitment to reduce recovery period and disaster risks by planning and implementing a knowledge development program targeted at specific level and sector.<br><br>**Groups 3, 4:** Introduce disaster risk reduction through creating awareness and building capacity for risk communication. | **Groups 1 and 2:** Delegate authority to local governments to initiate incentives to reduce risk.<br><br>**Groups 2, 3:** Partner with NGOs, businesses, affected community groups civil society organisations for recovery planning and implementation.<br><br>**Groups 2, 3, and 4:** Partner with local government. Local level NGOs, CBOs, civil society organisations.<br><br>**Group 1,2,3,4:** Promote participatory activities in recovery planning as a good governance practice. |

**Table 1.2**
**Roles and Responsibilities of Stakeholders**

| Themes / DM Cycle | Policies, Legislation and Institutional Arrangements | Assessments |
|---|---|---|
| Mitigation | **Group 1:** Promote a national strategy for pre-disaster risk reduction. Measures in development planning.<br><br>**Groups 1, 2:** Facilitate establishment of a well-funded institutional framework for disaster risk reduction attached to the highest political office, led by an experienced national coordinator with a team of well-trained staff.<br><br>**Groups 1, 2:** Provide local government with a legal mandate and access to adequate financial and technical resources to plan, initiate and implement disaster risk reduction interventions in development planning.<br><br>**Groups 1 and 2:** Make usage of hazard information in urban planning a mandatory requirement.<br><br>**Groups 1,2,3,4:** Promote appropriate risk transfer tools and private sector involvement in implementation.<br><br>**Group 2:** Formalise lines of responsibilities for different levels and sectors before, during and after disasters and have them supported by appropriate legal provisions.<br><br>**Group 3:** Incorporate disaster risk reduction in sector policies and legislation.<br><br>**Group 3:** Promote research to integrate risk reduction measures in all relevant sectors.<br><br>**Group 4**: Advocate for review and amendment of policies, legislation and institutional arrangements that promote disaster risk reduction.<br><br>**Group 4:** Assist in monitoring and evaluating policy effectiveness and compliance. | **Group 1:** Pass legislation (for ensuring compliance, checks and balances for accountability) that requires risk assessments for all development projects.<br><br>**Group 2:** Have standardised processes, tools and report formats that are easily accessible for risk assessment.<br><br>**Groups 2:** Establish mechanisms to coordinate risk assessments carried out by different organisations at different levels.<br><br>**Group 3:** Conduct risk assessment of sector activities and make information freely available.<br><br>**Groups 3, 4:** Assess risks prior to project planning and implementation, Carry out hazard zonation mapping for all hazard types for sectors involved as appropriate.<br><br>**Groups 3, 4:** Facilitate communities at risk to play an active role in risk assessment.<br><br>**Groups 3, 4:** Regularly monitor the impact of policy and project decisions on vulnerabilities and capacities.<br><br>**Groups 3, 4:** Review the results of risk assessment with stakeholders and disseminate results.<br><br>**Groups 3 and 4:** Develop a database on hazard information at local government level to cover the entire country. |

| Mitigation Planning and Implementation | Knowledge Development | Bringing Risk Management to Local Level |
|---|---|---|
| **Group 2:** Provide framework and guidance in developing disaster risk reduction plans.<br><br>**Groups 2, 3, 4:** Use risk assessment as a planning tool.<br><br>**Groups 2, 3, 4:** Consider an appropriate mix of structural and non-structural mitigation measures for cost effectiveness.<br><br>**Group 3:** Incorporate disaster risk reduction activities in economic and social development plans.<br><br>**Groups 3, 4:** Form partnerships in the planning and implementation process.<br><br>**Groups 3, 4:** Consider scientific and technical know-how, as well as traditional practices.<br><br>**Groups 3, 4:** Understand local perceptions of risk, capacities and needs and record traditional practices / coping up mechanisms. | **Group 1:** Promote international and regional collaborations in knowledge development.<br><br>**Groups 1, 2:** Earmark funds for knowledge development.<br><br>**Group 2:** Incorporate disaster risk reduction modules in regular programmes of schools, universities and institutes of public administration.<br><br>**Group 2, 3:** Standardise and systematise collection, analysis, storage and dissemination of disaster-related information.<br><br>**Groups 3, 4:** Incorporate knowledge development in disaster risk reduction programmes and projects case studies.<br><br>**Group 3:** Establish mechanism to regularly monitor and evaluate effectiveness of knowledge development activities and modify them if necessary.<br><br>**Groups 3, 4:** Conduct research studies on the impact of disasters and the different systems and approaches to disaster risk reduction & disseminate findings widely.<br><br>**Groups 3, 4:** Build capacity and share knowledge using different media, through print (newspaper, poster, brochure), audio-visual channels (radio, television, video) and information and communications technology (computer software, the Internet and mobile phone).<br><br>**Groups 3, 4:** Document achievements and lessons learned and disseminate the information widely. | **Groups 1, 2:** Provide a favorable political environment (including, policies, legislation, resources) that promotes and supports the participation of local institutions in the assessment of risk, planning and implementation of risk reduction measures.<br><br>**Groups 3, 4:** Build capacities and establish forums for government-community dialogue for risk management. |

**Table 1.3**
**Roles and Responsibilities of Stakeholders**

| Themes / DM Cycle | Policies, Legislation and Institutional Arrangements | Assessments |
|---|---|---|
| Preparedness | Groups 1, 2: Develop policies and legislation for all levels and sectors to have a plan of action to ensure community preparedness (eg. ways to assess damage, how to mobilise resources, early warning system, evacuation process, security issues).<br><br>Group 1 and 2: Make preparedness action planning at local government level mandatory requirement. | Group 1: Facilitate policies to establish a process for review and revision of preparedness plans at regular intervals and after disaster events.<br><br>Groups 3, 4: Develop mechanism to conduct joint assessments during and immediately after disaster so that the experience can be incorporated in future action plan. |

| Mitigation Planning and Implementation | Knowledge Development | Bringing Risk Management to Local Level |
|---|---|---|
| **All Groups:** Plan for communication of warning and decisions to act efficiently and for provision of basic needs - water, food, shelter; search and rescue; medical care; and restoring infrastructure and critical facilities.<br><br>**All Groups:** Allocate funds for preparedness planning and implementation.<br><br>**Groups 2, 3, 4:** Link preparedness strategies and plans with development strategies and plans.<br><br>**Groups 2, 3, 4:** Facilitate collaboration and coordination between scientific institutions, early warning agencies, public authorities, the private sector, the media and local community representatives to promote accurate, timely and meaningful warnings that can result in appropriate actions by an informed population.<br><br>**Groups 2, 3, 4:** Ensure that plans are regularly practiced, evaluated updated and improved by all levels and sectors.<br><br>**Groups 3, 4:** Conduct survey of preparedness level, monitor and evaluate the effectiveness regularly. | **Groups 2, 3:** Establish reliable system for gathering and sharing information between stakeholders (eg. forecasts and warnings, results of risk assessments and resources available).<br><br>**Groups 2, 3:** Develop and regularly update a national / regional resource network of equipment and experts required during response.<br><br>**Groups 2, 3, and 4:** Incorporate in public information and education systems, knowledge of risk and appropriate response.<br><br>**Groups 2, 3, 4:** Translate disaster warnings into layman's language and involve the mass media in preparing communities to take appropriate actions when warnings are issued; and in issuing the warnings to the communities. | **Groups 2, 3, 4:** Build a national network of local cadres for response (trained to disseminate warnings; assist evacuation; carry out search and rescue and first aid; conduct rapid risk assessments and manage the distribution of relief aid). |

# Disaster Risk Management Process

This is the systematic process of using administrative decisions, organisation, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid, (prevention) or to limit (mitigation and preparedness) adverse effects of hazards.

The best way for disaster risk management to become incorporated into the practices of national and sub-national (provinces / regions, local governments) organisations is to make the process part of development planning. By promoting a culture of sustainability, each ministry, department and individual becomes responsible for proactively identifying and acting to address the concepts and principles of sustainability in design, planning and engineering decisions.

Disaster risk management is a key element in establishing and maintaining sustainable development. Without considering disaster risks, critical advances in social, economic and environmental development may be eliminated by the next disaster.

## A process for incorporating disaster risk management in steps:

**Step 1. Obtain commitment**
An individual, community or central government department may identify disaster risk reduction as a critical element in preventing future extreme losses. This "champion" will need to motivate authorities to establish an institutional and legal framework, adopt policies that specify roles and responsibilities and allocate a budget to carry out an effective disaster risk reduction programme.

**Step 2. Communicate**
A clear presentation of potential national or community risks presented to authorities specifying how disaster risk reduction can improve the ability to achieve development goals and objectives by reducing these risks which helps gain commitment.

**Step 3. Collect information**
Information on past disasters and their effects, projected impacts based on new development practice and emerging research can be compiled and translated into accessible knowledge to support presentation.

**Step 4. Coordinate**
Coordination with other agencies, departments and groups facilitate the completion of the above tasks and strengthen commitment across all levels and sectors.

**Step 5. Identify stakeholders**
Stakeholders include all those who might be affected by future disasters and measures to reduce their effects. Involvement of stakeholders is a critical element in the process to establish sustainable development. Stakeholders representing general community preparedness and mitigation may be a broad cross-section of community members. Stakeholders may also represent specific sectors, such as energy or water utilities and may include engineers, planners and those residents who would be affected by changes in these systems.

**Step 6. Opportunity**
Be prepared to take advantage of opportunities to gain commitment by presenting information on disaster effects caused by recent local disasters or those occurring in other parts of the world.

# Common Themes and Cross-cutting Issues

## Common Themes

In subsequent chapters of this Primer you will come across ten common themes that recur throughout the three volumes that comprise the Primer on Disaster Risk Management. They include the importance of:

1. Policy and legal framework as a foundation for integrating disaster risk reduction in the development process.
2. Commitment to disaster risk reduction in everyday decision-making.
3. Risk assessment as a basis for decision-making.
4. Response and recovery periods as opportunity to introduce disaster risk reduction in development policy and practice.
5. Coordination and cooperation among the different sectors (water, housing, planning, infrastructure, health, education, finance) and levels (national, state, province, district, village / community).
6. Coordination and cooperation among different stakeholders (governments, NGOs, CBOs, community groups, private sector) in different sectors and levels, including regional and international partnerships.
7. A multi-hazard approach, because rarely is an area exposed only to a single hazard. A hazard, for example a flash flood, may trigger landslide or disperse toxic chemicals.
8. Knowledge development in providing a foundation for informed decision-making and a common understanding among stakeholders at all sectors and levels in risk reduction issues.
9. Participation of all stakeholders at all sectors and levels in disaster risk reduction planning and implementation.
10. Monitoring and evaluation to review changing needs, risks and new knowledge.

## Cross -cutting Issues

- **Food security and sustainability through disaster risk management**
  When carrying out a detailed analysis of the requirements for achieving food security and sustainability the following is worthwhile to consider:
  - Success of food security of communities and sustainability in development cannot be assessed without taking into account the long-term impact of risk reduction measures. Disasters can wipe out all development initiatives and security for the poorer section of communality cannot be expected without addressing their vulnerability.

- Poor communities especially in urban areas cannot afford the increasing costs and loss of employment opportunities due to events of natural disasters. In urban areas poor communities live through daily wages and if employment opportunities are lost or livelihood options disappear due to disasters, the affected communities will not have any income. Farmers living in rural areas depend on the income from the harvest and if it is destroyed they will not be able to recover losses easily. Therefore, it is a highly influential factor in guaranteeing the food security.

- **Poverty alleviation**
  The impact on low income sections of society in a disaster situation is high as these communities are the most vulnerable. Disasters have severe consequence on these groups as their capacity to cope is normally reduced. Therefore long-term disaster risk reduction measures need to target these sectors of people in order to limit their losses and both protect and increase their livelihood options.

- **Promoting gender equity through disaster risk management**
  - Gender relations refers to the interaction between women and men that are influenced by their societal roles and status. Roles, responsibilities, behavioral patterns and status of men and women seem to be not equitable in the society of some countries. In urban areas the women are engaged in formal as well as informal categories of employment. They are heavily underpaid and frequently forced to take up jobs that are subjected to health hazards.
  - Now, it is a widely acknowledged fact that women can play an effective role in dissemination of flood warning information and motivating communities in taking preventive actions before and during floods. Gender issues are highly relevant to be considered directly in relation to emergency management, land management and improvement, flood-proofing activities, among others.

see Chapter 8

- **Local-level governance**
  Participatory governance is a crucial component of management in disaster risk. The role of local government is to be an active leader to mobilise the community into considering actions that will assist in disaster preparedness and mitigation. Local governments need a framework that includes authority to integrate DRR in all development planning activities and ensuring financial resources and mechanisms of accountability to ensure that commitments are binding and that processes will last. This commitment contributes to a sustainable culture of safety. Establishing disaster risk management at the local-level allows the community to participate in decision-making to identify risk reduction measures and in the management of potential disasters that may affect their lives. Local people know their own situation best. The experience and know-how of community members needs to be understood, respected and applied to support the development of a sustainable community.

- **Health and sanitation**
  In some areas, rural as well as urban, communities are not supplied with good drinking water supply. Some urban poor have limited access to basic health facilities and will have to depend on services provided by the authorities. Due attention must be given to these groups, particularly in the relief and recovery stages.

- **Infrastructure development**
  Most of local governments do not have resources to meet infrastructure development needs. The demand is increasing and at the same time the capacity to meet the demand is decreasing. The initiatives for disaster reduction can be considered as improvements to infrastructure facilities. The improvements to drainage networks, provision of culverts and small bridges to reduce water stagnation, road filling and pavement are some of the infrastructure development work that can be undertaken.

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# identifying policy & legal & institutional arrangements

# 2

## Chapter Brief

## Key Words

Context
Institutional Framework
Legal Arrangements
Policy
Stakeholders

## Introduction

Introduction to the Disaster Risk Management Framework; Essential Tools for Institutionalising it.

## Concepts of Policy and Legal and Institutional Arrangements for Disaster Risk Management

Policy and Legal Arrangements and Institutional Framework
Policy Formulation
Legal Arrangements
Institutional Framework
What is the Conducive Environment for Establishing an Appropriate Risk Management Framework?

## Process for the Implementation of the Disaster Risk Management Programme

Key Factors
- Collaborations, Stakeholders, Partners and Coalitions

Implementation is a Long-term Process
- Examples of long-term efforts to implement disaster risk reduction policies:
- Leadership and good governance
- Multi-sector and multi-level cooperation
- Regional and international partnerships
- Monitoring and Evaluation

Process

## Case Studies

Japan. Acting with great determination
Bangladesh. Moving from disaster response to a more comprehensive approach
Vietnam. Policy and institutional framework spanning from central to local-level
The Philippines. Option for city development and risk management, Naga city experience

## Lessons Learned

## Discussion Questions

## Challenges

## References

## Resources

# Chapter Brief

- Policies, institutional frameworks and legal arrangements comprise the disaster risk management framework.
- For a disaster risk management programme to succeed, the participation of all stakeholders is crucial.
- Circumstances can encourage or catalyse policies to be made in order to address inadequacies in any part of existing risk management mechanisms.
- In some countries disasters have triggered the formulation of policies and disaster risk management systems which have become turning points for improvements in disaster risk management.
- National governments play a vital role in establishing a disaster risk management framework that applies to all government levels, non-government organisations and institutions, and all sectors.
- Legal arrangements establish basic guidelines for governmental and non-governmental actions related to disaster risk management. The legal arrangements can establish the institutional framework by defining authorities, responsibilities and roles of officials and organisations.
- Institutional frameworks define the relationships and locations of the organisations and institutions assigned with disaster risk reduction responsibilities.
- Disaster risk management policies should support collaborations, partnerships, coalitions and stakeholders.
- Implementation of disaster risk management policies involves the participation of many individuals, organisations and institutions.

# Key Words

## Coalition
An alliance or union for a particular cause, usually a temporary one.

## Collaboration
On-going, working relationships with other governmental and non-governmental organisations that have key roles in the prevention and mitigation of disasters.

## Context
"The set of circumstances or facts that surround a particular event, situation, etc." (Random House Webster's Unabridged Dictionary, 1997). The social, political and economic context surrounding the development of the disaster risk management framework will determine the resulting structure and content.

## Framework
An overall organising structure that identifies and defines the main components of a process. In DRM, it may delegate administrative roles and responsibilities and explain how each component fits together.

## Partners
People or organisations participating in a common activity, such as a partnership between two cities or countries.

## Policy
Policies express a government's political philosophy. They establish *"a course of action* pursued by a government, ruler, political party, etc." (Random House, Webster's Unabridged Dictionary, 2001). Policies form the framework for the legal arrangements necessary to put policies into action, such as local, state and national legislation, resolutions; programmes, appropriations, administrative practices, and/or court decisions.

## Programme
"A plan of action to accomplish a specified goal" (Random House Webster's Unabridged Dictionary, 1997). A disaster risk management programme provides a plan to put policies into practice.

## Legal Arrangements
Legal arrangements include a framework of laws, executive orders and other legal instruments that *establish basic guidelines* for governmental and non-governmental actions. They *define authorities, responsibilities and roles* of officials and organisations.

## Institutional Framework

An institutional framework *establishes the structure and relationships* of governmental and non-governmental organisations, including ministries, departments, local governments, individuals and the private sector.

## Stakeholders

Individuals, groups or organisations that have an interest or investment in the actions that will be taken to reduce disaster risks. Involvement of those who will be affected by disaster risk reduction actions is critical for successful development, implementation and maintenance of programmes and projects.

# Introduction

The three pillars of the disaster risk management framework consists of policies, institutional frameworks and legal arrangements. They combine to form mechanisms necessary to implement and maintain disaster risk reduction actions at all levels - national, provincial, district and local. Each element of this integrated framework must be equally strong for disaster risk reduction to be successful.

The disaster risk management framework forms the foundation for managing disaster risks by:

- Providing common goals and approaches for disaster risk reduction.
- Directing and securing resources (human, financial, information and material). towards disaster risk reduction.
- Promoting coordinated efforts and partnerships in reducing disaster risks.

National governments play a vital role in establishing a disaster risk management framework that applies to all government levels, non-government organisations, institutions and sectors, such as housing, health care, economics, etc. Good governance and strong leadership are necessary to generate the political will to drive the development, implementation and maintenance of the national disaster risk management framework including:

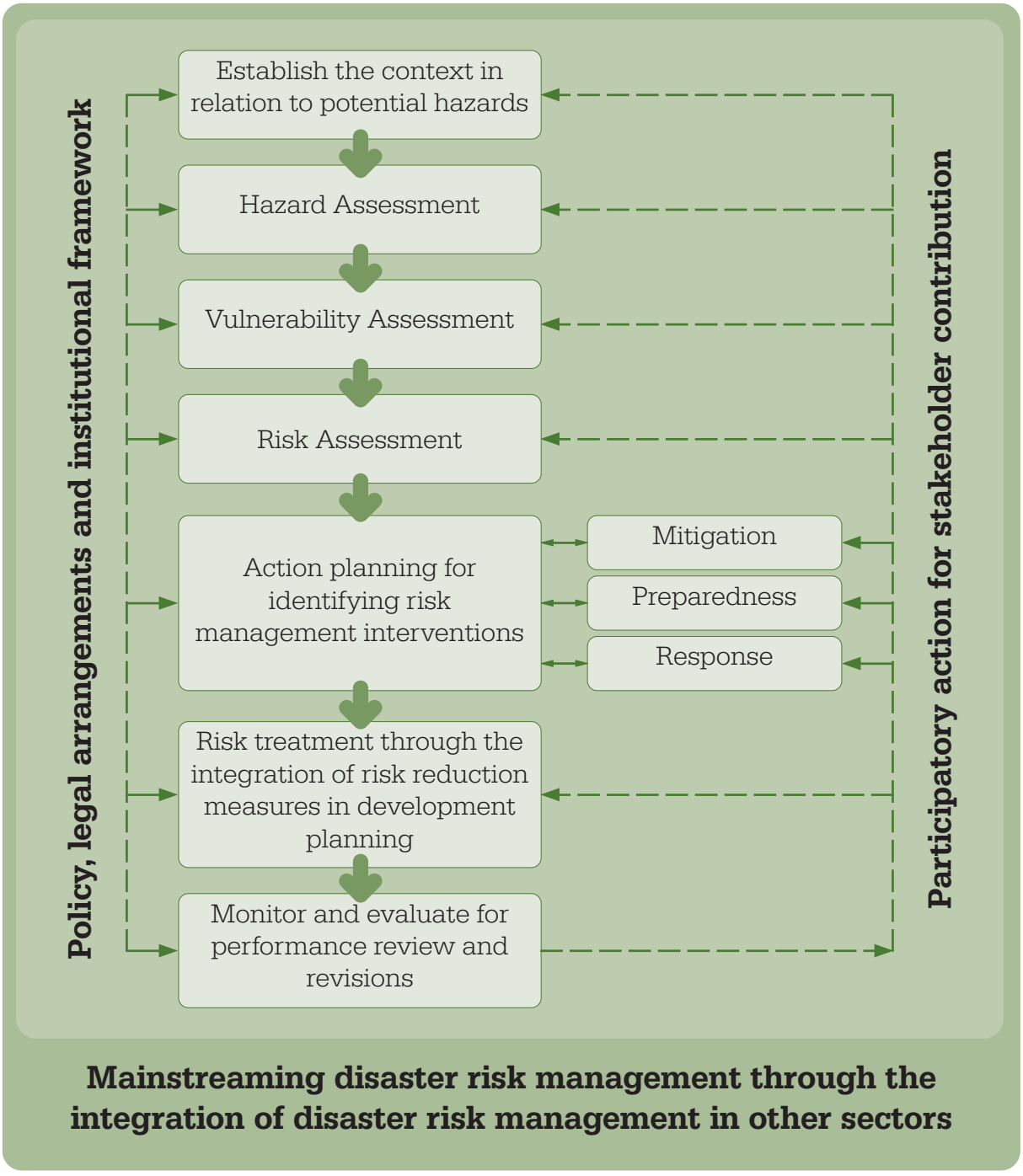
- Recognising the need for a national disaster risk management policy.
- Establishing a policy formulation process.
- Defining the main policy elements.
- Arranging for implementation and maintenance procedures, including monitoring and reviewing the effectiveness of risk reduction actions.

(Carter, 1992)

A disaster risk management programme is unlikely to succeed without the participation of all stakeholders who will be affected by the implementation of risk reduction actions. The stakeholders include the government, ministry departments, private sector companies, city developers, NGOs and communities.

The ideal disaster risk management framework requires a set of implementation tools. Policies, institutional and legal arrangements serve as these tools that address the need for each action displayed in the framework as well as identifying the roles and responsibilities of the actors and the resources required to put the framework into practice (see Figure 2.1).

**Figure 2.1**
**Disaster risk manegement framework**



# Concepts of Policy and Legal and Institutional Arrangements for Disaster Risk Management

## Policy and Legal Arrangements and Institutional Framework

The presence of policies, legal arrangements and an institutional framework is essential for effective risk management and institutionalising risk reduction. These three components demonstrate the commitment, action and progressive thinking of the national governments that employ them.

This section discusses each of these three interrelated elements; policies, legal arrangements and institutional frameworks and how they form the platform for disaster risk management.

## Policy Formulation

Policy is the starting point for risk reduction activities. It sets ideas and concepts into motion and outlines the course of action to be taken. Policy making brings important issues to the attention of governments. Below are some examples of what policies can do:

- Actions (high-level jurisdiction forces action at lower-level jurisdiction).
- Focus attentions (on risk reduction).
- Direct action (authorise direct action by the administration).
- Regulate policies (establish mandatory requirement).

(Mattingly, 2002)

Policies are integral to institutionalising disaster risk reduction. They help to incorporate risk reduction into everyday life, government strategies and customs. They have the benefits of building lasting capacity and lasting constituencies for risk reduction (Mattingly, 2002).

The integration of disaster risk management into routine government operations provides a mechanism to ensure that efforts to reduce disaster risks becomes a sustaining part of government activities.

## Reasons for policy formulation - examples from historical events

There are a number of reasons why policies are formulated. Reasons are mostly based on the social, economic, environmental and political circumstances (context) surrounding the risk management process. Circumstances can encourage or force policies to be made, or they can be created in order to address inadequacies in any part of existing risk management mechanisms. Disasters have often triggered the formulation of policies and disaster management systems and they have become turning points for improvements in disaster management as evident from history. A few examples are listed below.

| | |
|---|---|
| 1980s | Run-up to the start of the International Decade for Natural Disaster Reduction (IDNDR). |
| 1990/91 | The eruption of Mt. Pinatubo and Bagiou earthquake saw consolidation of NDCC in the Philippines. |
| 1991 | Cyclone in Bangladesh gave birth to a separate Disaster Management Bureau in 1993. |
| 1994 | Yokohama conference stimulated the preparation of national and sub-regional disaster management action plans for presentation there. |
| 1995 | Kobe Earthquake in Japan led to fundamental review of Japanese building control as well as national and regional disaster management arrangements. |
| 1996 | Typhoon Linda as well as 1998 and 2000 floods in Vietnam led to better implementation of the 1993 Water Disaster Management Plan and 2001 NDM Partnership. |
| 1997 | El Niño induced forest fires showed the regional scale of disaster and regional response (ASEAN Haze Task Force). |
| 1998 | After the 1996 and 1998 Anhui and Yangtse floods, China adopted a Natural Disaster Reduction Plan (1998-2010), a unique example of risk reduction mainstreamed in development planning. |
| 1998 | IDNDR had catalysed action and new commitment, national committees and plans were formed. ADRC was formed in Japan. |
| 2000 | In India (1998-2000), a series of disasters - floods, earthquakes and the Orissa super cyclone - expedited the formation of a high-power committee (HPC) on disaster management policy and plans. The way the disasters were managed raised expectations for wide ranging institutional reform. |
| 2001 | Gujarat Earthquake shook India and accelerated the HPC report and the shift of disaster management responsibility from the Ministry of Agriculture to Home Affairs. |
| 2000 | Mekong Floods in Cambodia and Vietnam led to regional river basin approach to Flood Management and Mitigation (FMM) led by the Mekong River Commission (MRC). The MRC FMM Strategy was formed. |

(Rego, 2000)

Similarly, the recent 2004 Asian Tsunami triggered the development and review of tsunami early warning systems, land zoning, building codes, emergency preparedness and response, and reform in government and inter-governmental risk reduction arrangements.

However, policy-making directed to risk reduction should not only be a reaction to disasters. Policies should be made as a proactive practice in order to reduce the risk of disasters occurring.

## Creating interest and support for policy formulation

The formulation of policy, as well as risk reduction in general, must be driven by political will. There must be a desire to make improvements as this is what translates programme elements into action and establishes disaster risk management as a routine part of government operations.

Political will requires strong leadership to advocate and find support for forming policies. Support can come from within the government, private sector, NGOs, media and the general public. It can be generated through creating awareness of the particular issue or risk. Support is essential as it presents a case in favour of the policy.

The strength of the community should not be underestimated in their ability to create change and enforce policies. The petitioning and pressure of affected communities to the government is influential and provides much needed support for advocates of the particular policy.

Issues surrounding policy formulation:

- National and sub-national governments assign different values and preferences to concerns related to disaster risk reduction due to variations in disaster experience, governmental goals and objectives, cultures, etc. These differences affect whether disaster risk reduction policies are developed, funding is allocated and long-term efforts are supported.
- Many countries and communities rank potential disaster impacts far behind more immediate concerns for health care, education, economic growth, etc. Infrequent disasters generally account for this relative lack of concern. In addition, the inability to see the link between a sustainable society and disaster management lowers the importance given to the formulation of disaster risk reduction policies.
- Even when the formulation of disaster risk reduction policies are a priority, differences in circumstances will influence the nature of the policies developed. Priorities and views at a ministerial / national level will differ from those at community level.
- A strategy for 'inter-relations' with other national policies such as National Development Policy or Environmental / Resource Management Policies, or Land-use planning may be a more effective means of putting disaster risk

management on the National agenda than establishing independent disaster risk management policies.
- Other sectors need to recognise the need for mainstreaming disaster risk management and apply policies, legal and institutional arrangements in their systems to enable risk reduction actions and programmes to be implemented.

## Legal Arrangements

Legal arrangements, consisting of a framework of laws, executive orders, regulations, acts and other legal instruments, establish basic guidelines for governmental and non-governmental actions related to disaster risk management. The legal arrangements can establish the institutional framework by defining authorities, responsibilities and roles of officials and organisations.

Legal arrangements may include, but are not limited to, establishing programmes, plans and projects:
- For multiple types of hazards (eg. floods, earthquakes, cyclones, etc.).
- At multiple levels of government (national, provincial/regional, district, local).
- Among multiple sectors of society (eg. educational, financial, medical, industrial, power, communications, etc.).
- Among multiple stakeholders (eg. business owners, parents, facility managers, utility companies, donor nations, NGOs, neighbouring countries, etc.).
- For multiple disaster phases (before, during and after).
- To establish cooperative agreements and collaborative relationships.

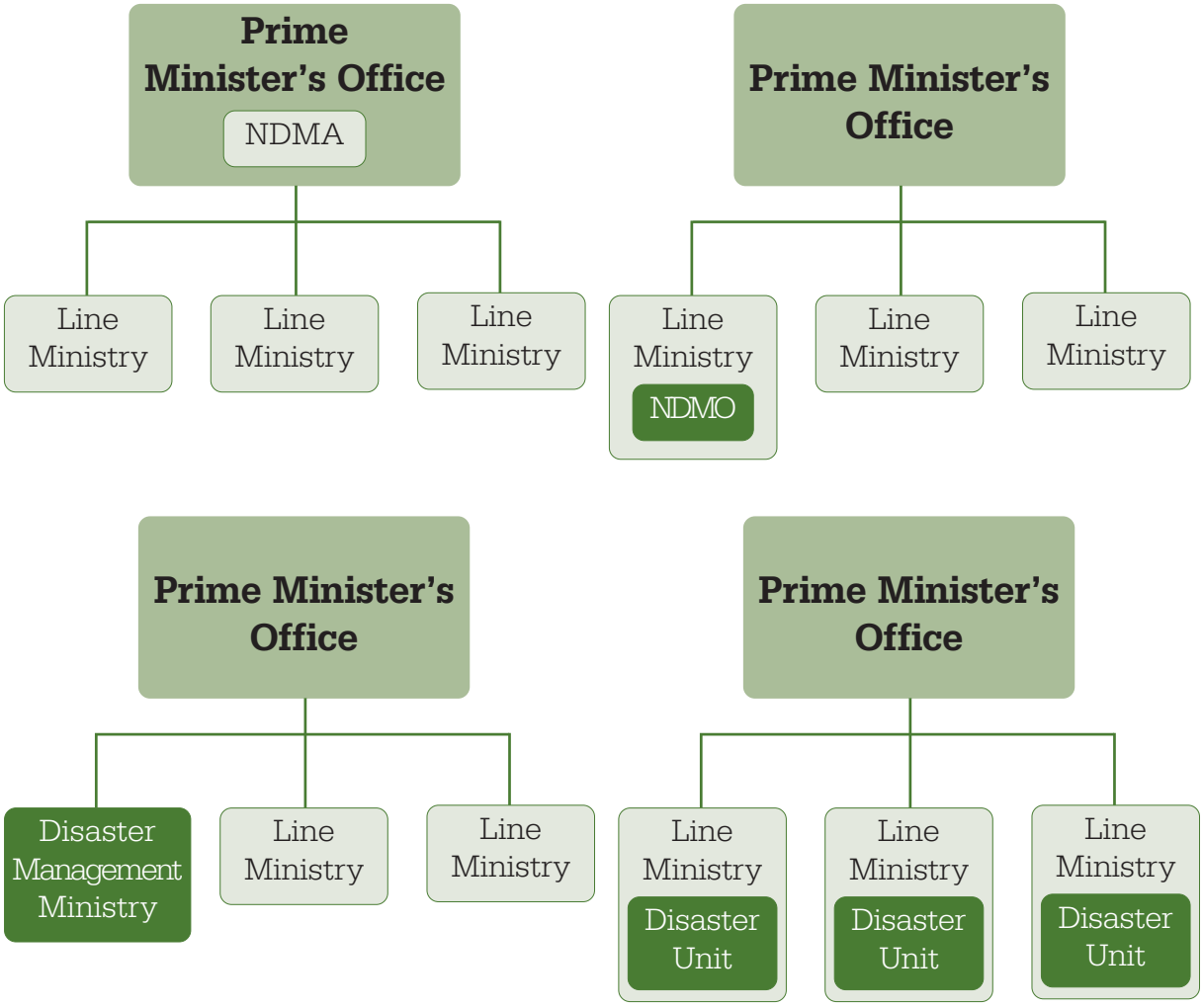
Issues surrounding legal arrangements:
- If governments and bodies become too dependent on law to govern their roles, responsibilities and actions, there is the danger that gaps will occur where laws do not cover particular circumstances, or if a law does not govern a specific action it may be left undone. There are two approaches (which can be combined) for addressing these deficiencies:
  1) Create consensus for institutional arrangements and plans that overcome the law's deficiencies;
  2) Propose new legislation and generate institutional and political support for its passage (Mattingly, 2002).
- Legal arrangements should address the issues vital to the institutional framework such as decentralisation of disaster management arrangements, as it is vital to the success of the overall risk reduction strategy.

## Institutional Framework

Institutional frameworks define the relationships and locations of the organisations and institutions assigned with disaster risk reduction responsibilities. The government is a major part of the framework, but ALL of

the stakeholders have a role to play in planning, supporting or implementing disaster risk reduction actions. The institutional framework identifies the reporting structure among organisations and institutions, and establishes a mechanism for coordination and the implementation of duties. It commonly establishes a single coordinating entity at each government level and shows the relationships among those levels and with non-government sectors and stakeholders. Figures 2.2 show four examples of national level institutional arrangements that have been used throughout Asia for disaster management institutions.

**Figure 2.2**
**Different arrangements for National Disaster Management**




**(Source: UNDMTP, 1998)**

Issues surrounding the institutional framework:

- Decentralisation of the institutional framework is a target to aim for. In many countries more power is needed at sub-national levels for decision-making, handling funds and prioritising and implementing risk reduction measures.
- The framework should seek to integrate disaster management into all levels of society, through the education and health systems, therefore the framework must be integrated and include representation from these ministries and departments as well as NGOs and private sector organisations.

- Achieving coordination and cooperation of agencies is a difficult task. Power struggles, lack of trust and difference in opinions create a significant challenge for the institutional framework. These must somehow be overcome through mediation and the establishment of legitimacy and trust in the core disaster management unit driving the programme.
- Capacity building in how their sectors relate to risk reduction is needed for relevant people across the ministries as they are all likely to be involved with integrated risk reduction, it also creates support for specific policy formulation.
- The institutional framework should have suitable arrangements to deal with all risk reduction activities including preparedness and response.

Having discussed policy, legal framework and institutional arrangements, Box 2.1 summarises the ideal characteristics of the Risk Management Framework.

**Box 2.1**

### Ideal characteristics of the risk management framework

- Advocated at the highest government level.
- A strong central agency for disaster risk management.
- Appropriate authority distribution. Decentralisation where possible.
- Multi-stakeholder participation in decision-making.
- Formalising of risk management strategies through polices and legal arrangements.
- Direct attention to total risk reduction covering mitigation, preparedness, response and recovery.
- Integration of all sectors in all aspects of risk reduction as disasters impact upon many different sectors.
- Co-ordination and management as well as clear structures in place so that each knows its responsibility and position.
- Good communications throughout the institutional framework because of the involvement of all the organisations. Some structures emphasise only one way communication, eg., top down, but this is inadequate, communities and local governments must be able to approach the higher levels with ease.
- The risk reduction framework should seek to increase the resilience of the country and its people. Communities must have a role in the institutional arrangements.
- It must be strategy driven to ensure the focus is maintained and goals are achieved.
- The framework should be flexible enough to respond to all hazards, robust enough to deal with them well and to the detail required.
- The framework must be based on risk assessments. There needs to be knowledge of risks, hazards and vulnerability.
- Supporting mechanisms such as IT management, training schemes, finance and logistics are essential. There should be adequate human and material resources.
- There should be suitable arrangements to generate or mobilise funds for proactive interventions for risk reduction.

## What is the Conducive Environment for Establishing an Appropriate Risk Management Framework?

It has been highlighted previously in this chapter how disasters have led to the formulation of policy. Disasters not only change policy relating to the reduction of a specific risk, but they along with other factors, as listed below, can contribute to the establishment of appropriate policy and risk management frameworks:

- Impact of disaster event.
- Ill effects of development (urban and sector based development activities).
- Environmental policies (Environmental impact assessment process and recommendations).
- Government commitment to global forums (Agenda 21, Kyoto Protocol, WCDR 2005).
- National policies for the conservation of natural resources.

Government commitment to global forums may be effective in encouraging the establishment of a risk management framework as international advocacy and awareness and collaboration emphasises the need for this issue to be addressed. They go as far as detailing the requirements of suitable frameworks to adopt. Some examples are given in Box 2.2:

**Box 2.2**

### Agenda 21 - excerpts about Agenda 21, the roles of Governments and the need for policies, legal arrangement and institutional framework

'Agenda 21 is a comprehensive plan of action to be taken globally, nationally and locally by organisations of the United Nations System, Governments, and Major Groups in every area in which humans impact on the environment. It reflects a global consensus and political commitment at the highest level on development and environment cooperation. Its successful implementation is first and foremost the responsibility of Governments. National strategies, plans, policies and processes are crucial in achieving this.'

**Caption from Chapter 11 - combating deforestation**

'Governments at the appropriate level, with the support of regional, subregional and international organisations, should, where necessary, enhance institutional capability to promote the multiple roles and functions of all types of forests and vegetation... in supporting sustainable development and environmental conservation in all sectors. This should be done... by strengthening and/or modifying the existing structures and arrangements, and by improving cooperation and coordination of their respective roles. Some of the major activities in this regard are as follows:

a) Rationalising and strengthening administrative structures and mechanisms, including provision of adequate levels of staff and allocation of responsibilities, decentralisation of decision-making, provision of infrastructural facilities and equipment, intersectoral coordination and an effective system of communication.'

(Agenda 21, www.un.org)

Agenda 21 is a particularly relevant international agreement to adhere to and adopt as the protection of natural resources is of great importance in disaster risk reduction.

## World Conference on Disaster Reduction, 2005 (Kobe, Japan)

**Excerpt from proceedings (Thematic cluster on governance, closing statement)**

'Governance was at the heart of the Yokohama review and it remains a significant component of disaster programming.

The panel stressed the importance of participation by all stakeholders in actions implemented to reduce disaster risks. Legal and regulatory frameworks are needed to ensure that governments have the authority to act. Equally, the establishment of national and regional platforms to promote disaster reduction is central to ensure multi-stakeholder, multi-sectoral and multilevel approaches. Platforms need to have the commitment of governments, strong leadership and guaranteed resourcing. Advocacy is important to ensure that disaster risk reduction remains high on government agendas especially when it is competing with so many other priorities.'

### The Habitat Agenda

The agenda addresses the needs to improve the quality of human settlements through solidarity, cooperation and partnerships, guided by the purposes and principles of the charter of the United Nations.

> *'The Habitat Agenda is a global call to action at all levels. It offers, within a framework of goals and principles and commitments, a positive vision of sustainable human settlements. The Habitat Agenda will guide all efforts to turn this vision into reality' (The Habitat Agenda, UNCHS, 1996).*

### The Kyoto Protocol

The 1997 Kyoto Protocol provides a legally binding set of rules to address the issue of climate change. It holds the membership countries accountable for their greenhouse gas emissions and their commitment to the protocol ensures their national reduction of emissions of least 5% from 1990 levels in the commitment period 2008-2012 (The Kyoto Protocol, UNFCC, 1997).

# Process for the Implementation of a Disaster Risk Management Programme

## Key Factors

### Collaborations, stakeholders, partners and coalitions

Disaster risk reduction policies should establish collaborations, partnerships, coalitions and stakeholders to help further disaster risk management goals and objectives. Implementation of disaster risk reduction policies involves the participation of many individuals, organisations and institutions. Relationships among these entities provide an opportunity to expand the personnel, expertise and funding available to implement risk reduction actions. These relationships also provide a number of pathways for disseminating knowledge and advice.

#### Collaborations

Collaborations among government ministries and departments with responsibilities related to disaster risk management, such as community development, land-use planning and public works, help advance consistent approaches to disaster risk management. These collaborations can take the form of round-table discussions among agency managers, workshops to exchange information on inter-related activities (eg. irrigation, meteorology, mineral resources) and inclusion of government representatives on an inter-ministry disaster risk management committee.

#### Stakeholders

Stakeholders include all those who may be affected by a disaster. This may include the residents of a community, representatives of the national government, the owner of a power company, etc. The broad range of stakeholders typically leads to sub-committees focused on selected issues related to disaster risk management.

#### Partnerships

Partnerships with private sector organisations can enhance national and local disaster risk management capacity through direct monetary contributions and / or provision of in-kind services. Such services might include the provision of technical expertise, publication assistance, planning, etc. Partnerships with the

international community may provide shared resources capable of advancing the disaster risk management programme of both partners.

**Coalitions**
Coalitions among multiple communities, countries or mixed public and private sector organisations provide a mechanism to address issues that extend beyond individual borders.

## Implementation is a Long-term Process

The time from policy formulation to the implementation of disaster risk reduction actions involves a long-term effort and the results may take decades to show. The widespread vulnerability related to unsustainable development practice, including poor building construction, lack of land-use planning, inadequate water systems etc., combined with rapid population growth and other pressures to maintain these practices, make disaster risk reduction a long-term, continual process. Success requires patience, attention to opportunities, the identification of priorities and an integrated approach that maximises results through coordinated efforts with other agencies tasked with improving conditions.

Examples of long-term efforts to implement disaster risk reduction policies:

- California initiated an earthquake risk management programme 75 years ago that today is considered an international model. Improved building codes and stronger enforcement practice has produced buildings more capable of resisting earthquake damage, especially school buildings. Despite the success of this programme, vulnerable buildings still exist in most communities. Continued political process will be needed to further the goals and objectives of the programme.
- After a decade and a half of concerted international effort to reduce earthquake disasters, the continued occurrence of catastrophic damage and loss of life in areas frequented by earthquakes show that it will take even longer for effective measures to be implemented at an international scale. A magnitude 6 plus earthquake in the Iranian city of Bam, the site of frequent past earthquakes, resulted in about 20,000 dead, tens of thousands injured and left most of Bam's 80,000 to 90,000 residents homeless. There is clearly much more that needs to be done regarding risk reduction.
- After Hurricane Andrew hit South Florida in 1992, it was decided that major changes must be made to the Florida Building Code. These changes were enacted in 2002 - a full decade later. Four hurricanes hit Florida in 2004 causing wide-spread destruction to many structures built prior to the implementation of the new wind-resistant standards.

These are a few examples of the need to view disaster risk reduction as a long-term, on-going process with rewards that may not be apparent for many years.

### Leadership and good governance

In order to be effective, risk management framework must be built on a foundation of strong leadership and good governance. It is crucial for the government as a whole to be legitimate and respected. Features of good governance include:

- Allowance and promotion of public participation.
- Equity and rule of law.
- Responsiveness, effectiveness and efficiency.
- Sustain the legitimacy of political processes.
- Accountability and transparency in actions.
- Strategic vision.
- Values of equality, empathy and tolerance.

(Cadribo, 2004)

Strong leadership will direct the course of action, the development management and the success of the whole risk reduction programme and framework. It is a driving force; it generates support and ensures success. The leadership is integral in forming public opinion and in upholding the motivation for those involved in the risk reduction framework. This leadership must be endorsed at high government level through support and representation.

### Multi-sector and multi-level cooperation

Disaster risk management requires a wide-range of interests and abilities. There is a growing need for more political and professional interaction through multiple and innovative forms of multi-sector cooperation. There is still a general need to develop policies and plans for various sectors at different levels, with clear roles and responsibilities for contributing to the national disaster risk reduction strategy.

## Regional and international partnerships

Regional and international partnerships can provide information and technical assistance to help reduce the consequences of disasters before they occur. While this expands the traditional role of providing emergency funds for disaster relief and recovery, pre-disaster risk reduction actions lower the need for post-disaster relief. Resources from donors, international and regional agencies, and government and non-government organisations include funds, technical expertise, information and networks for exchange of information.

Many high-level policy makers from the government sector and international agencies, including ADB, DFID, ECHO, UN agencies, USAID and the World Bank recognise the importance of disaster risk reduction.

Suggested forms of cooperation among regional and international partnerships include, but are not limited to:

- Training in different aspects of disaster risk reduction.
- Exchange of both operational and technical professional information.

- International and national partnerships and coalitions.
- Multi-national and multi-jurisdictional coordination in policy formulation and implementation, especially for hazards affecting neighbouring countries.
- Development of consistent methodologies in information collection, assessment of risk.

see Chapter 6

The advancement of information and communications technology has made cooperation easier. However, without the commitment of individuals to cooperate in reducing risk, interventions are likely to fail.

## Monitoring and evaluation

It is possible that even when policies are implemented, they do not reduce risk or that the cost outweighs the benefits. Sometimes there are no accountability mechanisms to ensure that policies are followed. The risk reduction framework should cover monitoring and evaluating the effectiveness of both the policies, laws and enforcement of the laws themselves as well as the effectiveness of the framework and institutional arrangements.

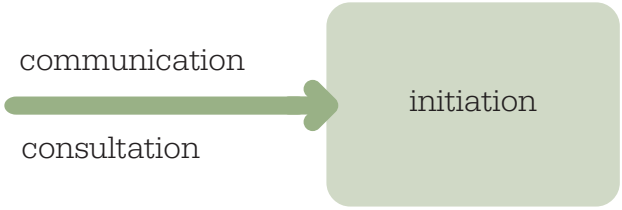
see Chapter 8

Monitoring can be carried out through reports and assessments submitted by implementing organisations and institutions and to provide a process for revising existing policies, legal arrangements and institutional frameworks. The capacity to monitor and evaluate the effectiveness and compliance of policies needs to be part of the disaster risk reduction framework.

# Process

Policy, legal arrangements and institutional framework are the basis of risk management. The process below demonstrates this.

**Step 1. Establishing the context of the disaster risk management process**
The circumstances surrounding the initiation of the disaster risk management process will influence the level of effort, types of issues and concerns to be addressed. The following identifies items that may inform initiation of the process:




- Identify an advocate and leader to guide the disaster risk management process.
- Communicate risks.
- Establish a consultation process.
- Identify the management team.

- Assign responsibilities and resources.
- Review social, economic and political goals and objectives of entity initiating the disaster risk management process.
- Report on past disaster experience.
- Identify stakeholders.
- Review existing disaster policies, plans and procedures.
- Review existing legal and institutional arrangements.
- Determine governance and management arrangements.
- Identify land-use practices.
- Determine demographic parameters.
- Determine socio-economic conditions.
- Identify financial protection instruments.

**Step 2. Formulate disaster risk management policies**

Disaster risk management policies set the course of action to be followed to reduce potential risks. Policies reflect the context of the disaster risk management process. The context typically changes as part of the disaster risk management process. This emphasises the iterative nature of this process and the importance of on-going communication and consultation.

**Step 3. Establish legal arrangements to enact or encourage the implementation of disaster risk management policies**

Legal arrangements include the laws, executive orders, acts, etc. necessary to translate policy into action.

**Step 4. Establish the institutional framework necessary to enact disaster risk reduction policies.**

The institutional framework establishes the roles and relationships among entities charged with implementing the disaster risk management programme.

Policies, institutional and legal arrangements combine to produce a disaster risk reduction framework that supports the implementation and maintenance of disaster risk reduction programmes, plans and projects.

# Case Studies

The case studies provide examples of disaster risk reduction policies, legal arrangements and institutional frameworks established in Japan, Bangladesh, Vietnam and the Philippines. They illustrate the influence of unique social, political, economic and environmental circumstances on the formulation and implementation of disaster risk reduction programmes. A common theme in each case study is the importance of past disaster experience as a motivation to establish disaster risk management programmes.

## Japan

### Acting with great determination

**Japan**

#### Motivation

The Japanese are determined that the catastrophic losses caused by the Great Hanshin-Awaji Earthquake that hit the city of Kobe and surrounding areas on 17 January 1995 do not happen again. The Great Hanshin-Awaji Earthquake caused more than six thousand deaths and US$ 95 billion of direct damage. As a result, the Japanese have prepared a comprehensive disaster risk reduction framework. Japan has experienced the consequences of many natural hazards:

- Frequent earthquake activity
- Volcanic activity, landslides and flooding
- Tsunamis
- Typhoons

Japanese scientists and engineers have collected and analysed hazard data and applied results to the development of modern earthquake resistant design. Many public works projects focus on providing hazard alerts (flow monitors on streams that automatically activate gates to prevent cars from crossing them) and mitigating hazard effects (lava diversion channels and traps for volcanic debris; upgraded seismic building codes for new construction). The occurrence of the Great Hanshin-Awaji Earthquake caused attention to the need to expand existing disaster risk reduction efforts.

#### Policy and legal arrangements

Japan's policy and legal arrangements for disaster risk reduction is given in the Disaster Countermeasures Basic Act passed in 1961 and revised in 1997 based on lessons learned from the Great Hanshin-Awaji Earthquake. The revised act aims to remedy inadequacies in the old disaster reduction framework and promote comprehensive and systematic efforts to reduce disasters.

The Disaster Countermeasures Act has five main foci:
1. Provide public financial resources to cope with disaster;
2. Clarify disaster reduction responsibilities and implement programmes to prepare for, provide emergency response to, and recover from disaster;
3. Promote comprehensive administrative efforts towards disaster reduction;
4. Promote systematic administrative efforts towards disaster management: and
5. Set out procedures for proclaiming disaster emergencies.

### Funding

Approximately 5% of the national budget was allocated in fiscal year 2001. Although not yet a provision, Japan categorises the use of funds for disaster management into four categories:
1. Research and Development
2. Disaster Preparedness
3. Land Conservation
4. Disaster Recovery and Reconstruction

### Roles and responsibilities

Before, during and after disasters, the Disaster Countermeasures Basic Act defines roles and responsibilities for:
- The Prime Minister
- The State and the Central Disaster Prevention Council
- The Prefecture and the Prefecture Disaster Prevention Council
- A City, Town or Village and their Disaster Prevention Council
- National and Local Public Corporations (such as Nippon Telegraph and Telephone, the Bank of Japan, the Japanese Red Cross Society, Nippon Hoso Kyokai (NHK) and other corporations engaged in power, gas, transportation, communication and other public utility work)
- Residents and others

In addition, there are other laws besides the very general Disaster Countermeasures Basic Act including the Flood Control Laws, the Disaster Relief Law, and the Large-scale Earthquake Countermeasures Act that are part of the legal arrangements for disaster risk reduction. Tables 2.1 and 2.2 show excerpts from the Disaster Countermeasures Basic Act and the Large-scale Earthquake Countermeasures Act.

**Table 2.1**
**Excerpts from the Disaster Countermeasures Basic Act**

| |
|---|
| Article 34 Paragraph 2 of the *Disaster Countermeasures Basic Act* states that the Central Disaster Prevention Council shall formulate a basic disaster prevention plan, which shall be reviewed each year in the light of research findings, conditions of disasters that have occurred, and the effect of emergency measures taken, and revise it if deemed necessary. |
| In Article 34 Paragraph 2 of the *Disaster Countermeasures Basic Act* the provisions shall apply *mutatis mutandis* to the formulation and revision of Earthquake Disaster Prevention Basic Plans pursuant to Paragraph 1. |

**(Source: ADRC, 2002)**

**Table 2.2**
**Excerpts from the Large-scale Earthquake Countermeasures Act**

In Article 5 of the *Large-scale Earthquake Countermeasures Act* it states: The Central Disaster Prevention Council shall formulate and promote the implementation of an Earthquake Disaster Prevention Basic Plan for an "Intensified Area," as defined according to the provisions of Article 3 Paragraph 1 of the Act.

When the Central Disaster Prevention Council has formulated or revised a basic disaster prevention plan as provided under the preceding paragraph, it shall promptly report it to the Prime Minister, inform the chief officers of designated administrative organs, governors of prefectures, and designated public corporations, and release to the public an outline of the plan or revision.

The prefect disaster prevention council, the city, town or village disaster prevention council and public corporations are expected to develop and revise annually the operational disaster prevention plan based on the basic disaster prevention plan.

**(Source: ADRC, 2002)**

## Bangladesh
## Moving from disaster response to a more comprehensive approach

**Bangladesh**

Bangladesh experienced a significant number of disaster impacts affecting an increasing percent of people in 1990s. One of the highlights of the actions taken by government is the establishment of institutional framework and policies. Bangladesh is one of the few countries in Asia where there is a separate ministry dedicated to disaster management.

Decision-making at the national government level to develop and devise plans and policies that delegate tasks, roles and responsibilities is an indication of a nation's capacity to recognise the importance of disaster risk reduction at top-level planning.

Since the mid-1990s, the Government of Bangladesh has taken steps to move from disaster response to a more comprehensive approach of reducing disaster risk. This is reflected in Bangladesh's institutional arrangements for disaster risk reduction and in their policies and plans.

### Roles and responsibilities

The structure of the Bangladesh Disaster Risk Reduction Framework comprises:

- Ministry of Disaster Management and Relief (MDMR)
- Disaster Management Bureau (DMB)
- National Disaster Management Council (NDMC)

- Inter-Ministerial Disaster Management Coordination Committee (IMDMCC)
- National Disaster Management Advisory Committee (NDMAC)
- District, Upazila and Union Disaster Management Committees (DMC)

Bangladesh is the only Asian country to have set up a separate ministry for disaster risk reduction which is the focal point for disaster-related issues. The DMB assists the Ministry with information management in all phases of disaster risk reduction, and with developing awareness and capacity building programmes for stakeholders at different levels and sectors.

The NDMC is chaired by the Prime Minister and meets twice annually. It is responsible for: policy formulation; issuance of guidelines; examining the recommendations of the IMDMCC and NDMAC and issue directives for their implementation; arranging framing of disaster-related law; and approving the standing orders and national disaster management plans.

### Bangladesh's report 1999

The IMDMCC chaired by the Minister of Food and Disaster Management is responsible for implementation, coordination, and monitoring and evaluation. District, Upazila and Union Disaster Management Committees have also been established at local-levels. Activities include:

- Standing Orders 1994
- Accountability defined and delegated
- Active political involvement at the highest level
- National Disaster Management Council
- Inter-Ministerial Disaster Management Coordination Committee

A Disaster Management Act has been drafted which gives provision for the formulation of disaster risk reduction policies and plans. Although the Act has not yet been passed, this has not stopped the Government of Bangladesh in taking actions to reduce disaster risks.

### Standing orders on disasters

Bangladesh has created an enabling environment for disaster risk management. The "Standing Orders for Disasters" drafted in 1994 is one such important action. It spells out the roles and responsibilities of each ministry and major agency / department to facilitate early warning and response actions in a coordinated manner. The National Disaster Management Plan for the period 1995-2010 has been developed in conjunction with the Standing Orders, but also covers rehabilitation, preparedness and mitigation measures. In addition, Disaster Action Plans for district, upazila and union levels are developed. For example, action plans to simplify existing cyclone warning signals have been initiated.

### Comprehensive Disaster Management Programme

In 2004, the UNDP initiated a comprehensive programme for risk management with the government of Bangladesh called the "Comprehensive Disaster Management Programme" (CDMP). It is currently being implemented with the

participation of the government and other stakeholders, such as NGOs, academic institutions and private sector.

CBDM is made up of five components, one of which is capacity building. Capacity building addresses the training and professional development of the Ministry of Food and Disaster Management (MFDM) staff. This is done through:

- Policy changes - Review and revision of MFDM rules of business.
- Professional development plan.
- CDMP standard training curriculum for professional development.
- Partnerships.
- Support from international institutes.

Other components address the wide ranging topics important in risk reduction to create a useful framework and plan.

The NDMC is comprised of the following members:

- Minister, Ministry of Water Resources
- Minister, Ministry of Finance
- Minister, Ministry of Local Government, Rural Development & Cooperatives
- Minister, Ministry of Communications
- Minister, Ministry of Health and Family Welfare
- Minister, Ministry of Home Affairs
- Minister, Ministry of Food
- Minister, Ministry of Disaster Management and Relief
- Minister, Ministry of Agriculture
- Minister, Ministry of Shipping
- Chief of Staff, Army
- Chief of Staff, Navy
- Chief of Staff, Air Force
- Cabinet Secretary
- Principal Secretary to the Prime Minister
- Secretary, Ministry of Agriculture
- Secretary, Ministry of Finance
- Secretary, Ministry of Health and Family Welfare
- Secretary, Ministry of Home Affairs
- Secretary, Ministry of Defence
- Secretary, Ministry of Local Government
- Secretary, Ministry of Roads and Railways
- Secretary, Ministry of Shipping
- Secretary, Jamuna Bridge Division
- Secretary, Ministry of Water Resources
- Secretary, Ministry of Food and Disaster Management
- Secretary, Ministry of Information
- Member, Socio-Economic Infrastructure, Planning Commission
- Principal Staff Officer, Armed Services Division

Bangladesh's commitment to risk reduction has enabled it to create this effective risk reduction framework. The risk reduction strategy supported and driven by the top government level has included many programmes that have enabled effective risk reduction to take place. Community based programmes have been very effective as well as the standing orders, disaster management plan and mitigation measures.

Vietnam

# Vietnam

## Policy and institutional framework spanning from central to local-level

### Motivation

People in Vietnam have been living with floods for centuries, constructing stilted houses, evacuating to higher grounds during the flood season and planting seasonal crops to reduce flood risks. After several decades of constructing large structures to control flood in Vietnam, it is evident that these historical approaches and large structures have not provided adequate protection from floods.

### Policy and legal arrangements

Over the past decade, Vietnam has adopted a number of policies and legal arrangement to address flooding, including:

1. The Central Committee for Flood and Storm Control (CCFSC) was established in May 1990 in accordance with the Law on Water Resources. CCFSC mainly focuses on emergency response. Tasks of CCFSC include:
   - Developing programmes, plans, measures for disaster reduction in coordination with other agencies, related organisations, and science and technology research.
   - Direct implementation of disaster mitigation activities.
   - Coordination with international organisations to increase cooperation in the field of disaster reduction in Vietnam.

2. Decrees 168-HDBT of the Council of Ministers - 1990
   - During the year 2000, the Government of Vietnam introduced the "Living with Flood" concept that became the strategy for disaster risk reduction in the Mekong River Delta. By building on traditional practices and by promoting regional and international cooperation (see Box 2.3), the Government of Vietnam has been planning and implementing a range of long, medium, and short-term measures to reduce flood risk. These measures contribute to the government's vision of achieving socio-economic stability and sustainable development by 2010.
   - Second Strategy and Action Plan for Disaster Management and Mitigation (2002-2020).

**Box 2.3**

**Article 5 of Vietnam's ordinance on prevention and control of flood and storm** states: "Vietnam shall expand its cooperation with countries, international organisations, foreign organisations and individuals in the field of scientific research and study, technology transfer, technical and professional training on forecasting, preventing, controlling and mitigating the consequences of floods and storms."

(Source: *www.adrc.or.jp*)

Vietnam has a comprehensive system of organisations spanning from central to local government. Provincial, district and village People's Committees, elected by the people, form a hierarchical ladder of political power sharing. There is also a network of Women's Unions, which contribute to the hierarchical flow of information.

## The Philippines

### Option for city development and risk management, Naga City experience

**Philippines**

> *"Successful leadership starts with a vision. When I ran in 1987, I knew clearly where Naga is (problem definition), what I want Naga to be (vision) and what must be done to get there (strategic management). The important corollary is that the leader must be competent and adequately prepared for the demands of the leadership".*
>
> *Jesse M Robredo, Mayor, Naga City Philippines*

*"During the local elections in 1988, a young bachelor named Jesse M Robredo was among the mayoral candidates who were invited to a forum organised by the local NGOs and the city's civic organisations. With the fervor and spirit of the EDSA revolution still fresh in the hearts, the people demanded that sincere and committed leaders should earn their vote."*

*"At the forum, the upstart candidate listened and responded positively to the people. He signed a covenant with the people that if elected, he would attend to urban concerns as poverty and burgeoning number of squatters were among the top issues of the time. A former Program Director of the Bicol River Basin Development office, Robredo seems to have made a positive impression on the urban poor in Naga city."*

*"True to his word, Robredo immediately convened a meeting after becoming the mayor, to flesh out details of an Urban Poor Affairs Office (UPAO). This was a beginning of a mutually beneficial partnership between the poor people and the local government. Barely a year in his post, Robredo established the "Kaantabay sa Kauswagon" program. The program is a tripartite partnership of local government, the urban poor, and private landowners designed to empower the urban poor to respond to two main problems underlying urban poverty, viz., "**the absence of land tenure and lack of basic infrastructure and facilities**. This approach helped him to create safer communities in Naga. Attempts to empower the urban poor were done three years before the local government code of the Philippines was enacted to provide local government units greater autonomy in managing their affairs. The City Government of Naga mobilised its resources to put up housing projects for urban poor and provided land tenure to them."*

*"Emergency Rescue Naga (ERN) is a showcase of a successful community resources mobilisation effort in Naga city combining the resources of the city*

*government, other government agencies and private sector institutions. ERN provides the following round the clock services;*

- *Emergency rescue and transfer*
- *First aid*
- *Ambulance services*
- *Quick police response*
- *Fire fitting and disaster preparedness and control."*

*"ERN is able to respond to disasters and emergencies within three to five minutes. For further barangay (villages) the response time is 30 minutes."*

*"Another successful endeavor of Mayor Robredo is the "Metro Naga Development Council" or "Metro Naga" concept. Metro Naga is composed of Naga and 14 rural municipalities clustered around the city for the task of local development in an environment of increased autonomy and ever present problem of limited resources. Given the poor condition of the area, municipalities in Metro Naga can hardly afford to provide the services needed by their constituents. But Naga city as a big brother helps in providing services including emergency services for other smaller municipalities. In return they provide opportunities for city of Naga to use the spare areas for projects such as housing and human settlement development projects, solid waste disposal through development of landfill sites and even to tackle flood problem since it is easy to handle the flood problem in upper watershed area rather than within the city of Naga."*

Extracted from book "Making Local Governance Work, The Naga City Model" by Jesse M Robredo.

*http://www.naga.gov.ph*

# Lessons Learned from the Case Studies

**Lessons learned from the case studies include:**

- Catastrophic disasters can generate the political will to adopt disaster risk reduction policies and legal arrangements, and establish institutional frameworks to guide their implementation. This is shown repeatedly in the case studies by the adoption or revision of disaster risk reduction programmes following a disaster.

- Unsustainable development resulting from rapid population growth, increased development in hazardous areas and lack of construction codes increases vulnerability to disaster. This increased vulnerability contributes to the motivation to adopt disaster risk reduction programmes.

- Incorporation of disaster risk reduction into legal arrangements guiding programmes targeting local communities, such as planning, construction, health and welfare, provides a mechanism for delivering information and encouraging and or mandating disaster resistant practices.

- Local government, non-government organisations and community networks are increasingly being recognised as necessary to the development of an effective disaster risk management programme. The case studies mention mechanisms and efforts to provide information and technical expertise to the local-level and to establish rules and regulations that mandate or guide planning and building practice.

- Disaster risk reduction does not depend on a single organisation or institution, but requires internal and external collaboration. Case studies involve adopting policies that establish mechanisms to coordinate among key stakeholders.

- The case studies demonstrate that there is no one model to the formation of a disaster risk reduction framework. The various approaches presented in the case studies provide an opportunity to identify one that may work in particular circumstances or provide ideas that will help to develop individual approaches.

- To formulate or revise a risk reduction framework it is important to assess what the risks are: how big, how frequent and where they occur.

- It is important to examine the recommendations made by implementing organisations and use to make revisions to existing policies, legislation and institutional arrangements. Capacity to effectively monitor and evaluate the

effectiveness and compliance of policies needs to be built. Indicators need to be developed to measure effectiveness. Evaluation studies developed by non-government organisations and academic institutes could be promoted.

- Many government institutions involved in disaster risk reduction have largely focused on response activities. Now with a shift to a more integrated approach, understanding and commitment for such an approach needs to be fostered in order to effectively frame laws and policies.

- An understanding and commitment for the disaster risk reduction approach should not be limited to those formulating the policies, but also to those implementing the policies.

- Placing greater emphasis on the role of municipalities, local governments and individuals would help foster disaster risk reduction at the local-level. However, responsibilities at the local-level cannot simply be increased without any support from the provincial and national governments. The absence of a strong provincial commitment may make it difficult for municipalities to reject development in flood risk areas or conversely municipalities may loosen development restrictions to encourage local economic development. In addition, a lack of technical and financial support would make it even more difficult.

# Discussion Questions

The following questions are intended to foster discussion among participants in disaster risk reduction activities. There are no "right or wrong" answers to these questions. Participants may want to discuss other issues of greater concern than the ones presented below. In discussing these or other questions, consideration must be given to the unique circumstances surrounding the development of your risk reduction approach.

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**Policies and legal arrangements** (national, provincial, district, community)

- What laws, acts, standards, guidelines etc. exist in your community, ministry, department, country etc. to implement disaster reduction actions?
- Who should be involved in developing new or revising existing disaster risk reduction policies?
- Are there policies and legal arrangements that can be amended to include disaster risk reduction goals and objectives?
- If your organisation has implemented disaster risk reduction policies and legal arrangements, did they have:
  - Intended effects on the target population?
  - Unintended side effects?
  - Were unintended side effects adverse?
  - Did implementation take place within a reasonable time frame?
  - Were the costs of implementation acceptable and reasonable?

**Institutional frameworks**

- Is there a central organisation or institution in your country or community charged with coordinating disaster risk reduction activities?
- Is there an institutional framework that shows how governmental and non-governmental organisations and institutes coordinate to address issues related to disaster risk reduction?

**Disaster risk reduction framework**

- What plans, procedures, documents, etc. does your community, ministry, department, etc. have to implement disaster risk reduction activities?
- Are these activities identified in disaster risk reduction policies and legal arrangements?

# Challenges

Over the past decade many Asian countries have improved their ability to respond to disasters. Most states have legislated and established disaster risk reduction apparatus and many have developed national emergency plans that serve as the basis for inter- and intra-governmental coordination during disaster events. In recent years, the increased severity of disasters and a range of public awareness endeavors have raised governments' sensitivity to the need for more interventions to reduce disaster risks.

While this new environment provides an opportunity for more cost-effective and sustainable efforts in disaster risk reduction, the increased awareness of governments and donors has yet to translate into tangible action where disaster risk reduction is incorporated in the plans and practices of multiple sectors and government levels.

**Motivation and capacity**

Disaster risk management policies and legal arrangements may not be a priority due to competing concerns. The occurrence of disaster events in the region and in other parts of the world may increase disaster risk reduction priority. Communication of risks from credible sources that are presented in a manner accessible to government officials and policy makers may provide the motivation needed to proceed.

People must be convinced that their lives, property and livelihood are in danger unless disaster risk reduction is implemented and maintained. "People" refers not only to communities and businesses likely to be affected by disasters, but also to government officials who have to juggle a number of other development needs and to donor agencies that have not included disaster risk reduction as part of their development agenda.

Disaster risk management policies and legal arrangements may be in place, but are not being implemented. Motivation tools used to increase the priority not being addressed at all may also help improve implementation and maintenance.

For disaster risk management policies to be implemented, people need to have the capacity to actions. People need to know what can be done to reduce risk and have the capacity to reduce risk. Priority needs to be given to the development of information and understanding (knowledge development) that can develop capacity. The various and complex dimensions of disaster risk management need to be taught and continually reinforced through structured educational programmes and professional training, as well as through informal training and community-based capacity building initiatives. For more details see Chapter 6.

**see Chapter 6**

### Integrating risk reduction into governance

Although risk reduction is now widely adopted as a concept, it still remains a challenge to fully integrate it into governance. It is a process that takes time and must follow a change in culture and thinking. Risk reduction should be held as an important part of development plans, and economic and political strategies. It should be given its own budget line, be a subject in capacity building of civil staff and allocated resources.

### The changing environment

Demographic, social and environmental changes take place quicker than policy, plans or simple procedures that can be applied and be effective. The government must be able to anticipate change to develop the capacity to adapt and respond quickly to changes. Complex conditions with multiple dimensions such as urbanisation and climate change require timely and strategic action that takes into consideration the wider environment context and stakeholders.

### Measuring effectiveness

Indicators and assessment methodologies need to be developed to measure programme effectiveness. A number of organisations are working to develop a global framework to monitor and evaluate disaster risk reduction for application at a national level. They include:

- The Instituto de Estudios Ambientale's Indicators for Disaster Risk Management Project for countries of Latin America, supported by the Inter-American Development Bank.
- Benfield Hazard Research Center's Disaster Risk Reduction Mainstreaming Framework, complete with indicators and benchmarks.
- United Nations Development Programme's Disaster Risk Index that allows country-by-country comparisons of the risk of loss of life associated with earthquakes, tropical cyclones and floods. The Index also identifies some development factors that contribute to risk.
- United Nations International Strategy for Disaster Reduction's Draft Framework to Guide and Monitor Disaster Risk Reduction.

Finding the motivation and resources to use these indicators to regularly measure the effectiveness and achievements of disaster risk management programmes will be a major challenge.

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# Resources

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ADRC has worked to foster cooperation among countries in Asia. A multi-lateral organisation for disaster risk reduction based in Kobe, Japan, ADRC is composed of 23 Asian Member Countries and four Advisory Countries. ADRC's website provides full texts and summaries of policies and legislation, and organisational chart of institutional arrangements of member countries in Asia.

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# assessing the risk

# 3

## Chapter Brief

## Key Words

Acceptable Risks
Capacity
Geographical Information Systems
Hazard
Hazard Assessment
Residual Risks
Risk
Risk Assessment
Risk Analysis
Risk Evaluation
Vulnerability
Vulnerability Assessment

## Introduction

What is risk?
How is risk created?
How is risk perceived?
How is risk reduced?

## Concepts of Risk Assessment

Purpose of Risk Assessment
Characteristics of a Risk Assessment
Steps in a Risk Assessment

## Risk Assessment Process

Risk Assessment Steps

## Tools and Techniques

Assessing the Risk: Checklist

## Case Studies

India. Vulnerability Atlas provides a national resource for planning
Vietnam. Developing framework for joint assessments
Lao PDR. Reducing urban fire risks
Sri Lanka. Reducing landslide risks
Nepal. Ward 34 takes matter into their own hands

## Case Study Lessons Learned

## Discussion Questions

Questions for Working at Community Level

## Challenges

## References

## Resources

*Risk cannot be totally eliminated.*
*Neither does risk assessment itself reduce risk.*

# Chapter Brief

- Risk is the possibility of harmful consequences catalysed by the interactions of three elements - hazard, exposure and vulnerability. If the influence to the society of one or more elements can be reduced, the risk also can be reduced.

- Risk assessment is an essential component in the disaster risk management decision-making process.

- The purpose of risk assessment is to define the nature of the risk problem, answering questions about characteristics of potential hazards (such as frequency, severity), vulnerabilities of communities and potential exposure to given hazard events.

- A risk assessment consists of identifying the hazard, assessing the hazard impact and vulnerability.

- Risk assessments are multi-hazard, multi-sectoral, multi-level, multi-stakeholder, and multi-phase.

- Risk evaluation helps prioritisation of risk reduction measures, giving due consideration to most severe, frequent and harmful hazard impacts; cost effectiveness of the measures; availability of funds, etc.

# Key Words

## Acceptable Risks

The level of loss a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions.

In engineering terms, acceptable risk is also used to assess structural and non-structural measures undertaken to reduce possible damage at a level which does not harm people and property, according to codes or 'acceptable practice' based, among other issues, on a known probability of hazard (UNISDR, 2004).

## Capacity

A combination of all the strengths and resources available within a community, society or organisation that can reduce the level of risk, or the effect of a disaster.

Capacity may include physical, institutional, social or economic means as well as skilled personal or collective attributes such as leadership and management. Capacity may also be described as capability (UNISDR, 2004).

## Geographical Information Systems

Analysis that combine relational databases with spatial interpretation and outputs often in form of maps. A more elaborate definition is that of computer programme for capturing, storing, checking, integrating, analysing and displaying data about the earth that is spatially referenced.

Geographical information systems are increasingly being utilised for hazard and vulnerability mapping and analysis, as well as for the application of disaster risk management measures (UNISDR, 2004).

## Hazard

A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydrometeorological and biological) or induced by human processes (environmental degradation and technological hazards). Hazards can be single, sequential or combined in their origin and effects. Each hazard is characterised by its location, intensity, frequency and probability (UNISDR, 2004).

## Hazard Analysis

Identification, studies and monitoring of any hazard to determine its potential, origin, characteristics and behaviour (UNISDR, 2004).

## Hazard Assessment

Hazard assessment implies the determination of the magnitude or intensity of a hazard over time. For processes like floods it is much easier to evaluate their probability of occurrence. Mass movements often correspond to gradual (landslides) or unique events such as extremely rapid flows. It is therefore difficult to predict the return periods. The level of severity of natural hazards can be quantified in terms of the magnitude of the occurrence as a whole (event parameter) or in terms of the effect the occurrence would have at a particular location (site parameter) (AUDMP-ADPC UDM materials).

## Residual Risks

Risks that cannot be reduced because no risk reduction solution exists or potential solutions are not feasible, are called residual risks.

## Risk

see Chapter 1 for definition

## Risk Assessment / Analysis

see Chapter 1 for definition

see Chapter 1

## Risk Evaluation

The social and political judgement of the importance of various risks by the individuals and communities that face them. This involves trading off perceived risks against potential benefits and also includes balancing scientific judgements against other factors and beliefs (AUDMP-ADPC UDM materials).

## Vulnerability

The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards.

For positive factors, which increase the ability of people to cope with hazards, see definition of capacity (UNISDR, 2004).

## Vulnerability Assessment

Assessment as the degree of loss to a given element at risk (or set of elements) resulting from a given hazard at a given severity level (AUDMP-ADPC UDM materials).

# Introduction

A risk assessment determines the likelihood that adverse consequences (risks) will occur as a result of potential hazards, such as floods or earthquakes and the elements that are exposed to those hazards. The risk assessment process facilitates risk reduction decisions by identifying, structuring and presenting the best available risk information for consideration. The risk assessment guides, but does not dictate decisions about risk. The significance of risk depends upon the point-of-view of the specific groups involved in initiating the risk assessment. These differences in point-of-view guide the selection of disaster risk reduction measures best capable of achieving each group's pre-established goals and objectives.

## What is risk?

Risk may be simply stated as the probability that negative consequences will occur. Risk consists of the interaction of three elements:

**Hazard:** probability of occurrence, severity and duration of analysis; eg. 10% probability of 0.3g ground shaking occurring within 50 years; a qualitative description may be conveyed in a scenario describing the impact of a hazard event on an area of concern. The scenario can be displayed on one or more hazard maps.

**Exposure:** characteristics of values at risk, i.e. inventory, that will be analysed under hazard conditions; for example, light wooden buildings lacking structural connections, struts, etc.

**Vulnerability:** expresses the potential loss of life, damage or estimated costs caused by the impact of potential hazard events on the exposure inventory. Disaster events reveal community risks by demonstrating the vulnerability of existing social, environmental and development practices.

## How is risk created?

- Changes in the hazard environment (global climate change, sea level rise, activation of dormant fault zones, etc).
- Increase in vulnerability (physical, social, economic, environment).
- Increase in exposure (due to urbanisation, land scarcity, economic pressure for higher production, etc).
- Decline in capacity to cope (resource constraints for training and capacity building, different political priorities affecting disaster reduction, etc).

## How is risk perceived?

People perceive risk differently, depending on their experiences, exposure and understanding. They often set an arbitrary level of risk that they consider

acceptable. This arbitrary level may be based on past experience, convenience, culture or resource availability. Future risk decisions will generally be based on this arbitrarily defined level of acceptable risk. Governments may also establish arbitrary levels of acceptable risk. Risk reduction actions defined according to an arbitrary baseline may be insufficient to achieve society's social, economic and environmental goals. On the other hand, if they are overly protective, may result in excessive risk reduction costs.

## How is risk reduced?

Methods to reduce risk are discussed in Chapter 4 and Chapter 5. These two methods may be classified as:

- **Preparedness**, including steps taken before a disaster to plan, train and exercise emergency response and recovery actions that must be implemented in case a disaster occurs.

- **Mitigation**, including long-term, on-going efforts to develop disaster resistant nations, communities, neighborhoods, etc. Mitigation actions may be taken before, during and after a disaster and may include mitigation planning, training and, the enforcement and adoption of engineering building codes, etc.

**see Chapters 4 & 5**

# Concepts of Risk Assessment

The risk assessment forms the core of the disaster risk management process and results in the identification of potential risk reduction measures. Risk assessments integrated into the development planning process can identify actions that meet both development needs and reduce risk. Identified risk reduction actions can be incorporated into development polices and legal arrangements. For example, policies and associated laws and regulations to reduce the risk of fire can require or encourage the replacement of old water pipes and fire hydrants as part of road improvement projects.

Risk assessment is an essential element of the disaster risk management decision-making process. The assessment includes risk identification, risk analysis and risk evaluation. The focus is on identifying, structuring and presenting the best available risk information to define the risk problem (eg. the risk created by the interaction of the hazards, exposure inventory and vulnerability inventory). Risk assessment determines the likelihood (probability) that negative impacts will occur as a result of identified hazards and the potential severity of those impacts.

The risk evaluation determines the significance of risk. Its significance depends upon the point-of-view of those involved. Risk is subjective and varies over time. The context that frames the risk assessment is also dynamic. These differences in point-of-view and context guide the selection and prioritisation of disaster risk reduction measures.

see Chapter 7

The risk assessment guides, but does not dictate decisions about risk. Authorities responsible for the policy formulation, legal arrangements and institutional frameworks that are required for effective implementation must be convinced of the need to reduce risk and must have confidence in the measures selected. The result of a risk assessment can change the perception of risk by community leaders, programme managers, high-level officials etc. leading to increased concern about the need to implement risk reduction measures in order to achieve a sustainable society. This concern may support the inclusion of risk in the development agenda, resulting in improved development decisions.

## Purpose of Risk Assessment

The purpose of risk assessment is to define the nature of the risk problem. The risk assessment provides a systematic process to answer questions about the frequency and severity of potential hazards and national and / or community vulnerabilities. Asking questions helps establish the scope of the risk assessment.

There are many advantages in defining the nature of the risk problem, including:

- Identification of the hazards to which the area being assessed is susceptible.

- Identification of the location, nature and probability of hazard events.
- Determining who and what are vulnerable, to what degree, and how they have become vulnerable.
- Identification of the capacities and resources available for reducing vulnerabilities.
- Determining acceptable levels of risk, based on people's perception of risk.
- Providing a tool for determining the potential socio-economic, physical and environmental risk.
- Providing an instrument for decision-making, policy formulation, conceptual improvements and accounting.
- Allowing for projection of future performance of physical build up, social and environmental elements and economy.
- Allowing for determining the capacity of the government to face reconstruction tasks in an event of a disaster.
- Facilitating training, capacity building and resource mobilisation to face future events.

(UNISDR, 2002)

### When are risk assessments carried out?

Risk assessments can be conducted anytime. For example: subsequent hazard events provide opportunity for testing the validity of design decisions, safety factors applied, implementation methodology and performance during the design period of existence.

Immediate consequences following a disaster will reveal the deficiencies in emergency management. Risk assessments initiated during the response phase commonly focus on concerns and needs of affected people and the safety of first responders. Risk assessments initiated during the recovery, rehabilitation and reconstruction phases can facilitate a change in risk perception, increased integration of risk reduction measures into development practice and strengthen resistance to future disasters, which potentially reduces response and recovery needs.

## Characteristics of a Risk Assessment

Risk assessments are:

- **Multi-hazard:** identify the range of hazards and the impact of these hazards on current and planned investments, on different groups of people, and their ability to resist and cope with the impact of hazards.
- **Multi-sectoral:** consider current and planned land-use, the building type, communication networks, people's livelihood, health and education systems, and people's awareness and commitment to protecting themselves.
- **Multi-level:** look at the national, provincial and local policies, plans and activities to see how they have contributed to increased or reduced risk, their strengths

and weaknesses in dealing with risks, and what resources are available at different levels to reduce risks.

- **Multi-stakeholder:** involve relevant individuals and organisations. They may be directly responsible for reducing a specific risk, such as fire. They may be directly affected by risks and / or the measures selected to control them, such as the local residents and business owners. They may have information important to mapping hazards or assessing risks, such as local geologists, engineers, land-use planners, etc.
- **Multi-phase:** consider actions for response, recovery, mitigation and preparedness.

## Steps in a Risk Assessment

A risk assessment consists of: a) identifying and assessing the hazard; b) assessing vulnerabilities and capacity.

A hazard assessment essentially involves:

- **Hazard identification**: including estimation of probabilities of occurrence of various hazards of different magnitudes;
- **Risk estimation**: combining information on the magnitude and frequency of hazards with vulnerability to them;
- **Risk evaluation** of the significance and acceptability or tolerance of risk, examining the balance between risks and benefits; and
- **Risk management** involving decisions on the acceptability of risks and implementation of mitigation measures to reduce or eliminate unacceptable risks and damage.

(EC 2000: World Bank, 1997)

The methods used to organise and analyse the scientific knowledge and information about potentially hazardous events varies according to the availability of hazard information, inventory data, vulnerability functions and the capacity of those performing the risk analysis to apply qualitative and / or quantitative analysis methods.

### Hazard identification

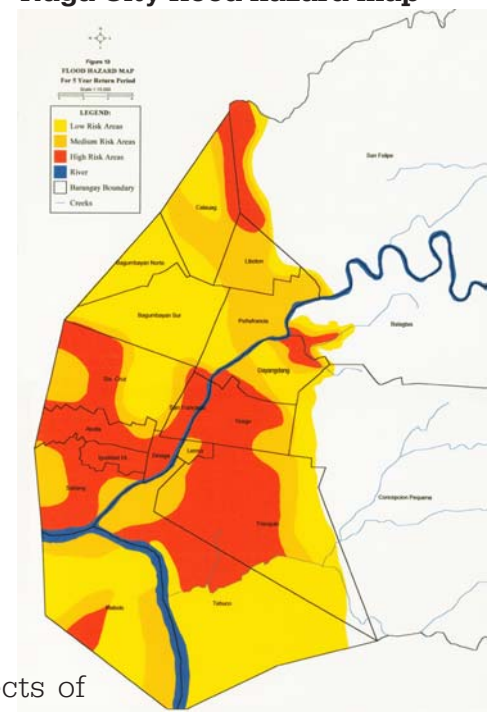
To perform risk calculations we need to know the probability of the occurrence of a hazard of a certain level of severity, within a specific period of time, in a given area. The level of severity of natural hazards can be quantified in terms of the magnitude of the occurrence as a whole (event parameter) or in terms of the effect the occurrence would have at a particular location (site parameter).

Hazard data is potentially available in various forms (Twigg, 2004) (see Figure 3.1):

- Geological hazard maps showing fault lines or unstable slopes liable to cause landslides.

- Hydrological maps of flood-prone areas.
- Wind, rainfall and sea-surface temperature data.
- Recordings of seismic activity from monitoring stations.
- Local rainfall and flood level records.

**Figure 3.1**
**Naga City flood hazard map**




Modern technology has advanced hazard mapping and prediction of future events considerably through techniques such as geological mapping and satellite imagery, production of high-resolution maps and computer modeling. New geographic information system (GIS) mapping techniques in particular, are revolutionising the potential capacity to analyse hazards, risks and vulnerability (EC, 2000: World Bank, 1997).

A summary of primary and secondary effects of natural hazards is presented in Table 3.1:

**Table 3.1**
**Summary of primary and secondary effects of natural hazards**

| Natural Hazards | Primary Phenomena | Secondary Phenomena |
|---|---|---|
| Cyclone | Strong winds, heavy rains | Flood and sea surge, landslide, water pollution |
| Flood | Flooding | Water pollution, landslide, erosion |
| Tsunami | Flooding* | Water pollution, landslide, erosion, deposition |
| Earthquake | Violent ground motion, fault rupture | Soil liquefaction, fire, flood, landslide, tsunami, water pollution |
| Landslide | Ground failure | Flooding via river damming, water pollution, debris flow |
| Volcano | Lava flow, pyroclastic flow / surge, ash fall, volcanic gases | Fire, air pollution, tsunami, lava flows, water pollution, ground subsidence |

**(Source: ICE UK, 1995)**

*Note on Tsunami: Some additional primary phenomena were observed in the December 26, 2004 Tsunami. Box 3.1 shows additional characteristics of tsunami waves

**Box 3.1**

## Characteristics of tsunami (seismic sea wave):

- The velocity of the wave depends on the depth of water at the point where the seismic disturbance occurs. Initial wave velocity may be as high as 900 kph (560 mph), slowing to approximately 50 kph (31 mph) as the wave strikes land.
- Warning time depends on distance from point of wave origin.
- Speed of onset varies.
- Impact on shoreline can be preceded by a marked recession of normal water level prior to arrival of the wave. This can amount to a massive outgoing tide, followed by the incoming tsunami wave. People may be trapped whilst investigating the phenomenon of the outgoing tide and then struck by the incoming wave.
- The tsunami wave can be very destructive; wave heights of 30 metres have been known.
- Impact can cause: flooding; salt water contamination of crops, soil and water supplies; also destruction of or damage to buildings, structures and shoreline vegetation.

(Carter, ADB 1991)

### Vulnerability

A vulnerability and capacities assessment and analysis is conducted to understand why disasters happen, why different groups are more susceptible than others, and how to estimate future disaster risk (Anderson and Woodrow, 1998). Vulnerability is the susceptibility of things to be damaged by a hazard. People's lives and health are at risk directly from the destructive effects of the hazard. Their incomes and livelihoods are at risk because of the destruction of buildings, crops, livestock or equipment, which these depend on. Each type of hazard puts a somewhat different set of elements at risk. Most disaster mitigation work is focused on reducing vulnerability, and in order to act to reduce vulnerability, development planners need an understanding of which elements are most at risk from the principal hazards that have been identified.

### Principal vulnerable elements

see Table 3.2

It is important for development planners to make some effort to quantify the tangible aspects of vulnerability and loss to assist mitigation and preparedness planning. Table 3.2 lists some tangible and intangible vulnerable elements. Some methods for doing this are discussed below. But, as explained earlier, the 'intangible' aspects of vulnerability will often be as important as the quantifiable aspects and must not be neglected. Local experience is a good guide to what is vulnerable in a society, and the list of potentially vulnerable elements should be supplemented by a study of written reports and the knowledge (often never recorded) of those who lived through previous disasters.

**Table 3.2**
**Principal vulnerable elements**

| | Principal vulnerable elements | |
|---|---|---|
| | **Tangibles** | **Intangibles** |
| Floods | Everything located in flood plains or tsunami areas. Crops, livestock, machinery, equipment, infrastructure, weak buildings. | Social cohesion, community structures, cultural artifacts. |
| Earthquakes | Weak buildings and their occupants. Machinery and equipment, infrastructure, livestock, contents of weak buildings. | Social cohesion, community structures, cultural artifacts. |
| Volcanic eruption | Anything close to volcano. Crops, livestock, people, combustible roofs, water supply. | Social cohesion, community structures, cultural artifacts. |
| Land instability | Anything located on or at base of steep slopes or cliff tops, roads and infrastructure, buildings on shallow foundations. | Social cohesion, community structures, cohesion, cultural artifacts. |
| Strong winds | Lightweight buildings and roofs. Fences, trees, signs. Boats, fishing and coastal industries. | Social cohesion, community structures, cultural artifacts. |
| Drought / desertification | Crops and livestock. Agricultural livelihoods. Peoples' health. | Disruption of populations. Destruction of the environment. Cultural losses. |
| Technological disasters | Lives and health of those involved or in the vicinity. Buildings, equipment, infrastructure, crops and livestock. | Destruction of the environment. Cultural losses. Possible population disruption. |

### Elements at risk in human settlements

Elements at risk undergo damage or destruction due to the non-availability, non-enforcement, or non-compliance of land-use regulation and building codes. Box 3.2 lists examples of elements at risk.

**see Box 3.2**

**Box 3.2**

**Physical**
- Infrastructure, eg. roads, railway, bridges, harbour, airport, etc.
- Critical facilities, eg. emergency shelters, schools, hospitals, nursing homes, fire brigades, police, etc.
- Utilities
- Services: transport, communications, etc.
- Government services: all levels - national, provincial, local
- Machinery and equipment
- Historical structures and artifacts

**Economic**
- Business and trade activities
- Access to work
- Agricultural land
- Impact on work force
- Productivity and opportunity cost

**Societal**
- Vulnerable age categories
- Low-income group people
- Landless / homeless
- Disabled
- Gender

**Environmental**
- Environmental resources: air, water, fauna, flora
- Biodiversity
- Landscape

### Quantifying vulnerability

Vulnerability can be quantified as the degree of loss to a given element at risk (or set of elements) resulting from a given hazard at a given severity level. The distinction between this definition and that of risk is important to note. Risk combines the expected losses from all levels of hazard severity, also taking into account their occurrence probability. The vulnerability of an element is usually expressed as a percentage loss (or as a value between 0 and 1) for a given hazard severity level. The measure of loss used depends on the element at risk, and accordingly may be measured as a ratio of the numbers of killed or injured to the total population, as a repair cost or as the degree of physical damage defined on an appropriate scale. In a large number of elements, like building stock, it may be defined in terms of the proportion of buildings experiencing particular level of damage.

## Risk evaluation

The risk evaluation determines the significance of the risk analysis to the ability of project participants to achieve pre-established goals and objectives. Risks are ranked according to their significance, the existence and feasibility of risk reduction solutions, the cost-effectiveness of potential risk reduction solutions, etc. Risks that cannot be reduced because no solution exists or potential solutions are not feasible are called residual risks. Residual risks may be addressed through risk financing mechanisms. Risk funding mechanisms do not reduce potential damage and harm, but do reduce potential financial loss. Risks that have been analysed, but will not be addressed by the implementation of risk reduction actions are considered acceptable risks. Note that acceptable risks are ones that have been assessed and evaluated. Risks that do not affect initial areas of concern may be addressed at a later time if they exceed a level of agreed upon risk acceptance.

# Risk Assessment Process

## Risk Assessment Steps

The basic steps of a risk assessment process include planning, data collection, risk analysis, risk evaluation and risk communication (presenting data and results).

**Step 1. Planning**

Plan your risk assessment. The objectives and context of the assessment needs to be clear from the start because they will determine the type of data to be collected, how it will be presented, and the tools and techniques to be used. Risk assessments need to address the priorities, interests and capacities of the community at risk to ensure that their problems will be addressed with cost-effective and sustainable interventions. Planning activities may include:

- Setting up goals, objectives and parameters (scale, methodology, tools to be used and area coverage).
- Encourage commitment and participation. Mapping is an effective tool to encourage participation of the community. Agreeable ideas or conflicts can be identified during the mapping process.
- Stakeholders, partners and coalitions. It is fundamental that all groups in the community participate in the risk assessment (eg. elders, monks, women, children and others). Additional support may come from national and international organisations and institutes.

**Step 2. Data collection**

Data collection is a major part of the risk assessment process. The access to reliable and accurate data poses a big challenge to data collection.

- Select the type of data **(data related to potential hazards, vulnerabilities, degree of exposure)** needed, based on the goals and objectives identified in Step One.
- Identify a data manager to direct the data collection process, including setting data standards, training and education, selection of staff for data collection and maintaining the risk assessment database.
- Identify data sources. This may include newspaper archives, scientific and engineering reports, interviews, field research, tax records, etc.

**Step 3. Risk analysis**

Choose an appropriate method to analyse the data collected. The method will depend upon the application of results, data completeness, analysis capabilities (qualitative or quantitative), training and education, hardware and software, etc.

**Step 4. Risk evaluation**

Review the capability of the identified risk reduction actions to meet the criteria for a good solution established during the planning phase. Risk reduction actions should further project goals and objectives.

### Step 5. Risk communication and consultation

Risk communication and consultation are essential and on-going parts of the disaster risk management process throughout, including the risk assessment. Communication and consultation with all stakeholders ensures that the risk assessment addresses issues of concern, keeps stakeholders up-to-date on progress and provides evolving information on the nature of the risk.

### Step 6. Presentation of results

Presentation of results should be appropriate for the intended audience. Simple maps and descriptions are useful for all audiences, but especially for those lacking a technical background. Equations, engineering studies, probability maps are more appropriate for technical audiences. Results may be presented at stakeholder workshops, scientific and engineering conferences; in newspaper articles, pamphlets, and documents; and, on Web sites and radio and television programmes.

Results should be easy to understand and easily accessible to all.

### Step 7. Monitoring and review

Monitoring and review occur throughout the disaster risk management process, including the risk assessment. These are long-term, on-going tasks to ensure that lessons learned are incorporated into the process. Lessons learned could be derived from:

- Experience in disaster events, demonstrating the effectiveness of the decisions taken and actions implemented.
- New planning initiatives (cost benefit analysis will give the appropriateness of actions).
- New projects (new projects will provide new opportunities for implementation).
- M&E process.

# Tools and Techniques

The tools and techniques used to carry out risk assessments range from qualitative, non-technical approaches to highly sophisticated, quantitative analyses using advanced computer modeling. The approach chosen will vary according to the project goals and objectives, available expertise, resources (funding and equipment) and the desired presentation format (eg. complex equations or area maps) of project participants.

Hazard information and inventory data that is routinely collected, such as in archives or for tax assessment purposes, provides a source of knowledge and information that can be used in the risk analysis. This can be augmented by interviews with local people. Scientific studies of geologic, social and engineering features, etc provide input for quantitative analyses.

- Qualitative, non-technical approaches may be used to produce scenarios describing the impact of hazards over the study region. Information from interviews, newspaper reviews, existing inventory data and interpretations of the hazard characteristics will provide the foundation for development of risk scenarios.

- Maps showing the distribution of hazard characteristics, such as estimated level of flooding, can be placed over maps showing the distribution of building inventory, population, etc. to provide a qualitative risk scenario.

- Physical vulnerability may be estimated through visual evaluation (age, construction material, workmanship, technology used in construction) or using advanced technology such as modeling and simulations (as example shake table demonstrations, wind tunnel simulations, computer modeling of buildings and structures, etc).

- Vulnerability of environmental resources such as air, water, land, flora and fauna can be assessed quantitatively.

- Economic vulnerability also could be analysed quantitatively.

- Social vulnerability (social components of society, poverty, gender, cultural, institutional vulnerabilities) cannot be measured in quantitative terms.

- Quantitative methods can be used to prepare complex risk scenario maps using data on the likelihood and severity of hazards, characteristics of the inventory (eg. building data) and damage functions for calculating the probability of potential inventory damage or economic loss. For example, a quantitative earthquake risk scenario can be made by estimating the probable ground shaking for a specific period of time (eg. the level of ground

shaking with a 10% probability of occurring in 50 years), applying that level of ground shaking to the characteristics of the building inventory using relationships between ground shaking, inventory characteristics and building damage functions.

- The past two decades have witnessed technological improvements in hazard monitoring as well as an increased use of computer applications designed to support the decision-making process (Geographic Information Systems, Information Systems, Remote Sensing, Internet and satellite imaging, modeling and simulations). These tools facilitate the use of large databases, complex models, incorporate new types of data and can rapidly produce useful maps to illustrate the level of risk. These methods have been used to compare results with and without measures, for example, to strengthen the building inventory as a means to estimate costs versus benefits.

- These highly sophisticated approaches are reliable and presentable to a non-technical audience to increase the awareness, but also have a number of limitations, including:
  - The need to invest a large sum of money in hardware, software, and training.
  - The difficulty in managing qualitative data, eg. how hazards have affected different social groups, how they have coped with disasters and how they perceive risks.
  - The difficulty of keeping data current and updating vulnerability models.

see Chapter 7

In addition to highly sophisticated approaches, less expensive methods can be used in risk assessment through community-based risk assessment techniques.

## Assessing the Risk: Checklist

### Working at provincial, municipal, city and district level

**Plan your risk assessment**

- Identify study region: province, municipality, district, city and village.
- Establish boundaries for comparing variations in risk.
- Establish a multi-stakeholder team.
- Identify risk assessment objectives based on risk reduction goals in policy statements, legislation, plans, focus group discussions, interviews, historic events, etc.
- Look for any risk assessment results and guidelines developed in the past in the study region.
- Consult stakeholders on what data is needed.

**Choose an appropriate method**

- Choose tools and techniques for data collection, data processing and data presentation that will provide results required for making decisions.
- Use development objectives and available resources of the study region to choose appropriate tools and techniques.
- Estimate and budget for costs of collection, processing and presentation.
- Prepare a plan that outlines tasks, responsibilities, budgets, etc.
- Provide specialised training for risk assessment such as interview techniques, mapping, GIS, etc.
- Practice risk assessment, eg. small pilot study.

**Involve communities at risk**

- Include the priorities, interests and capacities of the communities at risk, to ensure that problems will be addressed with cost-effective and sustainable interventions. The process could also enable community groups to better prepare for and respond to hazards themselves.
- Consult stakeholders including communities on the results of the risk assessment.

**Disseminate the results**

- Disseminate results using a range of different media. Maps and reports could be developed and presented at stakeholder workshops. Other ways of dissemination include the newspaper, pamphlets, radio, television and the Internet.
- Obtain the commitment of officials in the study region to risk reduction and assessment.
- Provide guiding principles based on the steps taken above.

**Develop mechanism for ongoing monitoring, evaluation and feedback**

- Document risk assessment process.
- Analyse significance of risk assessment to the decision-making process.
- Review and revise risk assessment process as necessary.
- Share results of the risk assessment with stakeholders. Feedback allows information to be reviewed and validated. It also informs stakeholders and facilitates their wider involvement in the risk reduction process.

## Working at community levels - participatory and community-based risk assessment

Participatory risk assessment often conducted at the community level may include tools and techniques used in rapid rural appraisal (RRA), participatory rural appraisal (PRA) and participatory learning and action (PLA). They differ in important ways, including the degree of participation they enable, and the information, ideas and understanding they produce. (Some of the tools and techniques commonly used can be found in the resources in the illustrated example in Chapter 7: Bringing Risk Management to Local Level)

**see Chapter 7**

# Case Studies

## India

### Vulnerability Atlas provides a national resource for planning

**India**

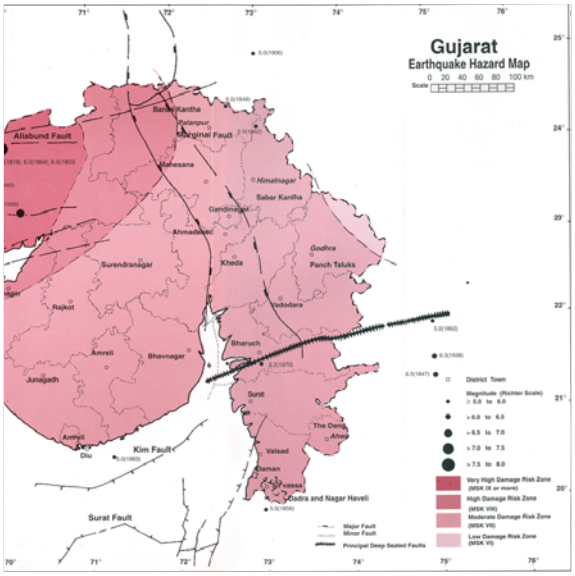
**Purpose**

A Vulnerability Atlas of India was completed in 1997 making available district-wide hazard maps for earthquake, cyclone and flood hazards, and risk tables showing the vulnerability of different building types. It was intended to be a pro-active approach to addressing disaster management.

The atlas has helped state governments and local authorities to strengthen regulatory frameworks by incorporating disaster risk reduction measures in the building by-laws, regulations, master plans and land-use planning regulations. It has also been used as a baseline to enable appropriate objectives to be set for recovery programmes.

**Methodology**

In July 1994, the Government of India employed an expert group to focus specifically on natural hazards and the impact on housing and infrastructure. The group conducted work in monitoring hazards, hazard zonation mapping, vulnerability assessment, prediction and forecasting, disaster risk assessment and mapping, retrofitting of existing unsafe structures and buildings, and preparation of building guidelines.




Hazard maps of each state (including unions and territories) for earthquakes, wind and cyclone, and floods were produced with the collaboration of various universities and government departments. For example, maps were drawn at a scale of 1:2.5 million using 'Survey of India Maps' of the same scale to use as a base. The seismic zoning map of India for 1893 and 1984 was used as a base to mark out seismic-tectonic features and epicenters marked with intensity.

Risk tables were drawn to identify building types and their vulnerability to each hazard. The risk tables included details such as wall materials, roof types and number of buildings of each type.

Vulnerability and risk assessments were conducted to determine the local hazard intensity and vulnerability of existing building types for each district. The data was presented in a table. The aim of providing information on a macro-scale was to bring vulnerable areas to the attention of potential development planners, decision-makers, professionals and households.

### Link to policy

The expert group has urged the government to restructure National Policy on Disaster Management to:

- Make appropriate amendments to legislative and regulatory instruments coupled with enforcement mechanisms.
- Ensure the use of disaster resistant construction techniques in all structures by making disaster resistant codes and guidelines mandatory.
- Create an institutional mechanism at national / state level to advise and assist existing long and short term plans for disaster management

Legislation is still needed at urban level development, land-use zoning, safety requirements for building by-laws of local bodies (panchayats) especially for new buildings and upgrading of old buildings.

(BMTPC, undated)

**Vietnam**

## Vietnam
## Developing framework for joint assessments

### Purpose

A framework on joint assessments for disaster response has been developed by a group of government, non-government and UN agencies to enhance participation and coordination in response and recovery in Vietnam.

### Method

Procedures for conducting the joint assessments and assessment tools / formats for data collection have been developed. To start, it was agreed that UNDP will function as the coordinating agency for joint assessments between July 2003 and June 2004. Joint assessment teams were mobilised during the floods in the central provinces in October and November 2003. The Ministry of Agriculture and Rural Development, CARE Vietnam, Catholic Relief Services, Oxfam, NDM-Partnership, Save the Children Alliance, UNDP, UNICEF and World Vision participated in the joint assessment.

### Data collection

Assessment tools have been developed for collecting data on: shelter; child protection; food security; nutrition and livelihood; health; water; sanitation; and education. These tools combine the checklists that have been used by different agencies in the past. Sphere Standards (see Chapter 5: Disaster Preparedness for Response and Recovery) have also been applied to develop the common formats.

### Dissemination of results

The data collected has been widely disseminated in print and made accessible on the NDM-Partnership website (UNDP, 2003).

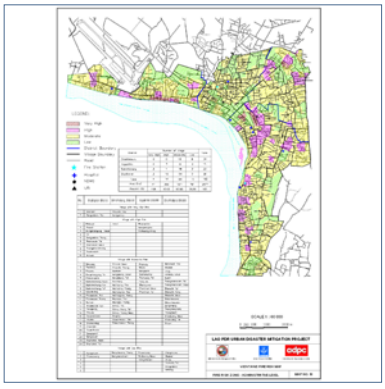
# Lao PDR
## Reducing urban fire risks

Lao PDR

### Purpose
The Government of Lao PDR's new policy promoting private sector investments resulted in a construction boom, focused on roads and large modern buildings. At the same time, urban fires caused more damage than any other hazard events over the past few years, particularly in Vientiane. The city government wanted to know what would be done to reduce fire risks in Vientiane.

### Data collection
Through stakeholder consultation it was decided that data would be collected on seven elements: 1) building material type, 2) availability of fire sources (quantity of fuel), 3) effectiveness of fire fighting services determined by availability of water and space to mobilise fire fighting team, 4) quality of electrical wiring, 5) fire history, 6) building density, and 7) accessibility. All information, except for fire history was collected through field survey. Information on fire history was obtained from the Fire Prevention and Protection Police Department.

### Fire risk assessment
Lao PDR's Urban Research Institute (URI) with technical assistance from ADPC and Chiang Mai University conducted a Fire Risk Assessment of Vientiane together with stakeholders including the National Disaster Management Office and the Vientiane Disaster Management Committee. The outcome of this assessment led to the development of a city action plan to reduce fire risk in Vientiane.



A Fire Risk Map overlaying a 1:10,000 land-use and infrastructure map of Vientiane obtained from the National Geographic Department was produced to display the data collected. Scores were given to the seven elements and when combined gave four categories in which the map was divided into: very high, high, moderate and low risk areas. Since URI did *not* possess GIS capacity, integration was done through AutoCAD method. In addition, qualitative data was collected on the vulnerabilities of people, building, infrastructure and facilities.

The Vientiane Fire Risk Map covered the four urban districts of Vientiane: Sikhottabong, Chanthabouli, Sisattanak, and Xaysettha and there were 100 communities in the four districts. The scoring results classified more than half of the 100 communities in the high-risk area, and six communities in the very-high risk area. Qualitative records showed the causes of vulnerabilities. For example, rehabilitation of the old water pipes under the roads had not been included in the road improvement projects, and the fire hydrants were not being replaced as the road surfacing was completed.

### Risk communication

Upon the completion of the risk assessment process, a series of stakeholder workshops were organised to develop a city-level action plan to identify priority areas for implementation, to be carried out by whom and within what time frame.

Recognising the fact that when a fire occurs, it takes time before external assistance could reach the affected area, it is important that communities and individuals consider fire risk reduction. Ban Hatsdy Tay community in Vientiane was selected to pilot a **community-based risk assessment**. A map was produced showing high, moderate and low risk areas based on similar elements: fire history; fire sources; building materials; building density; quality of electrical wiring system; accessibility; and houses where there were elderly and young children. From these maps, a community action plan consisting of priority mitigation and preparedness strategies was developed for fire risk reduction.

(ADPC, 2004)

**Sri Lanka**

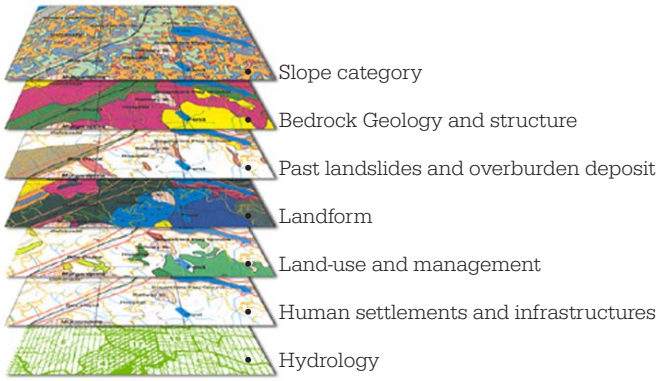
## Sri Lanka
## Reducing landslide risks

### Purpose

The heavy loss of life and grave damage to property and infrastructure during landslides in the monsoon seasons of 1986 and 1989 prompted the Government of Sri Lanka to act. Soon after, the National Building Research Organisation (NBRO) received technical and financial support from UNDP and UNCHS (now UN-Habitat) to assess landslide risks in the pilot areas of Nuwara-Eliya and Badulla districts in a Landslide Hazard Zonation Mapping Project. The other landslide-prone districts selected for replication were Ratnapura and Kegalle in 1996 and, Kandy and Matale in 2001 under government grants. Mapping of the Kalutara district is expected to commence in 2005. The Government of Sri Lanka recognised the importance of this mapping process and planned to develop similar maps in all landslide-prone districts in Sri Lanka. After flood and landslide disaster in 2003, areas in other districts viz., Galle, Matara and Hambantota were identified as prone areas, where mapping has commenced.

### Methodology

Between 1990 and 1995, a methodology for landslide hazard zonation mapping was developed. By looking at the range of factors that directly or indirectly influence slope stability, the

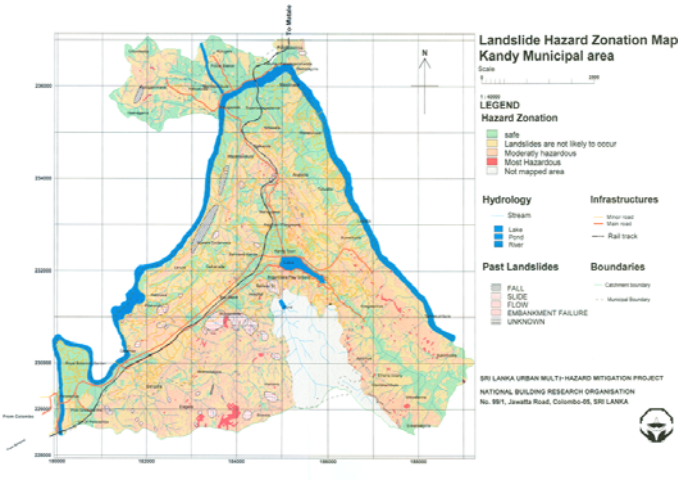



**(Source: UDA, 2000)**

slopes could be graded in terms of their estimated degree of instability and hazard potential. Basic data (see left page) was gathered from field surveys as well as from desk studies. Using an appropriate scoring system this data was analysed by a computer program to develop 1:10,000 scale landslide hazard zonation maps.

These maps were developed with the participation of civil engineers, geo-technical engineers, geologists, architects, planners, human settlement specialists, computer scientists, environmentalists, surveyors, cartographers and sociologists. These maps were combined to form an integrated landslide hazard map (see Figure 3.2).

**Figure 3.2**
**Sri Lanka landslide hazard map**




**(Source: UDA, 2000)**

## Application

To facilitate the use of these maps in planning and development, the Sri Lanka Urban Multi-Hazard Disaster Mitigation Project (SLUMDMP) developed the knowledge of stakeholders including politicians, planners, masons, school children and community groups.

This was achieved through a combination of policy review; advocacy and awareness campaigns; training courses; education programmes; development of construction guidelines in disaster prone areas; and facilitation of emergency management, and response planning and action planning.

The landslide hazard zonation maps were used to:

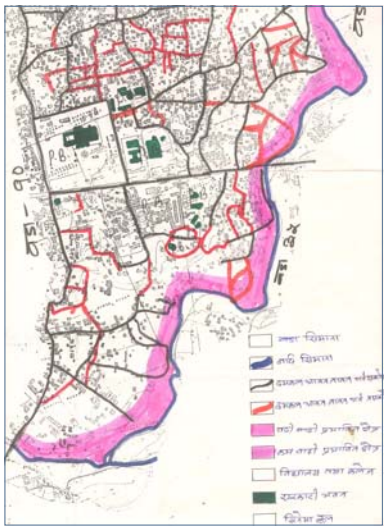
- Prepare the Development Plan of cities (example: under SLUMDMP in Ratnapura Municipal Council in Ratnapura district).
- Develop the Disaster Mitigation Action Plans (example: under SLUMDMP in Nawalapitiya Urban Council in Kandy district).
- Help in land-use policy planning (in Mahaweli Upper watershed area and implementation and assist the Urban Development Authority in land-use planning).
- Create awareness of town planners, surveyors, lawyers and construction professional and workers.
- Identify most vulnerable communities to pilot community-based disaster risk reduction projects

(ADPC, 2002)

Nepal

# Nepal
## Ward 34 takes matter into their own hands

### Initiation
One of thirty-five wards in Kathmandu Metropolitan City, Ward 34, took an interest in disaster issues following increasing media coverage on the vulnerability of Kathmandu Valley to a big quake in the near future. A Disaster Management Committee (DMC) was formed, chaired by the Ward Chairman and comprised of 22 residents of Ward 34.



### Presentation of results
With technical guidance from Nepal's National Society for Earthquake Technology (NSET), members of the DMC together with some volunteers prepared hazard maps for flood, fire and environmental degradation. These were simple maps that would require further technical improvement for designing any structural mitigation works, but they were useful for identifying problems and raising awareness.

The community hazard map showed streets that were too narrow for fire trucks to pass. These narrow streets marked in red compelled the map viewer to think about the problems of the ward. This map was enlarged and posted on the wall of the DMC office. Copies were also made available for distribution.

### Additional concerns
Other concerns of Ward 34 residents include bad road conditions that could impede a quick response to disaster, improper disposal of waste, poor sanitation and health systems that could increase residents' vulnerability, and poor drainage systems that could trigger flooding. Perhaps influenced by the risk assessment of the DMC, the Ward office relocated an electric pole erected from the middle of a narrow street.

# Case Study Lessons Learned

- A risk assessment facilitates the decision-making process by structuring, analysing and presenting information in a way that can be used by those making disaster risk reduction decisions.

- Risk assessment is a diagnostic tool, it can show the effects of hazard events on your community, city, district, province, state, or country (depending on the area being assessed).

- Risk assessment is a planning tool, it can provide insight to help assign risk reduction priorities, identify areas on which to focus, estimate necessary resources and identify those capacities necessary to implement and maintain risk reduction measures.

- National organisations can provide leadership by helping establish guidelines, setting expectations and providing incentives for local risk assessment and planning activities.

- Multi-hazard assessments are difficult to accomplish due to the different approaches used to assess specific hazards. A number of disaster risk indices for individual and multiple hazards have been developed to guide hazard comparisons. Identifying and assigning priorities to risk reduction measures require a means to understand the effects of each type of hazard.

- Mechanisms to regularly update materials produced by risk assessments, such as the Risk Atlas, are essential, especially in a rapidly changing environment.

- Joint assessments with the community can be carried out to foster participation and coordination in response and recovery efforts. Joint assessments can enhance the effectiveness of disaster risk reduction. The partnership established during the joint assessment can improve cooperation during the implementation of interventions. The joint assessment can also provide participants with greater awareness of the risks involved and increase their commitment in reducing these risks.

- Data collection is a major part of the risk assessment process. The access to reliable and accurate data poses a big challenge to data collection. The data collection process can be extremely time-consuming.

# Discussion Questions

*"It is not the answers that show us the way, but the questions."*
*Rainer Maria Rilke, Czech poet*

- Do you know the hazards, vulnerabilities and capacities of your jurisdiction?
- Are policies and legislation developed based on results of a risk assessment, eg. development policy and building codes; land-use restrictions, etc?
- Has legislation been passed (with necessary compliance and accountability process) that requires risk assessments for all development projects?
- Are disaster-related information collection, analysis, storage and dissemination standardised and systematised?
- Are there regional and national guidelines for conducting risk assessments?
- Is there a focal point for coordinating risk assessments?
- What mechanisms need to be in place to ensure that results of risk assessments are incorporated in development policies and plans?
- What mechanisms need to be in place to ensure that risk assessments are regularly conducted and results are shared with stakeholders each time?
- Is information on disaster risk reduction current, accurate, consistent, widely available and targeted at users within the country and to other countries in the region?
- Is there an ongoing commitment to periodically review and update the information?
- Are risk assessments conducted prior to implementation of development projects?
- Are the risk assessments conducted comparable with other assessments?
- Are the results of risk assessments widely shared with stakeholders?
- Are there regular monitoring and evaluations conducted on the impacts of policy and project decisions on vulnerabilities and capacities?

## Questions for Working at Community Level:

see Chapter 7

- Are risk assessments conducted prior to implementation of community level projects such as human settlement development projects, infrastructure development projects?

- Are all groups in the community participating in the risk assessment process (eg. elders, monks / imams / other religious leaders, women, children and others)?

- Are the results of the risk assessment easy to understand and easily accessible to all?

- Are the results of the risk assessment reviewed and widely shared with stakeholders?

- Are the risk assessments conducted comparable with other assessments at district and provincial levels?

# Challenges

Risk assessment of a community or even a nation can be a daunting, controversial and delicate operation. The assessment may expose risks rooted in long-established inequalities and access to resources and power. The assessment report could be deeply political and unacceptable to national authorities, or even to the leadership of the organisation conducting the risk assessment. The assessment process may also raise unrealistic expectations among vulnerable people that their problem may vanish. Or it may end up creating a wish-list of priorities beyond the capacities of local and national organisations to deliver.

In the last two decades there has been much progress in the development of methodologies for risk assessments. There have also been many reports of risk assessments conducted at national, state, provincial and local levels for single and multiple hazards throughout Asia by different organisations. However, challenges remain in:

- Access to reliable and accurate data, especially maps.
- Capability to use multiple data formats.
- Systematic incorporation of risk assessment across all sectors in development.
- Standardisation of risk assessment methodology for comparable results within and across nations.
- Commitment and making resources available for improving data quality and availability within and across nations.
- Commitment and making resources available for participation of all stakeholders in the risk assessment process.
- Accessibility and use of risk assessments in development policy and planning.
- Developing tools for user friendly vulnerability assessment.
- Making mandatory provisions for risk assessment prior to decision-making at all levels of governments to avoid arbitrary decision-making.

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World Bank (1997) *Environmental Hazard and Risk Assessment.* Environmental Assessment Sourcebook Update 21. Washington D.C., Environmental Department, World Bank.

# Resources

## Risk mapping and GIS

**Geographic Information System (GIS)** tools to manage, analyse and present data and results is becoming increasingly popular. GIS has been widely used in mapping hazards and assessing physical vulnerability (eg. buildings, power lines and infrastructure).

### HazPac

*http://www.crowdingtherim.org/docs/ctr/map.html*
HazPac is a free, interactive, digital natural hazards map of the Pacific Rim region. HazPac's GIS overlays the map with data regarding natural hazards, population, and infrastructure. It illustrates how hazards can affect the people and economies of local and distant communities. HazPac's versatility lets you design and manipulate the map while exploring regional interconnections and shared risk of the Pacific Rim.

### HAZUS

*http://www.fema.gov/hazus/hz_index.shtm*
United States' Federal Emergency Management Agency developed HAZUS to provide individuals, businesses, and communities with information and tools to work proactively to mitigate hazards and prevent losses resulting from disasters.

Using GIS technology, HAZUS allows users to compute estimates of damage and losses that could result from an earthquake. To support FEMA's mitigation and emergency preparedness efforts, HAZUS is being expanded into 'HAZUS-MH,' a multi-hazard methodology with new modules for estimating potential losses from wind and flood (riverine and coastal) hazards. In addition to estimating losses, HAZUS contains a database of economic, census, building stock, transportation facilities, local geology and other information that can be used for a number of steps in the risk assessment process.

### Pacific Disaster Center's Asia Pacific Natural Hazards and Vulnerabilities Atlas (Version 1.1)

*http://atlas.pdc.org/APNHVA/kickoff.html*

This online Atlas combines baseline geographic and infrastructure data layers with historical and near-real time data on natural hazard events including: earthquakes, tsunamis, volcanoes, and tropical storms. Its main objective is to provide a venue for exploring regional and national level issues related to risk and vulnerability and for assessing impacts of natural hazard events.

### RADIUS (Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters)

*http://www.geohaz.org/radius*

RADIUS is a simple-to-use tool based on a spreadsheet (Microsoft's MS Excel) and a free GIS software (ESRI's Arc Explorer) to estimate earthquake damage. It was developed through the support of United Nation's International Decade for Disaster Reduction and the Government of Japan to raise awareness and provide practical tools for earthquake risk reduction. The RADIUS tool has been simplified in order to promote an understanding of the process among decision-makers and the public. The results are preliminary and the tool cannot be used for a detailed and sophisticated study.

All the activities of the RADIUS project have been summarised on a CD-ROM together with this tool, which can be used as a tutorial for users. The CD-ROM includes the RADIUS project description, reports from the case-study cities, report on the comparative study, the guidelines for RADIUS-type projects, proceedings of the RADIUS symposium, and other reports.

## Vulnerability and capacity assessment

The need to assign a quantifiable value to the elements analysed into the spatial models used by GIS is not always possible for social and economic dimensions of vulnerability. Vulnerability and capacity is much more than the likelihood of buildings collapsing or infrastructure being damaged. It is also about the complexity of people and societies that include:

- Initial well-being (nutritional status, physical and mental health, morale).
- Livelihood and resilience (amount of savings, income and production options and opportunities, resources available).
- Self-protection (the degree of protection afforded by capability and willingness to build safe homes, use safe sites).
- Social protection (forms of risk reduction measures provided by society eg. building codes, evacuation centers, and willingness to cooperate in sharing resources and saving lives during disasters).
- Social and political networks and institutions (the leadership available and organisational structure to solve problems and conflicts, and people's rights to express needs and access to resources).

(Cannon, et al, undated)

Different methods of vulnerability and capacity assessments have been used by a number of NGOs in project design and implementation, and in training courses. The assessment is often implemented at the local level and emphasises people's participation in the process.

## Participatory and community-based risk assessment

**Asian Disaster Preparedness Center**
ADPC, undated, **Community-Based Disaster Risk Management Course Curriculum** (including Trainer's Guide, Coordinator's Guide, Participant's Workbook and Reading Materials).

**Citizens' Disaster Response Network, Philippines**
CDRN have documented their experiences of community-based disaster risk management in the Phillippines over several years, including the application of capacity and vulnerability assessments and other information-gathering and planning methods in their publication below.

Heijmans, A . and Victoria, L.P. (2001) *Citizenry-Based & Development-Oriented Disaster Response: Experiences and Practices in Disaster Management of the Citizens' Disaster Response Network in the Philippines.* Quezon City, Center for Disaster Preparedness.
*http://www.adpc.net/pdr-sea/cbdo-dr/cover.html*

**International Federation of Red Cross and Red Crescent Societies**
The Red Cross and Red Crescent Societies developed a Vulnerability and Capacity Assessment (VCA) methodology and toolbox.

IFRC (1999) *Vulnerability and Capacity Assessment: an International Federation Guide.* Geneva, International Federation of Red Cross and Red Crescent Societies.
*http://www.ifrc.org/what/disasters/dp/planning/vca*

IFRC (2002) *World Disasters Report:* Focus on reducing risk, Chapter 6: Assessing vulnerabilities and capacities - during peace and war. Geneva, International Federation of Red Cross and Red Crescent Societies.
*http://www.ifrc.org/publicat/wdr2002*

## Other resources

ECLAC (2003) *Handbook for Estimating the Socioeconomic and Environmental Effects of Disasters*. United Nations Economic Commission for Latin America and the Caribbean (ECLAC) and International Bank for Reconstruction and Development (The World Bank).
*http://www.proventionconsortium.org/toolkit.htm*

Cannon, T., Twigg, J. and Rowell, J. (undated) *Social Vulnerability, Sustainable Livelihoods and Disasters:* Report to DFID Conflict and Humanitarian Assistance Department (CHAD) and Sustainable Livelihoods Support Office.
*http://www.benfieldhrc.org/DMU/OtherPubilications/DFIDVulandLiveRepFin0303.pdf*
This report provides a good overview of vulnerability and capacity concepts and tools for analysis, including an inventory of methods and documents.

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*http://www.adpc.net/audmp/rllw/PDR/hazard mapping.pdf*

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*http://www.waterday2004.org/docs/TD955.pdf*

# disaster preparedness for response and recovery

4

gateway to disaster risk reduction

## Chapter Brief

## Key Words

Early Warning
Human Resources
Material Resources
Preparedness
Response / Relief
Recovery
Resources

## Introduction

## Concepts of Disaster Preparedness for Response and Recovery

Importance of Response and Recovery Programmes
Basic Principles of Disaster Preparedness, Response and Recovery
- Enhancing capacity of the response teams
- Enhancing response capacity
- Enhancing recovery capacity

Preparedness Response and Recovery Planning
- Preparedness procedures
- Response procedures
- Recovery procedures

Multi-phase Preparedness, Response and Recovery Actions
Multi-sector Preparedness, Response and Recovery Activities

## Disaster Preparedness and Response Planning Process

Pre-planning
Plan Preparation
Plan Implementation

## Tools and Techniques Used to Support Disaster Response and Recovery

Early Warning Systems
Communication Systems
Database Tracking Systems

## Case Studies

Bangladesh: Combining hardware and coordination of key responders for effective response
Papua New Guinea: Developing partnerships for response and recovery
India: Linking recovery to development planning
India: Linking recovery to sustainable development
Vietnam: Flood kindergartens

## Case Study Lessons Learned

## Discussion Questions

## Challenges

## References

## Resources

# Chapter Brief

- Disasters are events that overwhelm the response and recovery capabilities of the affected region and may require outside assistance.
- Disaster preparedness and response plans and procedures guide rapid response and recovery actions.
- It is essential to communicate information contained in disaster preparedness and response plans and procedures to potential target audiences through awareness raising, education and training.
- Activities such as drills, simulations and demonstrations enhance team building among response and recovery personnel, identify necessary improvements to disaster plans and procedures, improve response and recovery capabilities and accelerate the response and recovery process.
- Encouraging participation in developing a disaster preparedness plan will contribute to sustainable development.
- Preparedness can strengthen communities to better respond to disasters.

# Key Words

## Early Warning

The provision of timely and effective information, through identified institutions, that allows individuals exposed to a hazard to take action to avoid or reduce their risk and prepare for effective response.

Early warning systems include a chain of concerns, namely: understanding and mapping the hazard; monitoring and forecasting impending events; processing and disseminating understandable warnings to political authorities and the population, and undertaking appropriate and timely actions in response to the warnings (UNISDR, 2004).

## Human Resources

Human resources include trained staff and volunteers to: disseminate warnings; assist evacuation; carry out SAR and first aid; make needs assessments; and manage the distribution of relief aid. The skills of medical personnel, the police, fire fighters, engineers, architects, scientists, doctors and medical staff, media professionals and many others will also be needed.

## Material Resources

This includes: SAR equipment; boats and vehicles (and fuel to run them); and stockpiles of relief goods such as food, medicines, water purification and oral dehydration tablets, emergency shelter materials, blankets and cooking utensils, etc.

## Preparedness

Activities and measures taken in advance to ensure effective response to the impact of hazards, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations (UNISDR, 2004).

Preparedness activities include the development of disaster response and recovery plans and procedures to guide rescue efforts, medical assistance, the issuance of timely and effective warnings and the temporary removal of people and property from a threatened location, the distribution of disaster supplies and equipment, etc.

## Recovery

Decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk.

Recovery (rehabilitation and reconstruction) affords an opportunity to develop and apply disaster risk reduction measures.

## Response / Relief

The provision of assistance or intervention during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected. It can be of an immediate, short-term, or extended duration depending on assessments, needs and capacity (UNISDR, 2004).

# Introduction

*"In every sector, transition should lead to recovery that facilitates movement to sustainable development. In other words, the foundations laid for sustainable recovery during transition must put people on a path to sustainable development."*

*Praveen Pardeshi, Manager,*
*UNDP Gujarat Programme (UNDP, 2001)*

This chapter emphasises the links between preparedness and successful response and recovery. Innovative ways in which organisations, institutions and individuals from different sectors and government levels have prepared, responded to and recovered from disasters are presented. The overwhelming human needs caused by disaster events demand immediate and extensive resources to support response and recovery activities. Preparedness activities, including response and recovery planning, training and education, simulation and demonstration activities and the purchase of disaster supplies and equipment, provide the foundation for an effective and rapid disaster response and recovery. Without disaster preparedness planning, an ad-hoc, less efficient emergency management effort will emerge.

Government and non-governmental entities generously provide many forms of assistance to disaster stricken areas, such as aid, loans and debt relief. The most effective use of these resources demands advanced planning. The ability to immediately deploy and manage disaster response and recovery teams depends on the presence and understanding of disaster plans and procedures. Critical tasks include search and rescue (SAR), medical assistance, food and shelter, damage assessment, restoration of essential infrastructure and the distribution of resources to those most affected.

The initial response will be provided by the directly affected community itself, emphasising the need for preparedness at all levels. As response and recovery efforts escalate and there is time for those outside the affected area to mobilise, central governments, lead agencies, donors, NGOS, private organisations, volunteers, etc. who are willing to offer assistance. This multi-sector assistance must be guided by strong leadership and good management to be effective.

The budget allocated by national governments for disaster response continues to increase every year. National governments must often divert money intended for development to support urgent disaster response and recovery needs. Rapid increases in loss of life and property over the past few decades even though the rate of disaster remains constant, demonstrates that addressing response and recovery needs is not enough to reduce disaster related human misery.

Sustainable development measures aimed to strengthen communities against disaster, can complement disaster preparedness activities to improve response and recovery capabilities. Interventions that provide protection against future disasters can put communities on the path toward a safer and more sustainable development future.

# Concepts of Disaster Preparedness for Response and Recovery

## Importance of Response and Recovery Programmes

Disasters can make individuals, organisations and governments aware of the critical need to develop and implement integrated disaster risk management programmes that focuses on preparedness for response and recovery. Such programmes address both immediate response and recovery needs as well as long-term actions to contribute to greater social resilience to disaster impacts. The priority given to implementing and maintaining disaster risk management programmes will have a significant influence on reducing the extent of potential damages and losses.

A review and evaluation of the disaster response and recovery process provides an opportunity to identify the gaps and shortcomings that must be addressed in future disaster response and recovery plans and procedures. This de-briefing activity is critical to the continual improvement of disaster response and recovery capabilities. For example, identification and improvement of evacuation facilities of adequate capacities can make a big difference during frequent events such as flooding in Bangladesh and the Mekong Delta.

**see Bangladesh Case Study**

As part of the post-disaster review and evaluation process, attention must also be directed to identify interventions that can provide long-term protection against future disaster impacts. For example, after a disaster, technical assistance to improve construction practices can prevent reconstruction of inadequate pre-disaster levels that can recreate the original risk. Revised or new land-use policies can restrict development in high hazards areas, such as those prone to frequent flooding. These interventions are generally not implemented in Asia.

## Basic Principles of Disaster Preparedness, Response and Recovery

Disaster preparedness develops the capability and provides the tools to guide a rapid and effective disaster response and recovery. The implementation of well-rehearsed response actions can stabilise disaster situations, such as the spread of fire, and help prevent additional loss of life. Preparedness tools, such as disaster response and recovery plans and procedures can guide rescue workers, medical personnel, evacuation teams, shelter personnel, etc. However, preparedness does

not prevent a disaster from occurring. The benefits of preparedness take effect after a disaster occurs.

The reduction of disaster severity such as saving lives, reducing injuries, alleviating human suffering, etc. facilitates a more rapid recovery process and can have lasting effects. The implementation of recovery plans supports post-disaster normalisation and provides an opportunity to establish reconstruction guidelines. Improved reconstruction design requirements, land-use policies etc. help establish sustainable development practices that raise the community's resistance to a new level. Implementing sustainable development practices reduces the need for disaster response and recovery actions, but maintaining highly effective preparedness programme must remain a priority. The preparedness programme is necessary to address the unexpected needs not met through development practices.

## Enhancing capacity of the response teams

An effective disaster response requires immediate action. To facilitate a rapid response there are a number of things to be considered and addressed in disaster response plans and procedures:

- Are there pre-assigned disaster response teams with clearly defined duties?
- Where will members of the disaster response teams assemble?
- How will they communicate?
- Are alternative planned actions in case normal communications are not possible?
- Is there a designated co-ordination center to meet the needs of response personnel such as: safety and security, emotional support, rest, etc.
- Are there pre-designated field coordination centers to manage local response activities?
- Do you have or can you obtain supplies and equipment for the operations center? For the field response? For the community?
- What is the method established for monitoring disaster warnings and weather conditions in coordination with the pre-designated national agencies?
- Is the method of communication with Police, Fire Brigade, Defense Services, Civil Defense established?
- Are arrangements made to maintain law and order to prevent looting and theft of the evacuated premises?
- Is there a system established for getting reports on response and recovery activities from field centers and onward reporting to government or higher-level authorities at different stages?
- Is there a procedure established for requisitioning accommodation, vehicles and equipment for relief duty?
- What is the method for sanctioning expenses for reimbursement and how is the necessary approval to be obtained?
- What is the mechanism for intervention to prevent and initiate legal action on those engaged in hoarding, price hiking, corruption and unauthorised sale of relief materials with the assistance of Police and relevant officers.

- Have details been disseminated about legal and official procedures for assignments for coronary inquests and location where carcasses can be disposed of?
- Have details been disseminated about legal and official procedures and eligibility criteria with respect to relief and compensation for loss of life, injuries, livestock, crop, houses, etc. to be sent from the operating center?
- What are the arrangements for ensuring safe storage, distribution and transport of relief supplies and coordination of supplies distributed directly by NGOs and other organisations including private donors?
- How to ensure acceptability of supplies including medical equipment and medicine donated by private local and international donors (eg. inappropriate supplies such as winter clothes for countries with a warm climate, pork meat for Muslim dominated countries, drugs with details given in different foreign languages not understood in the locality)?
- Are there arrangements for assessing transport requirements, for coordination to get government helicopters, to supply of fuel for authorised relief vehicles (credit coupons, fuel orders, etc.), for proper maintenance of vehicles and equipment, etc.?
- Has an information centre been set up for sharing of information with mass media and community?

## Enhancing response capacity

To ensure that response is carried out effectively and in a timely manner after a disaster, it is very important to ensure that all procedures are in place and capacity building of all stakeholders is done. The preparedness plans should include plans and procedures for deciding the acceptance, tracking and utilisation of donated resources (human and material). Some questions to ask to ensure such preparation are listed below:

- Are the contact information of essential persons available including names, telephone numbers, fax numbers, mobile numbers, etc.?
- Are disaster maps of the locality showing areas that may be affected, information regarding alternative routes, water sources, layout of essential services which may be affected, etc. available?
- Have the prime agencies been identified to issue disaster early warning in case of different disasters?
- Are the mechanisms for early warning dissemination established?
- Are the evacuation routes for different disasters (likely landslides, floods, tsunami, etc.) identified and shown with name boards?
- Have the people been made aware of the evacuation process and drills carried out?
- Are arrangements made to maintain law and order to prevent looting and theft of the evacuated premises?
- Has training and awareness been carried out for identified informal groups such as community leaders, religious leaders, boy scouts, Community Based Organisations (CBOs), etc. about Search and Rescue (SAR), evacuation centers, evacuation routes, first aid and other immediate essential response activities?

- Have search and rescue teams been trained for different disasters?
- Is there coordination established with armed forces to call them for SAR activities if required?
- For urgent road clearing necessary for evacuation, is there coordination with agencies responsible? Can community involvement be obtained for such activities?
- Are Emergency Health Care Teams established for requirements during SAR? Will they have enough drugs and equipment?
- Will the number of ambulances available with public and private hospitals be adequate?
- Are the hospitals prepared to receive the injured and the sick?
- Are specific SAR and response functions assigned to specialised NGOs?
- Are there arrangements to mobilise and coordinate work of volunteers ensuring community participation?
- Are coordination mechanisms established to involve local level NGOs and other national level NGOs?
- Is there a method pre-identified to assess immediate relief and response needs?
- Have the temporary shelter and relief camps been identified in safe areas with adequate capacity, sanitary and cooking facilities?
- Are there procedures to ensure proper sanitation and disposal of waste?
- What are the arrangements for relief supplies, dry rations and family kits to transit camps and relief camps, and to site Operations Centres?
- What are the arrangements for ensuring safe storage and distribution of relief supplies donated by NGOs and other organisations including private donors?
- How to ensure acceptability of supplies including medical equipment and medicine donated by private local and international donors (eg. drugs with details given in different foreign languages not understood in the locality)?
- What is the arrangement for supervision of cooking arrangements, sanitation, water supply, disposal of waste, water stagnation and health services?
- Is the method established for sanctioning expenses for reimbursement with the necessary approvals?
- Is there a way of providing shelters with recreation facilities (in case people have to stay for long periods)?
- What arrangements are made for treatment of the sick in the camps, preventive medicine and anti-epidemic actions, psychological trauma counseling?
- Acceptability and how to handle foreign medical personnel who have come to assist in trauma counseling, but not understanding local languages?
- Will the hospitals have the medical equipment and medicines required to cope with the situation?
- Should there be a mechanism to assess, supply and supervise additional requirements for the hospitals?
- Should assistance be provided to affected communities in their homes for storage of rations, sanitation, water supply, disposal of waste water and health services?
- Are there any arrangements made for livestock and supplies of fodder and cattle-feed?

- Is there a system for reporting to government or higher level authorities at different stages?
- Has the method been clarified about legal and official procedures and eligibility criteria for issuing of relief tickets to affected families, cash compensation requirements, compensation for loss of life, injuries, livestock, crop, houses, etc.?
- Has the method been clarified about legal and official procedures for carrying out coronary inquests and location where human and animal bodies can be disposed of?
- What is the method to request transport requirements (including helicopters, additional boats, etc. when required), fuel, maintenance of vehicles and equipment etc.?

(Wisner and Adams, 2002; Carter, 1991)

## Enhancing recovery capacity

After a major disaster, aid for response and recovery may flow in from many donors. The preparedness plan should include guidelines and procedures for the acceptance, tracking and utilisation of donated resources (material as well as human). The recovery plan should consider both immediate recovery issues, such as providing temporary shelter, but also long-term recovery needs. For example, after a major disaster, the reconstruction of housing is often a priority, but in the absence of technical guidance the displaced persons may reconstruct the destroyed assets to pre-disaster level. In order to avoid producing the same vulnerable conditions that existed before the disaster, it is better to have reconstruction guidelines prepared in advance to provide technical assistance to minimise future losses and damages. In consultation with stakeholders, it would be useful to consider:

- Is there an acceptable methodology and trained staff to conduct assessment of short-term and long-term recovery needs? For example: assessments of mechanisms for mobilising funding, identification of resettlement etc. In many cases countries do not have an assessment methodology acceptable to the donor countries and banks. It will be difficult to obtain needed assistance within a short period.
- For urgent road clearing necessary for immediate recovery needs, is there coordination with the responsible road authorities?
- What is the arrangement for clearance of debris?
- What arrangements are there for temporary repairs to damaged infrastructure and utilities (water, power, transport, telecommunication, roads, bridges, canals and drains, public buildings, etc.)
- Is there an arrangement for providing facilities such as hand-pumps and water bowsers where necessary?
- If the needs arise, are there arrangements for constructing or repairing temporary structures for storage, medical facilities, postal facilities, help aids when required, educational facilities, etc.
- What agencies should provide assistance to self-help rebuilding or engage directly in housing construction, and what partnerships with community organisations and the private sector are possible?

- Are donations appropriate for the affected area?
- Should particular groups (such as artisan groups) be given special consideration?
- Are there ways of encouraging those engaged in self-help rebuilding to incorporate new safety features against earthquakes, wind, flood, etc. as appropriate?
- How can the "informal" construction industry that exists in many countries be stimulated to work with residents in building safer houses?
- Is it necessary to introduce new industries and techniques and start training building workers, etc. especially in low-cost safety improvements?
- Are new arrangements needed to provide financial support for house repair and new housing?
- Is it necessary to modify the laws governing land ownership, or access to vacant land for building, as well as zoning regulations?
- Are laws needed during the recovery period to regulate speculation in urban land prices and the prices of building materials?
- What are the arrangements for longer term road rebuilding?
- Is there a procedure for accommodating private donors, NGOs, etc. willing to assist by putting up housing, schools, medical facilities, hospitals and other such essential facilities, to identify such facilities to their likes, allocate land, provide local guidelines and other necessary requirements

(Some of this checklist is adapted from Wisner & Adams, 2002)

## Preparedness, Response and Recovery Planning

The procedures usually adopted for preparedness, response and recovery planning are listed below:

### Preparedness procedures

see Chapter 2

- Establishing policies and legal arrangements (laws, regulations, acts, etc.) that assign roles and responsibilities for all levels of government before, during and after disaster.
- Identifying the institutional framework appropriate for the delivery of disaster response and recovery programme activities.
- Preparing effective response and recovery plans and procedures that establish the emergency management organisational structure, define response functions and identify roles and responsibilities for all respondents.
- Identify communication channels for timely dissemination of early warning messages, evacuation directions, identification of temporary shelter locations and obtaining critical supplies and equipment.
- Establishing coordination plans and procedures with outside organisations, such as the Red Cross and Red Crescent Societies, including the definition of their roles and responsibilities during response and recovery.

- Developing and delivering training and education to disaster response and recovery teams.
- Preparing, delivering and evaluating response and recovery exercises, such as table top and functional exercises, drills, simulations, etc.
- Obtaining and strategically locating disaster relief supplies and equipment.
- Developing partnerships for preparedness.
- Raising awareness - the first step to preparedness.
- Sustaining preparedness measures.
- Linking recovery to development planning.
- Linking recovery to sustainable development.
- Establishing databases of response and recovery personnel, including contact information, location, capabilities, team assignments, etc.
- Developing damage assessment methodologies, including checklists to guide assessments.
- Establishing legal and institutional mechanisms for mobilising resources by the respective governments.
- Preparation of technical guidelines, codes and standards for construction in hazard prone areas.

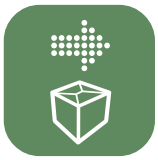
**see Bangladesh Case Study**

**see Indonesia, Vietnam, Maharasthra (India) & Patanka Case Studies**

## Response procedures

Emergency response plans and procedures are implemented following notification of a potential disaster event. Emergency response plans include procedures that provide a step-by-step guide to carry out the following actions:

- Monitoring and reviewing alert and warning information.
- Interpreting alert and warning information.
- Activate emergency plant program.
- Notifying disaster response and recovery personnel (eg. SAR and first medical response).
- Activating or establishing Emergency Operations Center (EOC) at the appropriate level depending on extent of disaster and need.
- Activating emergency response teams.
- Carrying out preliminary damage and needs assessments.
- Combining the resources (hardware and software) for effective response.
- Knowing when and how to call on resources.



**see Bangladesh & India Case Studies**

## Recovery procedures

The disaster recovery plan includes procedures to carry out the following recovery activities:

- Notifying and activating disaster recovery teams.
- Establishing disaster recovery centers.
- Assembling multi-disciplinary teams to carry out damage assessments.
- Establish database of all information collected.
- Providing technical assistance for reconstruction.
- Providing management and coordination.
- Ensure full participation of the national government.

## Multi-phase Preparedness, Response and Recovery Actions

Activities typically carried out in the preparedness, response and recovery phases of the disaster risk management process:

| Activity | Preparedness Phase (Before Disaster) | Response Phase (During Disaster) | Recovery Phase (After Disaster) |
|---|---|---|---|
| Assessments | Conduct risk assessments. | Rapid assessment eg.,<br>• Damage<br>• Health<br>• Social / Economic<br>• Immediate needs | Complete detailed damage assessments (multi-disciplinary and sector based). |
| Planning | Prepare response and recovery policies, programs, plans and procedures. | Implement response actions; develop quick contingency plan for responding to unforeseen events (if required). | Implement immediate recovery actions as outlined in recovery plan. |
| Implementation – capacity building, training, networking, partnerships | Build human resource capacity through promotion of family, community and government preparedness. | Mobilisation of community, SAR parties, medical first respondents, volunteers. | Establish communication and consultation with stakeholders for technical assistance. |
| Plan verification | Verify effectiveness of plans and procedures through drills, simulations, table top discussions and exercises. | Note strong points, lapses and shortcomings in the plans (what worked, what did not). | Note strong points, lapses and shortcomings in the plan (what worked, what did not). |
| Review and Revise Plan | Review and revise plans and procedures following disasters and annually after exercises. | Record the gaps, shortcomings, opportunities and difficulties in existing plan implementation. | Conduct post event surveys to identify gaps and revise recovery plan. |
| Implement proposals after revision | Implement public information programmes to create awareness of all aspects.<br>Introduce / amend construction codes, technical guidelines for practices that are not covered under codes and enforce as appropriate. | Mobilisation of community, SAR parties, medical first respondents, volunteers. | Use amended construction codes, technical guidelines for construction. |

# Multi-sector Preparedness, Response and Recovery Activities

| Activity | Preparedness Phase (Before Disaster) | Response Phase (During Disaster) | Recovery Phase (After Disaster) |
|---|---|---|---|
| SAR and Medical Assistance | Training, education and exercises for first responders: community, fire brigade and police, doctors, nurses and aides, ambulance services. | Carry out initial evacuation, SAR activities, establish field medical centers, control and direct traffic, law and order. | Provide long-term medical care, and initiate psychological treatment. |
| Child Safety Education | Parents and children: Child safety awareness programs, participation in art contests, dramas, drills, disaster safety day events. | Establish child-parent reunification centers. | Establish child counseling programs, education centers. |
| Emergency Supplies and Equipment | Emergency Management / Military: identification and storage of emergency supplies and equipment, including medical supplies, food, temporary shelters, construction tools, etc. | Distribution of supplies and equipment. | Inventory and replace disaster response supplies and equipment; store according to disaster plan . |
| Supply of potable water | Water utility companies: planning for purifying and distributing water; water bottling companies; beer brewing (can bottle / can water). | Initiate water safety procedures: boiling water orders, purification tablets, bottled water, cleaning of polluted water sources. | Initiate repairs to water systems; Apply disaster donations to upgrading water facilities. |
| Solid waste and waste water disposal | Waste water and solid waste systems: plans and procedures for disposing of waste materials, controlling run-off, treating waste water. | Deploy teams to repair damaged systems, re-route discharge as needed, treat. | Repair system to higher performance standard; install treatment facilities. |
| Transportation | Transportation: identify alternate routes, landing zones for large planes and, helicopters; identify repair needs. | Initiate immediate emergency repairs based on damage assessment, re-route traffic around damaged areas; assist with evacuation and transport of wounded. | Review and assign priorities to long-term transportation repair; identify potential design and routing improvements. |
| Roads and Highways | Responsible agencies: plan and assess capabilities to clean debris and open roads, temporary repairs and long-term repairs. | Clear debris, open roads for evacuation, SAR, carry out temporary repairs. | Repair roads to higher standards. |
| Communications from Operations Centre | Telecommunication services: plans and procedures; identify alternative communication modes; non-power dependent options; repair needs and capabilities. | Help establish emergency communications: radios, cell towers, repair / install repeaters, coordinate with incoming communication resources. | Review and evaluate communication system performance; identify necessary supplies and equipment to enhance response capabilities. |
| Utilities | Power utilities: plans and procedures; assess capabilities of system to perform under various hazard scenarios; estimate power needs to operate critical systems. | Repair and replace system elements; deploy portable generators; coordinate with outside resource providers. | Review and evaluate power system performance; identify necessary supplies and equipment to enhance response capabilities. |
| Partnership and Collaboration | Private sector: role of organisation in response; training and education of employees; resources available for community. | Provide resources and assistance identified in public / private sector disaster response plan. | Review effectiveness of public / private partnership; revise in-house plans and procedures. |

# Disaster Preparedness and Response Planning Process

## Pre-planning

Establish or delegate responsibility to an organisation who will provide management and coordination oversight of the disaster preparedness programme. Local government administrations can provide this function. The oversight body should be comprised of high-level officials. The following activities are suggested:

- Establish a government multi-level, multi-sector disaster preparedness team
- Select a leader for the disaster preparedness team (DPT).
- Identify all stakeholders, eg. key organisations, institutions, community leaders volunteers-individuals, etc. with a role in disaster preparedness, response and recovery who might participate on the DPT or team sub-committees.
- Identify and review existing disaster policies, plans and procedures and recommend improvements.
- Identify and interview key stakeholders to determine how current response and recovery programme is now carried out. This completes a capability gap analysis and identifies areas that need improvement.
- Assess risks through systematic context analyses and scenario building.
- Define planning assumptions, objectives and rationale for contingency planning.
- Establish present situation, set targets and estimate potential costs needed.
- Prepare a preparedness "road map" or a strategy action plan that details each item that needs to be addressed to prepare the disaster preparedness programme, recommend policies, set time lines, identify planning participants, describe roles and responsibilities.

## Plan Preparation

Define the context by describing the levels of planning that will be addressed and the scope of the geographic area, for example; city level, consisting of 11 municipalities, 38.55 $km^2$ with different daytime and night time population. Consideration must be given to the **numerous emergency scenarios, various time-frames** as well as the **resources** required to manage them. The use of historical information may provide direction to this process of scenario building.

- Establish the emergency management organisation (if there are no legal provisions it is advisable to form an informal committee).
- Define emergency response and recovery functions, such as logistics and operations and establish committees and sub-committees for defined functions.
- Assign roles and define responsibilities.

- Prepare a basic preparedness plan identifying policies, authorities, plan references (eg. existing response plans), description of situation (demographics, potential hazards, etc.), description of potential hazards; the basic plan should not have information that changes frequently.
- Prepare an operational response plan describing the emergency management organisation, location of emergency operation centers and detailed description of roles and responsibilities for each response function. Operating procedures should be developed for different agencies with the participation of representatives of such agencies spelling out their response actions.
- Add to the operational plan a separate Appendix with information such as, emergency contact names, locations, email addresses, telephone and fax numbers, etc. This avoids revising the whole plan each time phone numbers and information changes.
- Prepare a recovery plan based on sector-based plans for example, for construction sector identifying construction policies, reconstruction contact information (eg. engineers, cleaning companies, heavy equipment operators, etc.). These sector based plans should also include Operating procedures spelling out their roles and responsibilities.
- Define management and coordination functions for all stakeholders and establish a reporting system based on a checklist for reporting at different time intervals as a routine function.
- Prepare the comprehensive disaster preparedness and response plan combining above components.
- Arrange frequent meetings of the emergency management committee for continuous reporting, review and update of the plan.
- Establish procedure for activation of the emergency plan.

## Plan Implementation

### Plan concurrence

After the plan is prepared concurrence for the plan must be obtained from the relevant authorities comprised of members who are committed to implement the plan. The plan will indicate the relevant persons who will have the authority to respond in emergency or crisis by initiating or activating steps, which may be along the following lines:

**Crisis / initial response**

Activation steps

**Step 1** On declaration of an emergency situation the EOC and relevant SOCs are activated. National level department officers manage field operations with their resources from Departmental Operation Centres (DOCs), and coordinate with other relevant authorities.

**Step 2** Departmental Operation Centres (DOCs) send rapid damage assessments and analysis; and coordinate their respective inter-

departmental and inter-agency resource requests through the EOC and their line ministries.

**Step 3** If the District or local administration cannot meet the required resources, the EOC must work to secure the needed resources from the National Government through the Natural Disaster Management Authority.

### Training and education

- Identify training and capacity building needs for various stakeholders.
- Develop a training plan and conduct training.
- Prepare and deliver training seminars and workshops to prepare all response and recovery personnel for their disaster roles and responsibilities. Training should include procedures for warning and notification, assembly locations, reporting process, etc.
- Prepare materials to guide response and recovery activities.

see Chapter 6

### Public awareness

All people involved in the plan must be made aware of the existence of the plan, their roles and responsibilities. If a wide cross-section of the population is involved, it is important to launch an effective public awareness campaign to communicate this information.

see Chapter 6

### Drills, simulation and demonstration

Training and education is not enough to ensure a rapid, efficient disaster response or recovery. Exercises, drills, simulations, etc. for different target audiences are necessary as well. Exercises include plan orientations to provide general information on plan content and structure; 'table top' exercises to apply the plan to disaster scenarios in a group setting; and, functional exercises to test one or more aspects of the plan. There must be verification of the plan through simulation and demonstration involving all stakeholders.

### Purchase of supplies and equipment

The purchase of supplies and equipment may be done at the community, provincial / district and national levels. A strategic plan should be made for the storage and distribution facilitates for immediate access following a disaster.

see Chapter 2

### Institutionalisation

It is necessary to set up legal provisions and standards for various functions (including at national, local government and institutional levels). Institutional arrangements and coordination mechanisms have to be institutionalised for smooth functioning of:

- Emergency planning and drafting committees at various levels.
- Committee for implementation of emergency plans.

- Setting up an activation of Emergency operation centers.
- Early warning and emergency declaration in case of severe disaster events (authorisation for declaration and process of action at various levels).

Inter-institutional coordination: for example, at the national level National Disaster Management Organisations (NDMO) may take the lead role with the support from other sector-based institutions. Similar arrangements have to be made at district level, local government level, community level and so on.

## Important factors for ensuring the success of preparedness plan

To ensure the success of the plan it will need:

- Broad participation of relevant sector employees in planning and implementation.
- Maintain advocacy, promotion and training.
- Conduct simulations and evaluation exercises to test the effectiveness of plans.
- Disseminate information on lessons learned in similar incidents (for example, data on damages, emergency needs, competencies of SAR parties, medical first responders, temporary shelter).
- Rehabilitation programmes for complete recovery after disaster considering the physical, social, economic and environmental aspects.
- Support by government through policy formation to institutionalise the activities and actions.

# Tools and Techniques Used to Support Disaster Response and Recovery

## Early Warning Systems

Widely promoted during the international decade for natural disaster reduction (IDNDR), the emphasis on building good hazard forecasting mechanisms and early warning systems has resulted in a reduction of severity of the impact of natural disasters. It is used to warn of forthcoming events so people can protect both lives and property. However, for effectiveness, systems must be integrated and linked to all stakeholders to form a reliable communication chain between the scientific and technical data and the community at large.

Experience has shown that the process involved in early warning systems need to be part of a national legislative framework. They also need to be timely, accurate, reliable and understandable information for those at the grassroots level - the target audience for the warning, should be able to receive, process and make decisions in proper context.

Alert, warning and notification policies and procedures guide an effective disaster response. Exercises need to be conducted to test procedures and equipment to ensure operational capacity. Post-disaster assessment provides recommendations for improvements. Components of alert, warning and notification approaches include, but are not limited to:

- **Hazard identification and assessment** - Identification of hazard events for which an alert and warning system would provide an opportunity to save lives and property.
- **Operational capabilities** - Accurate forecast or prediction of an impending disaster through successful application of hazard monitoring / assessment techniques.
- **Clear communication channels** - Development of clear communication and reporting lines for transmitting information to local levels (from data source to user) - eg. Bangladesh Meteorological Department's communication of warnings to cyclone preparedness programme's (CPP) headquarters.
- **Clear and timely issuance and dissemination of warnings** - Timely issuance and dissemination of warnings including possible impacts on people and infrastructure (risk assessment results converted to maps, GIS databases, block diagrams and so on), and recommended actions to decision-makers (i.e. appropriate authorities and the population at risk).

see Chapter 2

- **Coordination from the center to local government and to community** - Involvement of stakeholders at national and local levels in the verification of information, agreement on the decision-making process, standard operational procedures and selection of appropriate communication media and dissemination strategies up to community and family levels.
- **Ensuring stakeholder participation** including community representatives) in planning and plan implementation
- **Planning** - Specification of roles and responsibilities in the disaster response plan for authorities and response workers to facilitate prompt operations.
- **Political consensus** - political support for mobilisation of finances from different sources for investing in appropriate technologies and training for the use of technologies with the greatest outreach.
- **Monitoring and evaluation** - Regular monitoring and evaluation are critical, particularly after a disaster. Disasters are opportunities to test the effectiveness of the measures and systems developed to reduce risks. Results from the evaluation need to be incorporated in the form of amendments to legislation, policies and programme objectives.

## Communication Systems

Communication failures commonly accompany disaster events. Multiple systems provide options in case one or more systems are non-operational. High-tech solutions, such as satellite phones, VHF radio systems, cell phones, landlines, etc., may be considered. *Battery operated radios are found to be more reliable in dissemination of information even in remote areas in Asia during disaster events*. Event triggered response procedures should be developed in case communications fail. Runners / volunteers may carry information within communities to pre-designated emergency operations centers.

## Database Tracking Systems

Before, during and after a disaster there are a multitude of supplies and equipment to manage. During and following a disaster, most of the international institutions mobilise donations for victimised families. But in most countries there are no systems for disaster assessment and need analysis, and it further complicates the ability to identify and distribute necessary items. The donors need to consider cultural and religious practices, and values in the countries and the tracking system should be able to provide information on the real needs of communities affected. Preparation of tracking systems as part of preparedness activates will help the response and recovery teams remain organised. Microsoft Excel and Access are two of many database systems that could be used for this purpose. Manual systems should be maintained in case of power outages.

**see India Case Study**

# Case Studies

Bangladesh

## Bangladesh

**Combining hardware and coordination of key responders for effective response**

***Cyclone preparedness saves millions***

### Disaster history

The Cyclone Preparedness Programme (CPP) was started by the International Federation, the Bangladesh Red Crescent Society and the Government of Bangladesh after the 1970 cyclone when almost 500,000 people died. Wind speeds reached 220 kilometers an hour and tidal surge topped ten meters that year. In 1991, wind speeds were even higher and the maximum reported tidal surge was six meters. 140,000 people died, but 350,000 were safely evacuated. In 1997 a similar cyclone with winds over 230 kilometers an hour and a tidal surge of up to 4.5 meters claimed less than 200 lives while a million people were evacuated into shelters.

### Preparedness activities

- Increased number of shelters.
- Established mechanism to manage and maintain shelters.
- Established warning system.
- Trained volunteers to rescue, evaluate and provide first aid to people; carry out post-cyclone damage assessment.
- Pre-disaster exercises and awareness rallies.

### Shelters, communications systems, evacuation

Over this period, the CPP has been progressively extending its shelter and communications systems. The Government of Bangladesh contributes to 56 per cent of CPP's operational costs, which amounted to US$ 460,000 in 2001, and the International Federation covers the remainder. Local communities raise funds to manage and maintain the 1,600 cyclone shelters across the coastal region.

Clearly, the investment paid off. The CPP can now alert around 8 million people across the entire coastal region, and can assist 4 million people to evacuate. The warning system uses Asia's largest radio network, linking the CPP's Dhaka headquarters with 143 radio stations. Radio warnings are then relayed by 33,000 village-based volunteers using megaphones and hand-operated sirens. The volunteers are also trained to rescue and evacuate people to shelters, administer first aid and assist in post-cyclone damage assessment and relief. Between disasters, volunteers organise simulations exercises and awareness raising rallies.

### Next steps

A recent study conducted by FOCUS on the CPP revealed areas for improvement. It showed that around 60 per cent of the people surveyed had problems understanding the signals or announcements due to complicated and technical language. Almost 80 per cent of the people stated their preference for broadcast bulletins in local dialect which would be easier to understand. The survey also showed that some people did not evacuate due to inadequate facilitates for water supply and sanitation and the lack of *purda* for women (a separate space for religious and security reasons) at the cyclone shelters.

(IFRC, 2002: and Ullah, 2003)

## Papua New Guinea

## Developing partnerships for response and recovery

## *Understanding tsunami*

**Papua New Guinea**

### Disaster history

On the evening of 17 July 1998, a strong earthquake was felt in the Aitape coast, located at the north-west tip of Papua New Guinea (PNG). A loud sound, similar to an explosion or the violent clap of thunder followed by the churning of what seemed to be a low-flying jet plane was heard. Curious to identify the noise, people from the surrounding villages ran to the waters edge, only to discover a huge wave forming.

Within seconds people were running as far away from the beach as possible, some climbed trees, others ran back to the village to warn the others, some ran to their boats moored in the lagoon nearby. The coast of Aitape was the scene of chaos for 35 minutes, and then there was calm. The entire coastline and inland area was completely destroyed by a tsunami. Over 2,200 people were killed, and 10,000 left homeless.

### Response and recovery activities

- Partnerships with scientific institutions enabled data collection and damage assessments to be carried out after the tsunami in PNG.
- A public information programme was implemented after the tsunami.

### Data collection and damage assessment

Directly after the disaster occurred, PNG-based researchers began the process of data collection - documenting eye-witness accounts, and mapping the patterns of destruction and distribution of sediment brought by the tsunami. International and local-based scientists continued with further investigations such as marine and onshore surveys. PNG based scientists conducted intensive interviews with survivors to determine the procedures, if any, taken to ensure survival. Hazard assessments such as historical profiles of past tsunami events, and damage assessments were also conducted.

### Risk communication - public information programme

From the series of research and assessments, it became apparent that there was no recollection of past tsunami events, and people were unaware of what had occurred. The people had to be reassured that this was a natural phenomenon, so accurate, concise and simple information was provided, and people were encouraged to ask questions. A comprehensive public information programme began in early August 1998. It involved the feedback from scientific investigations, distribution of pamphlets, visits by scientists to hospitals and universities, and regular stories in the national press to inform the people of the phenomenon. They remained unconvinced that this was not a human-induced disaster.

see Chapter 6

The Asian Disaster Reduction Center (ADRC) and Tohoku University, both in Japan, were called upon to share their own experiences of tsunami events with the people of Aitape. ADRC designed a tsunami information poster, which was distributed nationwide. A public awareness campaign for safe evacuation procedures was tried and tested as a second tsunami, this time hitting the north-east coast of PNG in November 2000 resulted in destruction of homes, but no deaths.

(Source: Davies, et al, undated)

India

## India

## Linking recovery to development planning

## *Maharashtra emergency earthquake rehabilitation programme*

### Policy and legal arrangements

The state of Maharashtra, India experienced a devastating earthquake in September 1993. After the earthquake, the Government of Maharashtra drew up the Maharashtra Earthquake Emergency Rehabilitation Programme (MEERP) in consultation with the Government of India, the World Bank and other stakeholders.

The MEERP was implemented between July 1994 to December 1998, although some work continued up to mid-1999. The total implementation cost of the programme was US$ 358 million. Lessons learned from this programme contributed significantly to implementation of the recovery process after the 2001 Gujarat Earthquake.

### Recovery

*Rehabilitation programme*

Accessing and motivating almost 200,000 beneficiaries required a multi-pronged effort, including local banks, material depots, contracted engineers, trainers and communications specialists. MEERP's greatest contribution was the disaster management plan. It was the first rehabilitation programme supported by a document with objectives and strategy, and spelt out beneficiaries' entitlements.

The government planned to relocate the worst damaged villages which led to the construction of 27,919 houses. Construction and engineering consultants were appointed for the design of village layout and houses, tender documentation, supervision and billing. Rural resettlement planners worked with the engineering consultants in preparing village layouts, community participation consultants joined the planning process by drawing in the villagers. For the first time, social and community aspects of housing were included by engineering consultants in the planning process, widening consultative participation and bringing together different perspectives on rehabilitation.

### Training and education

Throughout the programme the government acted as a facilitator instead of an implementer. Beneficiaries carried out reconstruction with government support, and became conscious of their entitlements and the rehabilitation process. In the relocated area, the government improved living conditions by promoting the construction of stronger houses, developing extensive infrastructure and accessible services, as well as building capacity in earthquake-resistant building.

(Source: MEERP, undated)

## India

## Linking recovery to sustainable development
## *A model recovery programme*

**India**

### Project initiation

Patanka Village of Patan District, Gujarat was among the worst hit, but least served villages following the Gujarat Earthquake in January 2001. Applying lessons from previous earthquake recovery projects, 15 like-minded organisations from India and abroad came together to pilot a "model" rehabilitation programme in Patanka.

Instead of simply building houses for residents of Patanka, the programme team worked together with local and state government officials and community groups in conducting a risk assessment and developing a plan of action for recovery that is based on the priority needs of the village.

### Recovery plan

The Patanka Navjivan Yojana (PNY or Patanka New Life Project) incorporates risk reduction measures as part of its recovery strategy. The aim is to strengthen people's capacity to protect themselves from future disasters.

PNY emphasises sustainability and replication. Activities introduced, such as the methodology for constructing stronger houses, is developed to ensure that it will not only continue after the programme ends, but also spread to other communities.

### Training and education

The programme team discovered that existing capacities in earthquake safe construction were very low. The community was ready to build their houses themselves. However, they needed guidance and support in building techniques and use of building materials.

From their findings, a comprehensive capacity building programme for different stakeholders was developed.

(Gupta, 2002)

**Vietnam**

## Vietnam
## **Flood kindergartens**
## ***Safe areas***

### Project initiation

In Vietnam, children have been found to be most vulnerable during the flood disasters. In the severe floods of 2000, 2001 and 2002, 1,683 people were killed of which 72% were children under the age of 16.

### Preparedness activities

The Central Government and provincial authorities supported the development of flood kindergartens (or child care centers) that takes care of children during the flood season. These kindergartens are often established in private houses, which have been donated for this cause. Sometimes they are in health commune stations and schools that are closed during the flood. This has eased the burden of many families, especially women as the flood season is the busiest time for fishing. During flood events, parents who need to travel distances to work or find food no longer have to leave their children unattended.

Since 2000, government and donor funds were granted to build these centers. Allowances for teachers and food for children were provided, and teaching and learning materials were donated. Currently there are over 1,000 centers keeping over 20,000 children safe in flood-prone areas. Almost half of the kindergartens have been transformed into permanent kindergartens for children.

### Benefits and next steps...

This initiative has not only resulted in a 62% decrease in number of child-deaths where the kindergartens were established, but provided rural children access to kindergarten education for the first time. This programme plans to phase out government funds and involve the community to take care of the total cost in the near future.

(Olsson, 2003)

# Case Study Lessons Learned

- **Collaboration and coordination is necessary to promote accurate, timely and meaningful warnings:** Collaboration and coordination among scientific institutions, early warning agencies, public authorities, the private sector, the media and local community representatives is necessary to promote accurate, timely and meaningful warnings that can result in appropriate actions by an informed population.

- **Early warning systems are not always effective**, especially for extremely infrequent and fast developing events such as tsunamis. When this is the case, good community preparedness planning should be put in place to lessen destruction of the impact.

- **The needs of different groups at risk must be understood:** In the case of the CPP, warning signals and announcements need to be prepared in a number of different dialects and pilot tested in selected communities to ensure that messages transmitted are effective in reducing risk. Cyclone shelters also need to be improved to meet the social and cultural needs of women.

- **Volunteers are the link between the technical warning data and the people:** They are the disseminators of information, and the active facilitators of the evacuation plan. They execute drills, demonstrations and training in evacuation and first aid at the community level. Responsible and fast acting volunteers are a vital component of the smooth running of the CPP.

- **Building on existing resources** (eg. using existing houses, retrofitting, health stations and schools for flood kindergartens) can reduce costs. Simple initiatives combining small resource contributions from different sources can make a big impact.

- **Small projects:** Small projects are the most effective when they identify a target group with a specific need.

- **Involvement of school children is very effective**: When designing risk communication programmes, involvement of school children is very effective. They should be treated as a separate segment of the society. Children are an effective entry point to the family and community and can be used to convey strong messages on preparedness aspects with proper training, drills and simulation exercises. By adopting this process, these practices can be easily institutionalised within a community.

- **Resource contributions from multiple sources** can support administration and operation. Financial and political support from national level decision-makers, policy makers and local communities have greatly contributed to the sustainability of this programme. A major reduction in the death toll is the result of their commitment.

- **Outside expertise:** Calling on outside expertise to assist establishment of risk parameters and sharing of their experience and knowledge can enhance the understanding of the disaster event, its impact on the community and possible risk management interventions.

- **Phased out withdrawal of recovery actions is important:** Recovery often ends abruptly after a short time-frame or communities become dependent on assistance. More careful phased withdrawal is needed.

- **In the absence of historical information on events,** developing knowledge through assessments and research on disaster events is appropriate. Disaster risk reduction interventions formulated to reduce the level of risk through such deterministic approaches are fundamental to effective response and recovery.

- **Documentation after a disaster:** Following a disaster, documentation is important after carrying out an audit and recording all events and lessons learned, including the need to incorporate risk reduction in future development activities; partnerships that worked well; sustainable community rehabilitation such as capacity building on improved disaster resistant construction techniques; improvement of livelihoods, etc.

# Discussion Questions

The discussion questions are provided to stimulate discussion about preparedness, response and recovery activities. These questions are just suggestions that may help guide your discussions. You may wish to discuss other disaster preparedness issues that will help improve your response and recovery capabilities.

- Does your community have a disaster preparedness committee, disaster committee or are elements of your local administration tasked to address disaster issues, including preparedness?

- Where would such an organisation be located and how would it relate to the local community and government organisations?

- Who would participate: government representatives, NGOs, community leaders, consultants, etc. All these stakeholders and perhaps others could be a part of a comprehensive disaster committee, of which there may be a preparedness sub-committee.

- Do you have disaster supplies and equipment? Where are they stored? Who has access?

- Who in your community has emergency related duties, eg. public works, fire services, that would be interested in contributing to the disaster preparedness effort?

- What policies, plans, procedures already exist for disaster preparedness?

- What has been your past experience responding to and recovering from disaster?

- What development projects are you planning and how might they be enhanced to reduce future response and recovery needs?

# Challenges

Disaster preparedness comprises of forecasting and warning, and planning for response and recovery. A range of organisations working in different sectors with different groups of people, competencies, specialities at different stages of operations, are required for disaster preparedness planning and implementation. Hazard events will reveal the appropriateness of the pre-planned activities, competencies of people involved and effectiveness of strategies adopted to deal with emergency situations. When an emergency occurs, these different organisations will be acting in their identified roles at a designated location for a specific purpose. Any failure or shortcomings in the pre-planned activities will convert the emergency into a major disaster.

The key challenges in developing and implementing a comprehensive preparedness programme is:

- Development of preparedness plans for response and recovery through multi-stakeholder participation including vulnerable communities. Developing clear roles and responsibilities for preparedness, response and recovery can be easy when it is institutionalised as a part of mandatory provisions of governments of different levels. The sector based plans should be incorporated into other levels and resources should be mobilised for plan implementation during disaster events and plan verification during peacetime.

- Creating legal and institutional frameworks to integrate preparedness plans with longer-term development plans is essential. Establishment of regular review and revision processes and having a coordinated approach for all actions should be considered as an important aspect.

- Sensitivity to the needs, development priorities and resources of the disaster-affected communities are important factors and should receive the adequate recognition and commitment of the plan development committees.

- It is a difficult task to prepare communities to overcome the impacts of hazards, which are of rare occurrence such as Earthquakes and Tsunamis. Creating awareness in such cases is a challenge, as communities do not expect such events.

- Effectiveness increases when response and recovery programmes for disaster events lead to livelihood improvement and sustainable development. National and international NGOs are making genuine efforts to introduce such programmes with maximum community participation. But it is difficult to mobilise the resources through international donor participation when it is not recognised as a priority by the appropriate government institutions.

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ASEAN Specialised Meteorological Center (ASMC)
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FAO Global Information and Early Warning System (GIEWS)
*http://www.fao.org*

Mekong River Commission (MRC)
*http://www.mrcmekong.org*

Regional Cooperation for Flood Information Exchange in the Hindu Kush-Himalayan Region
*http://www.southasianfloods.org*

World Meteorological Organisation (WMO)
*http://www.wmo.ch*

## Resources for response and recovery

For response and recovery there are a number of guidelines and approaches developed by international humanitarian organisations. Examples include codes of conducts, standards, training courses and equipment kits for assessments, the management of goods (food, medicine, emergency shelters) and services (search and rescue, medical first response), and improving accountability during response and recovery. Some initiatives include:

ADPC
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## Training courses

ADPC *(http://www.adpc.net)* offers regular courses on:

Public Health and Emergency Management in Asia and the Pacific
Public Health in Complex Emergencies
Hospital Emergency Preparedness
Medical First Responder
Collapsed Structure Search and Rescue
Road Accident Rescue
Canine Search and Rescue

RedR *(http://www.redr.org/redr_australia/index.htm)* offers a series of training courses for response and recovery including:
Essentials of Humanitarian Practice
Humanitarian Management

Humanitarian Logistics
Personnel Security and Communications
SPHERE Core Technical Sectors

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## Cross-sectoral resources for preparedness, response and recovery

CIDA (2003) *Gender Equality and Humanitarian Assistance: A Guide to Issues.* Quebec, Canadian International Development Agency.

EMA (2003) *Critical Infrastructure Emergency Risk Management and Assurance: Handbook.* Mt Macedon, Emergency Management Australia.

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Sinclair, M. (2002) *Planning Education In and After Emergencies.* Paris, United Nations Educational, Scientific and Cultural Organisation.
*http://www.unesco.org/iiep*

Twigg (2002) *Technology, Post Disaster Housing Reconstruction and Livelihood Security.*
*http://www.livelihoodtechnology.org/home.asp?id=disIntro1*

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WHO (2002) *Gender and Health in Disasters.* Geneva, World Health Organisation.
*http://www.who.int/gender/other_health/en/genderdisasters.pdf*

Rapid Environmental Impact Assessment in Disasters Response (REA)
*http://www.benfieldhrc.org/SiteRoot/disaster_studies/rea/rea_index.htm*

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# mitigation planning and implementation

5

gateway to disaster risk reduction

## Chapter Brief

## Key Words

Avoidance
Cost / Benefit Analysis
Land-use Planning
Mitigation
Non-structural Mitigation
Prevention
Risk Transfer
Structural Mitigation
Sustainable Development

## Introduction

## Mitigation Planning and Implementation Concepts

- Benefits of Mitigation
- Considerations in Mitigation Planning
  - Disaster risk management committee
  - Identify mitigation measures
  - Policy, legal arrangements and institutional framework
  - Ranking mitigation measures
  - Public involvement
  - Revisions
- Mitigation Measures
  - Structural mitigation
  - Non-structural mitigation
- Mitigation Approaches

## Mitigation Planning and Implementation Process

- An overview of mitigation planning and implementation process
- Who Should be Involved in Planning Process?
- How Should this Plan Look?
  - Five 'M's for mitigation planning
  - Rationale for a good mitigation plan

## Case Studies

India. Projected benefits of mitigation
Vietnam. The importance of policy environment
Philippines. Non-structural disaster mitigation
Bangladesh. Micro-financing for floods
Vietnam. Partnerships
Nepal. Non-engineered structures in Kathmandu
Bangladesh. Long-term structural mitigation
Nepal and Indonesia. Strengthening existing structures
China. Flood insurance in China

## Lessons Learned

## Discussion Questions

## Challenges

## References

## Resources

# Chapter Brief

- Mitigation priorities save lives , reduce damages and losses, and also reduces adverse consequences to the economy and society.

- Where resources for mitigation are limited, they should be targeted where they will be most effective.

- Mitigation measures are aimed at reducing or eliminating vulnerabilities in the community, and when sustained over the long-term, they can reduce unacceptable risk to acceptable levels and make a community more disaster resilient.

- Mitigation planning should aim to develop a culture of safety. Considerations in mitigation planning include establishing a Disaster Risk Management Committee (DRMC) for brainstorming mitigation priorities based on risk assessment results and ranking mitigation measures involving stakeholder participatory process. After a disaster, the DRMC should meet and review the measures based on lessons learned from the disaster.

- Mitigation programming for a defined geographic area involves the preparation of an action plan for:
  - The implementation of mitigation activities
  - Deciding on mechanisms for implementation and
  - Monitoring and evaluation

- Mitigation measures include structural mitigation measures (engineered and non-engineered structures) and non-structural mitigation measures (physical planning, economic activities, societal measures, appropriate institutional arrangements)

- Building disaster resilient communities is a slow process and it should be supported by programmes on professional training and education, and public awareness creation.

- Mitigation measures can be short, medium or long-term. Community-based mitigation actions are likely to be more responsive to the needs of communities, cost-effective and capable of mobilising local resources

# Key Words

## Avoidance

Many hazards are localised with their likely effects to specific areas, which are known to the planner. For example, floods affect floodplains and landslides affect steep slopes. Areas prone to landslides are generally known. The hazards can be avoided by not allowing the establishment of human settlements or important structures to be built in prone areas.

## Cost / Benefit Analysis

Feasibility studies of projects in hazard prone areas must include costs and benefits of investing in mitigation measures, in order to compare them with the value of losses that might be caused by natural hazards. The earlier these calculations are made the better. This integration can be done at different stages of the project development. During the feasibility and design stages attention must be given to:

- The impact of disasters upon the proposed development.
- The impact of the proposed development upon the possible triggering of natural hazards in the area concerned.

## Land-use planning

Branch of physical and socio-economic planning that determines the means and assesses the values or limitations of various options in which land is to be utilised, with the corresponding effects on different segments of the population or interests of a community taken into account in resulting decisions.

Land-use planning involves studies and mapping, analysis of environmental and hazard data, formulation of alternative land-use decisions and design of a long-range plan for different geographical and administrative scales.

Land-use planning can help to mitigate disasters and reduce risks by discouraging high-density settlements and construction of key installations in hazard-prone areas, control of population density and expansion, and in the siting of service routes for transport, power, water, sewage and other critical facilities (UNISDR, 2004).

## Mitigation

Mitigation refers to structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards (UNISDR, 2004).

## Non-structural Mitigation

Non-structural measures refer to policies, awareness, knowledge development, public commitment, and methods and operating practices, including participatory mechanisms and the provision of information, which can reduce risk and related impacts (UNISDR, 2004). They also include practices such as land zonation, land-use planning and urban planning.

## Prevention

For most types of natural disasters, it is impossible to prevent the actual event from occurring. The focus of mitigation policies against these hazards is primarily on reducing the vulnerability of elements that are likely to be affected. Some natural hazard risks can be reduced. The construction of levees along a riverbank is an example of prevention by flood risk reduction.

## Risk Transfer

A measure by which non-affected population of a country assists the affected people with risk finance by way of insurance or catastrophe fund.

## Structural Mitigation

Structural measures refer to any physical construction to reduce or avoid possible impacts of hazards, which include engineering measures and construction of hazard-resistant and protective structures and infrastructure (UNISDR, 2004).

## Sustainable Development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organisation on the environment's ability to meet present and the future needs (Brundtland Comission, 1987 in UNISDR, 2004).

Sustainable development is based on socio-cultural development, political stability and decorum, economic growth and ecosystem protection, which all relate to disaster risk reduction (UNISDR, 2004).

# Introduction

Mitigation planning involves the preparation of an action plan for activities and deciding on mechanisms for implementation and monitoring within a defined geographic area. The initiative may be taken by a local authority, or in some cases it may be a project, locally or foreign funded. For mitigating a specific natural disaster encompassing a broader geographic area, the provincial or state government, or a national ministry or authority may take the initiative.

The implementation and maintenance of mitigation measures:

- Improves development practices to increase resistance to future disasters.
- Reduces or eliminates vulnerabilities in communities and other built environments.
- Reduces unacceptable risk to an acceptable level.

Implementation of mitigation measures can limit or eliminate future disaster impacts and is integral to a policy of sustainable development. The effort expended in the preparation and implementation of mitigation measures can make human settlements safer before a disaster and accelerate disaster recovery following a disaster.

see Chapter 3

The disaster risk assessment and evaluation process described in Chapter 3 identifies and assigns priorities to mitigation measures. The performance of mitigation must be evaluated following a disaster to determine if these mitigation measures achieved desired results. Performance evaluations provide information to improve mitigation efforts and revise mitigation priorities.

A mitigation plan provides a guide to the development and implementation of mitigation measures. The plan describes a process for incorporating changes in risks, mitigation approaches and mitigation priorities. The failure to prepare a mitigation plan exerts tremendous pressure on those involved in response and recovery efforts. For example, reconstruction projects to meet urgent housing needs may proceed without consideration of mitigation in order to move forward as quickly as possible. The mitigation plan provides guidelines to facilitate rapid recovery and prevent uncontrolled growth.

Some key points on mitigation planning to remember:

- Mitigation interventions integrated in all development programmes to anticipate any hazard phenomenon will help to prevent emergencies becoming severe disaster events.
- The cost of integrating mitigation measures in development programming is minimum compared to implementing stand-alone projects. For example, mitigation can easily be adopted as a standardised component under Environmental Impact Assessment (EIA) processes.
- Incorporating mitigation into development projects targeting the most vulnerable can promote long-term poverty reduction strategies within the poorest segments of the community.
- If national policy can promote mitigation strategies and measures as part of development planning, this will set precedence for good governing standards.

# Mitigation Planning and Implementation Concepts

## Benefits of Mitigation

### Disaster impact adversely affects sustainable development

Mitigation measures reduce or eliminate vulnerabilities in the community, and when sustained over the long-term, reduce unacceptable risk to acceptable levels and make a community more disaster resilient. Mitigation includes what is commonly referred to as "prevention". But not all hazards can be prevented.

Mitigation actions link disasters and development positively. Development projects that effectively address risk reduction should contain components, which mitigate future disasters.

Proactive actions to reduce the impacts of hazards can reduce:

- Negative influences of disaster losses on the overall development indicators of a country (growth rate, per capita income, investment inflow, exports, share capital and so on).
- Exhaustion of national resources for relief and rehabilitation work, which could otherwise be channeled into development work.
- Human misery, psychological trauma and other societal impacts of disaster.

## Considerations in Mitigation Planning

### Appoint a disaster risk management committee

see Fogure 5.1

Identify members of the Disaster Risk Management Committee (DRMC), which will be responsible for developing and implementing the plan. Potential members should include those involved in the construction process (engineers, contractors, building officials, builders, facility managers, etc.) and appropriate government representatives (public safety, public works, community development, etc.) and representatives of other key-stakeholders (refer to Figure 5.1).

### Identify mitigation measures

see Chapter 3

Identify mitigation measures using the results of the risk assessment as described in Chapter 3, which includes the identification of:

- Potential hazards
- Elements at risk
- Vulnerabilities
- Potential mitigation measures

## Policy, legal arrangements and institutional frameworks

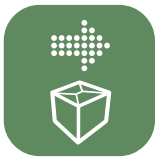
Policies need to be formulated to guide the risk assessment that will identify mitigation measures to reduce risk. Legislation can enforce compliance of such measures.

- Propose legal arrangements (laws, regulations, official acts, guidelines, etc.) to implement selected mitigation measures.
- Establish institutional framework necessary to carry out the defined mitigation policies.

**see Chapters 2 & 3**

## Ranking mitigation measures

The mitigation plan should include a description of how mitigation measures will be ranked as per a pre-defined rationale giving justifications for the prioritisation. Development of a criteria for the ranking based on the information in the risk assessment is also essential. This provides a pre-defined, equitable means to select appropriate measures.



**see Vietnam Case Study**

## Public involvement

Mitigation measures should be identified and prioritised through a participatory process. This can easily be done in a small geographic area. However, when it is carried out at city, district, or even national level there are some limitations. Public meetings can be held to involve the community in the process of selecting mitigation measures. This provides an opportunity to review the results of the mitigation plan.

## Revisions

Following a disaster, the Disaster Risk Management Committee should be reconvened. This allows review of the list of prioritised mitigation measures. Revisions are made based on lessons learned from the disaster. In addition, measures implemented before the disaster should be evaluated to see how well they performed.

# Mitigation Measures

Mitigation measures may achieve any one of the following:

- Preventive measures, which aim to minimise the physical damage created by hazard events.
- Spreading the risk, which aims to reduce the effects of physical damage by ensuring a range of alternative facilities.
- Delegating the responsibility, which aims to provide an incentive for different agents to implement mitigation measures.
- Covering or minimising the impact, which aims to manage potential effects.
- Planning disaster management, which aims at long-term resilience.

The following structural and non-structural means may be listed (Carter, 1991):

**Structural mitigation**

- Engineered structures
- Non-engineered structures

**Non-structural mitigation**

- Legal framework
- Land-use planning
- Incentives
- Training and education
- Public awareness
- Institutional building

*Elevation of homesteads and roads above maximum recorded flood level in Bangladesh, called* flood proofing

*Structural mitigation for floods also ensures* adequate size of culverts, and other drainage devices *built to control floodwaters, and bridges to ensure access over flooded areas. Drainage is a major problem in the floodplanes of Bangladesh. Improvements to old drainage systems and introduction of drainage pipes in areas experiencing population growth can reduce the level and duration of inundation. A minor structural intervention in a community-based initiative in Bangladesh has lessened the severity of flooding in these growing urban environments.*

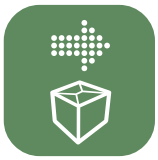
*A low cost bridge built through community-based action in Cambodia.*

## Structural mitigation

**A few generic structural mitigation options** (note that this list is not exhaustive):

- **Dams and dikes.** These man-made structures include the construction of levees and dikes to retain flood waters. Other types of intervention are dams and reservoirs to harness the flow of rivers, for flood control, irrigation and hydro-power. However these methods may not provide the level of protection intended.
- Another mitigation technique employs structural measures to **strengthen buildings and facilities.** These measures can take place at original construction, during renovations, or as specific retrofit projects.
- Another mitigation technique is the **elevation of structures** within identified flood-hazard areas.

**see Bangladesh Case Study**



**see India, Nepal & Indonesia Case Studies**

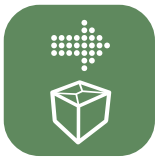
When considering structural mitigation, there are two categories of buildings viz., engineered structures and non-engineered structures.

*Engineered structures*

These are structures (eg., buildings, bridges, communication towers, dykes / dams, sluice gates, etc.) designed and constructed according to standard engineering practices. Engineered buildings are generally designed and supervised by a professional engineer who must obtain a building permit from the municipal or other designated authority. The building permit, plan review and construction inspection by the local jurisdiction helps ensure that the building meets building code requirements and planning by-laws. This process does not ensure that the building codes are adequate or that engineers have received appropriate training. In most developing countries in Asia, the formal design and construction process is observed only in urban areas, but the process may need to be improved to protect lives and property from disaster effects.

*Non-engineered structures*

These are physical structures (eg., buildings) that have been built without consideration of the design and construction standards that engineered structures must address. These structures have not been through a formal building permit process to ensure conformity with local building codes and land-use regulations. Such codes and regulations may not have been adopted. Neither have those responsible for construction received any guidance or supervision from the building department or professional engineers. Non-engineered structures are prevalent in rural and non-urban areas, such as the periphery of municipalities. A large percentage of the buildings and infrastructure even in urban areas of many developing countries are non-engineered constructions.



**see Nepal Case Study**

Mitigation strategies for non-engineered construction include:

- **Preparation of necessary documents**
  - Mandatory rules
  - Design guidelines
  - Mason's manual
  - Preparation of leaflets, posters and handbook
- **Raising awareness**
  People and house owners should be aware of the consequences of disasters, necessary actions for mitigation and also the affordability of the technology.
- **Training of artisans**
  Masons or craftsman should be trained through on-the-job training so that they would ensure safety of structures. They can also be trained to retrofit existing structures, especially in the recovery and rehabilitation process.
- **Development and transfer of appropriate technology**
  In case of earthquakes non-engineered buildings suffer most. Theoretically, if appropriate resources and building materials are made available, such buildings can be constructed to withstand the effects of earthquakes. Practically, it is not feasible to do so due to the very high costs involved. Engineering advice is essential to achieve the cost-effectiveness and optimisation of resources without compromising safety standards.

  Safety aims can be met if a building is designed and constructed using appropriate technology in such a way that even in the event of the probable maximum impact of a disaster, it will remain functional.

see Chapter 3

## Non-structural mitigation

*Institutional measures*

A legal framework supported by an appropriate institutional arrangement is a necessary platform for implementing disaster mitigation. It is a non-structural measure that demonstrates a clear lead from government, provides legislation and regulations, provides organisational arrangements with clear delegation of roles and responsibilities, and provides for a vision of expected standards.

**Broad categories of land-use:**

- Residential
- Agricultural
- Religious & cultural
- Recreational
- Conservation
- Forests
- Commercial
- Medical
- Educational
- Administrative
- Industrial / Airport
- Employment center
- Business center

A legal framework and its implementation is lacking in most countries throughout Asia. Good governance and commitment to risk management is a challenge for most national governments in the region.

An example of the use of a legal framework is the implementation of building codes that set standards for new construction to withstand the impact of natural hazards such as cyclones or earth quakes.

*Land-use planning*

Land-use planning helps in controlling human activities in hazard-prone areas to avoid damage to infrastructure, and loss of life and injury. Land-use planning addresses the changing relationship

between people and their environments. It is a useful approach to managing urban population growth and minimising risks.

The process involves the active participation of land developers, local governments and the community. Due to decentralisation of governance throughout Asia, local government needs to take a major role in the planning of land-use in their constituencies. Of late, there has been a greater emphasis on wider community consultation in land-use planning.

Regulatory mechanisms addressing disasters have proved effective in developed countries such as Australia, Switzerland and the USA, but in Asia, land-use planning is rarely practiced. In Asia, creating a regulatory environment for effective implementation of land-use planning poses a challenge.

The other challenge is the lack or inability to access, and reluctance to share information regarding hazard characteristics, vulnerability and risk. The case study of Naga City highlights the benefits that can result from good land-use planning.

### Land-use planning legislation that governs risk mitigation

**Zoning regulations**. Zoning is the way governments control the physical development of land and the kind of uses to which each individual property may be allocated. Zoning regulations should be based on detailed risk analysis including development of risk scenarios, risk projections and risk micro-zonation. Local authorities should implement it in consistency with a comprehensive Area Development Plan. Zoning should also consider the position of escape routes and safe places for preparedness planning.

**Acquisition and relocation**. The acquisition of land identified as a hazard-prone area is another land-use planning technique. In some cases, human settlements prone to flooding can be shifted and relocated to higher ground nearby. Such hazard-prone land is usually allocated for passive land-uses, such as open space suitable for parkland, children's playgrounds, sports fields, retarding ponds and retention areas, depending on the severity of flooding.

**Sub-division regulations**. It is the division of land into two or more parcels for the purpose of sale or building development. Subdivision regulations are a useful legal tool for controlling development and maintaining accurate records of land titles through taxation. The main benefit is that these regulations enable the authorities to follow a consistent policy.

**Building regulations**. Buildings in disaster-prone areas are likely to be subjected to abnormally heavy stresses, varying sccording to the types of hazards that occur in that region. Accordingly, buildings need to be built to certain varying specifications in order to combat the stresses.

Catastrophe Insurance penetration in developing countries:

India - under 0.5%
The Philippines - under 0.3%
Iran - under 0.05%
Romania - under 5%
Bulgaria - under 3%
China - under 0.5%
Turkey - 17%

Compared to the developed world situation, much has to be done to encourage insurance penetration in the developing world.

## Economic measures

**Incentives and disincentives.** Incentives as well as disincentives or penalties can be used as economic measures to promote or control development in hazard-prone areas. Loans, incentives, tax concessions, grants, etc. can be used to influence decisions communities make to reduce the disaster risks by attracting them to safer areas. Tax, fines and penalties can be used as financial tools to discourage people moving into hazard-prone areas.

People need encouragement to actively participate in mitigation activities. Whether they are government officials, construction specialists or the general public, legal mandates, legislations and policies are not always adhered to. However, incentives in the form of government grants or subsidies may help to persuade institutions both public and private to include mitigation measures into such activities as planning, building and construction.

**see Bangladesh Case Study**

One form of incentive relatively new to disaster management in developing countries is insurance. It is an area of potential growth that can spread the financial burden of disaster risk. This financial instrument involves private and public sector cooperation. Different systems need to be experimented on a small scale over short periods of time to pilot what works best and learn from the experience. At local level, micro-financing also provides a means for vulnerable communities to access financial resources.

### *Professional training and education*

Professional training and education provides the foundation for disaster resilient communities. There is a need to involve government officials working directly in disaster management, as well as engineers, construction specialists, builders, architects and land-use planners. The first step to improving professional training and education is to deliver a variety of training and education workshops, seminars, workbooks, text books, etc. on the need for mitigation and how to incorporate mitigation into the building process. These professionals can explain the importance of mitigation to their clients.

Some desirable components in training and education are indicated on the Box 5.1

### *Public awareness*

**see Chapter 6**

Public awareness campaigns generate community support for the implementation of mitigation actions and encourage those engaged in the building profession to address mitigation. The importance of public awareness and social marketing must be realised. Informing the general population about the potential hazards and risks increases public knowledge and understanding of the situation. Risk communication can encourage greater public participation in mitigation activities, enhancing the effectiveness of preparedness and prevention planning. Campaigns need to be targeted to specific audiences with directed messages.

**Box 5.1**

## Professional training and education

**Government officials**

Appropriate modules or programmes in specialist areas associated with their particular sector that would help career pathways. Strengthening of national or community capacity to lead and deal with disasters. This can work through identifying and strengthening organisations that serve as coping mechanisms: by increasing capacity and skills to face a crisis. Increasing the number of coping mechanisms within a country or community and linking them to outside resources; and, encouraging actions that promote cooperation among different government ministries, departments, programmes, etc.

**Construction specialists**

On the job training for structural mitigation measures. Special training programmes and guidelines that detail hazard specific mitigation practices.

**Planners**

Professional education, in disaster risk management courses that include theory and practice. Provide practical examples from other countries and highlight the long-term benefits.

**Tertiary students**

Include modules and subjects directly related to disaster risk management that contain both theory and practice associated with their disciplines.

**Building maintenance staff**

Include training for building maintenance staff on steps to take to reduce potential hazard damage, such as fixing of non-structural elements such as fans, cupboards, furniture, etc. in earthquake hazard prone areas.

Introduction to natural disasters and their potential impact on the community provide long-term opportunities to include public awareness. For example, the involvement of school children through art competitions, participation in disaster reduction campaigns and events, and meeting with people involved in disaster mitigation are among many tools that can be used for this purpose.

*Institutional building*

This is the strengthening of national or community capacity to lead and deal with disasters. This can work through identifying and strengthening organisations that serve as coping mechanisms, by increasing capacity and skills to face a crisis, namely:

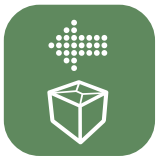
- Increasing the number of coping mechanisms within a country or community and linking them to outside resources.
- Encouraging actions that promote cooperation among different groups within society.

**see Vietnam Case Study**

***Allocation of funds for mitigation projects***

Ideally, if mitigation is considered an everyday component of development planning, budgets at national down to local level government should set aside funds for risk management. However, this is the exception rather than the rule. The importance of budget allocation for mitigation interventions is illustrated in case study on *Government fund allocation for disaster relief, preparedness and mitigation in the Phillippines (ADPC, 2004)*.

Applying disaster risk management tools and technologies to the built environment has been a neglected aspect of disaster risk management, yet it is the key link to sustainable development. Capital investment projects need to incorporate disaster mitigation technologies and construction methods for community facilities, infrastructure and shelter construction and retrofit programs. Capital investment in the built environment needs to be added to the disaster risk management agenda. Shelter and community service construction and retrofit programs can safeguard lives, support conservation of the natural and built environment - including historic urban areas and community structures - and contribute to local economic development.



**see India Case Study**

These programs can be financed domestically. It is neither necessary nor desirable to have mitigation projects funded by donors alone. Rather, it is important to mainstream the concepts of mitigation improvement into the existing lending activities of national and community-based financial institutions. Existing mortgage lending and home improvement credit can be expanded to include mitigation technologies for new construction and existing structures. Improvements can be based on well-researched construction guidelines and methods documented in how-to manuals and handbooks. Construction worker training in the application of improved construction techniques becomes useful when combined with the financing to carry out the recommended changes. The estimated five to seven per cent increase in construction costs is an investment in security and much less than the replacement cost of structures damaged and destroyed by disasters (ADPC, 2004).

## Mitigation Approaches

**A generic list of available options to prevent risk**

- Carry out audit of all infrastructure using city zonation maps to identify elements at risk.
- Identify key components of each system, particularly in installations and buildings of post-disaster significance and infrastructure linking them. Nominate strategic components for upgrading or re-routing away from vulnerable areas.
- Upgrade all vulnerable strategic structures.

- Design, detail or retrofit systems where it is impossible to avoid hazard-prone areas, to minimise the effects of hazards and enable a rapid return to normal operation.
- Review design standards, specifications and good practice guides. Revise them according to the priority of the component and the level of finance available.
- Provide protection for sensitive plant and equipment. For example, raise items above flood or surge level, fix and brace freestanding equipment in earthquake areas, insulate computer hardware and control equipment from the effects of volcanic dust.
- Keep records on a database secure from damage, and ensure that maps of primary systems and district-by-district records of secondary systems are retained and accessible to users.
- Allocate budget to finance risk reduction initiatives.

**Spread the risk**

- Avoid dependence on single facilities and transport routes.
- Introduce redundancy or reinforcement into the distribution system for re-routing operations (advisable to safeguard supply during major repairs). For example, city water or electricity supplies.
- Provide alternative sources of electricity supply.

**Spread the responsibility**

- Widen ownership of the system, particularly for maintenance and operation, under regulatory control.
- Help informal communities to install and manage local systems, subject to regulations on minimum standards for security and quality of supply.
- Encourage user participation by promoting public & private partnership in community-based projects utilising forms of concession such as BOT (build / operate / transfer) or BOOT (build / own / operate / transfer).

**Cover or minimise the impact**

- Establish procedures for system failure and minimising the effect of pollution.
- Encourage strategic users to install and regularly test standby power-generation equipment and ensure that there is adequate fuel for, for example, 30 days continuous operation.
- Hold spares to replace critical items.
- Provide insurance for physical losses, particularly for mechanical and electrical plant, to facilitate rapid decommissioning of the system.

**Plan disaster risk management**

- Plan to minimise the time taken to return to normality.
- Arrange regular workshops and training programmes for the continuing education of staff in hazard preparedness and mitigation.
- Promote hazard awareness and the planning of facilities away from vulnerable areas.

# Mitigation Planning and Implementation Process

The disaster risk management committee or the partnership responsible for the mitigation initiatives should 'brainstorm' on all possible measures that might help to reduce risk. The alternatives should be weighed and the more acceptable ones selected which are appropriate to satisfy community needs. A plan must be formulated to facilitate the implementation of the selected risk reduction measures. A focal point must be identified to coordinate, develop, implement and revise the plan.

see Chapter 3

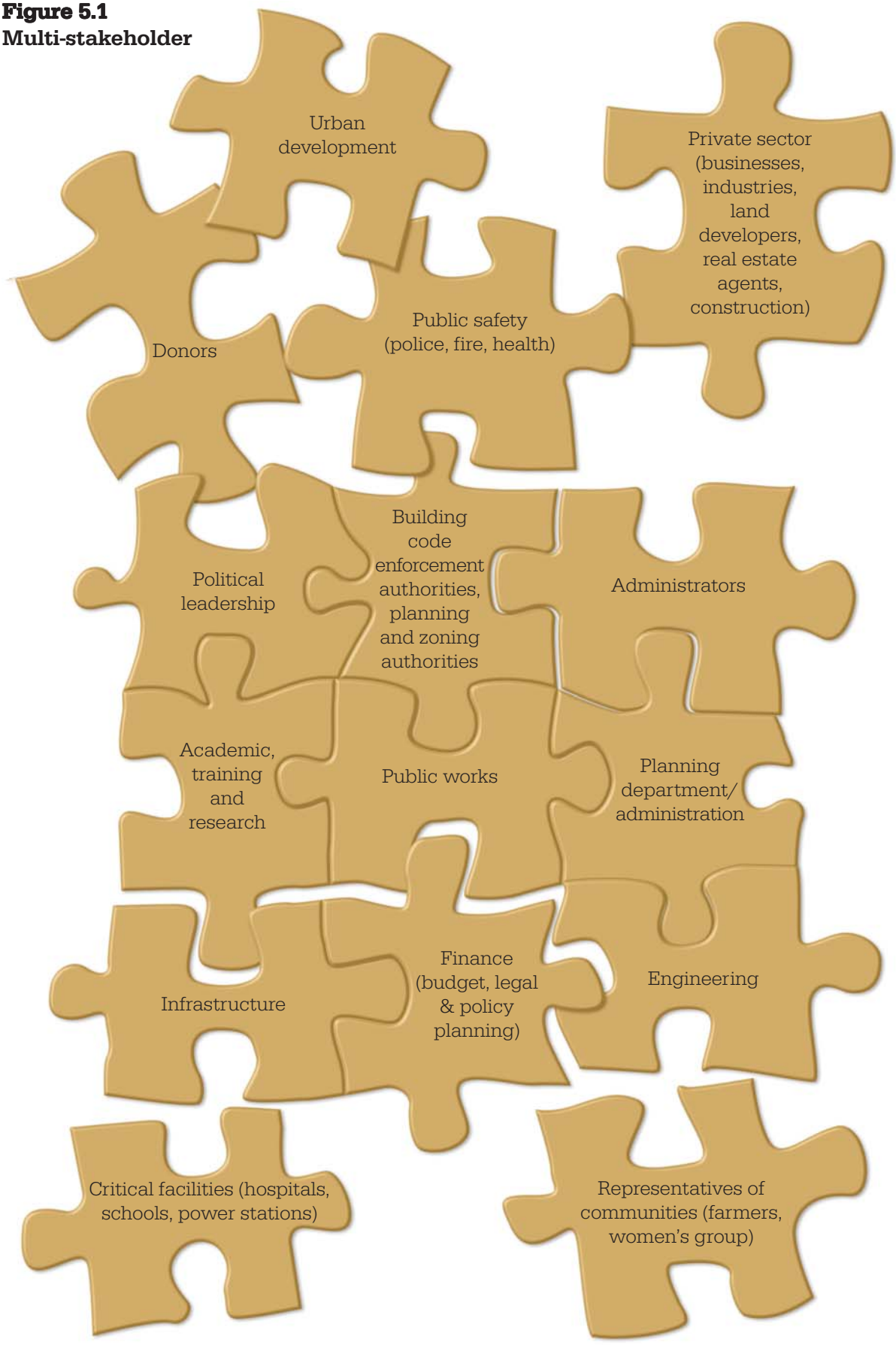
**An overview of mitigation planning and implementation process**

- Hazard identification in the planning area and analysis.
- Vulnerability and risk assessment.
- Action planning and identification of mitigation interventions.
- Prioritisation.
- Implementation of mitigation interventions.
- Monitoring and evaluation.
- Review and revise the plan.

## Who Should be Involved in Planning Process?

As mitigation is a multi stakeholder activity, it is desirable that representatives from the following organisations should be involved in mitigation planning:

**Figure 5.1**
**Multi-stakeholder**



## How Should this Plan Look?

A basic outline is given below. This is not a universal format, but points to major items that must be included in a mitigation plan.

### Components of a mitigation plan

**Introduction**

1. The reason for developing the mitigation plan.
2. How it was prepared.
3. Who was involved.

**Problem description**

For each hazard provide

1. Hazard description and vulnerability analysis.
2. Impact on built and natural environment.
3. Impact on human life, injury and health
4. Impact on social structures and economic systems.

**Community considerations**

1. Economic development
2. Environment
3. Future needs
4. Other considerations

### Goals and objectives

**Proposed risk reduction measures**

For each activity or action include:

1. Description
2. Objectives supported
3. Who is responsible?
4. When it must be done?
5. Who can help?
6. Budget

**Implementation and evaluation**

1. Implementation schedule
2. Monitoring (How? Who? What?)
3. Evaluation (How? Who? Scope? When?)
4. Revision and review

### Five "M' s for mitigation planning

**Multi-stakeholder.** While the development of a plan at its minimum may involve a small number of disaster managers or other specialists, ideally mitigation or disaster risk reduction planning is a priority-setting and partnership-building exercise to coordinate the efforts of multiple agencies and levels of government and society.

**Multi-phase.** These plans have various names to reflect their particular emphasis - mitigation action plan, disaster reduction plan - all reflect an emphasis on pre-disaster activities to manage risk and reduce the impact of future disasters. Some may include preparedness activities, such as the development of emergency response plans, although the term mitigation plan may refer specifically to plans for mitigation as distinct from preparedness or emergency response (Moga, 2002).

**Multi-hazard.** Some plans may focus on the mitigation of a specific hazard (eg. flood), although a multi-hazard approach would be more effective since risks are often multi-hazard in nature. A flash flood often triggers landslides or it may disperse toxic materials; and earthquake may cause fire and tsunamis. Planning must be based on a risk assessment.

**Multi-jurisdiction.** It is important to define the area(s) for planning. Local government most often create a plan that covers their political jurisdiction, be it province, municipality or city. In many instances, however, a multi-jurisdictional approach is useful for cities (or even countries) in the same watershed, or for towns located along the same earthquake fault zone.

**Multi-task.** Planning process involves continuous implementation, monitoring, review and revision of the plan to reflect the changing situation and needs of the area(s).

## Rationale for a good mitigation plan

A good mitigation plan shall be a plan developed recognising the:

- Technical acceptance and feasibility of activities / interventions under all circumstances.
- Capacity of implementing institution or its potential for adaptation.
- Positive environmental impacts the interventions can bring.
- Cost-effectiveness in the short and long term.
- Social acceptability and compatibility with farsighted community values and social ethics.
- Acceptance of political leadership for adaptation.
- Existing legal authority or possibility to create conducive environment in line with legal provisions.

(ADPC, 1999)

# Case Studies

India

## Projected benefits of mitigation

**India**

In 1977, a cyclone struck the Andhra Pradesh in India. The following loss figures were estimated for the East Godavari District.

| | |
|---|---|
| Houses destroyed | 289,906 |
| Houses damaged | 89,677 |
| TOTAL | 379,583 |
| Persons rendered homeless | 1.442 million |

If mitigation measures were taken to strengthen houses by retrofitting, the loss would have been reduced as follows.

| | |
|---|---|
| Houses destroyed | Nil |
| Houses damaged | 136,489 |
| Persons rendered homeless | 0.519 million |

The economic benefit is estimated to be Rs. 91 crores. The estimated economic benefit highlights the difference between response and mitigation. Response work is reactive and begins after disaster impact. It usually redirects resources from potential investments in development. Mitigation on the other hand is ideally proactive and decreases the impact. Resource for mitigation activities are an investment in sustainable development.

(Source: Government of India, 1997)

Vietnam

## The importance of policy environment

**Vietnam**

One of the initiatives under this strategy is the shift in the traditional cropping schedule so that the summer-autumn crop is planted earlier before the flood season. There are normally two rice crops cultivated each year. Crops are sown in February and July, and harvested respectively in March and November. If conditions are favorable for a third crop, farmers will attempt to increase their yearly yield. Flood season falls between August and November, coinciding with the growing season, thus risking crops to flood damage. To avoid peak flooding, but still utilise optimal flood conditions for rice cultivation, the Government of Vietnam banned the planting of the third crop and changed planting months to November and April, and harvests to March and August. In addition, enhanced mechanisms for cutting and thrashing and the promotion of short-duration varieties have all resulted in reduced crop damages in the Mekong River Delta.

Farmers in the delta provinces now plant the summer-autumn crop earlier to avoid floods and have taken advantage of floods for fish breeding and harvesting of aquatic plants for food and shelter.

The Government issued decision No. 668 / TTg on 22 August 1997 on the guidelines and measures to mitigate disaster risks in Central Vietnam. Programmes included: 5 million hectares forestry programme; construction of transportation infrastructure; constructions to protect riverbanks; and, the strengthening of schools, health clinics and offices.

## Naga City, The Philippines
## **Non-structural disaster mitigation**

**Philippines**

**Philippines**

Flood-prone Naga City of the Philippines has developed a range of innovative initiatives to incorporate disaster risk reduction as part of the development process. In Disaster Mitigation Planning, with support from ADPC and USAID, the city government developed a disaster mitigation plan endorsed by the city mayor. The plan guided development activities of Naga City. Strategies for land-use planning, safer construction, resources mobilisation, capacity building and cooperation emerged from a risk assessment developed using GIS.

**In land-use planning:** Under its successive five-year development plans and its comprehensive land-use plan, the city government has gradually shifted the focus of economic activity from the flood-prone central business area to safer areas of the city. One initiative is the Panganiban-Diversion Growth Triangle.

**In building code enforcement:** The city government has developed its own building ordinance by adapting the national building code to the local context and using UN-HABITAT's guidelines on settlement planning in flood-prone communities. This initiative allows the city government to prosecute violators without direct involvement of the national government.

**In forming partnerships:** Mitigating floods within Naga City calls for solutions well beyond its boundaries as the Bicol River snakes through two provinces and dozens of municipalities. Through Naga City's partnership with 14 neighboring municipalities, collectively known as the Metro Naga Development Council, cooperation in mitigating flood on a basin-wide basis is made possible.

**In capacity building:** As part of the disaster mitigation plan, the capacities of city planners, city government officials, barangay (district) officials, non-government organisations and schools are being built on a continuous basis with support from a range of organisations including the Naga City Government, ADPC and USAID.

(Elcamel, 2002)

## Bangladesh
### Micro-financing for floods

Undeniably, low-income vulnerable communities need access to financial resources to contribute to household level disaster mitigation measures. Investing in the pre-disaster cycle can reduce the vulnerability of households to natural disasters (Parker and Nagarajan, 2000). Micro-finance has the potential to provide an informal, flexible financial instrument to the vast majority of low-income communities. Yet this is a relatively unexplored option for the poor.

The 1998 floods in Bangladesh revealed the important role micro-finance plays in the relief and recovery phase. However, concerns have been raised in regard to the financial burden this places on Micro Finance Organisations (MFOs). A combination of the increased number of MFO clients requesting withdrawals and loans, and the inability of existing clients to make repayments and installments posed a liquidity problem for even large MFOs such as BRAC, Proshika and the Grameen Bank. Up to 60% of loans cannot be recovered, and portfolios were reduced by up to 50%.

Development finance programmes should consider disaster risk as important in developing its financial products. This leads to the establishment of development funds giving incentives and resources to motivate household and community level structural and non-structural mitigation measures.

As a disaster prevention and risk measure, new loan products were developed and aimed at reducing the exposure of clients to disaster related losses. The Bank of Bangladesh, through a network of government sponsored MFOs now provides 10-year long-term loans for clients in flood-prone areas.

1. **Structural flood mitigation.** By allocating a certain percentage of client's funds, MFO's began to build drainage, flood evacuation shelters, and raise roads at the community level. Shelters were to be used for income generating activities during normal times.
2. **Flood-resistant housing loans.** The Bank of Bangladesh has initiated loan funds to support MFOs to provide long-term loans for the construction of flood-resistant housing.

(Parker and Nagarajan, 1998)

# Vietnam
## Partnerships

Like many countries, disaster management in Vietnam meant distribution of food, water, medicine, seeds, concrete poles and iron sheets to disaster-affected families. However, the small gains from these short-term and stand-alone projects are wiped out during the next disaster.

Following the devastating flood of 1999 in Central Vietnam, the Government of Vietnam, donors and NGOs jointly expressed the wish to move away from short independent projects to collaborate in identifying needs, priorities and projects, and making best use of available resources. This led to the establishment of the Natural Disaster Mitigation Partnership (NDM-P), an institutional arrangement to formally facilitate cooperation and coordination in disaster response, recovery, preparedness and mitigation for Central Vietnam (with plans to expand this initiative nationwide).

A government and multi-donor joint assessment led to the identification of a range of priority projects for Central Vietnam. A number of government departments, international agencies, donors and NGOs are signatories of a Memorandum of Agreement to include these priority projects as part of their development strategy.

The Royal Netherlands Government, Government of Luxembourg and UNDP are, through the NDM-P, supporting pilot projects in Binh Dinh Province and Da Nang City. The projects are designed to be implemented by national, provincial and local government departments with technical assistance and capacity building by NGOs and international agencies.

An NDM-P Secretariat provides support in improved coordination and collaboration. Some of their ongoing initiatives include:

- Serving as a clearinghouse for information related to disaster risk reduction in Vietnam.
- Developing a mechanism for coordinated rapid risk assessment immediately after a disaster, including standard report formats and forms to assess: shelter; child protection; food security; nutrition and livelihood; health; water; sanitation; and education.
- Facilitating information sharing and capacity building through meetings, training seminars, a website, a quarterly newsletter and an electronic mailing list.
- Facilitating collaboration between funding agencies and implementing agencies in the implementation of priority programmes.

(UNDP, undated)

For more information visit *http://www.undp.org.vn/ndm-partnership/NDM-Partners.htm*

Nepal

## Nepal
### Non-engineered structures in Kathmandu

In the urban areas of Kathmandu, Nepal, it is estimated that more than 90 percent of existing building stock are non-engineered (partly because there are many old historic buildings), and every year about 5000 more such non-engineered buildings are added. To suit the resources and capacities available, non-engineered mitigation activities have been implemented.

Mostly these buildings are owner-built without application of appropriate construction technologies and using poor quality construction material. Even workmanship is observed to be poor. Local NGO, National Society for Earthquake Engineering Technology (NSET), has undertaken a programme to train masons and other artisans to provide skills on appropriate technology. Also NSET used to demonstrate the appropriateness of retrofitting and strengthening of buildings through shake table demonstrations in public forums such as exhibitions with the view to create awareness on appropriate technology.

(ADPC, 2001)

Bangladesh

## Bangladesh
### Long-term structural mitigation

The devastating floods of 1987 and 1988 spurred the Government of Bangladesh to consider long-term approaches to flood mitigation. With the financial and technical assistance of multilateral and bilateral agencies, the Flood Action Plan (FAP) was developed. Coordinated by the World Bank at the request of the Government of Bangladesh, the plan comprised of 26 different components contributed to by 15 donors.

Phase 1 was conducted between 1990-1995 and consisted of the following aims:
- To establish the principles and criteria for sustainable flood mitigation
- To undertake comprehensive planning studies
- To begin the implementation of high-priority projects

Mainly focusing on floodplain studies and trial pilot projects to identify appropriate measures, the objective was to identify potential long-term structural mitigation projects for donor funding. The FAP advocated a controlled approach to flooding in the rural areas, and flood protection measures in urban areas.

The results of the FAP found the use of embankments to cordon and redirect flood water, an accepted method of structural mitigation. The Greater Dhaka Embankment Project was the result of the feasibility studies conducted under the FAP. This huge, long-

term and costly project was implemented by the Bangladesh Water Development Board (BWDB), Dhaka Water Supply and Sewerage Authority, and the Dhaka City Corporation. It attempted to address associated urban flood issues such as excess rubbish, sewage, drainage, water-logging and dredging.

To date, it has been one of the most expensive and controversial projects. Critics blame the inundation in the north of Dhaka, the resettlement and displacement of largely poorer communities, and increasing debt, on the construction of the embankment. Recent flooding in 2004 leaving Dhaka at a standstill twice during one monsoon season for long periods of time have been blamed on the approach to flood control supporting the construction of the embankment.

The aim of preventing flooding in a fast changing urban metropolis by confining and channeling water, thus cordoning certain parts of Dhaka from inundation remains a contentious issue for Bangladesh. The embankment itself has not been as successful as first envisaged, and perhaps the flood 'protection and control' approach contributed to the impending problems Dhaka now faces. Yet, this does not spell the end to long-term structural mitigation. New studies and approaches that can use the rivers rather than block them may be the answer in the future.

## Nepal and Indonesia

### Strengthening existing structures

**Nepal & Indonesia**

Another mitigation technique employs structural measures to **strengthen buildings and facilities**. These measures can take place at original construction, during renovations, or as specific retrofit projects. Some hazard specific examples are given below.

There are hazard specific guidelines for building in hazard-prone areas to reduce damage from impact. Many of these measures can be done at any time within the life of a structure, not only during new construction. However, it's much more cost-effective to do it at the time of a new construction.

The school retrofitting initiative under the Kathmandu Valley Earthquake Risk Mitigation Project (KVERMP), Nepal, under the Asian Disaster Mitigation Programme (AUDMP) of ADPC, Bangkok used bandages of reinforcement materials to strengthen and tie together wall units.

In Bengkulu, Indonesia, the Indonesian Urban Disaster Mitigation Project (IUDMP) under the Asian Urban Disaster Mitigation Programme, ADPC, Bangkok, with the expertise of Teddy Boen carried out an innovative retrofitting scheme, which involved only selected components of the building prone to damage, thereby saving much cost.

(ADPC, 2003, 2004)

China

## China
## Flood insurance in China

China has experimented with the use of flood insurance through government assistance and by making participation in this scheme compulsory in the piloted area.

From 1986 to 1996, the Ministry of Water Resources, Ministry of Finance, Ministry of Civil Affairs, People's Insurance Company of China and Anhui provincial government jointly implemented on a trial basis a flood insurance scheme. Participation was compulsory - the central and provincial governments bore 70% of the cost of premiums and the affected persons the remaining 30%. At the end of the trial period, it was found that insurance helped raise people's awareness of flood risk and the need to manage flood for the greater safety of the community. The compulsory payment of premiums and the inclusion of a cap on the amount of compensation which insurers are required to pay, however, act as disincentives to investment in high-risk areas.

(Dang and Pham, 2003)

# Lessons Learned

- Usage of resources for mitigation activities is an investment for sustainable development.
- Conducive policy environment helps good decision-making at top government level resulting in benefits such as improved infrastructure, built environment and other disaster risk reduction initiatives.
- Development and implementation of a disaster mitigation plan result in good strategies for land-use planning, safer construction adopting relevant building codes, resource mobilisation, capacity building and partnerships.
- Micro-finance has the potential to provide an informal and flexible financial instrument to low-income communities for risk reduction activities such as loan schemes, structural mitigation for infrastructure and flood-resistant houses.
- Initiatives for strengthening buildings and structures can take place at original construction, during renovations or as retrofit projects, but are most cost-effective at the time of new construction.
- Institutional arrangements facilitating cooperation and coordination allows for identifying and prioritising disaster mitigation initiatives more effectively.
- Costly long-term mitigation projects need elaborate studies and multi-disciplinary, multi-stakeholder dialogue prior to finalisation.

# Discussion Questions

**Have you composed your team?**
Putting together a good team is important. Plan development will succeed smoothly only if the right people and organisations are involved.

The planning team needs to include those:
- Who know the technical details of the measures you will be considering (i.e., they know how to make the mitigation measures work).
- Who will be responsible for implementing some of the plan's recommendations?

**Have you access to a multi-sectoral committee?**
In some countries, multi-sectoral committees or sub-committees for disaster risk reduction are in operation and hold regular meetings, but often only at the national level. If you are planning for the province, or for a particular sector, do such committees exist?

**Have you got a dynamic and committed leader?**
You may be a professional planner, water resource manager, local government official or chair of the multi-stakeholder planning committee, selected to lead the planning process.

Whatever your background, be sure to check on the policy requirements for planning and the jurisdiction to implement what you plan for.

**Are there arrangements for review and revision?**
A plan for disaster risk reduction may already be in place. Is it up to date? Who prepared it? Was it prepared in the context of a multi-stakeholder forum? Does the plan include practical measures or is it a list of intentions? These are some of the questions that need to be asked. It may well be that the plan needs to be revitalised.

**Have you set the appropriate objectives?**
It is important to have clear objectives of the plan. For example, the main objective can be avoidance and therefore actions will be to resettle the people. (The process of planning is important. Make sure it is participatory, and identifies activities for reviewing, educating stakeholders, obtaining consensus, and building commitment and support.)

**Do you have adequate legal and mandatory requirements?**
It helps if you are officially designated with the authority to develop the plan. A council resolution or a memo from the city manager or mayor is useful, because one of your biggest challenges will be getting other departments to devote some attention to your task.

**Have you determined roles of responsibilities for implementation of plan activities?**
How do you delegate the authority / responsibility of actions to be undertaken?

**Have you avoided bias?**
It is important to have an open mind about the range of potential mitigation measures. Different professionals will bring their own preferences to the process. For example, a mitigation plan designed by an engineer often favours structural measures, while a plan prepared by a farming community may be biased towards agricultural needs.

**Have you done prioritisation of interventions correctly?**
How to prioritise the interventions (cost-effectiveness, resource constraints and time limitations)?

# Challenges

- **Making mitigation a part of regular decision-making process.** Regular decisions relating to planning, staffing and budgeting can reflect risk reduction priorities effectively when there is a mitigation strategy and a plan for implementation, well-integrated in development policies and plans at all levels and for all sectors.

- **Influencing national governments through the international donor community.** International agencies have begun to incorporate disaster risk reduction as part of their development strategy and plans. The Asian Development Bank has included flood management in their water policy. The World Bank has established a Hazard Management Unit to make sure that disaster risk reduction is an integral part of World Bank's development programmes.

- International agencies have also begun to require the development of mitigation plans or the inclusion of mitigation features as part of their plans and funding for disaster reconstruction. The World Bank and Asian Development Bank as part of their recent reconstruction loans are addressing not only emergency response and recovery capacity building, but also the development of mitigation plans and measures.

- **Legislation and policy changes.** Many countries in Asia have initiated the incorporation of mitigation strategies in development through legislation and policy change, risk assessment, loans and capacity building programmes.

  Policies and legislation can encourage planning for disaster risk reduction. China and Japan have legislated mitigation planning at national, provincial and local levels. In the United States, state and local government must have a disaster mitigation plan approved by the Federal Emergency Management Agency in order to receive post-disaster mitigation grants. However, enforcement is generally the weakest part of the system, often due to lack of human and financial resources allocated to this function and political interference.

- **Implementation of capacity building programmes.** Building the capacity of national level stakeholder agencies to undertake mitigation, as a part of development process is important. It is necessary to enhance capacity in policy planning institutions, professionals, and development agencies of government, NGOs and communities. It is necessary to have innovative solutions to reduce the cost and as a solution to resource constraints are required.

- **Reducing the burden on relief payment by national governments and diverting the same for development initiatives.** Many countries are beginning to take an interest in using insurance to manage the growing risks. In Asia, this initiative is still in its infancy. China has conducted some pilots in this area.

- **Converting the victims or vulnerable communities into a resource for undertaking mitigation intervention**. The victims of disasters mostly live in areas prone to hazards. If such communities can undertake interventions to reduce the risk, then they can become a resource.

- **Optimisation of the production of scientific information and usage by vulnerable communities through facilitation and interface between scientific community, DM practitioners and vulnerable communities**. The scientific community has a tendency to do research purely with academic interest on one hand and on the other hand there is a serious need for innovative cost-effective mitigation solutions. Best way to motivate them to undertake research in areas where there is a serious shortfall in innovative solutions capable of reducing the risk and vulnerability is to become an effective interface to create a balance between demand and supply. It includes increase of usage of scientific information effectively for mitigation interventions by vulnerable communities.

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# knowledge development

## education, public awareness, training and information sharing

6

## Chapter Brief

## Key Words

Capacity Building
Communication
Information Sharing
Knowledge Development
Public Awareness

## Introduction

## Knowledge Development Concepts

Building a Common Understanding
Information Sharing and Exchange
Education, Training and Public Awareness

## Knowledge Development Process

Strategy for Developing Knowledge and Awareness on Disaster Risk

## Checklists

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ADPC. Focus on Training
ADPC. Focus on Public Awareness
Nepal. An integrated awareness programme
Indonesia. Sustainability and replication
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## Lessons Learned from ADPC

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# Chapter Brief

- Common understanding builds the foundation for commitment to risk reduction activities of disaster risk. To build this, all stakeholders must be allowed to participate and voice their opinion. To achieve this, forums, community meetings, and discussion groups provide a platform to begin dialogue.

- Building a common understanding first requires a good understanding of the range of problems and needs of different **stakeholders.**

- Disaster risk management relies on many sources of information in order to plan and carry out activities. Information has grown significantly over the years. However, it is still not readily accessible to those who need it.

- It is essential to encourage better access to vital information and databases and sharing information sources between organisations and national governments.

- When information is lacking, there needs to be initiatives to encourage the establishment of updatable and well-managed databases and inventories.

- There must be financial resources allocated to build the capacity of human resources to build a strong knowledge base.

- Integrating **education, public awareness, training and / or information sharing activities** in all disaster risk reduction interventions is important when developing a comprehensive programme, problems and needs of different stakeholders should be considered.

- Awareness raising must be targeted at selected communities vulnerable to disasters, senior government officials responsible for developing policies, organisations from different sectors and even those involved in education, media and training.

- There are many channels of communication from which the most appropriate for the selected target group must be selected.

# Key Words

## Capacity Building

Efforts aimed to develop human skills or societal infrastructures within a community or organisation needed to reduce the level of risk.

Capacity building also includes development of institutional, financial, political and other resources, such as technology at different levels and sectors of the society (UNISDR , 2004).

## Communication

Communication is a dynamic two-way process consisting of a sender and receiver.

## Information Sharing

The exchange of processed data.

The widespread and consistent availability of current and accurate data is crucial for ongoing research, assessing risks, monitoring hazards and mitigation planning. The presence of information sharing forums and the participation of stakeholders in these forums at regional, national and local-levels are fundamental to effective disaster risk reduction. Rapid development in information and communications technology has helped to record, disseminate and share information (UNISDR, 2004).

## Knowledge Development

Knowledge development focuses on the processes and the people involved in creating, communicating / sharing and applying knowledge, and in building a common understanding among stakeholders. They include scientists, communities, development workers and policy makers.

## Public Awareness

The processes of informing the general population, increasing levels of consciousness about risks and how people can act to reduce their exposure to hazards. This is particularly important for public officials in fulfilling their responsibilities to save lives and property in the event of a disaster.

Public awareness activities foster changes in behaviour leading towards a culture of risk reduction. This involves public information, dissemination, education, radio or television broadcasts, use of printed media, as well as, the establishment of information centres and networks, and community and participation actions (UNISDR, 2004).

# Introduction

Effective disaster risk management demands a common understanding of risks by a multi-stakeholder group. Presently, the coordination and cooperation required to make sustainable plans and actions indicates that there is still a long way to go. Common understanding between government level officials down to local-level can be achieved through education and training, and awareness raising. Access to, and the sharing and exchange of information is paramount to ensuring that a comprehensive multi-hazard approach is adopted.

This chapter will draw attention to the importance of information sharing and exchange through bulding networks and forming partnerships and collaborations. It will define the role of education, training and awareness raising amongst key stakeholders, and highlight the need for targeted skills transfer. It will also provide a strategy for preparing a successful awareness raising programme with the goal of creating a common understanding of disaster risks.

# Knowledge Development Concepts

## Building a Common Understanding

A common understanding of disaster risk provides the foundation for commitment to, and participation in risk reduction activities. This understanding must involve the multiple stakeholders with vested interests in reducing risks. However, the common belief is that people do not understand their risks and therefore need to be educated (Twigg, 2004). This assumption is not entirely correct as risks are based on perceptions.

In order to build a foundation of common understanding, there must first be a forum for all stakeholders to participate and voice their opinion. Through the process of assessing risks described in Chapter 3, information can be generated and analysed in relation to the specific context of the project area or jurisdiction. Multiple hazards need to be discussed and risks need to be considered in context to people's everyday lives.

An understanding of disaster risk management is best achieved by integrating it as a part of daily life experience and professional interests through education, public awareness, training and information sharing. These approaches are ways in which different perceptions of risk can be linked, and complement each other.

Forums, community meetings, committees and discussion groups are a good place to begin dialogue and encourage participation. These discussions can draw out opinions, build awareness and increase engagement amongst different groups in society through facilitation of dialogue and communication.

## Information Sharing and Exchange

Disaster risk management relies on many sources of information, from socio-economic data, research on how people have coped in the past, to maps, rainfall data, seismic monitoring, hydro-meteorological data, to databases of past disaster events. Disaster related information is paramount to the development of good planning to reduce risks in the future. In Asia, the past 10 years has seen a growing number of information resources from data and maps to forums and networks for the sharing, exchange and discussion of disaster related information. New Information and Communications Technologies (ICTs) can now facilitate active discussions and disseminate vital up-to-date and real-time information.

Information is a vital component to the decision-making process. All stakeholders need to have access to this information. However, the difficulty now is what information is necessary and important to which stakeholder for the decisions that need to be made. Common understanding amongst stakeholder groups of a multihazard situation can help decide what is needed and what is not.

Important data or information for disaster risk reduction are being created, but they are either scattered or confined among individual research programmes, libraries, government offices or non-government organisations with no common point of access. They are often neither easily accessible nor well targeted for potential users.

One key challenge is to establish a sustainable focal point that can provide easy and consistent access to data and information on hazard and risk issues. Various government departments, international organisations, research centers and NGOs all produce data and information relevant to disaster risk reduction. However, the need of individual organisations to have adequate information for their own programme interests have motivated them to develop information systems that cannot easily be applied to other settings.

Information such as databases and specific GIS generated, hazard specific maps are costly to create and therefore, are available at a cost rather than in the public domain. Specialised hardware and software is sometimes necessary to access this information, which limits access and availability. Information sharing must be encouraged between institutions and government agencies. Where the resource capacity is lacking, less technical means should be utilised at collecting data that do not rely on high tech hardware, software and specific skills. A basic map can be a good beginning point to build from.

Information sharing and exchange needs to be practiced rather than spoken about to reach a common goal of disaster risk reduction. Partnerships, networks, collaborations such as those mentioned in previous chapters are good mechanisms for promoting the sharing and exchange of vital information resources. Donors need to understand the importance of helping organisations, agencies and government bodies to work together rather than against each other.

Another challenge is to the development of a culture of recording and documenting of information, experiences and lessons learned that contribute to a knowledge base.

There have been global and regional initiatives in information sharing which can guide the development of national and local information systems. At the same time, it is important to build the capacity of users in accessing, using and building on the information resources.

see Resources

The Internet is a useful tool for accessing, sharing and managing information. The use of email is expanding rapidly. Many organisations now have their own

websites. Some have started to develop intranets which can be accessed by the organisation's own staff. Catholic Relief Services, Reliefweb (UNHCR) and the International Federation of Red Cross and Red Crescent Societies, for example, have intranets where regularly used documents, guidelines, manuals, training materials, presentations, reports and standard forms are made accessible.

Electronic *listserves* and newsletters such as ADPC's *E-news: Disaster Mitigation in Asia* and the Natural Hazards Research and Applications Information Center's *Disaster Research*, are increasing.

The potential of advancements in information and communication technologies (the Internet, wireless and mobile technologies, virtual conferencing) to help organise and package information, create and share information is extremely valuable. However, many people still do not have access to these relatively new ICT services.

**Information is systematically categorised into the following groups:**

- Reference Databases - CRED
- Specialised Resource Centres - ADPC, ADRC, Pacific Disaster Center, ReliefWeb, FEMA
- Scientific Hazard Data Centers - NOAA, monitoring centres
- On-line Networks and Groups - discussion panels, analysis, research

## Education, Training and Public Awareness

The process of building awareness through education, training and targeted information dissemination is dynamic and multi-dimensional. The aim is to build a common understanding so stakeholders can act to achieve a common goal. Depending on the target group, appropriate skills, information, tools and techniques are presented in training sessions that will help facilitate development, planning and implementation of risk reduction activities.

Education, training and awareness provide support to overall disaster risk management strategies, particularly legal arrangements, policies, and institutional arrangements. The concept is termed Disaster Risk Communication (DRC). This term encompasses more than just public awareness campaigns, social marketing and education. It is about communicating a message through disseminating information and knowledge about risks to catalyse pro-active decisions, planning and actions of national, provincial and local governments, scientists, civil society groups, local communities, etc. DRC targets all stakeholder groups, however, each group will need specialist curriculums targeting their needs.

## Education

> *'Awareness about risks and dangers needs to start in early education before abilities to address them can become part of growing civic and professional' (UNISDR, 2004).*

Education for disaster risk reduction is a long-term goal. Targeting school aged children and exposing them to information about specific hazards, particularly those occurring in their immediate lives can have a lasting effect on an entire generation. Practicing preparedness planning activities such as earthquake drills, flood evacuation, participation in disaster reduction day activities, games and competitions are practical ways of increasing awareness in children.

Institutionalising disaster risk education in schools and universities through curriculum development can also play an important role in ensuring a generation of aware individuals who have a common understanding of risks in their own communities. Education from elementary school to university can build up a cadre of informed stakeholders for disaster risk reduction.

> *'Education for disaster reduction is a transdisciplinary exercise aimed at developing knowledge, skills and values which will empower people of all ages, at all levels, to assume responsibility for building a safer and sustainable future.'*
>
> *- UNESCO*

Creating familiarity about disaster risk reduction can start in school. The incorporation of disaster risk reduction as part of the school curriculum often benefits not only the school children, but also the teachers and parents in the community.

Many countries in Asia including Bangladesh, India, Indonesia, Japan, Lao PDR, Nepal, Philippines, Sri Lanka and Vietnam have attempted to introduce issues such as environment, hazards, health and safety issues in the school curriculum - in humanities, geography and science classes, and as extra curricular activities.

At the university level in Asia, only a few courses offer disaster risk management components. However, over the last two decades, there has been increasing incorporation of disaster risk reduction issues in other disciplines such as engineering, environmental management, hydrology and planning. Moreover, studies on disaster-related issues are no longer limited to specific hazards and to structural mitigation. More attention has been devoted to the social and economic conditions of vulnerability (for a list of universities offering courses in disaster risk reduction, refer to section Resources).

see Resources

The potential of e-learning, distance education, open learning or online learning tools that make use of the Internet and multimedia technologies (combining video, sound, animation, text and graphics) should be considered. In a society where

everyone is always busy, e-learning provides a more flexible learning environment which puts greater responsibility to learn on the learner. Prerequisites for using such tools include the availability of facilities and skilled professionals, and their ease of access to the targeted group.

ADPC pioneered the use of this technology and implemented an EU-funded project in partnership with 15 selected universities / training institutes in Asia to incorporate disaster risk management in their urban planning courses through an Internet-based platform for e-learning.

## Training

There are a number of highly regarded institutions committed to disaster risk reduction training. They have been organising a variety of training programmes for the past 15-20 years. Today, graduates from these programmes often constitute the core of disaster professionals in many developing countries around Asia. Training is conducted at regional, national and local-levels for different target stakeholder groups. Some are hazard specific, others are sector specific (disasters and health, development, environment, management, planning), or skill specific (risk assessment, community-based participation, advocacy, media).

see Resources

There are a number of training centers for disaster risk management. The training courses are beginning to attract a wider range of participants from senior government officials to planners to community organisation representative. These training courses offer opportunities to initiate a dialogue between the different stakeholders on their experiences and needs. (For a list of training centers offering courses in disaster risk reduction, refer to section Resources).

Training is not limited to formal courses. Practical hands-on skills training and vocational training eg. training of Nepali masons in earthquake-resistant building techniques requires a different approach as most masons are illiterate. Training could also be held to develop the capacity of an organisation to incorporate disaster risk reduction in their work. For example, the Prince of Songkhla University and the University of Chiang Mai in Thailand shared their skills on risk assessment with planners from Lao PDR's Urban Research Institute as part of an ADPC programme.

When those trained in disaster risk management return to their workplaces, most find that they are constrained in applying their newly acquired knowledge. Some will find their scope of work unchanged, and they will have neither the leeway nor the incentive to try new things and apply their new knowledge on disaster risk reduction. Many will work under similar policies that often prohibit stakeholders' partnership and community participation. Others will not have access to resource to implement new technologies and approaches.

One-off training is not very effective in changing attitudes and practice, unless there is adequate follow-up in the form of additional training or on-the-job support (see Twigg, 2004: for questions to consider when running training courses or sending staff on other institutions' courses).

### Training

**Disaster management training:** Potential manager - government officials, senior public sector staff, non-government organisations. Basic orientation on concepts of disaster management and processes.

**Co-ordination and skills training:** specific government agencies, NGOs and CBOs, volunteer civil society groups, support services such as police, fire and ambulance. Emergency planning and operations, SAR, first aid, communications, needs and damage assessments.

**Specialised training:** Journalists, politicians, ministers, community leaders, scientists. Aimed to provide information targeted to their particular sector and role in DRM.

(Source: Carter, 1991)

## Public Awareness

Public awareness is paramount. The aim is to *'promote an informed, alert and self-reliant community, capable of playing its full part in support and in co-operation with government, in all relevant disaster [risk] management matters (Carter, 1991).* Public awareness is an important means for establishing a common understanding of hazards, risks and vulnerability in order to work towards risk reduction. Throughout all aspects of disaster risk management a component of information dissemination and public awareness is essential. The community needs to be informed in order for them to make active decisions in their everyday lives to reduce risks.

It is essential for all stakeholders first to be aware of the hazards they are likely to face and the importance that risk reduction holds for their daily lives.

Countries such as Bangladesh and Nepal have annual campaigns for promoting public awareness for disaster risk reduction. The United Nations have designated the second Wednesday of October as the International Day for Natural Disaster Reduction. National events are held worldwide to raise public awareness on disaster risk reduction. These and other special commemorative events are important for raising awareness, but they need to be supplemented with a

strategy that builds public awareness on an ongoing basis, sustains public interest and motivates stakeholders to take appropriate actions.

Public awareness is also used to familiarise the public about early warning systems.

see Checklist

It is critical to ensure that the target audiences and specific channels of communication are most appropriate to the target stakeholders, especially when working with poor and marginalised groups. It is important to consider their literacy rate, languages or dialects used, and even availability of electricity.

Any project activity, whether it is development of an evacuation plan, retrofitting a school or conducting a risk assessment, should involve a component of awareness raising.

Disaster events in neighboring localities are opportunities to raise public awareness on the issues, lessons learned and mitigation strategies for reducing disaster risks.

Always inform and involve the mass media for greater outreach beyond the community. Television, radio and newspaper can contribute to raising awareness and disseminating information. However, media coverage is still largely focused on major disaster events and the immediate dramatic aftermath.

The potential of the mass media to report on patterns of loss and destruction and existing risk reduction practices remains untapped in many countries. Media representatives and journalists need to be included in risk reduction programmes and targeted as a group for training to encourage reporting on disaster risk reduction before a disaster occurs.

# Knowledge Development Process

## Strategy for Developing Knowledge and Awareness on Disaster Risk

Below are some simple questions to consider when planning and implementing a comprehensive strategy for education, public awareness, training and information sharing activities:

Who?
What message (s)?
Through which channels?
When?
With what effect?
Why document?

**Who are we trying to reach?** Whether in raising awareness, training or establishing networks, we need to specify and define our target group(s). This important question requires us to really understand the people and the environment (physical, economic, social and political) they live in.

**What do we want them to know?** It is important to have clear objectives. Participation of the target groups in defining objectives and planning activities is important. Their needs may turn out to be different from what was originally envisioned. Furthermore, they could add value to the programme by incorporating local knowledge. Always try to create two-way learning processes.

**What are the channels of communication?** Many media exist for disseminating information. The selection of suitable media is based on the defined objectives, available resources and the result of target group assessment. It is important to consider all forms of media to reach different target groups. Creative forms of media include traditional means of communications that have been used through the centuries for passing on information such as storytelling, folk songs, dance theatre, soap operas and puppet shows. Videos, exhibitions and the Internet are also useful channels for interacting with the target groups.

## Channels of communication

- Mass media: television, radio, newspaper, cinema.
- Electronic media: website, email, email discussion lists, electronic conferencing, distance learning platform, SMS and MMS.
- Audio-visual: video, audio, multi-media, artwork, photographs, slide show, model, map.
- Postal: direct mailing.
- Telephone: Dial-in conversation.
- Face-to-face: meeting, seminar, workshop, conference, march, exhibition, demonstration, training, exchange visit, planning.
- Stand-alone print: billboard, poster, banner, warning sign, flood water level marker.
- Distributor print: leaflet, pamphlet, brochure, booklet, guideline, case study, newsletter, journal, research paper, report.
- Folk media: story, drama, dance, song, puppet, music, street entertainment.
- People: community leader, volunteer, project worker, head of women's group.

Safer Cities 7
Can Small be Beautiful?
Community Based Flood Mitigation in Bangladesh
Introduction
Earthquake Preparedness in Schools
A Case Study of Mitigation Efforts in Indonesia
Abstract

**When?** Timing is very important for reaching a target group that will listen. An action plan needs to be developed. There may be opportunities to draw the interest of target groups. For example, there may be a street festival in which students, teachers and parents could carry banners in a parade, training may be conducted for homeowners on ways to strengthen their houses just before the beginning of the monsoon season, or there may be a global event on sustainable development in which a session on disaster risk reduction will be attended by senior government officials and donor organisations. The occurrence of a major disaster could also be a good time to promote disaster risk reduction.

It is important to establish sustainable information and communication systems and repeat activities, messages and / or training courses. People will forget. Politicians and leaders change. Community needs also change.

**see Chapter 8**

**How do we know whether or not our effort was effective?** A baseline study and a methodology for evaluation needs to be developed for periodic monitoring and evaluation of programme activities (See Chapter 8 Project Implementation, Monitoring and Evaluation).

Have the materials been pre-tested on a focus group? Are the right people being targeted? Are the programmes sufficient in scope and frequency to meet needs? Have any gaps been identified? If so, how can they best be filled? And most importantly, are the targeted groups using the knowledge gained to take appropriate actions toward disaster risk reduction? Mechanisms to feedback results of the evaluation to improve programme implementation also needs to be in place.

***Quality control*** - Making sure the message is accurate in its technical and social context is essential. Often when translated, slight variations on wording shifts meaning, not just in technical terms, but, in what it might mean to a different target group. Keep quality checks on the work in progress as well as after the translation is completed.

**Why document?** In the effort to build up knowledge on disaster risk reduction and promote replication of initiatives, it is important to document findings, experiences and lessons learned in different forms, for a range of media, and widely disseminate them.

The six key questions above are important for developing any educational, public awareness, training and information sharing activities.

# Checklists

Any education, public awareness, training and information sharing activities should focus on increased understanding of the problems and their solutions. The ability to be change agents in communities increases when a customised approach is implemented. By gaining a better understanding of the target stakeholders and involving them in the design and planning of strategies, the odds that they will take action to save lives, reduce property and business losses and ensure social and economic sustainability increases.

## Developing Strategies

To develop strategies for promoting understanding and appropriate actions for disaster risk reduction, consider the following eleven steps:

1. Define the overall project purpose.
2. Define the aims of the project's communications strategy.
3. Identify and prioritise audiences and participants.
4. Determine information needs.
5. Identify barriers and opportunities.
6. Identify communication channels and messages.
7. Plan coordinated timing of activities.
8. Formulate communications material.
9. Participatory pre-testing
10. Implementation
11. Evaluation

(Twigg, 2004)

## Planning and Implementation

Consider the following nine principles:

1. Involve stakeholders.
2. Customise for target group(s) using - **cultural indicators.**
3. Allow stakeholders to take ownership of the chosen approaches, tools and messages.
4. Incorporate local perspectives.
5. Create two-way communications.
6. Involve leaders.
7. Speak with one voice (particularly if partners are involved).
8. Evaluate and measure performance.
9. Repeat, repeat, repeat.

**see Box 6.1**

(Adapted from Frew, 2003)

**Box 6.1**

## Cultural indicators

Answers to the following questions will be useful when developing strategies:

- What are the *languages* used within the community? What are the differences in dialect, regional tone?
- Do the different groups in the community perceive *time* the same way or differently? Do some act more rapidly than others?
- Which *religions* are reflected in the community? How do these beliefs impact the way an individual perceives the message content, the timing of its delivery and the proposed approaches?
- What is the *ethnic makeup* of the community? Are there different groups that you will reach out to? How will this impact your use of languages, images and other important messaging?
- What is the level of *group identification* or "group thinking"? Do the groups in the community think and make decisions individually or as a group? Do some decide as an "I" or do they prefer to make decisions as "we"?
- Has the population of the community been affected by *migration* patterns - coming into the city, leaving the city or in between sections and neighbourhoods of the city?
- What is the general relationship with, and use of *new technologies* of the community or segments of the community? Do they trust it or have access to it?
- Are there major differences in the *thinking patterns* between the different ages and generations reflected in the community? How will this affect your approaches to reach them? In the type of images used?
- What different levels of *formality* will be needed in your communications to appeal to certain ranks or castes within the community?
- How do the different segments of the community *embrace change* or push against it, new approaches versus putting down older, traditional ways? Can you identify differences in age group and educational levels? Who will have the most influence in embracing your message? Is there a particular avenue that allows better introduction that might assist you in your outreach efforts?
- Who are the respected *champions* of the community - both formally, such as through established leadership positions, and informally in the roles of 'wise men and women'? Who are most active in disaster risk reduction and safety?
- What is the level of *cultural assimilation or integration*? Which groups have migrated to new areas or regions and assimilated (adopting) local values and behaviours, and which have maintained their own traditions?
- How has *globalisation* impacted the community? Is it impacting their style of living and decision-making with new ways and traditions beyond the

local community? Has the local community influence extended outside of the community to the country or internationally?

- Does the community face *historical conflicts*, such as religious differences, national wars or international or cross-border conflicts that will impact individual or group decisions on risk reduction issues?
- What local or national *traditions*, such as dance, song, street theatre, or shadow puppets, are celebrated locally that can be utilised in the strategy?
- What *community networks* exist in the community that would be particularly effective in getting the word out or in adopting new risk reducing efforts?
- Which *media* have worked most successfully in the community to reach different audiences?
- Other questions?

(Frew, 2003)

# Case Studies for Knowledge Development

## ADPC: Focus on Training

ADPC

ADPC facilitates a range of training courses and workshops each year. The type of course is dependent on needs and requests. The course focuses on a number of different stakeholder groups, hazard types, key sectors and skills. Most collaborate the expertise of other specialised organisations both in the region and internationally. There are a number of organisations in the region specialising in training such as; International Institute for Disaster Risk Management in the Philippines, Disaster Management Center at the University of Winsconsin in Madison, USA, and FEMA. There are also sub-regional organisations such as; Bangladesh Disaster Preparedness Center, Dhaka, Center on Integrated Rural Development for Asia and the Pacific, Dhaka, International Centre of Mountain Development, Kathmandu (see Resources).

Each programme or project will hold individual specialised courses, trainings and forums for government level officials, project partners and key stakeholders to facilitate a common understanding of risks. For example, the Thailand Urban Disaster Mitigation Project (TUDMP) conducted a Round Table discussion for Provincial Governors of Thailand to catalyse the discussion of risks in their own jurisdictions. The project also conducted training in volunteer search and rescue, and first aid for emergency volunteer services in the project site Had Yai. Community leaders in selected vulnerable areas were invited to attend disaster management training to introduce them to basic DRM concepts.

The efforts of this training resulted in the formation of key community organisations dedicated to discussing and acting in their own local areas.

## ADPC: Focus on Public Awareness

ADPC

It is important to identify **who** the key stakeholders are. Involving different stakeholders in planned activities for reducing disaster risks can lead to building a common understanding among stakeholders.

There are numerous **channels** of communication for sending, receiving and sharing information. Selecting the appropriate mix requires a good understanding of the target group.

### Vietnamese Boat People

A pilot campaign targeted at the boat people in central Vietnam was developed by ADPC in collaboration with Vietnam's Flood and Storm Control Department, and supported by DANIDA.

Following detailed questionnaire surveys and workshops with the boat people, government officials at different levels and non-government representatives, it was agreed that the project would focus on enhancing boat people's understanding of warning signals for flood and storm, and on developing an evacuation plan.

One of the chosen media for communicating with the people was through folk songs. The boat people enjoy singing. The songs have rhymes and rhythms which make them easy to recall. A song-writing contest for families attracted over 100 entries. Due to strong family ties among the boat people the contest was directed at families rather than individuals. Two families were awarded with colour television sets for best songs. The songs were played in the commune broadcasting system several times a day.

(ADPC, 2003; NDM-P, 2003)

### Bangladesh community-based flood preparedness

A partnership between ADPC (as part of the AUDMP), CARE-Bangladesh and local partner organisations Gano Unnayan Kendra in Gaibandha and Associated Rural Development in Tongi, developed a strategic campaign to attempt to instill a culture of self-reliance and flood preparedness. In combination with demonstration house-raising, drainage construction, road raising and the development of municipal contingency plans, the public awareness campaign aimed to pass on household tips to better prepare for annual floods.

The campaign used numerous tactics and communication channels to bring home the preparedness messages. The most creative was a snakes and ladders game used at primary school level to spread awareness at an early age. Here are some more examples:

- Using rickshaws for their familiarity, mobility, geographic reach, and uniqueness, placards were placed on the back with action messages suggesting useful household activities to prepare for floods.
- Art and essay writing competitions at primary and secondary schools with prize incentives was used to promote early vigilance and common understanding about flood risks.
- Dramas and folk songs were performed in public places to reach out to illiterate people.
- Murals and billboards, posters and brochures were distributed.
- Advertisements in movie houses were commissioned to spread the message.

(Safer Cities 8, 2004)

Nepal

# Nepal
## An integrated awareness programme

It is important that education, public awareness, training and information sharing activities are well-integrated in disaster risk reduction programmes.

The last major earthquake that shook Kathmandu Valley was a 1934 and many residents today are not aware of the devastating impact of an earthquake. Should an earthquake like that hit Kathmandu Valley again, the destruction would be unimaginable. For example, it is estimated that 66 per cent or over 400 public schools would collapse. Take a moment to consider the implications should an earthquake occur on a school day.

One way of reducing risks is to undergo a massive retrofitting or reconstruction project for all the 400 public schools. Alternatively, one could turn the reconstruction process into an educational exercise.

Nepal's National Society for Earthquake Technology (NSET) under the Kathmandu Valley Earthquake Risk Management Project (KVERMP) initiated a school earthquake safety programme (SESP) that involved the entire community.

NSET's action plan for Kathmandu Valley provides one possible framework to reduce earthquake risk. Targeting different levels and sectors, it includes a combination of:

### Education

- School children learned about earthquake safety in schools, practiced earthquake drills and took home an earthquake kit developed for parents.
- Engineering students worked over their summer vacation with NSET in conducting an assessment of the vulnerability of schools to earthquake. Through this experience they learned different aspects of safer construction in earthquake-prone areas which were not included in their engineering curriculum.

### Public awareness

- Community participation in planning and building safer schools raised awareness and increased community understanding on the concept of earthquake safety.
- Earthquake Safety Day (ESD), an annual event held every 15 January since 1999 in memory of the devastating earthquake that struck Kathmandu Valley on 15 January 1934, comprised a range of awareness raising activities over a one-week period. Activities ranged from exhibitions, interviews on radio and television, art competitions for school children to rallies. It continues to be organised by the ESD National Committee, chaired by the Minister of Science and Technology.

- Following the Gujarat Earthquake in January 2001, NSET took the opportunity to remind the general public in Nepal, the importance of earthquake safety. A range of public awareness activities were organised and materials produced including leaflets, posters and calendars.

### Training

- Masons' capacity was built through on-the-job training and hands-on demonstrations. In the aftermath of the Gujarat Earthquake in January 2001, Nepali masons trained local masons of Patanka Village in Gujarat.
- During ESD in 2002, masons from Gujarat attended the event and visited the schools that were retrofitted by Nepali masons in their hometowns. This two-way exchange between Nepal and India proved extremely valuable to local masons, families, children and teachers in the villages.
- NSET provided a series of journalist training, inviting expertise from other countries to share experiences on disaster risk reduction.

### Information sharing

- NSET is widely sharing their experiences and lessons learned in international conferences and training workshops. NSET's work is well-recognised and documented by regional and international organisations including ADPC, ADRC, Duryog Nivaran South Asian Network for Disaster Management and UN ISDR.

### Documentation

- The experience of masons training was documented in two significant outputs: 1) Manual entitled "Protection of Educational Buildings Against Earthquake: A Manual for Designers and Builders," developed by NSET in collaboration with UNESCO; and 2) Curriculum for masons training on earthquake-resistant construction produced by NSET based on the curriculum developed by the Royal Nepal Government's Department of Housing and Building Construction. The resources developed are used in training courses organised by NSET.
- Case studies of the experience and lessons learned have also been documented by ADPC as part of its Safer Cities case study series and made available in print and on the website.
- Over the past six years in Kathmandu Valley, a growing group of trained masons have started strengthening and rebuilding schools and public buildings with the help of the community. At the same time, homeowners have been hiring these trained masons, at higher than normal rates, to strengthen their houses. Homeowners have also been preparing their families for earthquake by following an earthquake preparedness kit distributed by their children's schools.

(ADPC, 2003)

Indonesia

## Indonesia
### Sustainability and replication

When planning and implementing any activities, its **sustainability** and **replicability** must be considered. In the Indonesian case study, the endorsement of the Ministry of Education to promote earthquake safety in schools led to its sustainability and replication nationwide.

In Indonesia, a component of the Indonesian Urban Disaster Mitigation Project started with awareness raising in schools. Through the engagement of the Ministry of Education in this process, the Ministry soon incorporated earthquake safety in schools' extra-curricular activity nationwide.

A training for trainers programme has been developed for selected future instructors of provincial teachers training centers in earthquake-prone areas in Indonesia. Teachers are then trained at these training centers to teach students earthquake safety, including the conduct of drills at schools.

Teaching materials and technical assistance was provided by the Institute of Technology, Bandung as part of ADPC's Asian Urban Disaster Mitigation Programme.

(ADPC, 2004)

Cambodia

## Cambodia
### Monitoring, evaluation and review

The Cambodian case study below shares Cambodian Red Cross system for maximising the impact of their training and for **monitoring** progress of trainees.

One of the components of Cambodian Red Cross (CRC) Community-Based Disaster Preparedness Programme (CBDP) is the training of Red Cross Volunteers (RCVs) in a range of risk reduction skills - from risk assessment, flood preparedness and mitigation, community-based first aid to leadership and community organising.

CRC recognised that training itself is not sufficient. CRC considered training as a first step in establishing a long-term relationship with the RCVs and community members. Continuing support and future training for RCVs have been incorporated in CRC's masterplan. It includes refresher courses that would allow existing RCVs to get together, clarify concepts on and practices of flood preparedness and mitigation; and learn from each other's experiences.

Between training sessions, CRC's training staff organised regular group meetings and site visits to support the RCVs as they worked in their respective communities. The meetings and visits allowed the RCVs to exchange experiences in the

practical application of their training. At the same time, these enabled CRC staff to monitor progress in the communities and troubleshoot individual problems.

(ADPC, 2002)

## India
### ICTs for disaster reduction

India

Advancement in **information and communications technology (ICTs)** is making it easier to collect, access, analyse and share information. The Internet has become a key source for information and learning. Moreover, mobile and wireless technologies are becoming increasingly cheaper and accessible, and are viable options for communications.

However, it is important to make sure that the targeted stakeholders have the necessary hardware (eg. computers, mobile phones, network infrastructure), software, training and support system.

India has developed a nationwide Internet-based network for more effective disaster response.

When cyclones, earthquakes or other calamities next strike in India, district officials in many areas can go online and quickly mobilise support for evacuation, search and rescue, medical aid and other relief priorities.

The Indian Disaster Resource Network (IDRN) (*http://idrn.gov.in*) is part of the nationwide Disaster Risk Management Programme. It is a joint initiative by the Government and UNDP that aims to reduce the vulnerability of communities in 169 districts in 17 States most at risk.

IDRN is a nationwide web-based inventory of essential resources for disaster response. The IDRN lists out the equipment and resources by type and by the functions they perform and it gives the contact address and telephone numbers of the controlling officers-in-charge of the said resources so that the equipment can be promptly mobilised. IDRN is accessible to emergency officers, district collectors, relief commissioners and other disaster managers at various levels of government.

National UN Volunteers helped design and develop the IDRN web-based application, providing technical support to the Government at district and state levels. They now assist relief commissioners and district authorities, in coordination with Government departments and public sector partners, in updating and maintaining smooth operation of the network.

(MHA, 2004; MHA, undated; UNDP, 2003)

# Lessons Learned from ADPC

ADPC's Asian Urban Disaster Mitigation Programme (AUDMP) started in 1995 when disaster risk reduction was just a concept. The regional programme with projects in nine countries aimed to provide working examples of risk reduction measures for Asia. The AUDMP approach provides some lessons learned on education, public awareness, training and information sharing that could be applied to other programmes at regional, national and local-levels.

*http://www.adpc.net/audmp/default.html* provides more information on AUDMP

To develop a comprehensive framework and strategy for building a common understanding of disaster risk reduction:

- **Requires a clear understanding of local perspectives**
  Extensive training was provided in different forms to equip stakeholders with the understanding and technical skills to reduce disaster risks. A series of regional course curricula were developed and delivered to potential trainers at the national level. The curricula were then adapted to suit national needs, translated to the local language and delivered by national trainers.

- **Needs to be sustainable**
  In many cases, the training courses could only be held once with support from ADPC funds and technical assistance. In Sri Lanka, however, the Center for Housing, Planning and Building, a training and research center under the Ministry of Housing and Plantation Infrastructure, has been able to *sustain* the activities. The center receives an annual budget to conduct training for national, provincial and local-level public and private sector agencies. They are able to conduct regular disaster risk management courses, as well as incorporate disaster risk reduction issues into other regular courses on urban development planning, housing development and construction management.

- **Calls for multi-stakeholder participation and partnerships in planning, implementation and evaluation**
  Education programmes in schools were implemented in Bangladesh, Indonesia, Lao PDR, Nepal and Sri Lanka. In Lao PDR, the development of teaching materials and teachers' guidelines for educating primary school students on disaster risk reduction was led by the National Disaster Management Organisation (NDMO) and the National Research Institute of Educational Science (NRIES) in consultation with curriculum development specialists, representatives of teacher trainers, school directors, teachers, students, road safety department and the fire brigade. These teaching materials are in the process of being incorporated into the national curriculum.

- **Entails networking for local, national, regional and international sharing**
  It is part of AUDMP's strategy to facilitate learning and promote replication of good practices worldwide. AUDMP assisted in the documentation of information and experiences for different audiences (in case studies, working papers, training materials and videos) and in the sharing of knowledge through different forums (in conferences, workshops, training courses, the Internet and email discussion list).

# Discussion Questions

- Are disaster risk reduction knowledge development programmes for targeted groups incorporated as part of policies and plans?
- Have disaster risk reduction modules been incorporated into the regular programmes of schools, universities, institutes of public administration, defense academies, etc.?
- Are you dependent upon courses conducted outside the country? If so, do they meet your needs?
- Have the teachers, trainers, educators been trained and provided with updated materials to deliver the courses?
- To what extent is the media involved in promoting disaster risk reduction by featuring regular news on disaster risk reduction initiatives and translating disaster warnings into layman's language?
- Is information on disaster risk reduction current, accurate, consistent, widely available and targeted at users within the country and to other countries in the region?
- Do you systematically document and disseminate / make available the processes, costs and benefits, and lessons learned of the disaster risk reduction project using different media?
- Do you promote cross-sectoral communication within your organisation and with target groups you work with?

# Challenges

We have come a long way, but much still needs to be done to develop a "culture" for disaster risk reduction. The wide range of stakeholders that deal with different dimensions of disaster risk reduction is obvious throughout this Primer. One important challenge is to stimulate and develop ways to link the different stakeholders and the different dimensions of disaster risk reduction.

Education, public awareness raising, training and information sharing are approaches that can be used to reduce disaster risks. To benefit from such approaches, a comprehensive strategic framework that considers the problems, needs and development objectives of the target stakeholder(s) is required. For these approaches to be effective they need to be incorporated in disaster risk reduction policies and plans that appreciate the multi-stakeholder, multi-disciplinary nature of disaster risk reduction. At the same time, disaster risk reduction education, public awareness raising, training and information sharing need to be integrated in development policies and plans of different sectors.

For example, disaster risk reduction in university courses and academic research needs to be multi-disciplinary in nature and supported by a multi-disciplinary group of professors and researchers. At the same time, other disciplines such as environmental management, planning, architecture, engineering, public administration and development studies need to integrate disaster risk reduction as part of their courses to undergraduates and postgraduates.

Often, education, public awareness raising, training and information sharing activities take time to set up and sustain. The challenge is to be able to sustain efforts and keep important stakeholders actively interested and engaged in the efforts. The right people need to be brought together. A well-targeted initiative from which all partners can benefit must be designed and implemented. When it works, these approaches could bring together more opportunities, partners and resources to meet the complex challenges of risk reduction.

Another challenge is to make these opportunities, partners and resources accessible. There is a need for closely linked national, regional and international information centers to identify, expand, order, synthesise, translate (to different languages) and disseminate information. At the same time, strategies to reduce gender, age and economic barriers to the use of new information and communication technologies need to be promoted.

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*www.sdnpbd.org/sdi/international_day/natural_disaster/2004/terminology_disaster_risk_reduction.htm*

# Resources

## Education

American Red Cross Masters of Disaster Curriculum for Disaster Safety.
*http://www.redcross.org/disaster/masters/intro.html*

A range of disaster risk reduction courses is delivered by Overseas Development Group. UK: University of East Anglia.
*http://www.odg.uea.ac.uk*

Bachelor of Science in Disaster Risk Management, University of Portsmouth, UK.
*http://www.port.ac.uk/edam*

Benfield Hazard Research Center, University College London, UK.
*http://www.benfieldhrc.org*

**CASITA** - A programme of ADPC in partnership with 15 Asian universities / training institutes to build capacity using Information Technology Applications.
*http://www.adpc.net/casita/default.html*

Participating universities / training institutes include:

Asian Institute of Technology, Thailand
Bangladesh University of Engineering and Technology, Bangladesh
Center for Environmental Planning and Technology, India
Chiang Mai University, Thailand
Gadjah Mada University, Indonesia
Hanoi Architectural University, Vietnam
Indian Institute of Remote Sensing, India
Institut Tecknologi, Indonesia
Kathmandu University, Nepal
Khulna University, Bangladesh
University of Moratuwa, Sri Lanka
University of Peshawar, Pakistan
University of Philippines, Philippines
University of Ruhuna, Sri Lanka
Urban Research Institute, Lao PDR

Certificate in Disaster Management, Indira Gandhi National Open University, India.
*http://www.ignou.ac.in/acadmic_programmes.htm#areaspeawa*

Masters of Science Course in Disaster Management, Cranfield University, UK.
*http://www.rmcs.cranfield.ac.uk/dmc*

Master of Science in Disaster Management and Sustainable Development, University of Northumbria, UK.
*http://online.northumbria.ac.uk/geography_research/ddc/msc.htm*

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## Training

Asian Disaster Preparedness Center, Bangkok *http://www.adpc.net*

Courses currently being held in ADPC include:

| Hazard-related courses | Disaster risk management courses | Sector-specific courses |
|---|---|---|
| Earthquake Vulnerability Reduction for Cities | Climate Forecasting and Applications | Land-Use Planning and Risk Management |
| Flood Risk Management | Community-Based Disaster Risk Management | Hospital Preparedness for Emergencies |
| Technological Risk Management | Disaster Risk Communication | Medical First Responders |
| Urban Fire Risk Management | Disaster Risk Management | Public Health in Complex Emergencies |
| | Urban Disaster Mitigation | Training for Instructors |

Disaster Management Center at the University of Wisconsin, USA.
*http://dmc.engr.wisc.edu*

Disaster Mitigation Institute, India.
*http://www.soutasiadisasters.net*

International Institute for Disaster Risk Management, Philippines.
*http://www.idrmhome.org*

Training centers with subregional or national focus:
(Extracted from ISDR, 2004)

- Bangladesh Disaster Preparedness Center, Dhaka, Bangladesh
- Center on Integrated Rural Development for Asia and the Pacific, Dhaka, Bangladesh
- International Center of Integrated Mountain Development, Kathmandu, Nepal
- National Center for Disaster Management at the Indian Institute of Public Administration, New Delhi, India
- National Institute of Rural Development, Hyderabad, India
- Uttaranchal Disaster Mitigation and Management Center, Dehra Doon, India

United Nations Disaster Management Training Program.
*http://www.undmtp.org*

## Information Sharing

ASEAN Committee on Disaster Management.
*http://www.acdm.net*

Asian Disaster Reduction Center.
*http://www.adrc.or.jp*

Caribbean Disaster Information Network.
*http://wwwcardin.uwimona.edu.jm:1104/home.htm*

Center for Research on the Epidemiology of Disasters.
*http://www.cred.be/sitemap.htm*

Duryog Nivaran South Asian Disaster Management Network.
*http://www.duryognivaran.org*

Gender and Disaster Network.
*http://online.northumbria.ac.uk/geography_research/gdn/index.html*

International Federation of Red Cross and Red Crescent Societies' World Disaster Reports.
*http://www.ifrc.org/publicat/wdr/index.asp*

Latin America Network for the Social Study of Disaster Prevention.
*http://www.desenredando.org*

MekongInfo: Regional Information System on Participatory Natural Resource Management.
*http://www.mekonginfo.org*

Natural-Hazards-Disasters email discussion group.
*http://www.jiscmail.ac.uk/lists/natural-hazards-disasters.html*

Natural Hazards Research and Applications Information Center, University of Colorado, USA.
*http://www.colorado.edu/hazards*

Radical Interpretations of Disaster Experience.
*http://online.northumbria.ac.uk/geography_research/radix*

Regional Disaster Information Center.
*http://www.crid.or.cr/crid/ing/index_ing.html*

Relief Web.
*http://www.reliefweb.int*

# 7 bringing disaster risk management to the local-level

## Chapter Brief

## Key Words

Community
Community-based Disaster Risk Management (CBDRM)
Coping
Empowerment
Networks
Participation
Partnership

## Introduction

## Concepts of Local-level Disaster Risk Management

Building a Culture of Safety
Participation and Sustainable Development
Role of Local Government
The Importance of Links: Networks and Partnerships Among Key Stakeholders
Securing Resources

## Process of Localising Disaster Risk Management

The Seven-step Process for Implementing a DRM Plan within the Community

## Case Studies

Bangladesh. Supporting indigenous practices with external funds
Sri Lanka. Indigenous techniques revisited
Philippines. An active local government - Dumangas
Thailand. Community-based approaches and establishing CBOs
India. The Panchayati Raj Institutions (PRIs), an opportunity lost
Cambodia. Empowering communities to mitigate flood risk

## Checklist: the Role of NGOs

## Lessons Learned

## Discussion Questions

## Challenges

## References

## Resources

# Chapter Brief

- Risk management at the local-level provides an environment for the community to put risk reduction actions into practice. It helps people to form an understanding of the risks that may occur in their community.

- Disaster risk management has traditionally been a responsibility assigned to national governments, but resources provided by the national governments are not always sufficient to meet the growing demand to make communities safe from disasters. It is important to appreciate the resources that people at the local-level bring to the disaster risk management process.

- Government decentralisation presents an opportunity for transferring power and responsibilities to local-level administrations and to forge new partnerships to address local needs and develop local capacity.

- Local governments must also establish links with key stakeholders to share resources and build on knowledge and information.

- Communities depend on cooperation among many stakeholders to become more secure and foster actions that support sustainable development.

- The approach of localising disaster risk management increases the capacity of the local community to take decisions to make their community safer and more secure.

- The role of community-based disaster risk management will help create awareness amongst people to take responsibility, to advocate and lobby for risk reduction activities, community mobilisation and decision-making. CBDRM is a powerful process to be used in conjunction with risk assessment, preparedness and mitigation processes.

# Key Words

## Community

In the context of disaster risk management, a community can be defined as people living in one geographical area, who are exposed to common hazards due to their location. They may have common experience in responding to hazards and disasters. However, they may have different perceptions of and exposure to risk. Groups within the locality will have a stake in risk reduction measures (Abarquez and Murshed, 2004).

## Community-based Disaster Risk Management (CBDRM)

A process of disaster risk management in which 'at risk' communities are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks in order to reduce their vulnerabilities and enhance their capacities. This means that the people are at the heart of decision-making and implementation of disaster risk management activities. The involvement of the most vulnerable is paramount and the support of the least vulnerable is necessary. In CBDRM, local and national governments are involved and supportive (Abarquez and Murshed, 2004).

## Coping

In the context of disaster management, coping is the manner in which people act using existing resources and a range of expectations to achieve a desired end. This can include the 'management of resources' and how it is done during unusual, abnormal or adverse situations (Blakie et al, 2001).

## Empowerment

To make a group of people in the community or society strengthened to be more confident or feel that they are in control of their lives, by self-actualisation or external influence, with or without official authority / legal power.

## Network

A large group established for the purpose of sharing information, consisting of many groups, especially in the context of different groups of people in a community or society, that are linked together to allow communication between or within the components and / or between the components and a central focal system.

## Participation

To be involved in activities of a group of people in the community or society, either with or without membership, sharing the work and contributing inputs to achieve the group objectives.

## Partnership

Relationship resembling a legal partnership and usually involving close cooperation between parties having specified and joint rights and responsibilities.

# Introduction

Disaster risk management at the local-level helps people form an understanding of the risks that may occur in their community. Disaster risk management provides a step-by-step process to identify community risks, select appropriate preparedness and mitigation actions and establish mechanisms to put these actions into place. This process acknowledges that people at the local-level have diverse concerns that will affect the types of risk they will consider important. When making risk reduction choices, people need to have a clear vision of the potential community risks and how those risks will affect their lives.

The objective of a local-level disaster risk management programme is to provide an environment to initiate discussions about risks and find ways to put community risk reduction actions into practice.

Throughout this chapter, it is important to appreciate the resources that people at the local-level bring to the disaster risk management process. Over time, people build strong coping mechanisms that rely on relationships and kinship ties, local resources and indigenous practices unique to their community. These coping mechanisms, local organisations and strategies are important for the survival of many communities.

Recent trends of government decentralisation in Asia means that power and responsibilities are being transferred to local-level administrations. Decentralisation presents an opportunity to forge new partnerships to address local needs and develop local capacity. Involvement of members of the community with local government representatives and agencies establishes important links to political support and financial resources. This cooperative approach initiates a greater capacity to deal with disasters.

Bottom-up disaster risk management strategies acknowledge the competence of local people without ignoring the responsibilities of governments to meet their needs. It is important to keep in mind that disaster risk management at the local-level alone is not enough. There needs to be an integration of bottom-up and top-down approaches to support and complement all efforts. Disaster risk management needs to incorporate a broader perspective that links risk reduction actions to sustainable development. Establishing this link promotes a long-term approach to disaster risk reduction. A long-term approach must acknowledge and understand the link between disasters, poverty and sustainable development, and the direct effects these have on all elements of civil society, particularly marginalised groups.

# Concepts of Local-level Disaster Risk Management

## Building a Culture of Safety

The rate of occurrence and the nature of disaster influences how people perceive disaster risk. It is difficult to maintain a state of heightened disaster awareness when the majority of disasters occur infrequently. This is true even if the effects are devastating. Catastrophic earthquakes may only happen once or twice in a lifetime, but may potentially kill thousands of people and destroy buildings, roads and other community elements necessary for survival. Severe annual flooding may destroy property and cause the evacuation of thousands of people. However, they are necessary for the production of critical food supplies, such as rice. Such differences alter perceptions of risk among members of the local community. Each individual is influenced by their personal experience, their ability to perceive the potential effects of rarely occurring disasters and their understanding of the benefits that accompany some disaster events. Each person will determine a unique level of acceptable risk based on these and other characteristics of disaster events.

It is this very personal and individual perception of risk that needs to be discussed and explored in order to build a culture of safety. Perceptions can change, and when they do, the level of acceptable risk may also change. Some people may become less "risk tolerant" while others may be willing to tolerate a higher level of risk to sustain activities necessary for immediate survival. These changes may depend on experience, education or even misinformation. Integrating individual needs into disaster risk reduction actions needs to account for these issues in order to be effective.

### Public awareness and education is the key to building a culture of safety

see Chapter 6

Better management of disasters in the community requires the development of a culture of safety. A culture of safety incorporates risk reduction into the everyday actions of people and contributes to a safe and secure future. Achieving a culture of safety at the local-level is the key to building safer, disaster resilient communities. Developing management practices that involve the participation of members of the community is the first step.

# Participation and Sustainable Development

*'The involvement of the most vulnerable is paramount and the support of the least vulnerable is necessary'*

*- Abarquez and Murshed, 2004*

## Why is participation important?

- Promotes commitment to decisions made.
- Ensures that all alternatives are reviewed so that the local problem is addressed by the most appropriate and cost-effective solution.
- Ensures that activities are coordinated with each other and with other community goals and activities.
- Prevents conflicts and reduces the costs of implementation.
- Educates communities and other local stakeholders on available resources and capacities for protecting themselves against disaster risks.
- Builds support and ownership of risk reduction projects, increasing the potential sustainability of interventions after projects end.

National level direction or 'top-down' approaches may fail to recognise the context of the local environment and may overlook specific local-level needs. Engagement with the national level is necessary, but certain measures need to be initiated and implemented at this level.

Addressing disaster risk management at the local-level has become an important aspect of a holistic disaster risk management approach. Local-level initiatives are often in line with current development practice. Establishing disaster risk management at the local-level allows the local community to participate in decision-making to identify risk reduction measures and to manage potential disasters that may affect their lives. Members of the community become active participants, establishing responsibility and ownership.

Local people understand their situation best. They have knowledge of their history, first-hand experience with local risks, an understanding of their environment, and experience with coping mechanisms that have worked well in the past. No one has a greater stake in creating a safe community than the people that live and work there. The experience and know-how of community members needs to be understood, respected and applied to support the development of a sustainable community.

## Role of Local Government

Effective disaster risk management stems from good governance practices. The historical political culture in Asia is only now emerging from a non-participatory, centralised approach to planning and decision-making. The recent climate of decentralisation and devolution of powers makes room for greater participation in risk management choices and enhances good government practices.

Local government entities are often better placed to develop, manage and implement disaster risk management processes than state and central governments. They have power to mandate measures and can access local financial and technical resources. The role of local government is to be an active leader to mobilise the community into considering actions that will assist in disaster preparedness and mitigation. Local governments need a framework that includes authority to lead, incentive to act, policies and plans to guide, financial resources for capacity building and implementing initiatives, and mechanisms of accountability to ensure arrangements that are binding and that processes will last. This commitment contributes to a sustainable culture of safety.

There are many government level stakeholders who should be involved in the development and maintenance of disaster risk reduction measures. Numerous ministerial sectors such as public works, health care, planning, agriculture, forestry, natural resources and coastal and marine departments are an integral part of this stakeholders group. Disaster risk management training, including an introduction to risk, hazard specific information, nature of disasters, impact on livelihoods, risk assessment, planning and action, is an effective and vital component to enhancing local government disaster risk management leadership. Training will build the technical capacity of local government stakeholders and is a strategy employed to build awareness and sustainability in local disaster risk management planning. See Case Studies on Thailand and Bangladesh, which highlights the positive outcomes of such engagement.

**see Bangladesh & Thailand Case Studies**

It is important to remember that disaster risk management at the state, provincial, district, municipal, city, kampong, tambon, or village level should never entirely rely upon national government policies and programmes, nor solely depend on community bottom-up strategies. The two must work together.

## The Importance of Links: Networks and Partnerships Among Key Stakeholders

Throughout this Primer there has been considerable discussion of the importance of forming partnerships, networks, links, collaborations and coalitions. It is a key strategy for incorporating multi-stakeholder opinions, resources, ideas and perceptions into the disaster risk management (DRM) process. It enables greater involvement and facilitates participation of all those affected by disaster events.

These partnerships contribute to DRM development, planning and activities, and foster ownership and sustainability.

Building partnerships and networks can help reduce redundancy and conserve limited resources. Evidence shows that an increasing number of projects cover the same areas and generate the same information. Forming networks and partnerships, and working in collaboration, promotes the sharing of information and knowledge so people can avoid duplication and unnecessary effort, maximise resources and work towards a common goal.

Local government departments, private sector representatives and organisations, NGOs, CBOs, community representatives, religious leaders and neighbourhood networks are stakeholders in the disaster risk management process. Among the contributions they can make to the disaster risk management process are:

- NGOs and CBOs can catalyse and facilitate participation, helping local communities become partners instead of only being recipients or beneficiaries of outside assistance.
- Key stakeholders can form working groups to provide a crucial link to the larger community.
- Organising community meetings and training workshops can provide a good platform for people to share their ideas and stimulate action.
- There needs to be a common mandate, aim or objective to establish a common goal.
- Building networks and partnerships fostering participatory approaches allows for diverse opinions and expands the number of options available. Multiple points of view provides a way to understand the cross-cutting issues contributing to increasing vulnerability.
- Disaster management training can become a platform for key stakeholders to meet and discuss the issues affecting them. This environment can facilitate the formation of linkages, networks and partnerships.

## Key stakeholders

- **Local government / municipalities:** Public works / Engineering, town planning, health and sanitation, community development, environment and natural resources, agriculture, fisheries, education.
- **Private sector:** Builders, contractors, engineers, hospitals, clinics, schools, financial institutions, private landowners, business owners, shopkeepers.
- **Public sector departments in the locality:** Public works, town planning, education, health and sanitation, community development, environment and natural resources, agriculture, fisheries, coastal protection.
- **Other:** NGOs; CBOs; religious leaders; community representatives (community leaders, village chiefs, district officials, academics, women's groups, girl guides, boy scouts).

## Securing Resources

The community's capacity to manage risks is largely dependent on available resources. The level of risk that a community is willing to accept may depend on the resources available to initiate risk reduction actions. The level of acceptable risk may be lower (eg. tolerate less risk) when more resources are available to identify and implement risk reduction actions. The community may be willing to accept higher levels of risk (eg. tolerate more risk) when resources are severely limited. Limited resources are typically directed to more immediate concerns.

Resources can have a broad definition and are not limited to financial resources. Community resources may include knowledge, coping strategies and mechanisms, information and networks. These resources can be used to develop a disaster risk management plan.

Resources can also be hidden. For example, funds can be re-directed from local government budgets. An example of this proactive decision is illustrated by the Case Study from the Municipality of Dumungas, Philippines. External funding from donor agencies can also be utilised to make big changes in a community. See Case Study from Bangladesh, which illustrates the use of outside funds for small scale structural mitigation at the community level.

**see Bangladesh & Philippines Case Studies**

The following is a list of potential resources that can be found at the community level.

- **Individuals** - skills, time, materials, labour or cash contributions.
- **Organisations** - community groups, existing or planned arrangements or activities.
- **Informal social networks and communications** - How do people learn about important developments in the community? How can these be used as a resource in the implementation of preparedness and mitigation activities?
- **Local institutions** - NGOs, businesses, schools, health centres, etc.
  - What are each institution's assets? What services do they contribute to the community? How can these assets and services contribute to community risk management plans and activities?
  - Local government - Are there government legislations, policies and programmes which cover or complement the objectives and activities of a community risk management plan? How can these be activated?
  - Physical characteristics / resources - land and natural resources, open spaces, transportation, infrastructure, roads etc. What resources are available in terms of renewable or underutilised resources with characteristics suitable to be used for risk management activities?

# Process of Localising Disaster Risk Management

In localising DRM a proven process is Community-based Disaster Risk Management (CBDRM).

CBDRM directly involves the community at every step. Members of the community are active participants. Their experiences, knowledge and understanding becomes vital to preparing a disaster risk management plan. The community is both the key resource and main beneficiary. CBDRM is a dynamic process that is shaped by long-term practice and experience.

The process, methodology, tools and techniques will evolve as experience grows. Each community is unique so CBDRM is constantly challenged and enriched each time it is used. Monitoring and evaluation is an essential feedback loop that allows practitioners to learn from good practices and analyse outcomes.

It is important to note that CBDRM will bring out the dominant perceptions of risk in the community. As perceptions are shaped by experience, memory and culture, apathy concerning risk reduction activities may dominate the community's views of disaster. The role of CBDRM is also concerned with changing apathetic perceptions of risk by creating awareness amongst active agents to take responsibility to advocate and lobby for activities to reduce risk, mobilise the community and become informed decision-makers.

CBDRM is to be used in conjunction with risk assessment, preparedness and mitigation processes and measures as described in chapters 3, 4 and 5. It can provide qualitative information and make a significant contribution to the holistic approach of disaster risk management.

**see Chapter 3, 4 & 5**

## The Seven-step Process for Implementing a DRM Plan within the Community

(Adapted from CBDRM Course 12, Philippines 2004 and Field Practitioners Handbook)

Multiple sectors and disciplines are involved in CBDRM. As communities are diverse, so also will be the participation of those affected by disasters. Different economic, education, religious, social, local municipal, environment, etc. sectors will have a vested interest in how they can reduce their susceptibility and build resilience to the risk of disasters.

## Multiple stakeholders and actors involved in CBDRM

They form two groups classified as:

- **Insiders** - those located inside the community such as individuals, households, businesses, community organisations, local NGOs.
- **Outsiders** - international and regional NGOs, sector organisations and private sector consultants used to enhance the capacity of the community.

In the multiple hazard contexts as emphasised in previous chapters, it is important to address disaster risk management from a multi-hazard approach to cover all potential risks the community may face.

### 1. Selecting the community

There are various factors influencing the selection of a community. The organisation / NGO generally has a mandate to prioritise the poorest and most marginal communities. Costs and available resources play a major role in selection. Profiles of communities will indicate needs specific to the organisation / NGO mandate. Personal, social and political interests also contribute to the selection process.

Establishing criteria for inclusion can assist in the selection process. Criteria may include: vulnerability, potential hazards, beneficiaries, community readiness to participate, accessibility, security.

### 2. Building trust and understanding the community

Trust is the most important ingredient to conducting successful CBDRM. Without trust, people are reluctant to participate and unwilling to accept or motivate change, especially from the 'outsider'. It is important to acknowledge, respect and work with local traditions, norms and practices; understand the community's way of life; be transparent in organisation and planning; have confidence in people's abilities; and most of all LISTEN (Chambers, 1997). CBDRM is as much about learning and sharing as it is about meeting objectives.

This is where partnerships, collaborations and associations with local community organisations help establish links to the local people. Using an already trusted organisation or individual inside the community to partner with or build the capacity of, can be the most effective activity.

### 3. Participatory disaster risk assessment (PDRA)

This step involves the collection of information and data related to disaster risks. The community is the focus of this risk assessment process. Indicators measured include the determination of people, their capacity and available resources. The information and data is both qualitative and quantitative in nature and subject to perception and interpretation. It is wise to keep an open mind as what may seem to be unimportant to the outsider may be a valuable resource to the insider.

see Chapter 3

PDRA consists of consistent and continued dialogue and negotiation involving all stakeholders. The steps described in Risk Assessment Chapter 3 are adapted to PDRA and applied at community level.

Eg., identify hazards and location; map hazards, vulnerable areas, critical infrastructures; identify and assess vulnerabilities and capabilities of people.

Participatory Rural Appraisal (PRA) tools are applied in this step to collect information and build a scenario. Here is a list of PRA tools that are useful to create a before and after scenario.

- Transect walks
- Hazard maps
- Time line and historical mapping
- Seasonal calendars
- Disaster ranking
- Venn diagram
- Focus group meetings
- Discussion groups
- Questionnaires and surveys
- Interviews

### 4. Participatory planning

Planning needs a vision, a goal to achieve and an ideal situation to reach. Using the results of the PDRA, a community disaster risk management plan can be devised. Members of the community as groups, households, businesses or individuals can be invited to submit their own plans or partial plans specific to their needs. Meetings can be held for discussions and airing of ideas. Marginal groups need to be targeted for their opinion by holding special meetings or interviews.

There may be consensus or a myriad of options presented. One needs to be open to these differences.

### 5. Building a community organisation

Delegating the role of disaster management to an appointed community organisation is an important task. Community members can feel a sense of responsibility and ownership of any plans or activities devised. It also increases the possibility that actions taken now will be sustainable in the future.

To build a community organisation, there first needs to be a vision / principle(s) to work by; functions, roles and responsibilities need to be established and formalised; funds allocated to the running of the organisation; formalised training in disaster risk management; and members who are willing, able, trusted and committed.

### 6. Implementation

As a result of participatory planning, a community disaster risk management plan should be developed using a consensus process. This plan will include planning objectives and key risk reduction activities to be conducted over a specified time-frame. The role of the delegated community organisation will be to implement, manage and generally oversee the operation and maintenance of the plan. This will also include delegating tasks, mobilising

and encouraging the community, building awareness, sourcing and directing community resources, capacity building, monitoring and evaluation and reviewing the plan as the environment changes.

**7. Participatory monitoring and evaluation (PM&E)**

Mechanisms for feedback are important for the community. It provides an opportunity to review work in progress and work that has been completed. Feedback enables the community to learn from successes and failures, and act upon the outcomes to generate future initiatives. PM&E encourages flexibility in community plans so change can occur in accordance with observed outcomes. It is an ongoing process involving all stakeholders.

Monitoring is ongoing and routinely conducted throughout the entire process. Information is collected about the progress of activities and how they were carried out. The relevance, efficiency and effectiveness of activities can be assessed. This can come in the form of periodic reports, documented meetings or interviews of members of the community organisation and participants in planned activities. The benefit of monitoring is to:

- understand the change occurring in the community.
- identify problems and priorities in the project needing action.
- determine what is happening.
- promote transparency.
- learn from previous actions.
- use as lessons for the future.

Evaluation is conducted to determine to what extent the objectives have been achieved. Information is collected for both qualitative and quantitative measures. The most effective way to measure change in the community is to use a baseline study to create a scenario of 'before' and then use PRA tools to draw a scenario of 'after' to assess the change.

Also consider the following issues when developing a plan and conducting CBDRM activities.

## Develop a strategy for citizen participation

- Involve the community in the entire disaster risk management process from risk assessment to planning and implementation. This ensures that its needs are heard, available resources are considered, and increases the likelihood that problems will be addressed with cost-effective and sustainable interventions.
- Initiate actions that take timing into account.
- Provide compensation for work and encourage commitment.
- Provide incentives for involvement and participation.
- Involve key community stakeholders and formalising networks.
- Be aware of diversity in communities that includes class, gender, religion, ethnicity, age and interest groups. Attention needs to be paid to this diversity and how to ensure their participation in activities and decision-making.

# Case Studies

Bangladesh

## Bangladesh
### Supporting indigenous practices with external funds

In Bangladesh river-bed mud has been used to raise homesteads above annual flood levels. People are encouraged to plant trees around their homesteads to prevent erosion and secure the soil. This small-scale, structural mitigation measure has been used by the community to make their homesteads flood-resistant for many years and is unique to the region.

The Asian Urban Disaster Mitigation Programme (AUDMP) together with CARE Bangladesh has encouraged and supported the continued use of this flood mitigation measure in the municipalities of Tongi and Gaibandha. The project initiated the partnership of local organisations and the municipal disaster management committee. Participation of key stakeholders, community leaders and members of the community was a vital component of developing a DRM plan. The community was engaged to determine their vulnerability with the use of PRA tools. This information was then used to develop a community DRM plan. Mitigation and preparedness activities were identified and implemented in the community. A public awareness campaign was used to inform people of simple household measures they could employ to prepare for annual flooding.

Demonstration homesteads were made flood-resistant using the technique of homestead raising with financial assistance from the project and community contributions. The community also decided to use external funds to construct drains, raise the school and use it as an evacuation facility, and also to raise the roads leading to the school.

To date, this project has been replicated in an additional four municipalities around northern Bangladesh. Other organisations also promote and support the use of this indigenous technique in Bangladesh.

(ADPC, 2002 & 2004)

Sri Lanka

## Sri Lanka
### Indigenous techniques revisited

Sri Lanka not only experiences flood and landslide, but also drought. A prolonged drought has been affecting southern Sri Lanka for the past five years. Despite an indigenous tradition of rainwater harvesting and irrigation systems dating back

to the third century BC, decision-makers have overlooked the value of such technologies, until recently.

As a result, government and some non-government organisations have installed water-collection tanks free of charge for selected households. However, many villagers did not have a good understanding of how to work and maintain the tanks.

Realising that the provision of water-collection tanks is not sufficient. The Intermediate Technology Development Group South Asia took a different approach by building the capacity of local builders and users of the tanks, and creating systems so that villagers could manage their own rainwater harvesting schemes.

(Ariyabandu, 2001)

## Philippines
### An active local government - Dumangas

**Philippines**

Situated in a flood-prone area, the municipality of Dumangas has taken steps towards improving its disaster management by mobilising its development fund for community level preparedness and mitigation activities. The current municipal mayor uses the development fund to support disaster management activities in selected sectors such as rehabilitation of roads and drainage systems, infrastructure sector appropriation and medical missions from the health sector.

Dumangas Municipality also appropriates funds for disaster management from private sector donations, and government and non-government organisations such as the Philippines Red Cross.

The municipal mayor is also the MDCC Chair and issues the official warning to alert people of hazard onset so they can translate preparedness planning into action. A total disaster management systems approach has been put in place in Dumangas Municipality. In November 1998, Typhoon 'Loling' catalysed the establishment of a disaster response system. MDCC staff received disaster management training, volunteers were trained in search and rescue, agencies were delegated monitoring and response tasks, and a local NGO radio group was formed to monitor hazards and emergencies and provide communications links between authorities and the community.

The mayor decided to invest in developing an early warning system that is provided information from different sources. This warning system in conjunction with a municipal level disaster management plan reduced the cost of relief efforts during subsequent hazard events.

**Table 7.1**
**Municipal fund for disaster preparedness, mitigation and response**

| | 2001 | 2002 | 2003 |
|---|---|---|---|
| Calamity Fund | 2,041,684 | 2,282,171 | |
| Development Fund | 3,320,000 | 3,361,684 | 6,383,856 |

The current Mayor admits that although a lot has been achieved, there is still room for improvement. As disaster risk is a continuous threat, management planning needs to build upon the experiences of previous disasters to refine the system.

(ADPC, 2003)

Thailand

## Thailand
### Community-based approaches and establishing CBOs

The devastating flood in November 2001 initiated a multi-million baht special budget allocated by the National Thai Government to implement large- scale structural mitigation measures in the city of Hat Yai, Songkhla Province. A bypass channel to the east of the city and retention ponds are some of the structures now in place.

Yet, these structures are not enough to keep the city of Hat Yai safe. Through the Asian Urban Disaster Mitigation Programme of ADPC, a proposal was put forth to develop community-based planning. The aim was to target key community stakeholders in vulnerable municipalities to form committees to develop a disaster management plan.

Government officials and community leaders were targeted to participate in disaster management training. Locally based CBOs and NGOs were invited to participate in specified training in search and rescue, first aid and fire fighting. A multi-hazard approach was followed for training to combat more potential risks. A public awareness campaign was implemented and included an art and essay competition for school children, and a disaster day rally coinciding with the International Disaster Day 2004.

To date, the community committees are holding regular meetings with volunteers and developing their own disaster management plan. The committee members feel a sense of responsibility to keep the people in their communities safe and have discussed many

issues with local officials. Because they now have access to local government for assistance, they have been able to work together to improve their preparedness planning.

(ADPC, 2005)

## India

### The Panchayati Raj Institutions (PRIs), an opportunity lost

India

The 73rd and 74th constitutional amendments in 1993 were a turning point for the Panchayati Raj Institutions (PRIs) or local government bodies. These amendments laid down guidelines for the structure of these self-governing institutions, their composition, powers, functions, devolution of finances, and the importance of regular elections and reservation of seats for previously excluded members of society, including women. They have the potential to effectively reduce disaster risks.

PRIs took the lead in organising rescue and relief operations in the first 48 hours after the Gujarat earthquake in January 2001. They organised community kitchens even before rations and relief supplies reached them from outside. They were the first to make arrangements for the cremation of the dead and attend to the injured. Where they were allowed to function, they proved a very effective coordination agency, bringing together the efforts of government, NGOs and external agencies and making sure that relief reached the most needy.

But in the aftermath of the earthquake, the panchayat was sidelined in the rehabilitation effort. Parallel organisations were established (some by state and central governments). Each village had different groups handling programmes of different organisations. An opportunity was lost by not working with PRIs.

(Palakudiyil & Todd, 2003)

## Cambodia

### Empowering communities to mitigate flood risk

Cambodia

Recognising that providing relief to communities after a flood disaster is not sufficient, the Cambodian Red Cross (CRC) initiated a Community-Based Disaster Preparedness Programme (CBDP) to strengthen communities' capacity to protect themselves from future floods.

Trained CRC staff and the expansive network of Red Cross Volunteers (RCVs) worked with communities in assessing risks, building capacity, mobilising resources, and identifying and implementing risk reduction measures. The CBDP

started in 1996 as a pilot project in 23 villages in collaboration with the Federation, ADPC and Pact Cambodia. After six years, the CBDP has impacted countless villages in seven flood-prone provinces. Valuable lessons were learned from implementing these projects.

Villagers of Boeng Psauth agreed to construct a new bridge as its flood mitigation priority. Seasonal flood had caused the previous wooden bridge to regularly fall into disrepair and become dangerous to traverse.

At a village meeting 75 per cent of those in attendance agreed to contribute financially and assist in the renovation of the existing wooden bridge. After PACT assisted the villagers in submitting a proposal to the NGO for funding support, floodwaters in 1999 washed away the remaining wooden frame of the bridge. A local ferry company agreed to replace the bridge with a new one, and as a result, the Community-based Disaster Management Committee (CBDMC) itself decided to build a cement bridge in another location.

The combination of inexperience in proposal presentation and a rush to submit the project proposal without thorough consultation with other community members resulted in the CBDMC's unrealistic cost estimates that were 23 per cent less than the actual. The fund shortage was eventually covered by the Cambodian Red Cross.

During project implementation, further complications arose. Firstly, the cost of transporting materials was not taken into account in the proposal. Secondly, the project started at the height of the harvest season. The busy schedule of the villagers during the harvest made it difficult to mobilise people. Thirdly, the lack of technical skills among the villagers in working with cement led to the added expense of hiring a skilled person.

(ADPC, 2002a & 2002b)

# Checklist: the Role of NGOs

- Raise awareness. Include an element of public awareness in every activity. Local demand for disaster risk reduction can be created by raising awareness.
- Act as facilitator and catalyst. Transfer ownership to the community as soon as possible. Ownership of an initiative captures interest and meets needs.
- Withdraw physical presence as soon as possible. Let the communities help themselves. Suggest ideas, resources and persons outside one's own organisation to broaden outreach and increase possibilities.
- Facilitate community-based organisation and government relationships.
- Set the scene for positive change, but do not impose change.
- Provide technical assistance and support in community organising and fund raising. Encourage and facilitate links, cooperation, multi-stakeholder partnerships and establishment of committees or centers to lead and coordinate disaster risk reduction activities.
- Involve all current and potential stakeholders in organised activities. In particular, involve key people to gain credibility.
- Take every opportunity to invite local authorities and respected individuals in the community. Raise their awareness. Their support and participation will ease resources mobilisation.
- Involve the media. Always inform and involve the media for greater outreach beyond the community level.
- Work with existing social structures in the community.

# Lessons Learned

- Communities consist of diverse groups representing various class, caste, gender, religion, economic activity and a host of other interest groups. Adequate attention needs to be paid to their diversity and questions such as who participates in what areas of decision-making and to what extent become important.

- Capacities are required to deal with conflicting interests. Sometimes a local community may be dominated by a few leaders or by a domineering NGO.

- Poor timing of project implementation may result in a lack of commitment. It is important to ensure sensitivity to work patterns, religious rites and festivals in communities.

- When communities are contributing to the project, it may be necessary to provide some form of remuneration for the time away from their work and employment. Cash and food-for-work are common approaches which also provide livelihood security during lean periods.

- The community needs to have active participation in disaster risk management planning.

- Forging partnerships with NGOs, businesses and communities can be beneficial. They could contribute knowledge, skills and resources in pre-and post-disaster situations and in risk assessment, planning and implementation, monitoring and evaluation.

- Sustainability is enhanced through the presence of organisational mechanisms (in the form of committee, assembly, cadre or team) to see the risk reduction process through.

- It has been proven useful to provide technical assistance in CBDRM tools and techniques to local government officials so they can begin with participatory practices.

- Communities are not only victims awaiting assistance, but are also capable people who can reduce their own risks.

- Indigenous community coping mechanisms need to be harnessed and respected.

- By involving the communities in the entire disaster risk management process from risk assessment to planning to implementation, their needs as well as inherent resources are considered. Therefore, there is a greater likelihood that problems will be addressed with cost-effective and sustainable interventions.

- Local government bodies are often better placed to manage and implement response and recovery processes than state and central governments.

- Recognising and building on existing social structures like the PRIs may be more effective than establishing new ones.

- Legislation for decentralisation needs to be matched by the operational transfer of power, resources and skills.

- Local institutions alone cannot effectively reduce risk. It will take concerted efforts at different levels and across different sectors to improve our understanding of the linkages and to devise effective mechanisms for disaster risk reduction.

- Local institutions including local government agencies, NGOs, CBOs, the private sector and community representatives are stakeholders in the disaster risk reduction process.

# Discussion Questions

- Is there a government department, community organisation or other group in your community focusing on disaster risk management?
- Who is participating in that group?
- Should the group be expanded? If so, who should be added to provide a broader perspective of the issues that will need to be addressed in the disaster risk management plan?
- If no group exists, what actions do you think you could take to start one? Who would you enlist to help you out? What resources would you need?
- Are there opportunities to move ahead with local planning? Local disasters? Disasters in another country?
- Are there elders in your community who could be interviewed to obtain information on past disasters?
- Are there myths or stories that may have roots in past disaster impacts?

# Challenges

- The gradual shift from a top-down relief and response approach to a more inter-sectoral risk management approach has begun to influence the way disaster risk reduction programmes are now being planned and implemented. Many high-level policy makers from the government sector and international agencies are recognising the importance of the participation of local government, NGOs, CBOs and communities in development.

- The British Government's Department for International Development (DFID) developed a livelihood framework which views people as operating in a context of vulnerability. The Disaster Preparedness - European Community Humanitarian Office (DIPECHO) developed an Action Plan for South East Asia in 1999 which identified the need to provide an institutional arrangement in targeted countries for training of national, provincial and local governmental and non-governmental institutions to enable them to incorporate community-based disaster risk management in their programmes.

- Despite policy initiative to decentralise and incorporate disaster risk reduction in development, this is not necessarily a guarantee of real commitment or demonstrated practical abilities on the ground. In many cases, the national government retains the authority for disaster risk reduction programmes which continue to focus largely on relief and recovery after disasters in the absence of local participation.

- Moreover, during a disaster, local governments are immediately confronted with the responsibility of providing relief, but often do not have the means nor adequate legislative authority to mobilise these resources. Local governments also have difficulty in accessing mitigation funds because funding and relief agencies typically work directly with the national government. These are some of the challenges that cannot be tackled at the local-level alone, but require concerted commitment and efforts from all levels.

- *"...weakness of decentralisation is that it puts responsibility for implementation on those who can only address local-level causes of vulnerability. Local government does not have the jurisdiction or political power to address the deeper political, social and economic forces that put people at risk. Under local government direction, disaster reduction can easily become fragmented into a series of small-scale initiatives, focusing on individual hazard events and artificially separated from the surrounding vulnerability context." (Twigg, 2004).* There needs to be a move toward integrating local bottom-up initiatives with top-down direction and support.

- Throughout Asia, there have been many successful community-based disaster risk reduction initiatives, largely managed and implemented by NGOs and CBOs. Here are some challenges:
  - How can the successful local-level initiatives be sustained after the project ends?
  - How can successful local-level initiatives be replicated so that their benefits are spread to other vulnerable groups?
  - How can successful local-level initiatives be scaled-up from a community-based initiative to a system (at district, municipal, provincial, national levels) large enough to protect all those living in areas of risk?

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# implementing programmes and projects

8

design, planning, implementation, monitoring and evaluation

## Chapter Brief

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Activities
Appraisal
Assumption
Baseline data
Environmental Degradation
Environmental Impact Assessment
Evaluation
Gender
Impact
Indicator
Inputs
Lessons Learned
Logical Framework (Logframe)
Mainstreaming
Monitoring
Objective
Outcome
Outputs
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Programme
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Scaling Up
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# Chapter Brief

- Integrating disaster risk management is one major component of the development strategies and plans of international and regional agencies.
- The project management cycle is a methodology that can help development organisations consider issues related to disaster risk reduction and sustainable development in programmes and projects.
- The three basic fundamental stages of the project cycle are: a) design and planning; b) implementation; and c) monitoring and evaluation.
- Stakeholder participation is important in all stages of the project cycle.
- Vulnerable groups are not victims of disasters. They are a resource to be tapped. They include those who are poor, women, children, aged and physically disabled.
- Linking environmental protection practices in disaster risk management programmes and projects is cost-effective.
- Technical, as well as, administrative, financial and managerial capacities are required for successful implementation of programmes and projects.
- Monitoring involves ongoing or periodic analyses of information and data to meet the performance of the project's implementation, and to assess whether it is progressing towards achieving the stated objectives.
- While mid-term evaluation is valuable to see if projects are heading towards the right direction and meeting defined results, it is usual to carry out an evaluation at the end of the project to assess the overall success of the project.
- Results must be documented, reviewed by stakeholders and disseminated widely.

# Key Words

## Activities
The action taken or work performed (training staff, preparing reports, etc.) through which inputs, such as funds, technical assistance and other type of resources are mobilised to produce specific outputs / results.

## Appraisal
An overall assessment of the relevance, feasibility and potential impacts and sustainability of a development intervention prior to a decision of funding.

## Assumption
An important external factor - i.e. event or action which must take place, or an important condition or decision which must exist, if a project is to succeed, but over which project management has little or no control.

## Baseline data*
Data that describe the situation at project start-up of the issues and development conditions that the project or programme will address. It serves as the starting point for measuring the performance of the project and is an important reference for evaluations (ADPC).

## Environmental Degradation*
Processes induced by human behavior and activities (sometimes combined with natural hazards) that damage the natural resource bases or adversely alter natural processes or ecosystems. Potential effects are varied and may contribute to an increase in vulnerability and the frequency and intensity of natural hazards. Examples include land degradation, deforestation, desertification, wildland fires, lost of biodiversity, land, water and air pollution, climate change, sea level rise and ozone depletion (UNISDR, 2004).

## Environmental Impact Assessment*
An assessment that examines the environmental consequences, both beneficial and adverse, of a proposed development project, and ensures that these consequences are taken into account in project design (OECD DAC, 1992).

## Evaluation
An assessment, as systematic and objective as possible, of a planned, on-going or completed development intervention or policy, its design, implementation and results. The purpose is to determine the relevance and fulfilment of objectives, development efficiency, effectiveness, impact and sustainability. An evaluation should provide information that is credible and useful, enabling the incorporation of lessons learned into decision-making process of both recipients and donors.

## Gender*

Refers to socially constructed differences between the sexes and to the social relationships between women and men. These differences between the sexes are shaped by the history of social relations and change over time and across cultures. Gender identity depends on the circumstances in which women and men live, and includes economic, cultural, historical, ideological, and religious factors. Gender relations also vary according to the economic and social conditions of the society and differ between social and ethnic groups (*http://www.unece.org/stats/gender/web/genstats/whatisgs/gender.htm*).

## Impact

Positive or negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended.

## Indicator

Quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor.

## Inputs

The financial, human, material and time resources used for the development intervention.

## Lessons Learned

Generalisations based on evaluation experiences with projects, programmes or policies that extrapolate from the specific circumstances to broader situations. Frequently, lessons highlight strengths or weaknesses in preparation, design and implementation that affect performance, outcome and impact.

## Logical Framework (Logframe)

Management tool used to improve the design of interventions. It involves identifying strategic elements (inputs, outputs, outcomes, impact) and their causal relationships, indicators, and the assumptions or risks that may influence success or failure. It thus facilitates planning, implementation, monitoring and evaluation of a development intervention.

## Mainstreaming*

Mainstreaming disaster risk management into development practice requires all institutions at all levels and from all sectors to clarify their roles and responsibilities. Mainstreaming should result in better anticipation of short- and long-term impacts and help people prepare for events that require trained personnel and safe, resilient 'lifeline infrastructure' for disaster victims. Mainstreaming promotes the preparation and application of information, assessments, guidelines and awareness of disaster risk. Government, financial, national and local implementing agencies must factor into their programs the

measures needed to reduce disaster risks. Are critical facilities located on land that is landslide prone? Resources to run these systems, especially investment capital, will need to come from domestic capital markets and national finance systems (ADPC, 2004).

## Monitoring

A continuing function that uses systematic collection of data on specific indicators to provide management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds. The purpose of monitoring is to provide a regular reporting mechanism to the outside bodies and to assist timely decision-making, ensure accountability and provide basis for evaluation and learning.

## Objective

A specific statement detailing the desired accomplishments or outcomes of a project at different levels (short to long-term). A good objective meets the criteria of being impact orientated, measurable, time limited, specific and practical. Objectives can be arranged in a hierarchy of two or more levels.

## Outcome

The likely or achieved short-term or medium-term effects of an intervention's outputs.

## Outputs

The products, capital goods and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.

## Programme

An ongoing development effort or plan, which may contain one or many projects.

## Project

An activity in which resources are expended in order to create assets from which benefits are derived. A project has specific objectives, a beginning, quantified resources and activities, and an end.

## Project Cycle Management

A methodology for designing, planning, implementation and evaluation of programmes and projects.

## Replication*

The *spread* of good practices and lessons learned from the programme and project in the design and implementation of other programmes and projects (i.e. applied in different geographic areas or scaled up) (ADPC).

## Scaling Up*

The process where a local initiative is taken up and institutionalised at the provincial, national, regional and even international levels by government departments or an organisation's headquarters. This means that disaster risk reduction issues are incorporated in the policies, strategies and systems of the institution. At the same time, personnel at the institution are adequately trained and committed to implement disaster risk reduction (ADPC).

## Stakeholders

Agencies, organisations, groups or individuals which have a direct or indirect interest in development intervention or its evaluation, or who affects or are affected positively or negatively by the implementation and outcome of it.

## Work Plan

A detailed document stating which activities and how the activities are going to be carried out and by whom in a given time period and how the activities relate to the common objectives and vision. The work plan is designed according to the logical framework.

(UNDP, undated, except those marked *)

# Introduction

Disaster risk management is no longer left to a few scientists and engineers who have sought to "control" disasters. Nor is it the sole responsibility of relief workers, fire fighters and the army when a disaster strikes. Throughout this volume you will see that disaster risk management encompasses a wider range of interests and abilities, and there is a growing need for more political and professional interaction through multiple and innovative forms of cooperation in the different phases (response, recovery, preparedness, mitigation) and components (policy development, risk assessment, awareness, education) of disaster risk management.

There is no shortage of possibilities for reducing disaster risks. Increasingly, a complementary combination of structural and non-structural risk reduction measures are used. Decision on the appropriate mix of risk reduction options will depend on the area's and organisation's policy framework and strategies, and an assessment of risks and the resources available.

Donor and international agencies have begun to contribute to the mainstreaming of disaster risk management by integrating it as part of development strategies and plans. Disaster risk reduction is a priority in the Plan of Implementation of the World Summit on Sustainable Development and the United Nations Millennium Development Goals. Donor agencies such as ADB, AusAID, DFID, DIPECHO, USAID and the World Bank address disaster risk reduction in their development agenda. ADPC in collaboration with GTZ and AusAID have recently initiated a project to support the mainstreaming of disaster risk reduction into the housing and infrastructure sectors in selected Asian countries.

At the national, local and community levels in many Asian countries, there have been numerous programmes and projects by government and non-government organisations (NGOs) towards reducing disaster risks. However, the impact of these projects and the extent to which they contribute to disaster risk reduction is often unknown. A research study managed by the British Red Cross found that only 12 of the 75 mitigation and preparedness projects implemented by UK-based NGOs assessed or evaluated project impact (Twigg, 2000).

In recent years, the increased severity of disasters and a range of public awareness endeavours have raised stakeholders' sensitivity to the need for appropriate interventions to reduce risks. This chapter introduces the project cycle management as a methodology for effective design, planning, implementation, monitoring and evaluation of programmes and projects.

Key considerations at each stage of the project cycle management will be discussed to ensure that programmes and projects protect development gains, contribute to sustainable development and do not increase risks. The purpose of this final chapter is three-fold. To:

1. emphasise the importance of mainstreaming disaster risk reduction in development programmes and projects;

2. highlight key issues to consider when managing disaster risk reduction programmes and projects; and

3. introduce key approaches and techniques for managing projects.

# Project Management Concepts

## Mainstreaming Disaster Risk Reduction

ADPC, in collaboration with GTZ and AusAID is working to develop guidelines to mainstream disaster risk reduction in sectors such as housing, infrastructure development and urban development.

To summarise, the achievements highlighted above are moving towards:

- A common global framework for disaster risk management.
- Indicators to measure progress.
- Functional mechanisms for cooperation.
- Integration of disaster risk reduction in sector policies, plans and programs.
- Establishing linkages and synergies between disaster risk reduction and other cross-sectoral issues including gender, environment, rural and urban development, and climate change.

The challenge is now putting these concepts, strategies and plans into **coordinated actions** across all levels and sectors that will contribute to reduced risk and sustainable development. ADPC is conceptualizing the idea of mainstreaming in alignment with other global initiatives such as:

- The Millennium Development Goals, of which 191 United Nations Member States have pledged to meet by 2015, resolve to "*intensify cooperation to reduce the number and effects of natural and man-made disasters.*"
- The Johannesburg Plan of Implementation of the World Summit on Sustainable Development held in 2002 has secured a place for disaster risk reduction on the development agenda (UNISDR, 2003b).
- The United Nations' International Strategy for Disaster Reduction (UNISDR) provides a global Framework for Action 2005-2015 which was recently reviewed and adopted at the World Conference on Disaster Reduction, 2005. One of the key strategic goals is the "*effective integration of disaster risk considerations into development policies, planning and programming at all levels*" *(UNISDR, 2005*).

UNDP's Bureau for Crisis Prevention and Recovery is contributing to global advocacy to reduce disaster risk in order to meet the Millennium Development Goals. UNDP has also begun development of a Disaster Risk Index (DRI) in order to improve understanding of the relationship between development and disaster risk. DRI compares countries according to their relative risk levels over time. Findings from developing the DRI are reported in the latest report, "Reducing Disaster Risk: A Challenge for Development" (see UNDP, 2004).

The concept of integrated flood risk management initiated by the Associated Programme on Flood Management (part of the WMO and GWP) is being considered as part of a broader flood management initiative.

Within Asia, the Mekong River Commission was established to promote sustainable development of the Mekong river basin's water resources for social and economic development, flood management and mitigation is one of the programmes in MRC.

## Cross-cutting Issues for Programme and Project Management

Project cycle management is a methodology that can help development organisations consider the issues of disaster risk reduction and sustainable development in programmes and projects.

There are different versions of the project cycle, but they all follow three basic fundamental stages:

- Project design and planning
- Implementation and monitoring
- Evaluation
- Replication

The section on "process" provides details of the three stages. Case studies of programmes and projects in Asia are presented to draw out the lessons learned and key considerations at each stage of the project cycle management.

Across all stages of the project cycle management, it is important to:

- Ensure stakeholder participation;
- Incorporate environmental and gender perspectives; and
- Promote sustainability, replication and up-scaling.

### Stakeholder participation

The methodology for ensuring stakeholder participation in all stages of the project cycle management is detailed in Chapter 7: Bringing Risk Management to the Local-level.

see Chapter 7

**Why stakeholder participation is important?**

- Enables people to explain their vulnerabilities and priorities, allowing problems to be defined correctly and responsive measures to be designed, implemented and reviewed;
- Can empower stakeholders if the participation process emphasises awareness raising and capacity building; and
- Promotes effective implementation and sustainability because stakeholders' involvement in decision-making can lead to the ownership of the project and its continuation after the project ends.

(Twigg, 2004: 114)

see Chapters 6 & 7

### Who should participate?

In addition to the participation of relevant government and non-government organisations, it is important to include vulnerable groups in the process. They include those who are poor, women, children, aged and physically disabled. There are a number of useful guides on the participation of vulnerable groups in disaster risk reduction.

Vulnerable groups are not victims of disasters. They are a resource to be availed of. Women and the elderly from many communities are often most effective at mobilising the community to plan and implement disaster risk reduction projects. Women also often lead savings and micro-finance schemes. Incomes earned by women are more likely to be invested in the family, especially for welfare of children.

## Cross-cutting issues

### Environment

The links between disasters and environmental degradation are well-documented. There is a general consensus that environmental degradation, caused by demographic pressures and misuse of natural resources, alters the resource base and increases vulnerability. Practices that protect the environment and promote sustainable use of natural resources can provide solutions to reduce vulnerability.

It is therefore important to include natural resources and environmental components in disaster management projects and vice versa.

*UNISDR (2004)* suggests ways of linking the environment and disaster reduction activities. It includes:

- Assessment of environmental problems linked to hazards based on reliable sources of existing information with the related evaluation of impacts and the need for additional data.
- Mapping of environmentally sensitive areas, description of characteristics of the environment and development trends in these areas.
- Examination of environmental benefits to be drawn from disaster reduction activities throughout various sectors.
- Monitoring to provide information for decision-making purposes (for example, suitability of land for development).
- Environmental tools for disaster reduction purposes: regulations, incentives, conservation programs, hazard control and mitigation, water / watershed and coastal zone management.

### Gender

Communities are comprised of different groups of people that can be distinguished by gender, age, socio-economic and political systems, language, religion and / or ethnicity. Relationships between and among these groups are often embedded in unequal power relations. Gender relations particularly represent a set of power relations. It is based on an understanding of women and men's roles, responsibilities and access to and control over resources.

Disasters affect women and girls, and men and boys differently. Women and girls, in general, are more vulnerable because they often have less access to resources, including social networks and influence, transportation, information, skills (including literacy), control over land and other economic resources, personal mobility, secure housing and employment, freedom from violence and control over decision-making.

One study on the 1991 cyclone in Bangladesh noted that many women perished with their children at home as they had to wait for their husbands to return and make an evacuation decision (WHO, 2002).

Women's vulnerability is exacerbated by their multiple roles and responsibilities which often go unrecognised. They have a 'productive' role (such as farming or employment). They have a 'reproductive' role (involving domestic work such as cooking, cleaning, fetching water, rearing children and caring for other family members). They also have a role in community tasks.

A sociological study on gender dimensions of floods in Northern Bangladesh showed that while women's lives were primarily restricted to homesteads, they were engaged in economic activities such as tending to gardens and livestock. During floods, many animals drowned and home gardens washed away. Women, unlike men could not seek work outside. They also had to meet their responsibilities for acquiring fuel wood and water, which became almost impossible for them. Cultural restrictions also prevented women from benefitting from the distribution of relief supplies or economic assistance (Kumar-Range, 2001).

However, as mentioned previously, women are not merely victims of disasters. Their multiple roles and responsibilities and their active role in community mobilisation and development also means that they can and have often played an active role in all phases of disaster risk reduction. The importance of involving women in the recovery process is illustrated by the work of Swayam Shikshan Prayog (SSP), India (see Box 8.1).

**see Box 8.1**

There is growing literature on gender and disasters. Most development organisations have gender policies, but few incorporate gender and disaster risk reduction. CIDA (2003) has produced specific guidelines on gender equality in humanitarian assistance. It highlights reasons for using a gender perspective in relief efforts, draws attention to current issues, sets out questions to ask in designing, monitoring and evaluating projects, and includes a list of tools.

**Box 8.1**

### Swayam Shikshan Prayog, India

Swayam Shikshan Prayog (SSP or Self-learning for empowerment) is an NGO in India aiming to transform crisis situation into an opportunity for mobilising communities, especially women. SSP has gained substantial experience in working with women after the 1993 Latur Earthquake.

After the 2001 Gujarat Earthquake, SSP facilitated the exchange of experience between women's groups in Latur and over 200 villages in Gujarat and built capacities of women in Gujarat for participating in the recovery process, forming savings and credit groups, improving access to basic services such as water supply, health and education, and creating a platform for women to establish dialogue with local government officials.

WHO (2002) proposes ways of incorporating gender in risk reduction activities:

- Pre-disaster activities such as hazard mapping and vulnerability analysis should integrate gender considerations.
- Community-based disaster risk reduction projects and disaster training and education programmes should include women as well as men, and address their respective needs and concerns. For example, training courses should be held at times of the day when women are free from domestic chores and other tasks. Child care facilities may be needed to encourage attendance.
- Information collected should be sex-disaggregated and include a gender analysis.
- Women and men should participate in the project design, planning, implementation, monitoring and evaluation processes.
- Gender training of disaster managers should become an integral part of staff training in all development organisations.

## Sustainability, replication and up-scaling

Almost all development organisations emphasise the importance of project **sustainability**.

The disaster risk reduction programme or project is more likely to be sustainable when it:

- Is relevant to stakeholders' needs.
- Complements other development goals.
- Involves stakeholders in the decision-making process at all stages of the project cycle management.
- Allows stakeholders to learn from the project cycle management process.
- Makes effective and efficient use of resources (including human, financial, information and material resources) that are available locally.

- Stimulates interdisciplinary and intersectoral partnerships. Partnerships can bring together the skills, expertise and experience of a broad range of groups to achieve a common vision for the community, province, state or country.

**Replication** involves the *spread* of good practices and lessons learned from the programme and project in the design and implementation of other programmes and projects (i.e. applied in different geographic areas).

**Scaling-up** refers to the process where a local initiative is taken up and *institutionalised* at the provincial, national, regional and even international levels by government departments or an organisation's headquarters. This means that disaster risk reduction issues are incorporated in the policies, strategies and systems of the institution. At the same time, personnel at the institution are adequately trained and committed to implement disaster risk reduction.

Stakeholder participation across different sectors, the inclusion of cross-cutting issues such as environment and gender, and project sustainability, replication and scaling-up, all contribute to the process of mainstreaming disaster risk reduction.

ADPC with support from USAID has piloted projects with country partners that contribute to disaster risk reduction mainstreaming in some development organisations and programmes.

CARE Bangladesh implemented pilot community-based projects to reduce risks. In the process a methodology for community-based risk assessment was developed. CARE Bangladesh now conducts a community-based risk assessment in the planning stage of all their community development projects.

Indonesia's Ministry of National Education has incorporated education on earthquake safety as part of primary school students' extra-curricular activity, with support for Bandung's Institute of Technology (ITB). This initiative grew from the Indonesian Urban Disaster Mitigation Project implemented by ITB.

The Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA) has been working with the agriculture, public health and water resources departments in making climate forecasts relevant to these sectors. This began as an Extreme Climate Events Project.

Sri Lanka's National Building Research Organisation developed a methodology for production of landslide hazard zonation maps using GIS to serve as tools for planning of settlement and infrastructure development in the hill country. This was initially a UNDP initiative and was further developed under the Sri Lanka Urban Multi-Hazard Disaster Mitigation Project with pilot studies in Colombo, Kandy, Nawalapitiya, Ratnapura and other cities along the Kelani River. It is now sustained through government funds.

# Project Management Process

The project cycle management (PCM) obliges programme and project managers to understand the problem and focus on the needs of the beneficiaries right from the beginning. The PCM provides a standardised sequence of actions that cover all relevant issues (such as sustainability and stakeholder participation). These issues are examined and revised where necessary and carried forward to the next stage.

The PCM also helps to manage stakeholders involved in the programme or project. This is done by guiding the project with a clear and concise plan made up of concrete goals, objectives and methods that convey to all involved the clear boundaries of the project. This process makes the project clear and visible and therefore, enables monitoring and evaluation.

## Project Design and Planning

**This stage could be divided into four sub-stages which, in reality takes place simultaneously:**

### i. Problem identification

It is important to understand a problem and its cause before attempting to design a project.

The first sub-stage in any project is an assessment of the problems and needs to be addressed. These are then matched with opportunities for work within the strategies of the region, country or locality; the implementing organisation(s); and the potential donors. Opportunities for partnerships and financial commitment should also be identified.

see Chapter 3

Problems have many effects and causes. There are many methodologies for assessing problems, needs and situations. A risk assessment to understand the hazards, vulnerability and capacity of the area should be conducted. Many assessment tools are used in risk assessment, including mapping, participatory methods, questionnaire surveys, wealth ranking and direct observations.

Gosling & Edwards (1995) provides a good general guide to an initial assessment. They state that assessment at this stage is needed to:

- Analyse the situation in which the implementing organisation(s) will be working.

- Help identify a suitable area or sector for the implementing organisation(s) to work in.
- Understand the complexities of a problem, its causes and how it is already being tackled.
- Understand how different problems affect the groups in which the implementing organisation(s) has a particular interest.
- Analyse the constraints and opportunities for development work.

Problems identified need to be matched with opportunities for "solving" them. Very often, the success of a programme or project depends on involving the right people at the right time. An analysis of the stakeholders is essential. Stakeholders range from: national and local government officials; NGOs involved in similar initiatives; academic, research and training institutions; community groups; vulnerable groups; donor agencies; the private sector; to staff of the implementing organisation. It is important to explore *perceptions of risk* by different groups.

Opportunities could come from: Member States' commitment to the UNISDR; Asian senior-level government's commitment to the priorities identified at Asian Disaster Preparedness Center's Regional Consultative Committee (RCC) on Disaster Management (ADPC, 2004b); donor agencies' risk reduction strategies (eg. DFID, 2005) and country strategies; countries' national plan for disaster risk reduction; the implementing organisation(s) comparative advantages in specific sectors or skills; and local capacities.

From the analyses of problems and opportunities, ideas for projects could be identified and prioritised.

Questions to Ask:

A. What are we trying to achieve?
B. What is our starting position?
C. How are we going to get from A to B?

## ii. Design

Once a specific area or set of areas are identified, objectives should be set to help guide the work. At this sub-stage, appropriate indicators and targets need to be selected for measuring progress, and a plan of action drawn up, including decisions on how best to monitor and evaluate the activities.

In practice, the process of developing objectives can be difficult because there are different levels of objectives, from the specific to the more general. One way to sort out the different objectives and their relationship to the aims and activities of a project is to construct an 'objective tree'. An example of an objective tree is illustrated in Case Study 1 on the Asian Urban Disaster Mitigation Programme.

**see AUDMP Case Study**

Each objective requires a clear work plan of action designed to meet it.

Things to illustrate in a work plan:

- What activities will be undertaken?
- How they will be carried out?
- Who will be responsible for what and when?
- What resources or inputs (human, financial, information and material) are required?
- The intended result, or output of each activity?
- How the output will help achieve the objective?
- How, by whom and when will monitoring and evaluation of project be undertaken?

(Adapted from Gosling & Edwards, 1995)

The extent to which project outputs are achieving the objective can be measured by developing indicators. The development and use of indicators is central to monitoring the implementation progress and evaluating the outcomes and impacts of programmes and projects. Indicators provide a means of measuring, qualitatively and quantitatively, actual accomplishments against what has been planned in terms of deliverables, resources, milestones, costs and time. In their practical application, indicators are:

- Quantitative and qualitative variables that provide a simple and reliable basis for assessing performance, achievement or change.
- Performance standards or benchmarks to be reached and maintained in order to achieve the objectives; and to gauge the extent of progress (or lack thereof) towards these objectives.
- The basis for before-and-after analyses and describe the effects (positive and negative) of programme and project interventions - anticipated and unanticipated, intended and unintended.

Indicators may be changed over time if they are found to be too difficult. Depending on the programme and project's objectives, impact indicators are used to measure the development and strengthening of:

- Individual and institutional capacity / services / processes - enhancement of the disaster management capacity and capability of relevant governmental, public and private agencies and organisations.
- Policies - implementation of effective plans, policies, legislations, statutes and communiqués that enforce sound disaster management regulations, practices and processes.
- Awareness and knowledge - general public awareness, knowledge and understanding of disaster management technologies / practices / processes that empower them.
- Financing mechanisms - availability of funding / financing to sustain disaster management initiatives / activities through annual government budgetary provisions, recurring donor contributions, private sector participation, etc.

**Box 8.2**

## Project proposal format

Information gathered in the project design and planning phase often needs to be put together in a proposal for approval by the national government, donor agencies or headquarters of an organisation.

A project proposal is normally comprised of the following sections:

- Introduction to the problem.
- Justification for developing this programme or project (including results of the risk assessment).
- Details of the objectives, activities and expected results, target stakeholders, indicators and means of verification, resources required, assumptions and risks (often including the Logical Framework Matrix).
- Profile of the implementing organisation(s) and capacity / arrangements, existing and planned, for implementing the programme or project.
- Work plan / time line.
- Budget (including requested amount and counterpart contributions by the implementing organisations).

Note: It may also be required to have plans with budget for personnel, material and equipment, procurement, staff training, and monitoring and evaluation.

see Tools & Techniques

## iii. Appraisal

At this third sub-stage, the project proposal is studied by a third party (for example, national government, donor agency or headquarters) to assess the proposed activities - including its ability to solve the problem; appropriateness in relation to organisation's priorities; and costs in relation to the expected outcomes - and decide whether to implement the project.

One of the challenges here is to convince development agencies of the threat that disasters pose to achieving overarching goals such as sustainable development and poverty reduction, and to convince finance authorities, national planning agencies and the donor community of the need to make resources available for disaster risk reduction.

In response to this challenge, UNDP in collaboration with UNESCAP will be introducing a methodology to Asian countries to identify and quantify disaster impact in socio-economic terms, to implement some socio-economic studies of disaster impact, and to present the findings and implications of these studies to national planning and development agencies. UNDP and UNESCAP will also seek to modify on-going household surveys to identify more accurately the linkages between disaster vulnerability and poverty in selected Asian

countries and to monitor whether disaster risk reduction significantly reduces poverty among rural households (Brennan, 2003).

On the other hand, in response to the lack of evidence to prove the net benefit of risk reduction, the Provention Consortium has developed guidelines on how project appraisal methodologies, including economic cost-benefit analysis, environmental and social appraisals can be adapted to consider risks from natural hazards, and on appropriate ways of monitoring the impact of risk reduction (Benson & Twigg, 2004).

For example, economic cost-benefit analysis (CBA) examines a project proposal in terms of its projected costs compared with its projected financial benefits, or other benefits converted to financial terms. It is used to assess large-scale structural mitigation projects. But it can also be used to assess policy initiatives such as the implementation of mitigation policies for the control of specific types of pollution, the recycling of waste or the retrofitting of buildings. It can make a convincing case for risk reduction, but is very difficult to conduct - particularly in pricing environmental, social, political and psychological costs and benefits (see Twigg, 2004 for the advantages and disadvantages of CBA).

Environmental impact assessments (EIAs) are required by most donor agencies and many national governments in the appraisal stage. A study commissioned by the Provention Consortium found that donor agencies are beginning to realise the importance of disaster risk assessment. For example, the Caribbean Development Bank is currently developing guidelines for natural hazard impact assessment and their integration into its EIA procedures. Other agencies working along similar lines include DFID and the World Bank (Benson & Twigg, 2004).

## iv. Approval and baseline study

Once official approval and funding is obtained, it is useful to carry out a baseline study so that the data collected could be compared later. Baseline data can be collected by quantitative and / or qualitative methods depending on the nature of the indicators.

For disaster risk reduction programmes and projects, Twigg (2004) suggests using vulnerability / capacity analysis methods and tools for the baseline study, and application of the same method and tools for project monitoring and evaluation.

Baseline data is collected prior to the start of the project, but it can also be collected during project implementation and monitoring missions. Often, project objectives and indicators will change and baseline data may not be relevant. This needs to be recognised and adjusted accordingly.

For more information on data collection for the baseline study and other assessments in the design, monitoring and evaluation phases, refer to Chapter 3.

see Chapter 3

# Implementation and Monitoring

## Implementation

Implementation is the major stage of the project cycle, when plans are executed. The work plan will help to manage the implementation and monitoring processes.

Inputs to the project, which are often items mentioned in the project budget, will need to be managed.

Cost components of a project budget include:
- Personnel (management, technical, administrative, financial staff and volunteers / interns).
- Contracts (for consultants, partners).
- Training (for staff, partners).
- Equipment (computers, furniture, vehicles, etc.).
- Communications (internet, phone, fax, mail).

Regarding personnel, there are four main capacities required for implementation:
- **Technical capacity.** With skills and experiences in the relevant aspects of disaster risk reduction and other project components (eg. community development, health, awareness raising, training, information management and engineering).
- **Managerial capacity.** With skills in project management and the ability to plan, monitor, evaluate and coordinate people, resources and activities.
- **Administrative capacity.** With the ability to provide logistical support to project staff and other stakeholders including staff recruitment, contract development, procurement of goods, maintenance of inventories, arrangements for travel and filing.
- **Financial Capacity.** With the ability to manage project budget and develop a transparent financial reporting system.

When employing staff for projects and seeking appropriate partners, it is important to consider project sustainability. Existing local resources and capacities should be used and strengthened, thus, building a cadre of personnel with knowledge in disaster risk reduction in-country.

Personnel will need clear job descriptions with details of their roles and responsibilities, and capacity building opportunities. Contracts are often drawn out for partners. Where consultants are required, it is necessary to develop clear terms of references. Depending on donor agencies' policies and regulations, competitive bidding practices may be required in procuring services and goods, with clear selection criteria and several persons participating in the decision-making process.

Good filing system of all correspondence, documents, reports, financial records, stakeholders' contact information and project outputs, and documentation of

processes in the form of weekly and monthly reports on activities, constraints, opportunities and lessons learned, are recommended. They would be useful not only for monitoring, financial audits and evaluations, but also for organisational learning, ease in continuing the work initiated by the project when there is a change of personnel, or when the implementing organisation (or other organisations) plan to replicate a similar project in other areas.

**Project completion report**

A comprehensive project completion report generally has to be prepared at the end of the project providing information on:

- Process
- Difficulties, constraints
- Lessons learned
- Opportunities
- Results achieved
- Recommendations for future interventions

However, ways to maximise the impact and sustainability of the outputs or outcomes should be considered. The experiences gained in planning and implementing the project, including strategies, processes and approaches used and the lessons learned should be documented and products packaged in user-friendly and accessible forms for wide dissemination. This is important in advocating for disaster risk reduction and promoting replication of similar projects in other areas. It is also useful for promoting the work of the implementing organisation(s).

Outputs and outcomes can be disseminated using a range of different media: publications; audio-visual means; electronically through websites, emails and distance learning platforms; face-to-face in meetings and training courses; and folk media in drama, dance and song. Advancements in information and communication technology can help to manage information and make them readily accessible to stakeholders and the wider community.

Monitoring involves an ongoing or periodic analysis of information / data to measure the performance of a project's implementation status (eg. deliverables, milestones, cost, schedule) in order to assess its progress towards achieving the stated objectives. A well-established and ongoing project monitoring system is essential for improved project planning, implementation and project management.

## Why Monitor?

In summary, monitoring can:

- Ensure project is on target and improve programme and financial planning and management decision-making.
- Demonstrate accountability to those they seek to help, as well as those who support them.
- Improve understanding of how disaster risk reduction works in practice.
- Be the time to reflect, analyse, learn and fine tune projects to improve performance as appropriate.
- Provide opportunity to foster good rapport with partners and other stakeholders.
- Be used to collect data that can be used for reporting and development of new projects.

Monitoring (and evaluation) needs to be carefully planned in order for it to be useful. Their purpose and methods need to be clear and agreed by the stakeholders. Key issues to consider include:

- Resources (human, financial, information and material) available for monitoring.
- Choice of coverage: Depending on the size of the project, it may not be possible to cover all project locations or interventions.
- Choice of data collection methodology, eg. questionnaire survey, focus group discussions, observations, participatory methods, secondary data collection, development of case studies, etc.
- Scheduling - who, when, will do what? It is useful to plan well ahead and have a multi-disciplinary team, especially when the project involves multiple project locations and interventions.
- How the analysis of the findings be reported back to all stakeholders and how will they be acted upon.

To the extent possible, participatory monitoring and evaluation mechanisms should be used to enable stakeholders to provide feedback. This is one way of promoting learning among those involved in the programme or project.

Who monitors?

Project Managers
Project Staff
Project Partners
Community Groups
Donors
Consultants

Monitoring results are often presented in the form of reports to donors on a monthly and quarterly basis. However, to generate a learning environment, reporting to donors alone is not sufficient. Monitoring results can be documented in the form of newsletters, electronic newsletters sent by email, series of case studies, and on videos. They can be presented in meetings and workshops or on the Internet where feedback on the results could be received.

### Evaluation

Monitoring usually addresses inputs, activities and outputs. Most monitoring systems are designed to meet the ongoing information needs of project managers and provide information for donor reports. Evaluations focus on outputs and especially impact, and are intended for a wider audience within and outside the organisation.

Monitoring should be frequent, ideally throughout the project. Evaluation is infrequent. It can take place at any point in the project cycle. It is usual to carry out evaluations towards the end of the project, or the end of a phase in the project. Mid-term evaluations are valuable in identifying if projects are heading in the right direction and meeting the desired results.

In summary, evaluation can:

- Determine the full extent of positive and negative outcomes and impacts, usually at the end of a project or programme.
- Identify lessons that can be applied to future programme strategies and improve effectiveness of interventions.
- Be used to advocate for policy change and institutionalisation of disaster risk reduction by demonstrating to donors, policy makers and practitioners that it works.
- Reveal programme or project quality and effectiveness that can be used for institutional marketing.
- Demonstrate accountability.

Many factors combine to make people vulnerable and create situations of risk. No programme or project can address all these factors, but they are influenced by them. This influence must be understood in order to assess a project's achievements and impact. *Twigg (2004)* has a useful section on Monitoring and Evaluation of disaster risk reduction projects where some challenging questions for evaluators were raised:

- To what extent are particular changes due to the project itself or its environment?
- How can one assess the results arising from one particular type of intervention against another when good risk reduction work should comprise a diverse range of activities - organisational, educational, structural and economic.
- Especially where hazards are infrequent (e.g. earthquakes, volcanic eruptions), what indicators can be used to measure impact?
- Within a community, there is differential vulnerability due to gender, ethnicity, age and disability differences. How will the impact on different groups of people be measured?

Using different stakeholders or evaluators to assess the same issue, and the cross-checking (or triangulation) of different data sources and sets can help to identify factors affecting success or failure.

Depending on the purpose of the evaluation and resources available, evaluation can be conducted in several ways:

- Internal or self evaluations by implementing agency
- External evaluations by independent agencies or experts not directly associated with the programme
- Collaborative team evaluations that include internal and external parties
- Participatory evaluations that are conducted with multiple stakeholders

Key stakeholders can be involved in the evaluation process in two ways. First, by ensuring that senior representatives from partner organisations take part in the mission, either as full members or as resource persons. This is important when strategic decisions will be made. Second, by holding workshops, meetings and interviews with all stakeholder groups.

It is essential that staff and partners in a programme or project and other key stakeholders have a sense of ownership of the evaluation process from the start. Terms of Reference for evaluations should be formulated jointly with them and they should be involved in identifying key strategic issues such as the scope of the evaluation, who will be involved in what way, and what indicators will be used to measure change.

All evaluation teams should include:

- Professional expertise relating to disaster risk reduction and other issues being evaluated.
- Knowledge of the country / region.
- Multi-disciplinary skills eg. social, economic and institutional.

At the start of the evaluation, project reports should be distributed in advance and a brief presentation of the project logical framework and key issues made. Projects with clear objectives, targets and a hierarchy of indicators that link process to impact make monitoring and evaluation more coherent. Having baseline data for comparison is also important. Field visits and workshops are important for the evaluation team to meet with key stakeholders, show project outputs and discuss different issues.

**see AUDMP Case Study**

Twigg (2004) found that most disaster risk reduction projects report on outputs rather than impact. For example, projects tend to measure the number of training courses conducted or the number of awareness posters distributed, rather than the number of trained staff using the skills learned in their work or signs of changed attitudes in community groups protecting themselves from future disaster risks. This is largely because projects are for short periods, making it too soon to measure impact. Post-project impact assessments after one or two years are rare.

Monitoring and evaluation are not very useful unless this lead to improvements in organisations' work to reduce disaster risks. Once the findings of the evaluation

have been documented, it is important to provide a forum to reflect, review and comment on the findings. Evaluation reports are useful knowledge resources which should be disseminated to the wider disaster risk reduction community.

**Evaluation report format:**

- Executive Summary.
- Project Background (development context, project overview, achievements, performance measurement information, inputs).
- Evaluation Background (methodology used and evaluation team).
- Evaluation Findings.
- Conclusion and Recommendations.
- Lessons Learned.
- Appendices (list of acronyms, terms of references, logical framework, references, list of consultations, minutes of key meetings, photographs, maps, data, analytical results, etc.).

# Tools and Techniques

All the information collected and analysed up to this point can be organized into a **Logical Framework**. A Logical Framework is a **project design and management tool** for systematically establishing and monitoring the logical relationship between the inputs, outputs and objectives / goals of a project, in relation to the risks, assumptions (or factors necessary for project success), resources and costs. These relations are summarized in a Logical Framework Matrix. Typically, all projects should have a Logical Framework Matrix prepared at this stage to guide and support project implementation and evaluation.

Although risks that may impede project implementation are considered in the Logical Framework, very rarely is it used to examine and address disaster risks (Benson & Twigg, 2004). When disaster risks were mentioned, there were no explicit efforts indicated to reduce those risks. Benson and Twigg (2004) calls for revision of Logical Framework guidelines to include more explicit guidelines on when and how to take into account disaster risk-related issues.

A Logical Framework Matrix is a useful tool. It provides a summarised description of the project, including:

- Why a project is carried out?
- What the project is expected to achieve?
- How the project is going to achieve its results?
- Which external factors are crucial for the success of the project?
- How can project progress be assessed?
- What data is used to assess progress?

Details of developing a Logical Framework can be found in AusAID (2000), DFID (2003), EC (2003), Gosling & Edwards (1995), Jackson (undated), UNDP (2003) and UNDP (undated).

The main strengths of the Logical Framework are the structure it provides to test and clarify means, ends and assumptions, and its potential as a collaborative consensus building exercise. In addition, the Logical Framework describes a proposed operation and provides a framework for determining how performance should be measured (through the development of indicators), providing the foundation for monitoring, reporting and evaluation.

The main limitations are that the Logical Framework is time-consuming to develop and requires a good understanding of the principles involved, and once completed tends to become rigid and frozen in time.

# Case Studies

## ADPC's Asian Urban Disaster Mitigation Programme (AUDMP)

AUDMP

The Asian Urban Disaster Mitigation Programme (AUDMP) is a ten-year programme (1995-2005) with projects in eight countries. With support from OFDA USAID, it is designed to respond to the need for safer cities.

**Programme and project design**

The design and initial implementation phases were set at the start of the United Nations IDNDR in the late 1980s or early 1990s when a relatively small group of academics, development professionals and practitioners were aware of the large sums of money spent on disaster relief and response and the need for a shift in approach to focus on mitigating the potential effects of disasters.

In Asia, the focus was chiefly on response and recovery after disasters. The tools, methodology and process to mitigate disaster risk were neither widely known nor practiced, and what little mitigation work was being practiced focused primarily on structural and technical solutions rather than on making those solutions an integrated part of the development process.

The economy in Asia was booming, urban population growth and rural to urban migration was increasing. Industrialisation and infrastructure investment was at an all time high. At that time, ADPC was the only regional center providing disaster management training and technical assistance. ADPC was pointing out repeatedly in its training courses, the exponential increase in Asia's vulnerability to disaster risks.

At the same time, the evaluation of OFDA USAID's programmes recommended that a Prevention, Mitigation and Preparedness Office (PMP) be set up. Through this office, OFDA signed an MOU with USAID's Office of Housing and Urban Development (RHUDO) through which they had agreed to jointly fund urban mitigation initiatives.

Between October 1994 and October 1995, a programme design team was assembled consisting of staff from ADPC, OFDA / PMP, RHUDO / Asia and three international disaster risk reduction experts. The team designed a regional programme through country visits to India, Indonesia, Sri Lanka, the Philippines and Nepal, identified (by OFDA / PMP and RHUDO / Asia) as the five initial target countries.

The ultimate **goal** of the program was to reduce the disaster vulnerability of urban populations, infrastructure, critical facilities, and housing in targeted cities throughout Asia. Working in conjunction with collaborating institutions in each target country, it was decided that the program **strategy** would take a three-tiered approach:

1. **National Demonstration Projects** in each of the target countries would serve to provide a working example of urban hazard mitigation. In a selected urban area in each country, a hazard or set of hazards would be assessed, followed by the design and implementation of appropriate disaster mitigation measures.
2. The **Information and Networking** component aimed to help build public and private networks as a forum for exchanging information and experience on urban disaster mitigation, with the goal of replicating successful hazard mitigation practices from the demonstration projects throughout the region.
3. The **Training, Resource Materials, and Continuing Education** component provided an opportunity to further institutionalise hazard mitigation practices through seminars for national level decision makers, as well as by using an in-country and regional "training of trainers" approach for passing on technical skills via a core curriculum in risk assessment and mitigation. Courses would be offered by in-country partner institutions and on a distance learning basis.

At the national level, each project design began with joint visits to USAID Missions by representatives from ADPC, OFDA and RHUDO. From this visit, potential collaborating organisations from government, NGOs and the private sector were preliminarily identified and project partner(s) selected to design and implement the national demonstration project.

One of the key challenges in this process was balancing the in-country needs, and the goals and objectives of the project, USAID Mission, OFDA, RHUDO, ADPC and the selected project implementation partner. This did not always lead to the best selection of partners.

Regarding selection of the partner institution itself, the biggest challenge was finding an institution with the correct mix of community, local government, national government and NGO contacts along with enough combined urban development and disaster risk reduction knowledge and expertise to be able to quickly learn how to successfully implement the demonstration project. Finding such an organisation was almost impossible because most organisations had either a relief and response orientation, or a development focus with knowledge of a very limited technical part of disaster mitigation.

Once local partner(s) were identified, target cities were identified and hazard mapping and vulnerability / capacity assessments conducted in order to

formulate specific mitigation measures. The programme examined high-risk areas more closely to determine several mitigation options and selected the most cost-effective of the options.

**Programme and project implementation and monitoring**

The country projects mirrored the regional strategy and followed a three-tiered approach - (1) demonstration projects; (2) information dissemination and networking; and (3) training. The three components reinforced one another. The communities required training to implement the demonstration projects, and the demonstration projects provided lessons learned and case studies that were incorporated in training courses and widely disseminated to advocate for disaster risk reduction. The information campaign helped raise awareness of the public and mobilised support for the demonstration activities.

Programme partners were requested to send progress reports on a monthly and quarterly basis. They were also encouraged to document the project implementation process. From these reports, AUDMP published monthly highlights and disseminated information on the project through newsletters distributed to a wider audience. While the early newsletters were published in hard copy for USAID, an electronic version was launched in 2003 that was meant for a wider audience. All monitoring and evaluation documents were made available on the ADPC website for transparency, information sharing and knowledge building.

On a quarterly basis, AUDMP prepared detailed reports to USAID, on regional and national progress, achievements, problems and lessons learned against the objectives and indicators set. Simultaneously, programme staff and USAID / OFDA representatives conducted regular monitoring visits to partner countries.

The programme organised annual working group meetings to discuss issues related to programme implementation. The working group meetings brought together representatives from project partner institutions and subject experts in disaster management and urban development in the region to review progress of the programme, share knowledge and experience and discuss future directions.

The period 1998-2001 focused on documenting experiences of ongoing projects and learning lessons so that experiences could be used in advocating for disaster risk reduction, identifying needs and designing future projects. In 2002, AUDMP developed case studies documenting the strategies, processes, achievements, problems and lessons learned in each country project. The case studies, unlike reports to donors, were developed in an easily digestible, user-friendly form for the wider community. These case studies were made available in print form and electronically on the ADPC website and CD-ROM.

Project experiences and lessons learned were also documented in other forms: in project reports; working papers; workshop proceedings; and on video; most of which are available on the ADPC website *http://www.adpc.net/AUDMP/library.html*

### Programme and project evaluation

The objectives of AUDMP in the original 1995 proposal were to:

- Reduce the natural disaster vulnerability of urban populations, infrastructure, lifeline facilities and shelter in targeted cities in Asia.
- Promote replication and adaptation of successful mitigation measures within the countries where demonstration projects are carried out and in the region.

The mid-term evaluation in 1998 shifted the emphasis towards building public and private capacity to plan and implement mitigation measures. The objectives were revised to:

- Establish sustainable public and private sector mechanisms for disaster mitigation that will measurably lessen loss of life, reduce the amount of physical and economic damage, and shorten the post-disaster recovery time.
- Promote replication and adaptation of successful mitigation measures within target countries and throughout the region.

Very early in the programme, the Monitoring and Evaluation system was developed based on the required "Managing for Results" process used at the time throughout USAID. This system documented measurable results based on the stated programme goals and objectives. Although it did not perfectly capture all the nuances of the project's success, unintended successes or the intangible results that had to do with institutional development in the countries, it did document regularly achieved results of targets set initially and then revised after the mid-term project evaluation.

The achievements were measured by the agreed upon performance indicators. Unlike many programme indicators that only measured outputs (eg. number of plans developed or number of training courses conducted), AUDMP attempted to measure whether or not these outputs led to changes. Below are examples of selected AUDMP indicators:

- The number of operational plans developed with resources from national collaborating institutions to carry out mitigation measures and demonstration activities after the programme ends.
- The number of replications or adaptations of mitigation skills and procedures promoted in AUDMP demonstration activities by other organisations, communities or countries in Asia.
- The number of new or improved assessment methods and guidelines / standards used for public and private sector development.
- The number of public and private sector professionals with AUDMP initiated disaster mitigation training who are employed and using the knowledge gained in fields impacting disaster management or urban development.
- The number of AUDMP initiated training and professional development courses institutionalised in training centers and universities.

The gathering of data to measure results set by these indicators was not easy and required significant commitment and resources from AUDMP in providing training and regular support. About 10 per cent of the programme budget was set aside for monitoring and evaluation.

These quantitative results are supplemented with qualitative information on intended and unintended outcomes and impacts. For example, the AUDMP had at least influenced or sometimes played a significant causal role in the development and implementation of disaster mitigation policy.

**Institutional learning**
What became obvious to ADPC from the AUDMP experiences is that institutionally ADPC support for disaster mitigation needs to continue. In anticipation of this, ADPC developed a Strategy Asia 2020 to continue providing support in the ways that worked the most effectively and based on what it learned from its partners throughout Asia.

New projects in line with Strategy Asia 2020 emerged from the AUDMP. They include an EU-supported project where ADPC partnered with 15 universities and training institutes in Asia to incorporate disaster risk management in their urban planning courses through an Internet-based platform for e-learning. ADPC implemented this project in collaboration with the *International Institute for Geo-Information Science and Earth Observation* (ITC) in the Netherlands and the *Ecole Nationale des Sciences Géographiques* in France. ADPC also collaborated with universities worldwide to conduct action research on disaster risk reduction.

In another project supported by UNDP, ADPC has developed a Primer on slow onset flood risk management. The primer will serve as a comprehensive and practical "How-To" guide designed to serve as a daily reference tool for development practitioners working in flood-prone areas. This is one volume in a series. This general volume on disaster risk management was developed under the AUDMP and ADPC continues to seek support for volumes on rapid onset flood, earthquake, landslide, drought and hydro-meteorological disaster risk management.

(Source: ADPC, 2004b)

**ADPC**

## Development of Proposal

This case study shows a simple example of a logical framework matrix developed by ADPC to seek funding support for two Primers - on "Disaster Mitigation in Asia" and "Community-Based Disaster Risk Management (CBDRM) Practices".

The need for these two Primers emerged because Asia, in particular, lack well-resourced comprehensive reference documents which could be used by professionals and practitioners for understanding disasters in their own geographical, social, economic and cultural contexts.

To fill the gap, ADPC proposed to prepare the Primers to foster better understanding and knowledge of disaster risk management practices and methodologies by making accessible experiences and lessons learned on disaster

risk reduction. These Primers are expected to contribute to the integration of disaster risk reduction into development planning and practice.

| Objectives | Measurable Indicators | Means of Verification | Assumptions |
|---|---|---|---|
| **GOAL**<br>To mainstream disaster risk management into development practices to achieve sustainable development at all levels. | • Enactment / revision of policies and national / provincial / local levels internalising the concepts of disaster risk reduction, mitigation and CBDRM in overall development planning.<br><br>• Risk focused development plans of governments, NGOs, UN and donors.<br><br>• Presence of institutional structures at various levels to address the need for disaster risk reduction. | Publications, newsletters of various national, regional and international agencies, government ministries / departments, UN, NGOs & other agencies. | The officials from government departments, NGOs, INGOs, UN and donor organisations are interested in the need for integration of disaster risk management in development planning. |
| **PURPOSE**<br>Enhance understanding of tools, methodologies, successful practices for disaster risk reduction and of CBDRM amongst stakeholders at various levels. | Documentation and dissemination of tools, methodologies, successful practices is being made available to stakeholders and opportunities for face-to-face interaction are provided. | Overall increase in integration of disaster risk management in development planning, which will be reflected in the review of ongoing projects at various levels and also increase in the number of institutions / agencies having incorporated the concepts of disaster risk management in their development projects. | Inadequate knowledge about disaster risk management and community-based approaches (activities and processes) to disaster risk management hinders the officials of NGOs / INGOs, UN, donors and governments from incorporating risk reduction measures into their programmes. |

| Objectives | Measurable Indicators | Means of Verification | Assumptions |
|---|---|---|---|
| **OUTPUTS**<br>Primer on Disaster Risk Mitigation in Asia.<br><br>Primer on CBDRM Practices. | One Primer on Disaster Risk Mitigation in Asia published.<br><br>One Primer on CBDRM practices published. | One Primer on Disaster Risk Mitigation in Asia published.<br><br>One Primer on CBDRM practices published.<br><br>Financial records for conducting research, writing, editing and printing of publication. | Donor agencies are interested to support the process towards sustainable development through integration of disaster risk reduction. |
| **ACTIVITIES**<br>Research, documentation and interactive consultations with subject experts from throughout the region on one hand and consultations with stakeholders on the other hand. | • Collection, collation and analysis of published, unpublished & web based literature on the subject areas of the two resource books.<br><br>• Consultations with selected subject experts.<br><br>• Field visits to selected organisations, communities and countries.<br><br>• Staff hired for the activities undertaken as per the given budget. | • Reports on review of literature.<br><br>• Mission reports on field visits and research.<br><br>• Reports on interview & survey.<br><br>• Staff job descriptions.<br><br>• Work plans.<br><br>• Financial reports. | Respective organisations and individuals are willing to cooperate in research and compilation of their work. |

# Vietnam
## Strengthening homes, improving livelihood

This case study shows an innovative way of documenting, monitoring and evaluation results in the form of a story giving a personal account of one of the project's beneficiaries. This story is extracted from Development Workshop (France) website. It is a story that is easy to read and relate to. However, it is not comprehensive enough for readers to fully understand and learn from the experiences and lessons learned of the project. It also only shows readers the project success, but does not provide information on the problems encountered and the project's weaknesses.

"Married at the age of 17, Madame Yêm assures us that this was not considered young at the time, but life was really hard" - difficult to express how hard. To begin with, the young couple were farmers, and were able to feed and bring up their children. Then her husband went off in 1963 to fight in the Resistance. He was killed then in a ghastly massacre. This was a terrible blow, leaving her with 5 young children, the eldest 13 and the youngest only 3 years old. With meagre savings from making straw hats, like others in the village, she was able to pay for her children to attend school. But once basic needs were met, she could only afford to live in a poorly maintained bamboo shelter. Using savings scraped together and with manual help from cousins and neighbours, in 1974 she managed to build a cement block house with a tin roof, but no reinforcement. Only to find herself homeless in 1985, when the typhoon ripped off all the roofing and she was forced to purchase fibre-cement sheets to replace it. "That's why when I hear a typhoon warning, I'm absolutely terrified," she adds.

Asked about strengthening houses against storm damage, she says she had heard about this and was most interested. Which is why when the village meeting to decide which families should benefit from the damage prevention project was held, Madame Yêm took an active part. In the event she met all the conditions for becoming a beneficiary. She assures us that if the project could provide her a loan, she would do everything she can to help improve her house as required by the project. Before strengthening, her house was built of cement blocks, with a tin roof and very rudimentary tin panel doors.

All her children are married and have work, but at some distance, except for her youngest daughter who still lives with her. So she hopes her house can be finished before the Têt (Vietnamese New Year) holiday so that she can celebrate with her neighbours. The total budget for the work is 4.2 million dôngs, of which Madame Yêm is contributing 200,000 dôngs, and the Project has agreed to lend her a further 1.5 million dôngs at an interest rate of 0.3% per month. She receives a State pension of 120,000 dôngs (as a Revolution widow) and this together with her income from raising animals will enable her to make the monthly repayments of 57,000 dôngs. Before, she used to borrow from the Women's Union for her farming activities, but until now no organisation used to provide loans for

strengthening homes against storms. She is delighted with the new loan scheme and is determined to save and repay on time so that others can also benefit. At the time of writing, the walls of her house have been carefully rendered and eight iron reinforcements have been added to the roof, making it both attractive and strong.

Greatly moved, Madame Yêm tells us that although her children have grown up now, none of them are in a position to help her. Thanks to the help she has received from the project as well as from her cousins and neighbours, her house is now comfortable and strong. She is grateful to the project and hopes that others like her will be able to benefit."

(Source: Development Workshop (France) website *http://www.dwf.org/Vietnam/preventdamage/v_case.htm*)

# Checklist

1. It is commonly advised that **objectives** and **indicators** be SMART:
   - S - Specific
   - M - Measurable
   - A - Achievable
   - R - Relevant
   - T - Time based

   In addition, objectives and indicators should be:

   **Defined by stakeholders.** Different stakeholders may have different objectives and they should be recognised throughout the PCM stages.

   **Empowering.** The objectives and indicators should allow stakeholders to reflect critically on their changing situations.

   **Flexible.** Vulnerability is not static. Therefore, objectives need to be reviewed and changed if it is no longer relevant. Data to show achievements made in each objective or indicator should be feasible to collect and use.

2. Programme management should consider:
   - What and who is available in terms of staff, resources, skills, management capacity – locally and from elsewhere.
   - Priorities of people involved, including government officials, donors, communities, groups within communities including children, women, people with disabilities and different ethnic groups, and their participation in the decision-making process.
   - Assumptions being made in suggesting that the activities will achieve the objectives.
   - Risks (including disaster risks) that could affect the success of the activities.
   - Negative impact of project activities, e.g. on the environment.
   - Likely cost and cost-effectiveness of the activities.
   - Building local commitment and capacities.
   - Promoting project sustainability, replicability and up-scaling.
   - Ensuring accountability to beneficiaries as well as partners and donors.

(Adapted from Gosling & Edwards, 1995)

# Lessons Learned

- There are a wide range of mitigation measures to choose from. Selecting the appropriate mix of options will depend on a number of factors, including your organisation's goals and objectives, an assessment of risk and needs in the area or sector you are planning for and the resources available.

- Partner selection is among the most significant step in the project design process that will determine the success or failure of the project.

- Programme and project sustainability, replicability and upscaling right from the start in the design phase should be considered.

- A programme or project success is based on developing sustainable strategies eg. establishing mechanisms and implementing activities that could be continued in the future by the communities themselves. The strategies should also be focused on people's livelihood, and relevant to their needs.

- A programme or project should aim to use local resources. For example, a project should not only focus on building a safer home for beneficiaries, but also, employ locally available materials and construction methods, produce designs based on forms understood by people in the area, allow for future improvements based on people's needs and resources, provide technical training and resources, conduct regular demonstrations and awareness-raising events, create employment and generate income.

- Some people are more vulnerable than others. They include those who are very poor, women, children, aged and physically disabled. Plans should include the needs of these vulnerable groups.

- Vulnerable groups are not victims of disasters. They are a resource to be tapped. Women and the elderly from many communities are most effective at mobilising the community to mitigate and prepare for disaster risks. Women also often lead savings and micro-finance schemes.

- It should be included as a budget line item, 5 to 10 per cent of total programme or project funds for monitoring and evaluation.

- Mid-term evaluations are useful for re-assessing the objectives, strategies and progress of programmes and projects.

- Qualitative accounts of intended and unintended achievements, opportunities and problems, as well as lessons learned should be supplemental by quantitative results..

- It is important to be creative in the documentation of monitoring and evaluation results.

- Long-term support allows the programme to make significant impacts and institutional learning to be fully absorbed.

# Discussion Questions

- Is disaster risk reduction part of your organisation's development strategy?
- Is your organisation's strategy for risk reduction in line with the national disaster risk reduction strategy / plan (if they exist)?
- Do your projects contribute to greater understanding, appreciation and commitment to disaster risk reduction among government, donor, community and/or private sector representatives?
- How do you ensure that the development projects you are managing are not increasing your people's risk to disasters?
- How can you motivate all stakeholders to take responsibilities for reducing disaster risk?
- Does your organisation conduct risk assessments for all development projects?
- Does your organisation have strong relationship with disaster risk reduction organisations and committees?
- Can the projects implemented be sustained?
- Can the projects implemented be replicated and scaled-up, forming mechanisms large enough to protect all those living in areas of risk?
- How can you promote and guide the integration of disaster risk reduction in development policy and practice across sectors and levels?

# Challenges

Disasters can disrupt development programmes. Likewise, development programmes can trigger disasters. There is a growing awareness that organisations need to incorporate disaster risk reduction as part of their development strategy.

While this new environment provides an opportunity for more cost-effective and sustainable efforts to reduce disaster vulnerability, the increased awareness of governments, NGOs and donors has yet to translate into tangible action that is focused on comprehensive risk reduction across all sectors and levels.

The "How-To" guides and mechanisms for this transition from concept to action remain limited. This Primer attempts to fill this gap. It is also important to note that UNDP has established two technical support offices, one for South Asia and one for Southeast Asia to provide technical assistance through its Missions in the region to ensure that national development programmes it supports have an integrated disaster vulnerability reduction component. Along with this, the EU has established programmes and fielded programme officers to support disaster mitigation in Asia.

Government, NGOs and donor agencies should develop or revise assessment and appraisal guidelines to incorporate consideration and analysis of disaster risks and options for reducing vulnerability. There also remains a need for guidelines and mechanisms to link disaster risk reduction to related strategies in the context of sustainable development, poverty eradication, protection of natural resources and gender equity. ADPC, in collaboration with GTZ and AusAID is attempting to fill this gap by developing guidelines to mainstream disaster risk reduction in development of infrastructure and housing in Asia.

To convince governments, NGOs and donors that mitigation "pays", that mitigation is a cost-effective strategy, a framework and guidelines for monitoring and evaluating disaster risk reduction projects are fundamental. A wide range of pilot risk reduction projects have been developed and implemented in Asia, but rarely are these projects adequately monitored and evaluated. Standard guidance on generic disaster risk reduction indicators at project level is also lacking.

There remains a need for regional and national monitoring frameworks that are designed to assess progress by governments and other actions, although some proposed frameworks for monitoring disaster risk reduction at the national level have been developed by UNISDR, World Bank's Caribbean Country Management Unit and Mitchell (2003), they have yet to be tested in the field (Benson & Twigg, 2004). Benson & Twigg (2004) suggests developing a methodology for assessing

the quality of pre-disaster reduction measures through evaluations of post-disaster relief operations and developing new tools specifically for evaluating the "mainstreaming" of disaster risk reduction within organisations' systems and structures.

Asian organisations also need to develop a culture of documentation, learning and partnership building. For example, in the aftermath of disaster events, agencies should collaborate in undertaking risk analyses, focusing on lessons learned in order to further knowledge on forms and levels of vulnerability and the adequacy of existing risk management practices.

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# Resources

## Mainstreaming Disaster Risk Reduction

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Cross-cutting issues
There are many issues that need serious consideration when developing and implementing disaster risk reduction activities and actions. Many have been discussed throughout the Primer in brief and in detail. This list is by no means exhaustive:

- Environmental management
- Gender
- Culture, heritage, tradition and religion
- Governance
- Transboundary
- Poverty alleviation
- Participation
- Sustainability and development

The issues of environmental management and gender will be discussed in detail.

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Gender and Natural Disasters Site.
*http://online.northumbria.ac.uk/geography_research/gdn/resources/*

Gender-Sensitive and Community-Based Planning.
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UNISDR's resources on Gender and Disaster Risk Reduction.
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Humanitarian Practice Network.
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Monitoring and Evaluation News Service.
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