

Disaster Risk Reduction

John Twigg

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Preface

This Good Practice Review identifies and discusses the principles and practice of disaster risk reduction (DRR), drawing on experiences from around the world. It gives guidance on the main issues that should be taken into consideration when carrying out projects and programmes, and ways of addressing these issues in practice. DRR is a wide-ranging field of activity, as the following pages show, and each of the 18 chapters addresses a specific theme.

The book is intended primarily for practitioners, principally project planners and managers already working in the DRR field or planning to undertake DRR initiatives, mainly at sub-national and local levels. Some of these practitioners will be based in specialist DRR organisations, but many will be engaged in other development or humanitarian work, and seeking to incorporate DRR into their activities more effectively. They may be working in NGOs, local government, community organisations or other types of organisation, for there are many different stakeholders in DRR.

The Good Practice Review is above all a practical document, but it is not a manual. Its emphasis is on the *process* of planning and implementing risk reduction initiatives, looking at key issues and decision points. The descriptions and discussions are supported by case studies, which aim to give a sense of the range and diversity of the practical approaches that can be used. Extensive further reading can be found at <http://www.goodpracticereview.org/9>.

It is difficult to present a balanced coverage of such a broad and diverse subject, and inevitably there are gaps. However, there is now far more evidence and literature on DRR than there was a decade ago when the first edition of this book was published – a good indication of how much progress has been made in recent years – and as a result we know a great deal more about good practice in a wide range of fields. Nevertheless, there is still much that we do not fully understand, and a lot of good practice remains undocumented or unpublished.

Lasting protection against disasters will not be attained overnight: it is a long-term goal to be achieved through a continuous process of improvement, which requires that lessons are learnt and shared. This book is a small contribution to that process.

Acknowledgements

Many colleagues and friends have helped me to research and write this second edition of the Humanitarian Practice Network (HPN)'s Good Practice Review on disaster risk reduction by giving advice, providing information, commenting on drafts and encouraging me to persevere.

Special thanks are due to Wendy Fenton at HPN for recognising that an update of the first edition, published in 2004, was long overdue, commissioning and managing the project, resolving issues that arose from time to time along the way, and staying admirably calm during the lengthy process. The text that you are reading has benefited greatly from Matthew Foley's astute and thorough editing.

I was fortunate to have had the support of an informed and enthusiastic project steering group to provide strategic direction, guidance and information, as well as reviewing drafts of the book's chapters. The members of the group were Kate Crowley (CAFOD), Steve Darvill (Australia Department for Foreign Affairs and Trade (DFAT)), Bruno Haghebaert (Global Network of Civil Society Organisations for Disaster Reduction), Nick Hall (Save the Children UK), Maggie Ibrahim (World Vision UK), Nicolas Lamade (Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)), Katie Peters (Overseas Development Institute) and Tim Waites (UK Department for International Development (DFID)). Amanda Aspden (DFAT), Franziskus Bayer (GIZ), Anne Dickson (DFAT), Felicity Lee (DFAT), Alison Ramp (DFAT), Frances Sutherland (DFAT) and Sebastian Wigele (GIZ) also took part in steering group meetings and related activities at various times during the project.

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I dedicate this book to Frances, with heartfelt thanks for her extraordinary tolerance and support.

John Twigg
University College London
October 2015

List of acronyms

CBA	cost–benefit analysis
CBDRM	community-based disaster risk management
CCA	climate change adaptation
DRM	disaster risk management
DRR	disaster risk reduction
EWS	early warning system(s)
GDP	gross domestic product
GIS	geographical information system(s)
HEA	household economy approach
ICT	information and communications technologies
IDP	internally displaced person
KAP	knowledge, attitude and practice
M&E	monitoring and evaluation
MFI	micro-finance institution
NGO	non-governmental organisation
PLA	participatory learning and action
PRA	participatory rural appraisal
PTD	participatory technology development
PTSD	post-traumatic stress disorder
VCA	vulnerability and capacity assessment/analysis
VDC	village development committee

Chapter 1

Introduction

1.1 The disaster challenge

On 25 April 2015, a major earthquake struck central Nepal, killing more than 8,000 people and destroying a quarter of a million homes. This tragic event was a major disaster, but it was just one of many triggered by natural hazards during the writing of this book. Global disaster data from 2013, the most recent annual analysis to be published, shows that there were 330 reported disasters triggered by geophysical, meteorological and climatological hazards in that year, affecting 108 countries, resulting in more than 21,600 deaths, affecting 96.5 million people and causing damage and losses to the value of \$118.6 billion. In fact, 2013 was much quieter than many previous years: the average annual death toll from such disasters in the decade 2003–12 was 106,654; the average annual number affected was 216m and average annual losses were \$157bn.¹ Between 2008 and 2012, 143.9m people in 125 countries were displaced by a variety of natural hazard events. Many of these displacements were repeated or prolonged.²

Disasters are a major problem worldwide and a serious threat to sustainable development. Their impacts are diverse: as well as loss of life, injury and disease and the destruction of property and other assets, disasters can also cause social and economic disruption, loss of infrastructure and other services and damage to the environment. In an increasingly integrated world economy built on networks of global supply chains, disasters in one country can easily affect others, and a shock or disruption to one part of the supply chain, such as a production plant or distribution centre, can have a ripple effect throughout the whole chain. This was illustrated well by two disasters in 2011, an earthquake and tsunami in Japan and extensive flooding in Thailand. Both countries are important suppliers of parts, components and finished products to industries and markets worldwide. In both cases, production of a range of export products was severely disrupted, with a knock-on impact on producers and consumers in many other countries.³

1 D. Guha-Sapir, P. Hoyois and R. Below, *Annual Disaster Statistical Review 2013: The Numbers and Trends* (Louvain: Centre for Research on the Epidemiology of Disasters (CRED), 2013), <http://www.emdat.be/publications>. Data are from the EM-DAT database (www.emdat.be).

2 M. Yonetani et al., *Global Estimates 2014: People Displaced by Disasters* (Oslo: Internal Displacement Monitoring Centre, 2014), http://www.nrc.no/arch/_img/9184209.pdf.

3 UNISDR, *Global Assessment Report on Disaster Risk Reduction 2013* (Geneva: UNISDR, 2013), <http://www.preventionweb.net/english/hyogo/gar/2013/en/home/download.html>, pp. 41–50; L. Ye and M. Abe, *The Impacts of Natural Disasters on Global Supply Chains* (Bangkok: United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), 2012), www.artnetontrade.org.

1.2 Disasters explained

Disasters result from a combination of factors: the nature of the particular hazard or hazards; the extent to which people and their possessions are exposed to them; the vulnerability of those people and assets; and their capacity to reduce or cope with the potential harm. Many different kinds of hazard can contribute to disasters. These may be natural (e.g. floods, earthquakes, landslides, windstorms), technological (e.g. industrial and transportation accidents) or otherwise created by humans (e.g. riots, terrorist incidents and conflict). They can act in combination, as well as individually: the 2011 tsunami in Japan, for instance, led to a crisis in a nuclear power plant,⁴ while earthquakes and intense rainfall can both trigger landslides. Other threats facing human development include economic shocks, the effects of inequality, health risks and food insecurity.

Disasters take place in time as well as in space. They can be short- or long-term in their duration. They can be sudden events (or shocks), such as disease outbreaks, storms, earthquakes and conflict, but they can also arise from the accumulation of stresses, such as long-running drought, the degradation of natural resources, unplanned urbanisation, climate change, political instability and economic decline.

Disasters are generally seen as extreme events in their scale or impact, requiring some form of external assistance. However, small-scale, lower-intensity hazard events can also have significant impacts locally. These small, recurrent events are usually referred to as ‘extensive risks’. Poor people also often face high levels of everyday risk, for example from lack of clean water and sanitation, poor healthcare, pollution, occupational injuries, road accidents, domestic fires, violence and crime.

This book focuses on disasters in which natural hazards play a part, although it also addresses the interaction between such disasters and social crises and conflicts (see Chapter 15: DRR, social crisis and conflict), and the relationship between disaster impacts and prevailing social and economic conditions. The phrase ‘natural disaster’, which is commonly used, is misleading and often causes confusion. Strictly speaking, there is no such thing as a natural *disaster*: there are only natural *hazards*. The difference between a hazard and a disaster is an important one. A disaster takes place when a society or community is affected by a hazard (disaster is usually defined as an event that overwhelms society’s capacity to cope – see Box 1.1: Disaster terminology). In other words, the impact of the disaster is heavily influenced by the community’s vulnerability to the hazard. This *vulnerability* is not natural: it is the human dimension of disasters.

⁴ For the Japan event, see F. Ranghieri and M. Ishiwatari (eds), *Learning from Megadisasters: Lessons from the Great East Japan Earthquake* (Washington DC: World Bank, 2014), <http://elibrary.worldbank.org/doi/abs/10.1596/978-1-4648-0153-2>.

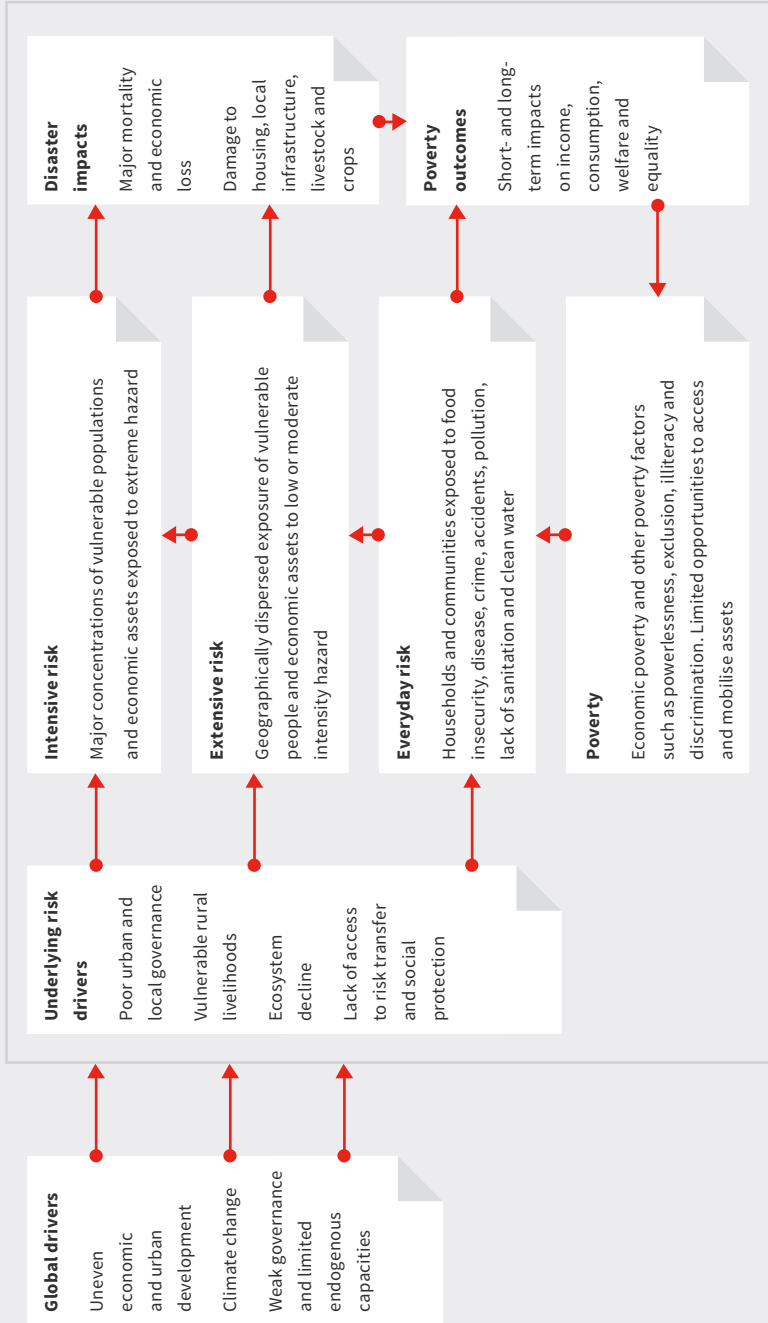
Box 1.1 Disaster terminology

The literature on hazards, vulnerability and disasters is full of technical terms. This book tries to sidestep the technical jargon as far as possible because many people working in aid and development find it off-putting (a related problem is that use of the emotive word ‘disaster’ automatically conjures up images of emergency relief and often leads to disaster reduction work being viewed solely as an aspect of humanitarian aid when it should also be a central component of development programmes). Nevertheless, certain terms are used regularly in writing and discussion about DRR. These can be defined and understood in slightly different ways and there has been considerable debate about their precise meanings. They are also often used quite loosely or flexibly by practitioners, which can cause confusion or even lead to disputes. Table 1.1 (p. 22) sets out some of the key terms as defined by two international and reputable bodies: the UN Office for Disaster Risk Reduction (UNISDR) and the Intergovernmental Panel on Climate Change’s Special Report on Extreme Events and Disasters. Everyone using DRR terminology should be clear about their own understanding of it, and communicate this to others with whom they work.

Vulnerability is the result of the whole range of economic, social, cultural, institutional and political factors that shape people’s lives and create the environments that they live and work in. Development processes play a key role in exposing people to hazards, as well as shaping their vulnerability to potential disasters. For example, the fact that large numbers of people live in flimsy houses in hazardous locations could result from a combination of several factors: poverty (itself a symptom of local, national and even global economic forces), population growth, displacement due to economic development (e.g. loss of smallholdings to commercial agriculture), migration to towns and cities (which has a variety of socio-economic causes, including livelihood opportunities), legal and political issues, such as lack of land rights, government macro-economic and other policies and other political features, including weak government and civil society institutions.

Extensive research all over the world has shown that in general it is the weaker groups in society that suffer worst from disasters, principally the poor, the very young and the very old, women, the disabled, migrants and displaced people and people marginalised by race, caste or other socio-economic or cultural characteristics (see Chapter 5: Inclusion). Those who are already at an economic or social disadvantage because of one or more of these characteristics tend to be more likely to suffer during disasters. Vulnerability is not just about poverty, but poverty is a fundamental factor. Disasters’ impact on society is uneven and unequal: poor and socially marginalised households tend to be much more vulnerable to losses than wealthier households; they are pushed deeper into poverty as a result; and they find it more difficult to recover.

Figure 1.1 The disaster risk–poverty nexus



Case Study 1.1 Central European floods, 2013

Germany, Austria, Hungary and the Czech Republic were badly affected by flooding in June 2013. Flood protection and water storage structures, such as levees, water diversion channels, dams and lakes and restored floodplains (many of which had been created following devastating floods in Central Europe in 2002), generally proved effective in preventing flooding, especially in major towns and cities, but in some places they were overwhelmed by the exceptionally high water levels, or there were gaps in the defences that allowed floodwater through. Although the death toll was relatively low (25 people were killed), estimates of economic losses ranged from €11.9bn (\$16.5bn) to €16bn (\$22bn). In Germany alone, an estimated 52,500 people along the Danube and Elbe rivers were forced to leave their homes.

Zurich Insurance, *Central European Floods 2013: A Retrospective* (Zurich: Zurich Insurance Company, 2014), <http://knowledge.zurich.com/flood-resilience/risk-nexus-central-european-floods-2013-a-retrospective>.

This issue of vulnerabilities linked to socio-economic context (in particular inequalities in society) is very important in understanding the impact of disasters and making choices about how and where to intervene. Vulnerability is highly dynamic, changing in response to many different influences, yet most vulnerabilities remain persistent because they result from deep-rooted social marginalisation, the indifference or incapacity of political and official institutions and the inadequacy of public services.

Disasters affect rich as well as poor countries (see Case Study 1.1: Central European floods, 2013), but they have a particularly severe impact on low-income countries, which experience disproportionately higher mortality and suffer higher levels of economic loss in relation to the size of their GDP. Disaster events can sometimes set back years of economic and social development gains, generate political instability and cause long-lasting environmental damage. Like poor families, low-income countries often lack the resources and capacities to cope with disasters (see Box 1.2: DRR capacities in richer and poorer countries).

The multiple pressures and factors that combine to create and increase vulnerability can be tracked to identify a 'progression' of vulnerability (see Figure 1.2: The progression of vulnerability). These pressures can be released by taking measures to reduce vulnerability right along the causal chain – an indication of the wide range of interventions that are possible.

Box 1.2 DRR capacities in richer and poorer countries

Richer countries	Poorer countries
<ul style="list-style-type: none">• Have regulatory frameworks to minimise disaster risk which are enforced• Have effective early warning and information mechanisms in place to minimise loss of life• Have highly developed emergency response and medical care systems• Insurance schemes spread the burden of property losses	<ul style="list-style-type: none">• Regulatory frameworks are weak or absent, and/or the capacity to enforce them is lacking• Lack comprehensive information systems linked to pre-emptive response• Divert funds from development programmes to emergency assistance and recovery• Those affected bear the full burden of property losses and may lose livelihoods

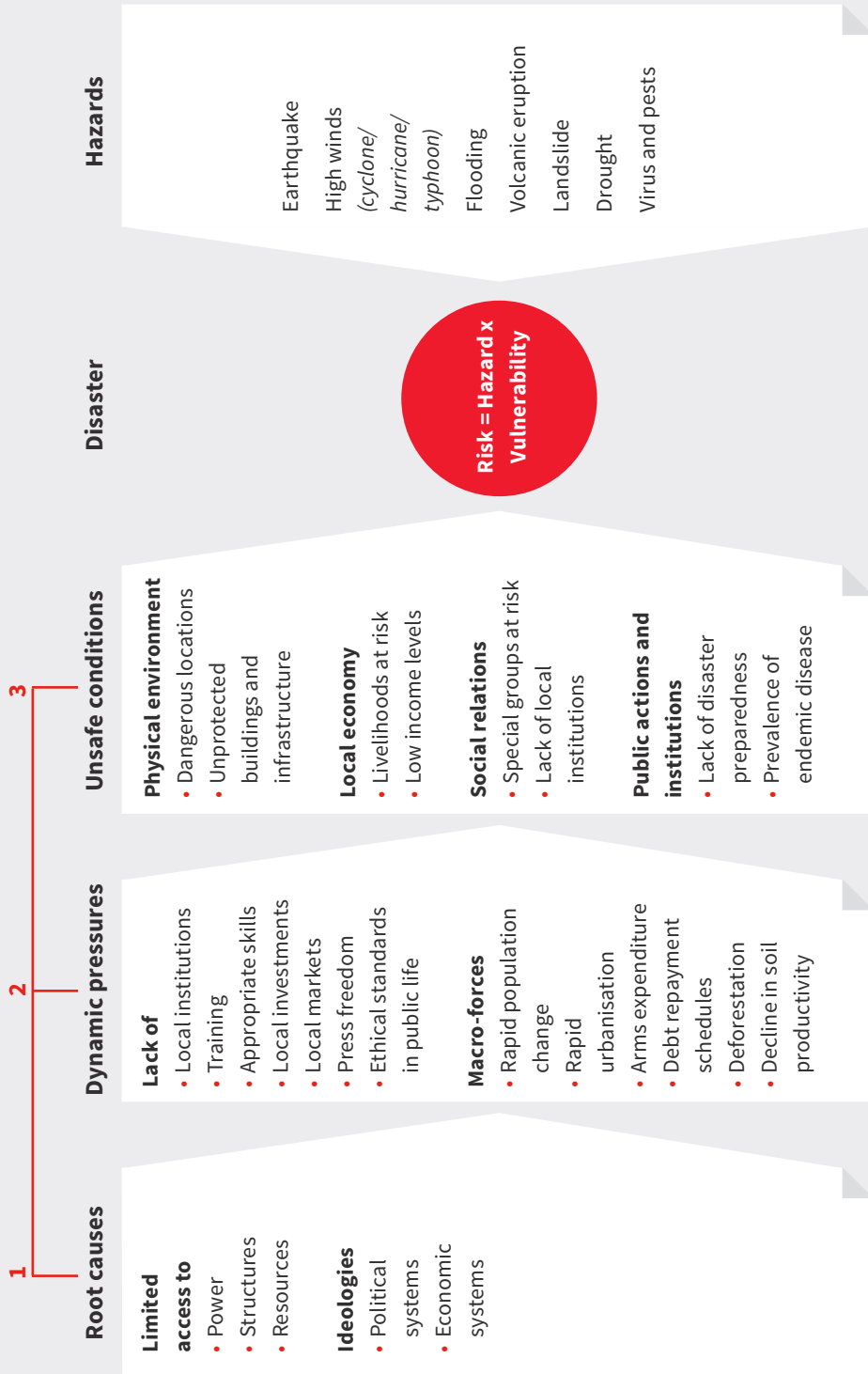
P. White et al., *Disaster Risk Reduction: A Development Concern* (London: Department for International Development, 2004), http://www.preventionweb.net/files/1070_drrscopingstudy.pdf, p. 9.

Even well-intentioned development programmes can increase vulnerability. For example, building embankments for new roads and railway lines can block natural flood drainage channels, and the promotion of heavily irrigated rice agriculture can lead to increased incidence of malaria because mosquitoes breed where there is standing water.

1.3 Disaster risk reduction

What is disaster risk reduction (or DRR)? There are various definitions in the technical literature (see Box 1.1: Disaster terminology), but it is broadly understood to mean the development and application of policies, strategies and practices to reduce vulnerabilities and disaster risks throughout society. The term 'disaster risk management' (DRM) is often used in the same context, referring to a systematic approach to identifying, assessing and reducing risks. DRM is more focused on the practical implementation of initiatives to achieve DRR goals, but there is some overlap between the two terms and in practice they are sometimes used quite loosely or flexibly, with very similar meanings. In this book, the term DRR is applied in the broader sense to cover policy, strategic, institutional and operational issues (reflecting the wide scope of the book itself), whilst the term DRM is

Figure 1.2 The progression of vulnerability



B. Wisner et al., *At Risk: Natural Hazards, People's Vulnerability and Disasters* (London: Routledge, 2004), p. 51.

Case Study 1.2 Linking DRR interventions

A community-based DRR project in the village of Genda Ada, Ethiopia, adopted a range of linked approaches to reduce short-term hazard risk and promote long-term livelihood security. The village lies at the foot of a large hillside which had been severely degraded by years of deforestation and quarrying. As a result, crop and livestock productivity fell, leading in turn to greater food insecurity and poverty, forcing some of the inhabitants to move to towns in search of work. Flood risks also increased, as water ran off the hills. In 2006 flash floods nearby killed 17 people and ruined crops and farmland.

Jerusalem Children and Community Development Organisation (JeCCDO), an Ethiopian NGO which provided emergency assistance after the 2006 floods, continued to work in the area to build long-term resilience to disasters. Its staff received training in community-based DRR methods (see Chapter 6 for a discussion of this approach). Then, following consultations with local leaders, it mobilised villagers to carry out a local risk and vulnerability

assessment which highlighted flooding and drought as the main hazards.

A community DRR committee was established, a vulnerability map was drawn up and an action plan developed. The hillside was rehabilitated by constructing terraces, trees were planted and access to conservation areas was restricted to allow vegetation to regenerate more quickly. These measures helped to reduce the speed and volume of water flowing downhill, and enabled floodwater to be diverted to irrigate fields. A community flood warning system was established, with rainfall information being shared by cell phone. The project provided households with loans to buy livestock and gave training in livestock rearing. Farmers' cooperatives and self-help groups were formed. JeCCDO also organised training and site visits for local government officials, and the mayor of the nearby town allocated funds for the rehabilitation of a neighbouring hillside. The community also pressed successfully for the local town administration to build additional flood defences.

Cordaid and IIRR, *Community Managed Disaster Risk Reduction: Experiences from the Horn of Africa* (The Hague and Nairobi: Cordaid and International Institute of Rural Reconstruction, 2011), https://www.cordaid.org/media/publications/CMDRR_experience_Horn_of_Africa_1.pdf, pp. 45–48.

used more specifically to refer to aspects of operational practice. But a key point about both terms is that they describe a very broad-based approach to the causes of disasters and dealing with their consequences.

The basic principle underlying this Good Practice Review is that disaster programming should adopt a *risk management* approach – i.e. a systematic approach to identifying, assessing and reducing risks associated with hazards and human activities. Risk management should be an integral part of the way organisations do their work: not an add-on or a one-off action but a process of constant improvement. The risk management approach recognises that there is a wide range of geological, meteorological, environmental, technological, socio-economic and political threats to society. Risks are located at the point where hazards, communities and environments interact, and so effective risk management must address all of these aspects. Disasters are seen not as one-off events to be responded to, but as deep-rooted and longer-term problems that must be planned for. Effective risk management generally involves a variety of different but related actions. Such integrated approaches work best when they are informed by specific local conditions and targeted towards local needs (see Case Study 1.2: Linking DRR interventions).

Disaster risk is not a distinct sector. It should be everyone's business and, as this book shows, an extensive range of options and approaches is available. Project planners and managers need to take a very broad view of the options available to them, and they ought to be imaginative in their approach. It follows that DRR should be integrated into long-term development planning to reduce underlying socio-economic vulnerabilities, protect interventions against hazards and ensure that development policies and programmes do not inadvertently increase or create risks (see Case Study 1.3: Connecting development and disaster risk management).

DRR and other forms of risk management should not be seen simply as defensive measures: they also facilitate positive change. Improved security and safety provide vital support and opportunity to households, communities, societies and governments so that they can undertake development initiatives that improve well-being, strengthen livelihoods and contribute to sustainable development. Effective DRR actions provide development benefits in the short term, as well as contributing to vulnerability reduction in the long term, although in practice there may be trade-offs between different goals.

Traditional approaches to disaster management have usually been based on the 'disaster cycle', a conceptual model that is still used by many emergency management and civil protection organisations (see Figure 1.3: The disaster cycle). This is a linear operational model, dividing the cycle into phases (before, during and after disaster), each of which requires different forms of intervention (mitigation, preparedness, response and recovery). The formulation is easy to understand and makes it easy for disaster management organisations to allocate tasks,

Case Study 1.3 Connecting development and disaster risk management

Following severe flooding in 2000, which affected more than 4.5m people, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) began a project with villages along the Búzi River in central Mozambique to reduce disaster risk and integrate DRM into wider rural development initiatives. A large part of the population of Búzi District depended on subsistence farming, rural poverty was widespread and public infrastructure and services were limited. River flooding was a major hazard, with many municipalities sited close to the river; cyclones and droughts also affected parts of the district.

In 2003 GTZ combined its earlier development and reconstruction initiatives into a single integrated programme with four main components: district development planning, strengthening local government and communities, technological innovation and adaptation and sustainable use of natural resources and DRM. The project collaborated with a range of actors (government, community, NGO, private sector) at village, district and provincial levels, as well as with scientific institutions collecting and disseminating meteorological and hydrological data. Workshops, seminars and other meetings on DRM and climate change targeted decision-makers and communities, and a local radio station broadcast information about disasters and how to manage them.

Following discussions with officials, a long-term process was developed for integrating DRM into district development planning. A detailed and comprehensive risk analysis was carried out in nine especially disaster-prone municipalities. Local DRM committees were set up in particularly endangered villages, and their members were provided with training and equipment to plan and carry out emergency response. Simulation exercises were carried out and local early warning systems established (see Case Study 16.6: A community-managed flood warning system). Other measures included introducing regulations for cyclone-resistant public facilities such as schools and hospitals, and the construction of new settlements in less hazardous locations.

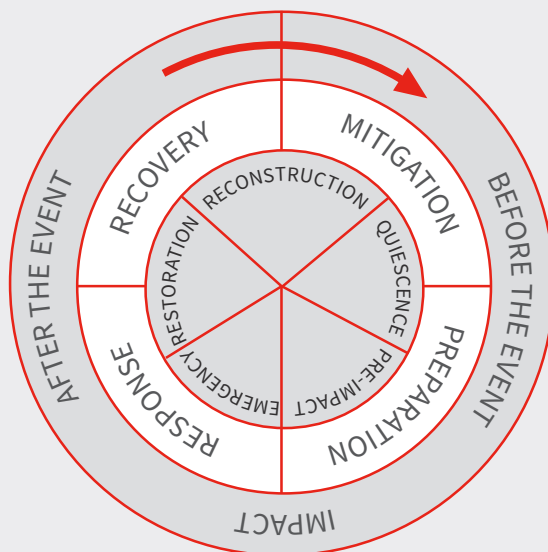
J. Ferguson, *Disaster Risk Management along the Rio Búzi* (Eschborn: GTZ, 2005), <http://www.preventionweb.net/english/professional/publications/v.php?id=10527>.

Box 1.3 Five insights on the process of risk management

1. Taking on risks is necessary to pursue opportunities for development. The risk of inaction may well be the worst option of all.
2. To confront risk successfully, it is essential to shift from unplanned and ad hoc responses when crises occur to proactive, systematic and integrated risk management.
3. Identifying risks is not enough: the trade-offs and obstacles to risk management must also be identified, prioritised, and addressed through private and public action.
4. For risks beyond the means of individuals to handle alone, risk management requires shared action and responsibility at different levels of society, from the household to the international community.
5. Governments have a critical role in managing systemic risks, providing an enabling environment for shared action and responsibility, and channelling direct support to vulnerable people.

World Bank, *World Development Report 2014: Risk and Opportunity* (Washington DC: World Bank, 2013), <http://www.worldbank.org/wdr2014>.

Figure 1.3 The disaster cycle



D. Alexander, *Principles of Emergency Planning and Management* (Harpenden: Terra Publishing, 2002), p. 6.

which may be one of the main reasons for its enduring popularity, but it does not capture the complexity of disasters, which cannot be neatly compartmentalised in this way. It can also lead to fragmentation of effort operationally. Risk management models, which are largely derived from business and organisational management thinking, are also based on a linear sequence of actions, but provide a different perspective on how to approach disasters, in that risk management is seen as a constantly repeating process of risk identification, analysis and treatment that incorporates feedback and learning.⁵

DRR planning, implementation and evaluation require holistic models and frameworks that are not confined to particular types of intervention or moments in time. The most influential of these to date has been the Hyogo Framework for Action 2005–2015, agreed by member states of the United Nations at the Second World Conference on Disaster Reduction in Kobe, Japan, in January 2005.⁶ The framework sets out a number of key and mutually supporting activities grouped under five main priorities for action:

1. Ensure that disaster risk reduction (DRR) is a national and a local priority with a strong institutional basis for implementation.
2. Identify, assess and monitor disaster risks and enhance early warning.
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
4. Reduce the underlying risk factors.
5. Strengthen disaster preparedness for effective response at all levels.

The framework has been widely used by governments and civil society organisations at national and local levels; agencies have also adapted it to make it more appropriate to their own work.⁷

The Sendai Framework for Disaster Risk Reduction 2015–2030 (see Figure 1.4), the UN system’s successor to the Hyogo Framework, was approved at the Third World Conference on Disaster Risk Reduction in Sendai, Japan, in March 2015. The framework has four priority areas: understanding disaster risk; strengthening disaster risk governance;

5 InConsult, *Risk Management Update: ISO 31000: Overview and Implications for Managers*, 2009, <http://www.inconsult.com.au/wp-content/uploads/ISO-31000-Overview.pdf>, p. 4.

6 The Hyogo Framework for Action is at http://www.unisdr.org/files/8720_summaryHFP20052015.pdf.

7 A similar approach has been adopted by the World Bank’s Global Facility for Disaster Reduction and Recovery (GFDRR) in the operational framework for its strategy 2013–15. See GFDRR, *Managing Disaster Risks for a Resilient Future* (Washington DC: World Bank, 2013), https://www.gfdrr.org/sites/gfdrr/files/publication/GFDRR_Strategy_Endorsed_2012.pdf.

investing in disaster risk reduction for resilience; and enhancing disaster preparedness for effective response, and to ‘Build Back Better’ in recovery, rehabilitation and reconstruction.⁸

1.4 DRR and climate change adaptation

Climate change is predicted to increase the frequency and severity of certain types of hazard event in many parts of the world. Gradual climatic changes are also likely to have a significant impact on people’s vulnerability. The risk environment is changing and the speed and scale of these changes may be greater than in the recent past. There is also a large degree of uncertainty about future climate change risks and their impacts: climate change may generate new threats which regions and populations have no experience of. People have always adapted their livelihoods and ways of living to climate variability. However, changes in variability are putting pressure on many vulnerable communities’ capacity to adapt, cope and respond, as well as increasing their exposure to weather-related risks. Climate change also affects people indirectly by influencing prices in crop and livestock markets (at global and more local scales), triggering environmental and economic migration and potentially creating conflicts over natural resources.

In the past, climate change and DRR specialists have operated largely in isolation from one another. However, a growing number of thinkers and organisations are working on ways of integrating DRR with climate change adaptation (CCA), as well as mainstreaming both into development. Development, DRR and CCA are interdependent and mutually reinforcing areas of policy, strategy and action. The key challenge is how to achieve this convergence at conceptual, strategic and operational levels.

In many ways, DRR and CCA have overlapping aims and involve similar kinds of intervention. They share the aim of reducing the impacts of shocks by anticipating risks and addressing vulnerabilities. In practice, CCA and DRR interventions range from supporting long-term sustainable development and vulnerability reduction to more specific measures to help societies adapt to, protect against, prepare for and respond to risks and hazards. This includes adapting development practices to long-term environmental stresses, as well as reducing or managing the risks associated with more frequent, severe and unpredictable weather events.

A stronger connection between the two areas of work could help to reduce losses from climate-related disasters. CCA measures can become more effective by building on existing DRR experiences and through more widespread implementation of DRR. DRR practitioners

⁸ See <http://www.preventionweb.net/files/resolutions/N1514318.pdf>.

Figure 1.4 Chart of the Sendai Framework for Disaster Risk Reduction 2015–2030

Scope and Purpose

The present framework will apply to the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters, caused by natural or manmade hazards as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors

Expected Outcome

The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries

Goal

Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience

Targets

Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020–2030 compared to 2005–2015	Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020–2030 compared to 2005–2015	Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030	Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030	Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020	Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030	Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030
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Priorities for Action

There is a need for focused action within and across sectors by States at local, national, regional and global levels in the following four priority areas.

Priority 1

Understanding disaster risk

Disaster risk management needs to be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment

Priority 2

Strengthening disaster risk governance to manage disaster risk

Disaster risk governance at the national, regional and global levels is vital to the management of disaster risk reduction in all sectors and ensuring the coherence of national

Priority 3

Investing in disaster risk reduction for resilience

Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social,

Priority 4

Enhancing disaster preparedness for effective response, and to 'Build Back Better' in recovery, rehabilitation and reconstruction

Experience indicates that disaster preparedness needs to be strengthened for more effective response and ensure capacities are in place for effective recovery. Disasters have also

Priorities for Action (cont'd)

and local frameworks of laws, regulations and public policies that, by defining roles and responsibilities, guide, encourage and incentivize the public and private sectors to take action and address disaster risk	health and cultural resilience of persons, communities, countries and their assets, as well as the environment. These can be drivers of innovation, growth and job creation. Such measures are cost-effective and instrumental to save lives, prevent and reduce losses and ensure effective recovery and rehabilitation	for effective recovery. Disasters have also demonstrated that the recovery, rehabilitation and reconstruction phases, which needs to be prepared ahead of the disaster, is an opportunity to 'Build Back Better' through integrating disaster risk reduction measures. Women and persons with disabilities should publicly lead and promote gender-equitable and universally accessible approaches during the response and reconstruction phases
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Guiding Principles

Primary responsibility of States to prevent and reduce disaster risk, including through cooperation	Shared responsibility between central Government and national authorities, sectors and stakeholders as appropriate to national circumstances	Protection of persons and their assets while promoting and protecting all human rights including the right to development	Engagement from all of society	Full engagement of all State institutions of an executive and legislative nature at national and local levels	Empowerment of local authorities and communities through resources, incentives and decision-making responsibilities as appropriate	Decision-making to be inclusive and risk-informed while using a multi-hazard approach
Coherence of disaster risk reduction and sustainable development policies, plans, practices and mechanisms, across different sectors	Accounting of local and specific characteristics of disaster risks when determining measures to reduce risk	Addressing underlying risk factors cost-effectively through investment versus relying primarily on post-disaster response and recovery	'Build Back Better' for preventing the creation of, and reducing existing, disaster risk	The quality of global partnership and international cooperation to be effective, meaningful and strong	Support from developed countries and partners to developing countries to be tailored according to needs and priorities as identified by them	

already use a variety of methods and tools to assess risks and vulnerability (see Chapter 3: Project planning) which can be used or modified for adaptation work. DRR approaches are more likely to be sustainable if they take climate change forecasts into account. DRR would benefit from the longer-term perspective of CCA and its emphasis on addressing the underlying drivers of vulnerability and building adaptive capacities to deal with future problems. Greater collaboration could also make more efficient use of limited human, material and financial resources, although it is not necessarily easy to bring such a wide range of scientists, practitioners and policymakers together.

Although DRR and CCA have much in common, they also have differences in their scope and emphasis. The most obvious is that CCA seeks to manage and reduce risks associated specifically with changes in the climate, whereas DRR also considers other hazards and risks (e.g. earthquakes, volcanic eruptions). In adaptation, the emphasis is more on long-term changes in average climatic conditions, whereas DRR focuses on extreme events. CCA strategies are based on climate science projections of future changes and threats (and the associated uncertainties), whereas DRR remains more grounded in current risks, previous experience and local knowledge. A further challenge is that there is often a lack of climate data on the more local scale at which many development and DRR interventions work.

At a global level, there is already a substantial alliance of scientists, environmentalists and businesses (notably insurers) engaged in advocacy to reduce greenhouse gas emissions. At more local levels, disaster workers are sometimes unsure what they can do about climate change beyond what they are already doing to minimise risk. How can they calculate the increased risk due to this problem? How far should their existing disaster planning be stepped up, expanded or altered to counter the threat from climate change? Although there has been much discussion about new or alternative frameworks and tools for bringing DRR and CCA work closer together operationally, agencies are finding that integration can sometimes be achieved relatively simply by modifying existing project planning methods and tools to incorporate a wider range of questions and information. This has been particularly useful in adapting standard risk, vulnerability and capacity assessment tools (see Chapter 3: Project planning) such as seasonal calendars, historical profiles and risk mapping to identify longer-term climate trends and uncertainties.⁹ Many participatory assessments can be adapted in this way (see Case Study 1.4: Identifying and integrating DRR, CCA and other concerns through participatory assessments).

⁹ For example, see 'Yumi Stap Redi Long Climate Change': *Integrating Climate with Vulnerability and Capacity Assessment in Vanuatu* (The Hague: Red Cross Red Crescent Climate Centre, 2013); *Changing Tools in a Changing Climate: Experiences from the Philippines* (The Hague: Red Cross Red Crescent Climate Centre, 2012), <http://www.climatecentre.org/publications/case-studies>.

Case Study 1.4 Identifying and integrating DRR, CCA and other concerns through participatory assessments

A research project in Papua New Guinea in 2006–2007 facilitated participatory situation analyses in three rural communities. The aim was to enable the communities to identify and assess evidence, problems and solutions. Each community carried out a detailed situation analysis using participatory tools such as mapping, timelines, seasonal calendars and environmental trend analysis. These enabled them to identify a number of changes in their lives and environments over the years, and to see links between community activities, the environment and increasing natural hazard events and impacts. One community identified connections between local land use practices and the greater frequency of landslides and floods; another realised that farming practices and land clearance were contributing to riverbank erosion. The community groups went on to review the underlying causes of these problems, situating them in a broader development context. All three communities felt, without prompting, that changes in the climate were affecting their vulnerability. However, they saw climate change as just one of the major underlying problems facing them, which included land degradation, lack of government support, population growth and globalisation.

J. Mercer, 'Disaster Risk Reduction or Climate Change Adaptation: Are We Reinventing the Wheel?', *Journal of International Development*, 22(2), 2010.

1.5 Resilience

In recent years, the concept of resilience has become prominent in development and humanitarian debate and policy. It is widely seen as a useful organising concept that can be applied across different sectors and disciplines, helping to break down the boundaries between them. Resilience seeks to strengthen capacities to cope with a wide range of threats, both anticipated and unforeseen. DRR is a key part of resilience-building.

Like vulnerability, resilience is a complex and multifaceted idea applied to dealing with different kinds and severities of risk, shock, stress and environmental change. Resilience and vulnerability are often seen as opposites, but this view is restrictive and somewhat simplistic. Both are relative terms: it is necessary to ask what it is that particular individuals, communities and systems are vulnerable or resilient to, to what extent, in what ways and why this is so. Resilience is related to capacity, but is a broader concept that goes beyond the specific resources, plans and actions normally understood as capacities. However, in

Box 1.4 Defining resilience

Many attempts have been made to define and explain what ‘resilience’ means in different contexts. This has led to a variety of concepts and definitions. For operational purposes, DRR and development agencies often find it more useful to work with more straightforward or widely accepted definitions expressing commonly understood features of resilience. One such definition of resilience is:

*The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions.*¹⁰

Some organisations choose to work out their own understanding of resilience, matched to their own work and organisational goals. The UK Department for International Development (DFID) defines disaster resilience as:

*the ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses – such as earthquakes, drought or violent conflict – without compromising their long-term prospects.*¹¹

(See also Box 1.1: Disaster terminology)

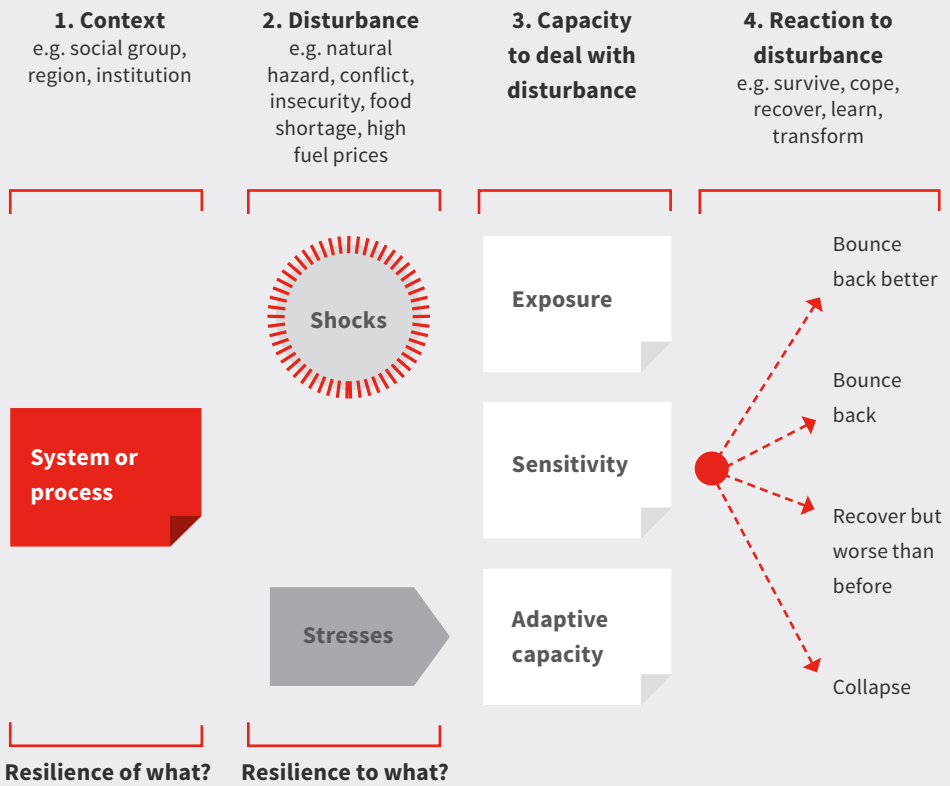
everyday usage the terms ‘resilience’ and ‘capacity’ are sometimes used quite loosely and interchangeably. Resilience has also been understood both as a desired outcome (a safe and resilient community) and as a process leading to that outcome (enabling individuals, communities and institutions to adapt and move towards resilience).

A disaster resilience perspective should be holistic. All relevant aspects and issues should be taken into account to produce a comprehensive analysis of disaster-related problems. This will support the development of coherent, wide-ranging strategies and programmes involving a variety of complementary and mutually supporting interventions, with the aim

¹⁰ IPCC, *Managing the Risks of Extreme Events and Disasters To Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change* (New York: Cambridge University Press, 2012), <http://ipcc-wg2.gov/SREX/report>.

¹¹ DFID, *Defining Disaster Resilience: A DFID Approach Paper* (London: Department for International Development, 2011), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/186874/defining-disaster-resilience-approach-paper.pdf, p. 6.

Figure 1.5 DFID's Resilience Framework



DFID, *Defining Disaster Resilience: A DFID Approach Paper* (London: Department for International Development, 2011), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/186874/defining-disaster-resilience-approach-paper.pdf, p. 7.

of moving people permanently out of vulnerability. Such an approach contrasts with more conventional disaster programming, which has often focused only on specific hazards and discrete aspects of vulnerability and resilience. Figure 1.5 (DFID's Resilience Framework) is a visualisation of such a holistic perspective; many other agencies have developed similar frameworks of their own.

Resilience thinking encourages a systems approach to enable a better understanding of how different types of system (e.g. ecological, socio-economic, technological, political) interact with one another, and the connections and interactions between different elements within particular systems (e.g. between electricity supplies and railway services in a public transport

Box 1.5 Disasters and ecosystems

Risk and vulnerability are linked not only to environmental hazards but also to the environment more generally. Human and ecological systems are interdependent and human actions can have a significant impact on ecosystems. Environmental degradation increases hazard risk and contributes to vulnerability. For example, the removal of trees, bushes and other vegetation in the course of building, farming or other commercial activities can create hazardous conditions. It accelerates the loss of fertile topsoil to wind and water erosion. Water is no longer held in the soil by vegetation and so runs away rapidly, increasing vulnerability to drought. On hillsides, rapid water run-off can cause flash floods and landslides, which in turn silts up rivers and may cause flooding further downstream. In coastal zones, the destruction of mangrove forests for commercial development removes a natural barrier to the winds and sea surges created by tropical cyclones. Overgrazing and over-cultivation of land can exhaust soils. Building on flood plains reduces the capacity of the ground to absorb rainfall, increasing the likelihood of flooding.

Ecosystem management can make an important contribution to disaster reduction. Healthy ecosystems provide protection against hazards: for example, wetlands such as marshes and swamps store water and provide an outlet for floodwaters; coral reefs and sand dunes protect shorelines. Productive ecosystems support sustainable livelihoods and income-generating activities, and they can be important assets for communities in the aftermath of disasters. Natural resources can be managed and replenished through measures such as reforestation and other planting, waste management, environmentally sustainable farming and grazing practices, terracing and building protective stone and earthworks to prevent rapid water run-off.

Attempts to protect the environment often challenge powerful people who stand to gain from its destruction: it can be difficult and even dangerous to make such challenges. More generally, economic and demographic pressures on poor countries, coupled with entrenched political and cultural attitudes, inhibit effective responses to environmental crises.

system). Systems and system interactions can be very complex: a good example of this is the relationship between ecosystems and human systems, which is a significant factor in disaster risk and vulnerability (see Box 1.4: Disasters and ecosystems). Disasters often result from multiple and interacting failures within a system. In New Orleans during Hurricane Katrina in 2005, for example, a complex urban system failed because of a combination of factors, including the widespread failure of flood defences, ineffective emergency planning and response, weaknesses in disaster governance, high levels of exposure to risk and deep-rooted socio-economic vulnerability and marginalisation (the last two factors the result of the city's historic patterns of growth and development).¹² Resilience approaches and systems thinking help agencies to understand and deal with such complex situations. Projects and programmes cannot manage everything, but they can assess where they will be most effective, identify the best entry or leverage points, build relationships with other key stakeholders and coordinate different types of intervention that stimulate more widespread and lasting system changes.

Resilience is clearly helpful in enabling DRR organisations to identify their vision and direction. However, some find it a challenge to understand exactly what it means in practice and how it can be applied to their work.¹³ Resilience-building is a new approach and organisations have much to learn about resilience programming in practice. Some so-called 'resilience' projects seem to be no different from previous forms of intervention: they represent re-branding rather than re-thinking. Resilience has also been criticised for not paying enough attention to power relations within communities and societies: one group or community may become more resilient at the expense of another because it has more resources and choices. For this reason, it has been suggested that one aim of resilience initiatives should be social transformation and the reduction of inequalities.

¹² L. Comfort, 'Cities at Risk: Hurricane Katrina and the Drowning of New Orleans', *Urban Affairs Review*, 41(4), 2006.

¹³ For a discussion of these issues, see A. Pain and S. Levine, *A Conceptual Analysis of Livelihoods and Resilience: Addressing the 'Insecurity of Agency'* (London: Overseas Development Institute, 2012), <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/7928.pdf>.

Table 1.1 Some key DRR terms

UN Office for Disaster Risk Reduction (UNISDR)	Intergovernmental Panel on Climate Change (IPCC) Special Report on Extreme Events and Disasters
<p>Adaptation The adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.</p>	<p>Adaptation In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate.</p>
	<p>Adaptive capacity The combination of the strengths, attributes, and resources available to an individual, community, society or organisation that can be used to prepare for and undertake actions to reduce adverse impacts, moderate harm or exploit beneficial opportunities.</p>
<p>Capacity The combination of all the strengths, attributes and resources available within a community, society or organisation that can be used to achieve agreed goals.</p>	<p>Capacity The combination of all the strengths, attributes and resources available to an individual, community, society or organisation, which can be used to achieve established goals.</p>
<p>Climate change (Cites IPCC and UNFCCC definitions)</p>	<p>Climate change A change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.</p>

Table 1.1 (cont'd)

UN Office for Disaster Risk Reduction (UNISDR)	Intergovernmental Panel on Climate Change (IPCC) Special Report on Extreme Events and Disasters
<p>Disaster A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.</p>	<p>Disaster Severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.</p>
<p>Disaster risk The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period.</p>	<p>Disaster risk The likelihood over a specified time period of severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.</p>
<p>Disaster risk management The systematic process of using administrative directives, organisations and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.</p>	<p>Disaster risk management Processes for designing, implementing and evaluating strategies, policies and measures to improve the understanding of disaster risk, foster disaster risk reduction and transfer, and promote continuous improvement in disaster preparedness, response and recovery practices, with the explicit purpose of increasing human security, well-being, quality of life, resilience and sustainable development.</p>

Table 1.1 (cont'd)

<p>UN Office for Disaster Risk Reduction (UNISDR)</p>	<p>Intergovernmental Panel on Climate Change (IPCC) Special Report on Extreme Events and Disasters</p>
<p>Disaster risk reduction The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment and improved preparedness for adverse events.</p>	<p>Disaster risk reduction Denotes both a policy goal or objective, and the strategic and instrumental measures employed for anticipating future disaster risk; reducing existing exposure, hazard, or vulnerability; and improving resilience.</p>
<p>Emergency a threatening condition that requires urgent action.</p>	
<p>Emergency management The organisation and management of resources and responsibilities for addressing all aspects of emergencies, in particular preparedness, response and initial recovery steps.</p>	
<p>Exposure People, property, systems or other elements present in hazard zones that are thereby subject to potential losses.</p>	<p>Exposure The presence of people; livelihoods; environmental services and resources; infrastructure; or economic, social, or cultural assets in places that could be adversely affected.</p>
<p>Extensive risk The widespread risk associated with the exposure of dispersed populations to repeated or persistent hazard conditions of low or moderate intensity, often of a highly localised nature, which can lead to debilitating cumulative disaster impacts.</p>	

Table 1.1 (cont'd)

UN Office for Disaster Risk Reduction (UNISDR)	Intergovernmental Panel on Climate Change (IPCC) Special Report on Extreme Events and Disasters
<p>Hazard A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption or environmental damage.</p>	<p>Hazard The potential occurrence of a natural or human-induced physical event that may cause loss of life, injury or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision and environmental resources.</p>
<p>Resilience The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.</p>	<p>Resilience The ability of a system and its component parts to anticipate, absorb, accommodate or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration or improvement of its essential basic structures and functions.</p>
<p>Risk The combination of the probability of an event and its negative consequences.</p>	
<p>Risk management The systematic approach and practice of managing uncertainty to minimise potential harm and loss.</p>	
<p>Vulnerability The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.</p>	<p>Vulnerability The propensity or predisposition to be adversely affected.</p>
<p><i>2009 UNISDR Terminology on Disaster Risk Reduction</i> (Geneva: UNISDR, 2009), http://www.unisdr.org/we/inform/publications/7817.</p>	<p><i>IPCC, Managing the Risks of Extreme Events and Disasters To Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change</i> (New York: Cambridge University Press, 2012), http://ipcc-wg2.gov/SREX/report. (Note that some of the definitions used in this report differ from those used in other IPCC publications.)</p>

Chapter 2

Institutionalising DRR within organisations

2.1 Introduction

This chapter discusses how DRR can be ‘institutionalised’ or ‘mainstreamed’ within organisational structures and processes. There is relatively little guidance on this subject; much of what is available is limited to general principles, and examples of good or bad practice are rarely documented or shared. Writing on the organisational aspects of DRR tends to present future idealised conditions or criticise existing institutional structures.

Anyone who has tried to change policy and practice within an organisation will know how difficult this can be, but change is possible and there are some encouraging signs in the field of DRR. Institutionalising DRR can seem a daunting task, but it becomes less so if it is approached as a process (see Case Study 2.1: Institutionalising disaster resilience). Organisations cannot be expected to mainstream DRR overnight: it will usually take some time, especially in large organisations, but improvements can be made incrementally. The reviews of policies, strategies and systems that all organisations carry out periodically offer a good opportunity to incorporate risk awareness and DRR practices with minimal disruption. However, gradualist approaches should not be used as an excuse for delay: disasters can strike agencies, and those they aim to help, at any time.

Organisational size is an obvious influence on the rate of change. Small organisations often function as teams of individuals and can adapt their outlooks and systems relatively quickly. As organisations get larger, their structures become more formal and complex, and it becomes more difficult to make substantive changes. A tradition of institutional and cultural barriers between relief and development professionals within the same organisation can also impede progress. Where DRR originates in humanitarian departments, it is more likely to be perceived as an aspect of disaster management than as a developmental question of vulnerability reduction. As a cross-cutting issue, DRR has to overcome the strong sectoral boundaries that exist within some development agencies. It also faces the challenge of integrating with existing cross-cutting themes in development work (e.g. gender, rights) and the risk of being seen as a further complication in an already complicated environment.

Case Study 2.1 Institutionalising disaster resilience

DFID plans to embed disaster resilience into all its Country Offices by 2015. It has produced a short guidance note for Country Offices on how to make this happen, drawing on good practice in DFID and elsewhere. The guidance suggests a simple seven-step process, much of which is based on existing systems and procedures, such as strategies and assessments, and can be integrated with the offices' current operational plans:

1. Designate an office 'champion' (lead person and cross-disciplinary team) to drive forward development of a disaster resilience strategy and monitor results.
2. Carry out a multi-hazard risk assessment for that country, looking at disaster threats, vulnerabilities and capacities, drawing on existing analyses by DFID, the national government and other international agencies.
3. Develop a country/regional disaster resilience strategy covering opportunities and obstacles, expected results, and resources required; this is linked to annual operational planning.
4. 'Disaster-proof' new programmes by including risk assessments in their business cases.
5. Develop new programmes and adapt existing programmes to support disaster resilience.
6. Develop emergency plans to facilitate rapid humanitarian response.
7. Contribute to DFID's twice-yearly reporting to the UK government on disaster resilience.

DFID's head office in London provides technical advice and some seed funding to support the process.

DFID, *Minimum Standards for Embedding Disaster Resilience in DFID Country Offices* (London: Department for International Development, 2012).

2.2 Policies and strategies

Policy statements should refer to the importance of disasters, vulnerability, risk and resilience, and commit the organisation to addressing these issues. They should set out the agency's goals in overcoming the problem, linked to its broader strategic objectives. Commitments to take action are particularly important, but may be vague or rhetorical and are sometimes absent even when the importance of disasters has been acknowledged. Hazard-induced disasters may be placed under the catch-all heading of 'external shocks and stresses', which can indicate that the agency concerned is taking a holistic approach to vulnerability, but equally may lead to their particular significance being played down. Nevertheless, even general policy statements are important because they give a mandate to managers and planners within organisations. A specific DRR or resilience policy can be helpful, but may only be feasible for large organisations.

The limitations of policy statements make it essential to provide support at the level of strategic planning. An organisation's strategy or business plan should not only recognise the importance of DRR, but also set priorities and targets for addressing the challenge over a specified period. These might cover incorporation of hazard/risk/vulnerability questions into project planning guidelines, staff training in issues and methods, assigning responsibility for relevant tasks, giving appropriate authority to those responsible and establishing monitoring and reporting procedures.

Introducing or modifying policies and strategies can be a long and sometimes tortuous process, not least because few development or humanitarian organisations would now contemplate policy, strategy or structural changes without extensive consultations with all their main stakeholders. Considerable time, effort and money may be spent on this. Senior managers are generally unwilling to revise policies or strategies unless they are convinced it is necessary, and only after seeing the impact of those already in place. The up-front costs of the necessary training and capacity-building can be substantial, whereas it may take some time before the benefits of changes are felt. Nevertheless, in most agencies policy or strategy review seems to be a semi-permanent condition, which should give grounds for optimism about the uptake of relevant ideas and approaches in the medium and long term.

Whatever form they take, all attempts to promote or mainstream DRR, resilience and other related issues into organisations' work should be based on a coherent 'theory of change': that is, a clear and explicit understanding or set of assumptions about how beneficial, long-term change happens, both within the organisation itself and in those groups and societies it aims to support. Theory of change is also important in project planning (Chapter 3) and monitoring and evaluation (Chapter 18).

2.3 Planning and operational guidelines

Most agencies work to geographical strategies and plans, at regional, country or district level; some plan their work sectorally (e.g. small enterprise development, health, education); others have both geographical and sectoral plans. These may guide an agency's work and set priorities for relatively long periods, perhaps up to five years. These plans should include an assessment of the major hazards, vulnerabilities and risks, and should outline appropriate risk reduction strategies. Methods for carrying out such assessments are outlined in Chapter 3. Explicit decisions should be made about which risks to address, and how to do so.

Like geographical and sectoral plans, programme and project proposals should also include risk assessments and plans to deal with risks. Where agencies use logical or results-based frameworks to design their projects, as many do, the framework's 'risks/assumptions' component should take hazards and disasters into account. Because these are almost always viewed as external factors beyond a project's control, merely identifying risks is a weak indicator that project designers are actually planning to deal with them. So-called 'killer' assumptions, where projects are likely to fail if the assumptions turn out to be wrong – such as the assumption that there will be no major disasters – are sometimes left out of logical frameworks in funding proposals for fear of alarming donors.

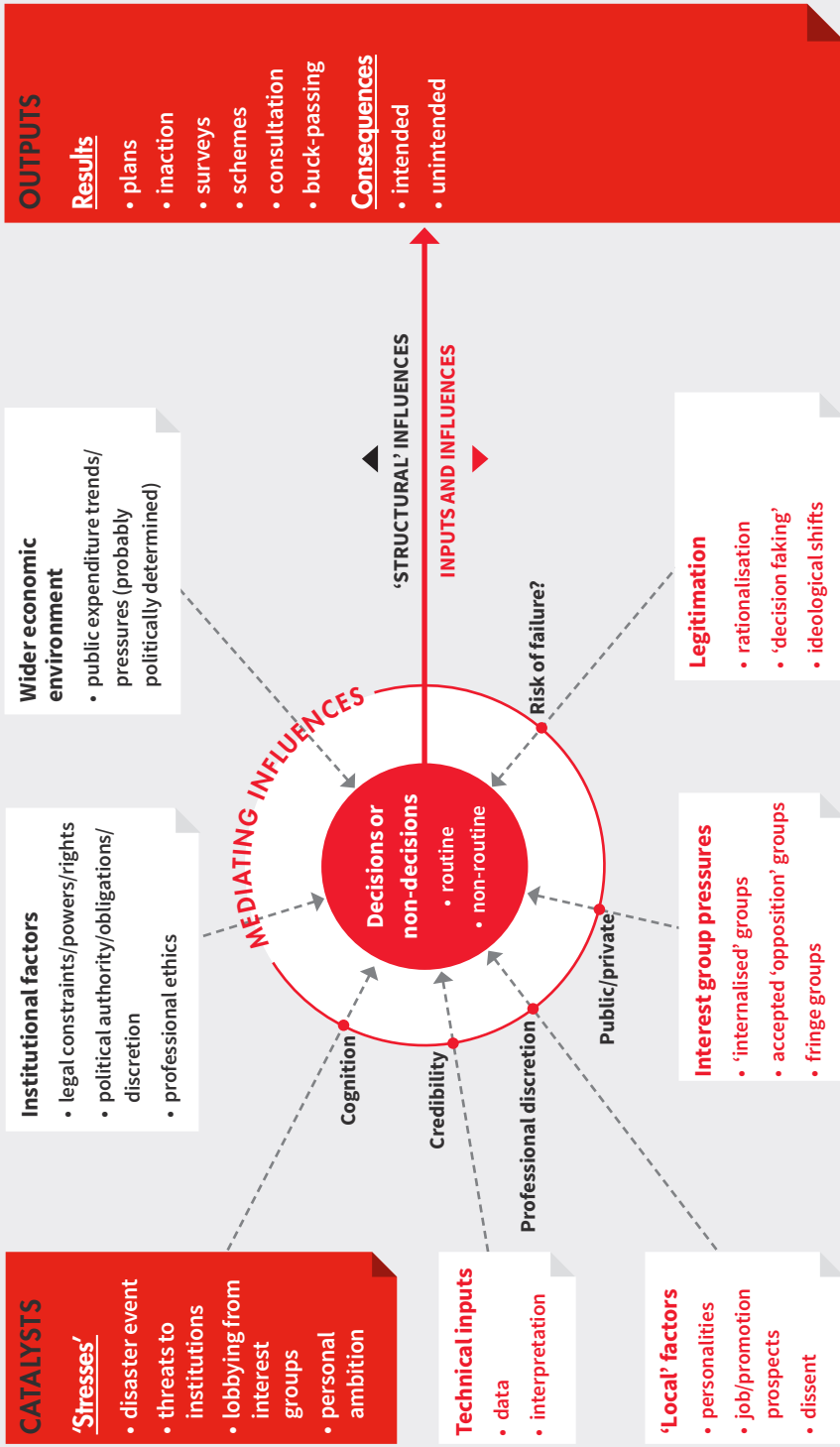
Risk analysis, treatment and monitoring can be inserted into many operational guidelines without great difficulty. The simplest way to do this is to add a few basic questions or criteria to standard project checklists, such as:

- Will the project affect people's vulnerability to man-made and other disasters?
- What impact will the project have on socio-economic vulnerability and resilience?
- What significant hazards might affect the target group?
- How will the project identify and reduce hazard risks to its beneficiaries?
- How does the project assess the likelihood of disasters and, where appropriate, prepare the community and the project itself to deal with disaster situations?

Detailed operational manuals are another matter: here, more thorough guidance will be required. The other chapters in this Good Practice Review cover issues that such manuals will need to consider, including specific tools for appraisal, monitoring, assessment and participation. The existence of operational guidelines does not, of course, guarantee that staff will use them. There must be a supporting commitment from agency personnel.

Operational guidelines vary greatly in quality. In larger agencies they are more likely to be comprehensive and detailed, but for this reason less likely to be read. Simpler versions may be more accessible, but contain limited practical guidance on planning and implementation,

Figure 2.1 Decision-making in a political context



or on assessing proposals from partners. Moreover, operational guidelines often contain so many issues to consider that no development or emergency programme can address them all adequately, and some are bound to be squeezed out by those that appear more important. The guidelines themselves tend to allow for this, often being meant to guide rather than prescribe. This gives project planners and managers considerable discretion.

An extensive process of research/analysis, methodological development and testing, internal advocacy and training is required to bring operational innovations into the organisational mainstream. Organisations may believe that it will be too difficult or impractical to integrate DRR into all their programmes, and may instead opt for stand-alone DRR strategies and projects that are easier to implement. This runs counter to the aims of DRR, which is not a separate sector but a cross-cutting issue, and may leave DRR isolated or marginalised within the organisation.

Organisations' planning and policy decisions are never made in isolation from the wider context of events, societies and institutions. In this sense, they are essentially 'political' decisions; they are certainly not purely technical ones. In particular, the ideologies and policies of governments, donors and other institutional actors help to shape the context in which the work will take place, and should be analysed as part of project planning. For instance, an agency may want to build flexibility and adaptability into its programming, but it is likely to be constrained by donor requirements that focus on programmes and projects with fixed objectives and timeframes.

2.4 Staff capacity

Human capacity in DRR needs to be developed, either by recruiting specialists or providing existing staff with the relevant technical, planning and management skills. Both resources require the investment of time and money. Heavy workloads can be a major obstacle to capacity development. Most people working in relief and development agencies are too busy, most of the time, to reflect on their experiences or absorb new ideas and practices. In many agencies overwork, and pressures of work, have arguably become systemic weaknesses.

Time for individual and group learning about DRR needs to be protected from the demands of heavy workloads. Here the attitude of senior managers is a key factor. Organisations need to be realistic about their timetable for change. They may need to allocate extra funding or hire more staff to cope with increased demands. Wherever possible, they should make full use of existing operational methods and tools, or adapt these to DRR contexts, instead of creating new ones (see Case Study 2.2: Innovation or harmonisation?). If new methods are needed, the process for developing them, rolling them out and ensuring organisational ownership needs to be thorough and well planned (see Case Study 2.3: Mainstreaming participatory vulnerability analysis).

Case Study 2.2 Innovation or harmonisation?

A major international NGO working in relief and development seeking to integrate its work on DRR and sustainable livelihoods more effectively commissioned a consultant to develop a new livelihoods framework and guidance to enable better analysis of vulnerability, hazards and climate change. The consultant reviewed internal documentation and interviewed a number of technical and programme staff in the agency's head office and country offices. From this, it became clear that the agency was already using a wide range of methods, tools and guidance relating to various aspects of livelihood security and vulnerability; programme managers also had access to technical guidance on all areas of project management.

The consultant's recommendation was that the agency should focus its efforts not on introducing new tools but on improving its capacity to use and modify existing ones (country programme managers in particular were keen on this). The overall approach should be towards gradual refinement and harmonisation of methods. More emphasis could also be put on peer learning, for example through secondments and creation of communities of practice, with less reliance on the production of technical documents.

Many agencies speak of the need for DRR leaders, champions or focal points. Leadership is a key element in successful DRR mainstreaming, and there is evidence that determined individuals can push significant innovations through if there is sufficient space within institutional structures and systems. People in senior positions or who have been in an organisation for a long time (with good knowledge of the system and extensive personal networks) are particularly well placed to do this.

Specialist technical advisers can be influential in encouraging, advising and supporting project managers. They can operate across an organisation which may otherwise be compartmentalised in its structure and in the focus of its work and thinking. They have a mandate and, crucially, time to think. Their influence can come not just from their position and expertise, but also from their personality and approach, as well as the length of time they have worked in the organisation. External consultants are often used by organisations to assist them in DRR thinking, including policy guidance, project planning and evaluation, technical aspects of project delivery, and training. In many agencies, interest in DRR and resilience has been stimulated by the experience of responding to recent disasters.

Case Study 2.3 Mainstreaming participatory vulnerability analysis

In 2000, a study for ActionAid International showed a need for a participatory vulnerability analysis (PVA) method that put greater emphasis on people's involvement in assessing their own vulnerability, finding solutions and influencing policies. New guidance prepared by academic specialists proved to be too long and detailed for use at field level. ActionAid also realised that it was important for country offices and their staff to be involved in developing the PVA. A new and more appropriate PVA guide was designed, field tested, discussed across the organisation and finally published; training was carried out at country level, involving ActionAid staff from neighbouring countries, and the new PVA method was taken up and applied widely. Success in developing and promoting PVA across the organisation depended on continued commitment from higher management levels in ActionAid, including the allocation of sufficient resources for development, training and facilitation. It also benefited from the enthusiasm of the country programmes involved in piloting and developing it, and from the creation of a cadre of staff willing to champion PVA and share good practice. There were challenges too. One was that PVA users needed to be familiar with other participatory approaches and tools. Effort was also needed to harmonise the PVA approach with some of the other methods used by ActionAid in its development work.

E. Chiwaka, *Mainstreaming Participatory Vulnerability Analysis in ActionAid International* (London: UCL Hazard Centre, 2005), http://www.ucl.ac.uk/hazardcentre/resources/working_papers2.

2.5 Knowledge-sharing

Good knowledge management should be integral to how DRR organisations operate. Knowledge management is challenging given that DRR is such a broad area of work and involves so many different types of knowledge and institutions. Institutional memories are often weak, project documentation may be non-existent or difficult to find and its quality may vary considerably. Staff turnover hinders consolidation of learning within organisations. Material generated by head offices may be too formal or abstract, and initiatives from headquarters may be regarded as top-down or out of touch by staff in the field, who mostly want information that is directly relevant to their immediate, practical objectives. Field staff themselves often do not realise how useful their knowledge may be to others. Agencies should encourage reflective practice, where staff are given opportunities to record, think about and share their knowledge,

Case Study 2.4 The Gender and Disaster Network

The Gender and Disaster Network (GDN) began in 1997 as an educational project by a group of researchers interested in gender relations in disaster contexts. Today it has more than 1,000 members around the world. GDN promotes gender mainstreaming in DRR through advocacy, information gathering and knowledge sharing. It documents and analyses women's and men's experiences before, during and after disasters; supports applied research and collaboration; shares information and resources; and maintains an international community of researchers and activists. Its website (www.gdonline.org) is an international forum for discussion, networking and information exchange. The website holds a large number of documents relating to policy, planning, practice, communications, training and evaluation, and its Gender and Disaster Sourcebook is a key resource for practitioners and researchers. GDN also runs a lively email discussion list. Membership is open to anyone who shares GDN's goals.

experiences and ideas (along with this, agencies should encourage the development and testing of innovative approaches that might generate new lessons).

Communities of practice – groups of people who share a common role, interest or technical skill – have an important part to play in raising awareness of DRR's value and stimulating innovative approaches, both within and between organisations. These are often informal networks (although professional associations can also perform this role), without fixed membership and operating independently of bureaucratic hierarchies. Their activities typically include collecting and sharing information, discussing issues and methods, problem solving, documenting experiences and identifying knowledge gaps (see Case Study 2.4: The Gender and Disaster Network). Inter-institutional learning networks collect, debate and disseminate useful knowledge on good practice; the Active Learning Network for Accountability and Performance in Humanitarian Action (ALNAP) plays this role in the international humanitarian sector, and several countries have national networks of DRR practitioners (see also Case Study 2.5: Inter-agency learning).

2.5.1 Professional training and standards

Professional training and education are essential components of capacity-building in all organisations. Continuity of learning is needed: regular in-house training, workshops and briefings are a better way of developing skills, knowledge and understanding at all levels in the organisation than short-term inputs, such as one-off training sessions (see Case Study 2.6: Designing training programmes for DRR). Such training should also be aligned with broader organisational development initiatives.

Case Study 2.5 Inter-agency learning

In 2005, five international NGOs (ActionAid, Christian Aid, Plan International, Practical Action and Tearfund) received funding from DFID to implement large-scale DRR programmes over a five-year period. An inter-agency group to share knowledge and discuss common issues met regularly in the following years. Each agency submitted reports and evaluations on their own projects, but the inter-agency group and DFID agreed that there should also be a collective 'learning review' to synthesise learning and evidence from across the different initiatives.

The review was based on a peer review approach in which each agency offered lessons from its work to the rest of the group for discussion. These highlighted what had gone well in building resilience, as well as problems and challenges. The process involved three group workshops, sharing and revision of texts and ongoing dialogue by email and telephone. A number of agency staff took part in the process and over 100 evaluation reports, case studies, operational and training manuals, research papers, institutional analyses and DVDs were collected and reviewed. Important issues and themes were distilled gradually from this iterative process: this was a challenging task requiring considerable thought and debate. The most common and important themes identified were then collated into a concise, readable report which was shared with other agencies working on DRR.

J. Twigg and H. Bottomley, *Disaster Risk Reduction: Inter-Agency Group Learning Review* (London: DRR Interagency Co-ordination Group, 2011), http://www.preventionweb.net/files/21185_drrreviewweb5b15d1.pdf.

The number and range of courses on risk and disaster management seems to have increased massively over the past decade in most parts of the world; in fact they have proliferated so rapidly that an overview of this field is not possible. Many national government organisations for coordinating disaster management offer courses to government officials or outside organisations. Courses in community-based disaster management, pioneered by the Asian Disaster Preparedness Center and other organisations in the 1990s, have become more common. Other agencies have published training manuals and materials for project and community workers.

There are more graduate and undergraduate courses on offer in universities (though still mostly in high-income countries). Shorter courses for professional development are available in a variety of subjects. E-learning courses are also becoming more widely available and accessible: these cost less than face-to-face training, though they cannot substitute completely for direct interaction. E-learning opportunities range from Masters-level courses

Case Study 2.6 Designing training programmes for DRR

The Africa Climate Change Resilience Alliance (ACCRA), founded in 2009, is a consortium of international development organisations working with government agencies and other partners in Ethiopia, Uganda and Mozambique. In Ethiopia, ACCRA and its partners have developed a training programme for government and civil society organisations to mainstream DRR and climate change adaptation. Training is delivered over nine months through three workshops. Each workshop builds on the preceding one and the work becomes progressively more detailed and intensive. The first workshop focuses on key concepts and strategies, the second on developing the knowledge and skills to build local adaptive capacity and the third on how to mainstream DRR and climate change adaptation into projects and programmes. Participants develop relevant and practical outputs in the form of funding proposals, and are mentored between workshops. The initiative focuses on practical learning that can be readily applied, provides knowledge and skills gradually and incrementally and brings together a range of participants with different expertise and from a variety of agencies.

ACCRA, Training for Sustainable Impact – Mainstreaming of CCA and DRM, Africa Climate Change Resilience Alliance.

at universities to short training courses.¹ Individual agencies also give internal courses for head office staff, local offices and partners.

There are no common standards for training in disaster management or DRR internationally, although a number of countries have formalised accreditation for training in various aspects of emergency management. The development and application of minimum standards in specific areas of competence is needed to raise the quality of training, planning, implementation and evaluation, but DRR is such a wide field of activity that it could be difficult to develop common certification overall.

Agencies' experiences suggest that one should ask the following questions when considering running training courses or sending staff on other institutions' courses.

- Does the demand for training in your organisation reflect a genuine need, or is 'training' seen as a panacea without proper consideration of its cost or value? Training is expensive. Be clear about what it can realistically deliver. Set goals and indicators.

¹ See for example the World Bank Institute's wide-ranging e-learning programme for development practitioners: <http://einstitute.worldbank.org>.

- How will you ensure that the skills and knowledge individual trainees receive are applied and shared across the organisation? Staff may move to jobs elsewhere, taking their expertise with them.
- Do you have a long-term training plan? 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.
- Are there courses available that meet your needs, run either by specialist training institutions or by other organisations for their staff and partners? If not, is it cost-effective to design your own, or might it be better to collaborate with other agencies?
- Are you aware of the training materials that are available? Could you adapt these to your own purposes, as free-standing training or integrated into your existing staff development programmes?
- Is conventional training in risk or disaster management really what your staff need? How useful is it to learn the details of disaster theory and technical terminology, which is a major part of many courses?
- Is formal training the best way for your organisation to acquire new ideas? A lot of information spreads informally in organisations.
- Should your organisation act as an educational ‘multiplier’ by extending training to community organisations? Is the ‘training of trainers’ approach the best way of supporting local partners?
- Training generates demands from staff and partners, especially for follow-up initiatives (which require resources). Those who provide training, or help others to get it, have a responsibility to support activities that arise from it. Does your organisation have the motivation and capacity to do this?

2.5.2 External learning resources

There is much more knowledge about disasters, vulnerability, DRR and resilience than there was even a few years ago, and interest in these issues continues to expand. The number of research centres and institutes has grown significantly across the world. There is a growing body of interdisciplinary and applied research, although more needs to be done to bring natural and social scientists together, and to bring researchers and practitioners together. At operational levels, there is more emphasis on learning from experience, through evaluations and reviews (see Chapter 18), and disseminating the results. Well researched, thoughtful and constructively critical reports have become more widely available.

DRR knowledge network focal points and information hubs have also multiplied, helping to build up strong and active communities of practice. Electronic listservs and newsletters

Box 2.1 International DRR networks, documentation centres and information-sharing platforms

Asian Disaster Preparedness Center: <http://www.adpc.net>

DRR and Building Resilience Community: <http://community.eldis.org/.59e3c45b>

Emergency Capacity Building Project: <http://www.ecbproject.org>

Gender and Disaster Network: <http://www.gdonline.org>

Humanitarian Practice Network: <http://www.odihpn.org>

Natural Hazards Center: <http://www.colorado.edu/hazards>

PreventionWeb: <http://www.preventionweb.net>

ReliefWeb: <http://www.reliefweb.int>

Risk Reduction Africa: <http://www.riskreductionafrica.org>

on DRR are numerous and freely accessible. Email discussion groups and groups on social networking sites such as facebook can be an effective way of sharing information and creating links between professionals in different countries. Electronic conferences give researchers and practitioners around the world an opportunity to take part in debates on particular issues, and webinars and podcasts make debates and discussions accessible to people who cannot attend in person. Video-conferencing is becoming more common and affordable through internet communications tools such as skype. Technically, electronic meetings and conferencing are not difficult, but managing them may be time-consuming; good preparation and a good internet connection are essential.

Operational agencies are increasingly publishing books, guidelines, reports, journals and newsletters electronically as well as in print. In some countries academic research centres are now expected or encouraged to make their research findings openly available. Unfortunately, much of the online literature on DRR is 'grey' and so does not feature in standard library catalogues, although some can be identified through web-based catalogues such as the Natural Hazards Center's HazLit database and the Institute for Development Studies' eldis gateway site (which has over 30,000 summaries and links to topics on all aspects of sustainable development, including DRR).²

² See <http://www.colorado.edu/hazards/library>; <http://www.eldis.org>.

2.6 Business continuity

Organisations working on DRR and development must protect themselves against disasters. In other words, they need to maintain their own ‘business continuity’. This means they should have contingency plans in place to ensure that they can maintain their own functions and activities in an emergency, by ensuring that premises and staff are safe, that staff are able to get to work and that information and communication technology (ICT) and other support systems do not fail. They also need recovery plans for dealing with the aftermath of a crisis.

Risk management is a core element in corporate governance and most agencies follow some system of risk assessment and compliance. However, it is unclear how many DRR or development agencies have plans and arrangements for business continuity in emergencies, or how effective these are. There is anecdotal evidence of such things as offices in earthquake-prone countries that have not been built or retrofitted to be seismically resistant, and emergency operations centres that are at risk of flooding. Organisations should also consider the effects of hazards and disasters on their ongoing projects and the vulnerable people they are supporting.

2.7 Monitoring and evaluating organisational mainstreaming

In principle indicators of DRR mainstreaming can be identified at all levels of an organisation, covering many different aspects of its work. For example, Tearfund has published detailed guidance on how to assess, measure and monitor progress towards mainstreaming DRR (see Case Study 2.7: Measuring DRR mainstreaming in organisations). Some agencies have tools to assess capacities in certain aspects of DRR (see Case Study 2.8: Preparing organisations for disaster), or include more comprehensive reviews of DRR capacity as part of broader assessments (for example ACT Alliance’s guide to organisational capacity assessments).³

3 *A Guide for ACT International Members and Forums Undertaking Organisational Capacity Assessments* (Geneva: ACT International, 2008) http://www.actalliance.org/resources/policies-and-guidelines/capacity-development/ACT_OCA_Guide_Final_English_130208.pdf; *ACT Organisational Capacity Assessment Tool* (Geneva: ACT Alliance, 2014), http://www.actalliance.org/resources/policies-and-guidelines/capacity-development/ACT_OCA_TOOL_2014_ENGLISH.pdf.

Case Study 2.7 Measuring DRR mainstreaming in organisations

Tearfund's *Mainstreaming Disaster Risk Reduction: A Tool for Development Organisations* enables agencies to assess how far they have got in mainstreaming risk reduction into their relief and development work, and to identify priority issues and set targets for achieving progress. The guidance sets out performance targets and indicators covering key areas of an organisation's work. Six key areas are identified:

1. Policy
2. Strategy
3. Geographical planning
4. Project cycle management
5. External relations
6. Institutional capacity

In addition, four general levels of attainment are specified, which can be applied across all the categories:

- Level 1: Little or no progress
- Level 2: Awareness of needs
- Level 3: Development of solutions
- Level 4: Full integration

In each area of work there are a number of suggested indicators for the four levels of attainment. The target and indicator sets are broad and can be adjusted to the specific conditions of individual organisations. Factors that may affect the mainstreaming process are also considered. In carrying out an assessment, data can be collected from agency documents and interviews with staff and external stakeholders.

S. LaTrobe and I. Davis, *Mainstreaming Disaster Risk Reduction: A Tool for Development Organisations* (Teddington: Tearfund, 2005), www.tearfund.org; P. Venton and S. LaTrobe, *Institutional Donor Progress with Mainstreaming Disaster Risk Reduction: A Tearfund Research Project in Collaboration with UN/ISDR* (Teddington: Tearfund, 2007), <http://www.unisdr.org/we/inform/publications/1199>.

Case Study 2.8 Preparing organisations for disaster

In 2001, the IFRC drew up *Characteristics of a Well-Prepared National Society*, a simple checklist that could be used by Red Cross and Red Crescent National Societies to assess and improve their disaster preparedness capacities. The checklist's indicators covered many different aspects of organisational capacity: policy and planning, structures and organisation, human resources, financial and material resources, the relevance and effectiveness of disaster preparedness activity, advocacy and external relations.

A questionnaire based on the *Well-Prepared National Society* checklist was developed and sent to all National Societies. Collated findings, which were shared with National Societies and published, were used to identify strengths and weaknesses. Over the following years the checklist/questionnaire has been refined and expanded to allow a more holistic view of emergency management, taking into account issues such as conflict, shelter, food security, recover and DRR.

IFRC, *Characteristics of a Well Prepared National Society for Situations of Disaster and Conflict* (Geneva: International Federation of Red Cross and Red Crescent Societies, undated), <http://www.ifrc.org/Global/WPNS-characteristics-en.pdf>; IFRC, *Well-Prepared National Society Self-Assessment 2002–2004* (Geneva: International Federation of Red Cross and Red Crescent Societies, 2005), <http://www.ifrc.org/Global/Publications/disasters/lr-wpns-whole.pdf>.

Chapter 3

Project planning

3.1 Introduction

DRR programmes and projects vary widely in terms of size, aims, focus and methods, but all are similar in being a series of activities to achieve specific objectives and outcomes within a defined period of time. The basic principles and elements of good planning are common to most development and DRR projects, and are covered in standard manuals and guidelines. This chapter focuses on those aspects that are most directly relevant to DRR, either in stand-alone projects or as part of wider development, humanitarian or recovery initiatives: methods for assessing and analysing hazards, risk, vulnerability and capacity, and ways of adapting existing planning tools to take account of these factors. Chapter 18 looks at the monitoring and evaluation of DRR initiatives.

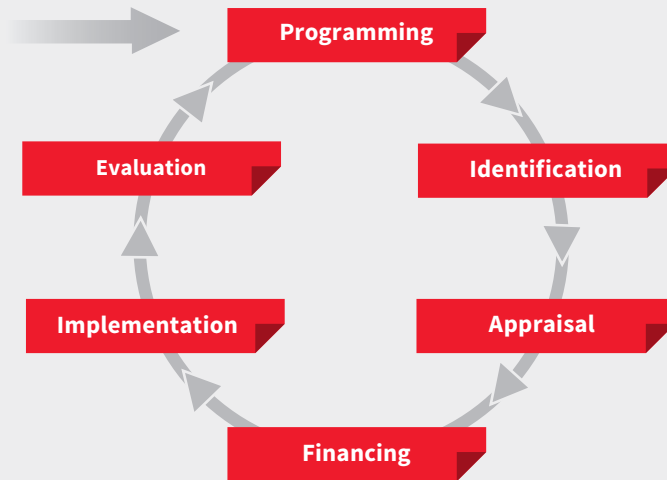
It is often argued that projects are an artificial and limited way of dealing with the complexities of risk, vulnerability and sustainable development. Recent thinking about development, resilience, systems and adaptation is exploring alternative forms of action outside conventional project boundaries, favouring planning that is integrated across sectors and involves more extensive partnerships. Nevertheless, programme and project management is still operational agencies' main approach.

Planning a project assumes that something will be done to address hazard and vulnerability problems. This may not always be the case, however. Conventional risk management approaches allow the option of ignoring identified risks, principally on the grounds that they are minimal; that the chance of a major disaster happening is too remote; or that there are other more immediate or significant problems to address. Only when a decision has been made to address the identified risks do other project planning processes come into play. The stages then are to identify and evaluate the different options for dealing with risks, select the options and approaches to be taken and prepare and implement plans.

3.2 The project cycle

Most agencies use a 'project cycle' management approach. The project cycle is a way of viewing the main elements that projects have in common, and how these relate to each other (see Figure 3.1: The project cycle).

Figure 3.1 The project cycle



- **Programming.** The establishment of general guidelines and principles for cooperation, agreement of focus areas and outlining ideas for projects.
- **Identification.** Within the programme framework, analyse problems, needs and stakeholder interests; identify and screen project ideas; decide whether or not to follow up the options developed.
- **Appraisal/preparation.** Study all significant aspects of the issue, taking into account stakeholders' views, relevance to problems, feasibility and other issues. Develop logical or results-based management frameworks and activity and implementation schedules, and calculate required inputs.
- **Financing/funding.** Decide whether or not to fund the project or seek funding for it (this may not be a separate stage: financial decisions may be taken at different points in the cycle).
- **Implementation.** Use the agreed resources to carry out the planned activities and achieve the objectives. Monitor progress and adjust to changing circumstances where necessary.
- **Evaluation.** Assess the project's achievements and impact (this leads to a decision to continue, change or end the project). Use lessons for planning and implementing other projects.

C. Benson and J. Twigg with T. Rossetto, *Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations. Guidance Note 5: Project Cycle Management* (Geneva: ProVention Consortium, 2007), http://www.preventionweb.net/files/7511_toolsformainstreamingDRR.pdf.

3.3 Project planning

Many of the features of good project design set out in this section are common to project planning in general, as well as to DRR initiatives. Among the main issues to be considered in planning are:

- **Process.** Planning should be approached as a process, not merely the production of written documents. In particular, it should be seen as a process of continuous improvement, reflecting the idea of risk reduction as a long-term goal to be approached gradually. This means that one should not try to work out all the details at the outset.
- **Clarity.** There must be clarity about the overall goals, strategies and scope of the activities to be undertaken. Project plans should also be clear about how proposed activities are linked to broader strategic objectives: logical and other results-based frameworks may help here.
- **Targets.** Projects should set targets whose achievement can be verified by monitoring and evaluation. Evaluation of risk reduction work does present problems, as Chapter 18 shows, but that is no excuse for avoiding the issue. Targets should be realistic and understood by everyone involved in the initiative. Targets may also have to change because vulnerability and risk are not static.
- **Analysis.** The need for a thorough understanding of the problem cannot be over-emphasised. Hazard, vulnerability and risk analysis are well worth the time and effort spent on them. The analysis should include thinking about what might realistically happen in the future, not just about what has happened in the past or what an assessment shows could happen in the present. The nature of communities' vulnerability can alter very quickly under external pressures and opportunities. Anticipate problems.
- **Definition.** There are many different dimensions of human vulnerability to disasters and many different ways of approaching the problem. It is very important to define clearly the nature of the project (e.g. activities, participants), its extent (time, location) and its outputs, together with performance criteria.
- **Resources.** Inputs and resources should be matched closely to the projected outputs – i.e. outputs should be realistic, given the resources available. Assess the implementing organisation, its capacity to address the risks and needs identified, and factors that support or impair its capacity to deal with those risks. An institutional assessment of the kind outlined in Chapter 2 will help here. Assess partner organisations' capacity as well (see below).

- **Setting priorities.** This is fundamental. All projects need to balance costs, benefits and opportunities. Should the project adopt an all-risks approach or be more selective, targeting specific risks? Is the project designed to reduce the direct, indirect or secondary impacts of disasters (see Box 18.3 for an explanation of these terms)? How does one set priorities regarding not only different hazards and vulnerabilities but also different vulnerable groups? What minor or remote risks are acceptable or tolerable? On what basis should such decisions be made (e.g. the magnitude and frequency of the potential disaster, beneficiary priorities, organisational capacity and resources)? The criteria for making such decisions may be operational, technical, financial, social, humanitarian, political or legal. Analysis of costs and benefits (discussed in Chapter 18) often forms part of this. In a development project, reducing risk will be only one of the project's goals, so the priority given to it must be agreed at the start.
- **Generic approach.** As a general rule, it is better to adopt a generic approach rather than one that is hazard/risk-specific – i.e. one that builds up capacities to deal with the range of threats that will affect a given community. Often, this does not happen in practice, with separate planning around different hazards. Such inefficiency leads to gaps in coverage of disaster threats, and sometimes to disputes between disaster management agencies. This does not mean that agencies should not have priorities, or that all hazard threats can be treated identically; rather, it means that the basic human and organisational problems of preparing for disasters are similar, whatever the hazard. However, one should not focus so much on one hazard that other significant risks are overlooked.
- **Partnership and capacities.** Agree roles and responsibilities within the organisation and with partners well in advance. No organisation or group can work alone. Understanding the capacities of individuals, communities and agencies who might be involved in a project is essential to good planning. Identify all relevant internal and external stakeholders, considering everyone who might be affected by an intervention, or who might have influence over it: what are their roles and capacities, how does the implementing organisation relate to them and how can its work complement or support theirs? Partners and stakeholders should be involved in the planning process, not simply written into the plans. Stakeholder partnerships are discussed in more detail in Chapter 4 (see also Box 3.1: Integrating science into project planning).
- **Integration.** Take an integrated approach to the problem. There is rarely, if ever, one single option for reducing risk. A package of measures will be required, based on an all-round view of hazards, vulnerabilities and livelihood options. Choices will have to be made according to local needs, the likely success of different interventions and the resources available. Integrating risk reduction into development programmes is very important.

Box 3.1 Integrating science into project planning

It is generally acknowledged that there is a need to integrate scientific knowledge and understanding of risk into the planning of humanitarian and development projects. In the past, this has happened infrequently and has been based on personal contacts and one-off activities more than systematic collaboration. Recent guidelines explain how the scientific community (natural and social science) and NGOs can engage more effectively with each other to reduce risk. They set out five main areas of activity for effective integration of science into DRR practice:

1. Defining the problem to be addressed. It is easier to build a dialogue around an initial set of questions than a vague concept. Having clear aims and objectives also helps subsequent monitoring and evaluation.
2. Accessing scientific information, knowledge and expertise. Ongoing partnerships with scientists and scientific organisations are recommended, as is the involvement of all relevant stakeholders and experts. These partnerships should be established before planning individual projects or managing crises.
3. Understanding the science and assessing its credibility. Scientific information should be trustworthy and representative of the real world. Practitioners and other users of science need to acquire the skills to determine its credibility and the level of uncertainty in scientific information and assessment. Seeking out more than one source of information, and appreciating that there may be scientific debate about particular issues, is advisable.
4. Applying scientific information and methods. Scientific information should be applied in an ethical and accountable manner. It is important to have an agreed set of values and to put accountability mechanisms in place.
5. Measuring the impact of science integration. It is essential to know what impact the application of scientific knowledge has had on vulnerable communities. Monitoring should take place throughout the project cycle.

The guidelines also note the importance of managing expectations in these partnerships, finding suitable entry points for scientific investigation and knowledge, ensuring the process of integration is well managed and benefits everyone involved, and engaging communities fully in the process so that they can make their own informed decisions. Emphasis is placed on the ‘co-production’ of scientific knowledge about risk by scientists, practitioners and communities.

M. Duncan et al., *Integrating Science into Humanitarian and Development Planning and Practice To Enhance Community Resilience: Full Guidelines* (London: CAFOD, 2014), <http://www.ukcds.org.uk/resources>. For a case study of successful collaboration between climate scientists, vulnerable communities and field agencies, see *Operationalising Climate Science: An Exchange Between Climate Scientists and Humanitarian and Development Policymakers: Senegal Demonstration Case Study* (London: Climate and Development Knowledge Network, 2012, <http://www.humanitarianfutures.org/wp-content/uploads/2013/10/Operationalising-Climate-Science-Senegal.pdf>).

- *Flexibility.* This is essential. It requires process, not blueprint, planning that can adapt according to changes in understanding and circumstances.
- *Assumptions.* These should be stated clearly at the outset so that all partners are aware of them. What external factors might affect the project's implementation and long-term sustainability? What are the risks – natural, social, economic, political – to the project?

3.3.1 Integrating DRR into development projects

This should be considered right from the start of the project cycle, with good situation analysis identifying risks, vulnerabilities and capacities at an early stage. DRR can be incorporated into standard project planning tools, such as logical frameworks, environmental assessments and social impact assessments, relatively easily and effectively.¹ It can also be built into the whole project cycle through the use of checklists and entry points. Checklists set out a series of questions relating to DRR, to be answered when developing project planning documents. The entry point approach focuses more on the planning process to ensure that relevant issues are considered throughout the project cycle. Most planning approaches combine the two.

3.4 Risk assessment

Development and disaster management practitioners use risk analysis or assessment methods when drawing up project plans and making operational decisions. Risk assessment analyses the risks that threaten a project and the options for reducing those risks. Hazards and vulnerability assessments (discussed in Sections 3.5 and 3.6) form a major part of an overall risk analysis, though they can be carried out separately. It is perhaps most helpful to see risk analysis in a broad sense, as an interpretation of all kinds of data on hazards, vulnerabilities and capacities. In practice, the difference between risk analysis, hazards analysis and vulnerability analysis is often blurred. The terms 'risk' and 'vulnerability' are used quite loosely, with some overlap. Many 'vulnerability' assessments include wider risk analysis, whilst many 'risk' assessments focus on vulnerability.

Project risk analyses cover various kinds of risk, including factors within the project's control (e.g. poor design or performance management); external factors in the wider policy and institutional environment that are outside the project's control (e.g. institutional weaknesses, lack of political support); and other risks that will have a damaging impact on project beneficiaries (e.g. environmental hazards, conflict, sudden changes in commodity prices).

¹ C. Benson and J. Twigg with T. Rossetto, *Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations*. Guidance Notes 6 (Logical and results-based frameworks), 7 (Environmental assessment) and 11 (Social impact assessment) (Geneva: ProVention Consortium, 2007), http://www.preventionweb.net/files/7511_toolsformainstreamingDRR.pdf.

Risk analysis may be based on quantitative or qualitative data, or a combination. Quantitative risk analysis requires extensive and accurate ‘hard’ data, and tends to focus only on those aspects of risk that can be most easily measured. It often needs to be combined with other forms of information and analysis to give a comprehensive view. Advanced scientific knowledge and computer modelling enable sophisticated quantitative risk analysis, but also require a high level of resources and technical skills and may not in any case be required; in the fire risk assessment in Vientiane (Case Study 3.1), much of the data needed was collected by visual surveys and a relatively straightforward scoring system was used. Qualitative analysis uses descriptive scales

Case Study 3.1 Fire risk assessment in Vientiane

A fire risk assessment in the city of Vientiane in Laos identified seven key risk factors and gave a numerical value to each to arrive at a total risk score for each geographical unit surveyed.

Risk factor	Total score
Building material type	25
Sources of flammable material	15
Fire-fighting scenario (availability of water and manoeuvring space for fire-fighters)	15
Quality of electrical wiring	5
Fire history	10
Building density	15
Accessibility (roads)	15
	Total: 100

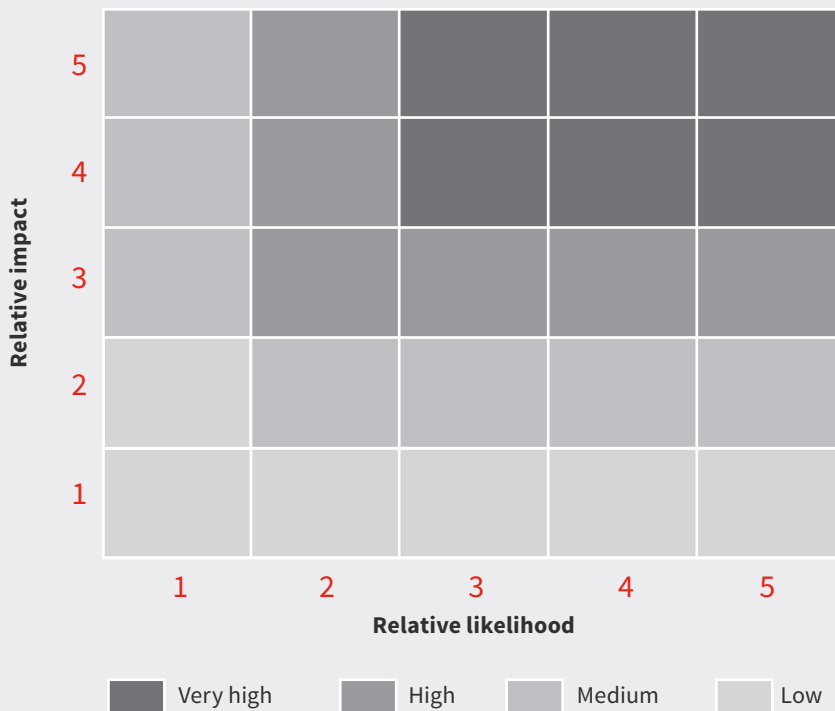
There was a sub-set of quantifiable features within each of the seven categories. Again, each carried a numerical score. For example, under ‘fire history’, there were four categories of risk: high (4 incidents of fire recorded during the past 5 years – score 10), moderate (3 incidents – score 5), low (2 incidents – score 3) and very low (1 incident – score 1).

P. Sounnalath et al., ‘Fire Risk Assessment in Vientiane Lao PDR’ in *Proceedings: Regional Workshop on Best Practices in Disaster Mitigation: Lessons Learned from the Asian Urban Disaster Mitigation Program and Other Initiatives, 24–26 September 2002, Bali, Indonesia* (Bangkok: Asian Disaster Preparedness Center, 2002), http://pdf.usaid.gov/pdf_docs/pnadk776.pdf, pp. 97–102.

for the likelihood and magnitude of risks. It is mostly used for initial screening, where the level of risk does not justify fuller assessment or there is insufficient data for more quantitative analysis. It often takes the form of a probability/impact matrix (see Figure 3.2).

One common limitation of risk analysis is that it does not take a broad view of human vulnerabilities and capacities, tending to focus on more visible and quantifiable elements, such as buildings and physical or financial assets and human lives. It is possible to capture less visible aspects through more qualitative, participatory risk analysis, and the results of such exercises can be valuable in understanding local perceptions and priorities (see Case Study 3.2: Risk mapping among East African pastoralists).

Figure 3.2 Probability/impact matrix



OECD, *Disaster Risk Assessment and Risk Financing: A G20/OECD Methodological Framework* (Paris: OECD, 2012), <http://www.oecd.org/gov/risk/G20disasterriskmanagement.pdf>, p. 43.

Case Study 3.2 Risk mapping among East African pastoralists

A team of researchers developed a simple but systematic approach to classifying and ordering the sources of risk faced by pastoralists in arid and semi-arid districts of southern Ethiopia and northern Kenya. The aim was to find a robust participatory method that was less costly and time-consuming than full surveys. There were two stages in the method: risk identification and risk ranking. The first stage was achieved using an open-ended questionnaire. The researchers emphasised to the pastoralists that they could list as many problems as they wished, and should identify these through discussions amongst themselves. The second stage used a simple numerical ranking method to group risks in order of severity. Risks thought to be equally severe could be ranked equally. After they had done the ranking, informants were asked to discuss each risk in turn, explaining how they used to deal with the problem, or why they no longer could, and how they would like to overcome it. Assessment of the incidence of risk was based on the proportion of participants who identified it. Severity of risk was assessed using a mathematical calculation that translated the informants' perceptions into a simple risk scale. Findings could be plotted on maps to identify areas and groups at risk. Disaggregation by age, gender, wealth and other socio-economic characteristics was also possible. The method was tested in the field over six months, involving 120 groups (59 groups of women, 61 of men). The responses identified 15 major sources of risk, ranging from availability of food and water to banditry. The most frequently mentioned problems were insecure access to food and water, livestock disease and access to health clinics. Food and water shortage were the only risks mentioned by a majority of informants, indicating that the extent of the other risks varied considerably across the region and its population, even though some (e.g. malaria, conflict) were certainly severe in places.

K. Smith, C. Barrett and P. Box, 'Participatory Risk Mapping for Targeting Research and Assistance: With an Example from East African Pastoralists', *World Development*, 28 (11), 2000.

3.5 Hazards assessment

Project planners and managers need to understand the hazards in the places where they work. Development and disaster workers do not need to be hazards specialists themselves, but they ought to understand hazards' main features, seeking help from experts where necessary. General information on different types of hazard is available in textbooks and manuals, but in field projects and programmes more location-specific data are needed. Hazards should also be seen in a broader context, as part of eco-systems and the environment in general.

To identify past, present and potential hazard events and estimate their impacts, planners need information on their characteristics, causes, location, frequency, magnitude and severity, and the damage they might cause to property, communities and the environment. They also need to be aware of hazards outside the project area that might affect it (e.g. by cutting off transport links or power supplies), and how hazards occur through natural physical processes and human activities (e.g. deforestation causing slope instability or rapid water run-off).

Hazard exposure and intensity will change over time. Planners should understand historical trends and probable future changes, as well as current situations. This is particularly relevant to climate change (see Chapter 1), which may have a significant effect on the frequency and intensity of some natural hazard events. Data collection and analysis should begin early in the project cycle and continue throughout, generating more detailed information in the process. Significant hazard threats should be identified at the earliest possible stage in order to set priorities. Hazard assessments must not stand alone but should be integrated into the overall planning process. The amount of information needed and its format will vary according to the type of hazard and project, the stage of the planning process and the accessibility and relevance of hazards data. Project planners want information that is accurate, reliable and intelligible, but must also be realistic about the time and resources needed to collect and analyse data, and the types and quantities of information required.

Hazards data are largely quantitative or spatial and can take many forms, such as 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; and local rainfall and flood level records. A high level of accuracy and detail can be obtained visually (for example in geological mapping and satellite images) and prediction (for instance modelling rainfall run-off, the movement of floodwaters and flood inundation areas). Maps are widely used in hazard identification and assessment. They can provide accurate records of the location, probable severity and occurrence of hazards, and display this information clearly. They can be at any scale or level, making them useful for national or local disaster planning. They can be technologically sophisticated (e.g. geographical information systems; see Chapter 8) or created by community participation using whatever local materials are to hand (see Chapter 6). Maps can also be useful for communicating hazards information to decision-makers and communities at risk, but they often need interpreting for non-specialists, who may not be used to seeing information presented in this form, and for educated users who may be unfamiliar with the particular formats and symbols used (see Chapter 10).

Project planners will usually need to collect different kinds of information to build up a comprehensive picture of the relevant hazards and their impacts. Hazards information can be found in many places and obtained in many ways. The principal types of information provider are:

- vulnerable communities and local stakeholders;
- state disaster management agencies, planning organisations and other ministries and departments;
- national and international scientific research and monitoring organisations (e.g. meteorological offices, volcano observatories, geological surveys);
- international development and disaster management agencies; and
- other non-state organisations (e.g. universities, research institutes, libraries, insurance companies, the media, NGOs).

Much information about the location, frequency and impact of hazards can be found in sources such as historical records (oral and written), archaeological findings, professional reports and research studies, damage reports and old newspaper and magazine articles. A great deal of such information is available online and from open-access sources (this includes geospatial information such as maps and satellite images). Even a basic atlas will contain some geological and meteorological data; information on weather and rainfall is generally distributed through media channels (press, TV, radio) and online; and data from academic research are often in the public domain. That said, specialists may be needed to interpret hazards information, and it is advisable, therefore, to bring scientific specialists into the planning process at an early stage.

In some countries information may be restricted. Access to information from official sources is usually controlled by disclosure regulations. Maps are sometimes considered militarily sensitive and high-resolution maps in particular may not be publicly available. Government or industry hazard and risk maps may be considered too commercially or politically sensitive to share. Even in countries with relatively open access to information, obtaining it may require time-consuming bureaucratic procedures. Information on technological hazards is likely to be hard to find because many of the sources of such hazards are commercial industrial operations such as factories. Official enquiries or health and safety assessments may have produced relevant reports, and environmental groups may be a useful source of information. Poor countries find it difficult to collect and maintain data sets because of cost and skills shortages; the provision and maintenance of seismic monitoring equipment, for example, may be beyond the resources of local or national governments.

It is important to identify gaps, inconsistencies or ambiguities in the evidence, and very important to remember that all hazards assessment contains an element of uncertainty. It can be a complicated process because it combines different kinds of information. For example, in studying a landslide-affected site, scientists would want to look at past history, slope steepness, bedrock type, rainfall and vegetation patterns and land use. In other

cases, there may be limitations in the current state of scientific knowledge. Forecasting of volcanic eruptions, for example, is a highly advanced science, but volcanoes are complex geophysical phenomena and difficult to understand, so that even the most sophisticated monitoring systems may not be able to predict individual eruptions precisely. Experts may also disagree over interpretations of scientific evidence, including probabilistic calculations of hazard events.

In many cases project planners will have to use incomplete or out-of-date data sets. For example, in the 1990s the Kathmandu Valley Earthquake Risk Management Project accepted at the start the need to work in conditions where data were lacking. Instead of carrying out further research, the project used previously collected geological and seismological information, matched this to the current state of infrastructure and the built environment and adapted an existing loss estimation method to the Kathmandu context.²

It is not always necessary to rely on sophisticated technologies and outside specialists. Visual surveys by experienced people can identify areas at risk from landslides; simple stream gauges or flood marks can be used to monitor rising water levels and identify areas likely to be flooded; and local people's knowledge of hazards is often more accurate and extensive than outsiders appreciate (see Chapters 6 and 7). Many community projects carry out participatory surveys such as transect walks, community mapping and seasonal calendars to supplement more formal scientific information. It is increasingly recognised that the production and sharing of hazard and risk knowledge in these contexts should be a collective effort, including people at risk, implementing agencies and scientists, although considerable effort and patience may be necessary to create working relationships and increase levels of trust.³

Analysis of long-term trends and future uncertainty may also be required, for example in the context of climate change. Scenario planning may be helpful in understanding possible future changes, especially in the absence of predictions and reliable data; tools for carrying out participatory scenario planning with communities are available.⁴

2 A. M. Dixit et al., 'Hazard Mapping and Risk Assessment: Experiences of KVERMP', *Proceedings: Regional Workshop on Best Practices in Disaster Mitigation: Lessons Learned from the Asian Urban Disaster Mitigation Program and Other Initiatives, 24–26 September 2002, Bali, Indonesia* (Bangkok: Asian Disaster Preparedness Center, 2002), http://pdf.usaid.gov/pdf_docs/pnadk776.pdf.

3 E. Visman, *Knowledge Is Power: Unlocking the Potential of Science and Technology To Enhance Community Resilience Through Knowledge Exchange*, Network Paper 76 (London: ODI, 2014), <http://www.odihpn.org/hpn-resources/network-papers>.

4 See for example A. Addison and M. Ibrahim, *Participatory Scenario Planning for Community Resilience* (Milton Keynes: World Vision UK, 2013), <http://www.preventionweb.net/english/professional/publications/v.php?id=34947>.

3.6 Vulnerability and capacity assessment

Vulnerability is complex. It has many dimensions – economic, social, demographic, political/institutional and psychological – that affect people’s susceptibility to environmental hazards, in addition to their physical exposure to the hazards themselves. It is influenced by a number of factors, at different levels from the local to the global. It is also dynamic, changing under the pressure of these many different forces.

Vulnerability and Capacity Analysis/Assessment (VCA) identifies groups who are vulnerable, the factors that make them vulnerable, how they are affected and their needs and capacities, and ensures that projects, programmes and policies address these needs. VCA views vulnerability in the broadest sense, and therefore tries (where possible) to consider a wide range of environmental, economic, social, cultural, institutional and political pressures. It also considers the capacities, resources and assets people use to resist, cope with and recover from disasters and other external shocks.

VCA originated in the late 1980s and in one form or another is now widely applied around the world. VCA is a generic term: agencies attach many different names to the different VCA methods they develop (the term Community Risk Assessment is increasingly coming into use to comprise both VCA and risk analysis at community level). Operationally, VCA is used as a diagnostic tool (to understand problems and their underlying causes), a planning tool (to

Box 3.2 Defining vulnerability and capacity

There are many similar definitions of the terms ‘vulnerability’ and ‘capacity’ (or ‘coping’ or ‘adaptive’ capacity in a hazards/disaster context). The United Nations Office for Disaster Risk Reduction (UNISDR) defines them as follows:

Vulnerability: ‘The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.’

Coping capacity: ‘The ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters.’

2009 UNISDR Terminology on DRR (Geneva: United Nations Office for Disaster Risk Reduction, 2009), www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf.

Case Study 3.3 VCA at national level

In 2012–13 the Mongolian Red Cross Society (MRCS) carried out a country VCA covering urban and rural settings. Some 2,500 individuals were involved, including government officials, staff in official health, agriculture, veterinary and weather forecasting services, the police, MRCS staff and volunteers and members of the public.

Data were collected from reviews of official and other documents, key informant interviews with more than 500 people, focus group discussions and field observations. A variety of analytical tools was used, including mapping, historical profiles, case studies, seasonal charts, problem ranking, problem trees and trend analysis.

The key risks identified and discussed in the VCA were fire, floods, winds and storms, road traffic accidents, air and dust pollution, soil pollution, *dzud* (extreme winter weather) and infectious diseases. Targets for intervention were identified in each of these areas.

The Vulnerability and Capacity Assessment Study 2012–2013, Mongolia (Ulaanbaatar: IFRC and Mongolian Red Cross Society, 2013).

prioritise and sequence actions and inputs), a risk assessment tool (to help assess specific risks) and a tool for empowering and mobilising vulnerable communities. VCA can be applied at many different levels, from national and programme to community and household. Most VCAs are local, but many higher-level analyses have been produced (e.g. Case Study 3.3: VCA at national level). VCA can also perform a range of functions: scoping or screening, programme or project design, research, baseline studies and monitoring and evaluation.

Organisations working in DRR use VCA principally for problem identification, because reducing vulnerability is one of their prime objectives. In development projects it is applied mainly in the project appraisal or preparation phase as part of risk analysis or social appraisal, focusing on a particular geographical area or sector. Other project planning tools, such as social analysis and social impact assessment, and especially sustainable livelihoods approaches, may address similar issues. They may also use similar data collection and assessment methods, and their results can feed into a VCA.

There are many ways to approach and implement VCA. Some guidelines are prescriptive, requiring all VCAs to be done in the same way, but many supply a ‘toolkit’ of methods, which allows greater flexibility to adapt to different needs and contexts. These should be consulted

Box 3.3 VCA toolkits and guidelines

Participatory Vulnerability Analysis: A Step-by-Step Guide for Field Staff (London: ActionAid International, 2005), http://www.actionaid.org.uk/sites/default/files/doc_lib/108_1_participatory_vulnerability_analysis_guide.pdf.

VCA Toolbox with Reference Sheets (Geneva: IFRC, 2007), <http://www.ifrc.org/Global/Publications/disasters/vca/vca-toolbox-en.pdf>.

Participatory Vulnerability and Capacity Assessment (PVCA) (London: Christian Aid, 2010), <http://community.eldis.org/.59e79141/1>.

Participatory Capacity and Vulnerability Analysis: A Practitioner's Guide (Oxford: Oxfam GB, 2012), <http://policy-practice.oxfam.org.uk/publications/participatory-capacity-and-vulnerability-analysis-a-practitioners-guide-232411>.

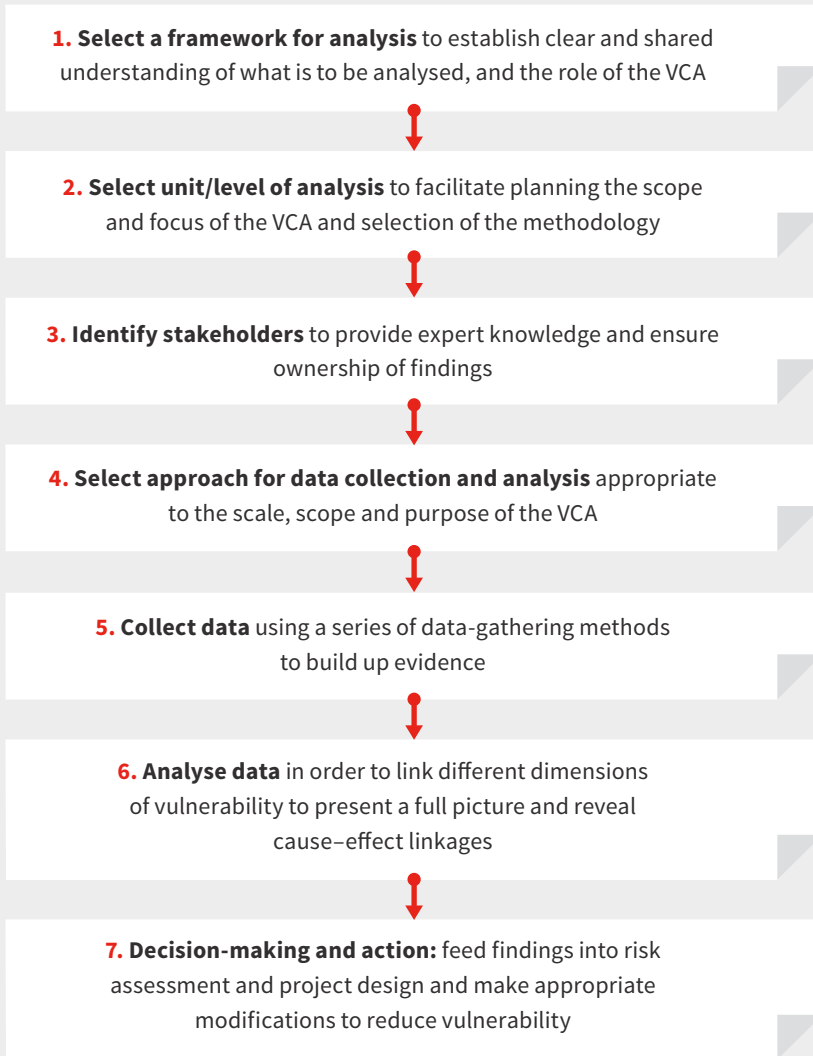
Community Based Resilience Analysis (CoBRA): Conceptual Framework and Methodology (Nairobi: UNDP Drylands Development Centre, 2013), <http://www.disasterriskreduction.net/drought-online/documents/detail/en/c/2693>.

for detailed advice on how to plan and carry out a VCA (examples of well-tested and widely used toolkits are given in Box 3.3; there are many more).

Figure 3.3 outlines the main steps in carrying out a VCA. This is just one standard model; organisations may follow their own, different, approaches. However, it should be remembered that vulnerability is specific to time and place and to particular hazard threats and groups of people. In practice, each VCA should be planned as a distinct exercise, according to its purpose, using the most appropriate approach.

It is essential to establish a clear, shared understanding of what is to be analysed. Designing or selecting an appropriate analytical framework is key to the assessment. The framework should be user-friendly and adaptable. It does not have to be complicated, but it should cover all significant relevant issues, identify the most vulnerable and consider underlying causes of vulnerability, as well as the current situation. These issues are complex, and building up a comprehensive view of vulnerabilities and capacities requires time. Vulnerability analysis should not be rushed. It should also be carried out well before a potential disaster, allowing hazards and risks to be set within a broader socio-economic picture. It can also be done as part of long-term rehabilitation after a disaster, and in long-term development. As well as time, vulnerability

Figure 3.3 Basic steps in VCA



C. Benson and J. Twigg with T. Rossetto, *Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations*. Guidance Note 9: Vulnerability and Capacity Analysis (Geneva: ProVention Consortium, 2007), http://www.preventionweb.net/files/7511_toolsformainstreamingDRR.pdf, p. 106.

analysis can require considerable resources. Many field agencies lack sufficient experience and skills to implement analyses effectively, and staff training in the requisite methods will probably be needed, though there are still few trainers in vulnerability analysis methods.

There are many different indicators of vulnerability and capacity. Some are more helpful than others, and some (such as indicators of coping ability) are particularly hard to obtain. Do not rely on only a few indicators, or those that are most easily identified. Careful triangulation of the different indicators is needed to build up an overall picture. Data may be unavailable, too difficult to collect, of poor quality and inconsistent. VCA teams often have to make the best use of what they can find. Data limitations should be acknowledged in VCA reports. Because vulnerability is not simple, and the data will be diverse, it may be difficult to reach agreement on priorities. Organisations carrying out vulnerability analysis may have to put significant effort into reaching a consensus on how to proceed. Finally, VCA should be an ongoing process, not a one-off, because vulnerability is dynamic and ever-changing. There should always be an up-to-date vulnerability analysis for the district or communities being assisted. In practice this rarely happens because agencies lack the resources to carry out repeated vulnerability analysis exercises. VCA is typically undertaken only at the start of a project or programme.

In terms of process, *how* the vulnerability analysis is done is as important as its findings. VCA is not just an information-gathering exercise: if done properly, with vulnerable people themselves taking part, it can raise awareness and increase knowledge of the risks people face and their ability to deal with them. VCA depends on the involvement of a wide range of stakeholders in providing and analysing data (be it at national or community level). As well as supplying more valid data through local expert knowledge and perspectives, this ensures wider ownership of the findings. The collaborative involvement of vulnerable people and external stakeholders (e.g. government officials) can stimulate a shared understanding of the issues and appropriate solutions, as well as having the potential to influence policy and practice elsewhere.

VCAs often fail to pay enough attention to the ‘capacities’ dimension. Identification and assessment of existing coping capacities is the starting point for building community resilience and can motivate community action. Engagement of communities in the VCA process is in itself an act of capacity building. The capacities of excluded or marginalised groups (e.g. children, older and disabled people) should not be overlooked (see Chapter 5). It is essential that the views of all groups in the community are heard – particularly those of women and the most vulnerable. VCA guidelines emphasise this and organisations working in DRR claim to be targeting marginalised vulnerable groups. However, there is evidence that these good intentions are not always put into practice: local men may dominate, vulnerable people may be overlooked (for example, disabled people are often invisible in VCAs)⁵ or local elites may attempt to control the process in order to benefit from the projects planned on

5 J. Twigg, ‘Attitude before Method: Disability in Vulnerability and Capacity Assessment’, *Disasters*, 38(3), 2014.

Case Study 3.4 Local elites and VCA

A series of VCAs in six villages and the capitals of two rural districts in Malawi in 2008 revealed a number of issues relating to local power relationships. In each village, the team conducted interviews with the village head, focus group meetings with community members and members of the Village Development Committees (VDCs), together with other interviews and group meetings with local government officials and field staff of local NGOs.

At village level in rural Malawi, VCA teams generally have to choose between two established social communications channels to manage community participation and ensure they collect complete and accurate information. Both options are linked to local power structures. The first involves the village heads: traditional authorities, holding office for life, with power over customary property such as land, water and natural resources. The second involves the Village Development Committee, a representative structure set up by the state.

In poor areas, association with NGOs and their projects can give local power holders access to resources such as vehicles or well-paid jobs, or it can be used to strengthen their power base by allowing them to control distribution of goods such as food aid, seeds and fertilisers and the management of local development infrastructure (such as irrigation systems or grain storage facilities). They therefore seek to develop long-term NGO connections, starting with involvement in the VCAs.

Village headmen wanted the VCA assessments to be carried out under customary rules, with the village head convening and chairing community meetings. Village Development Committee members claimed the right to participate in the assessments separately, as the only representative structure at the local level. They seemed to perceive NGOs as allies in their struggle for public space, and saw the VCAs as opportunities to raise their profile and gain legitimacy in the community.

J. L. Peña and J. Nyong'o, *Who Controls Development? NGOs, Accountability and Power in Rural Malawi* (London: Aon Benfield UCL Hazard Centre, 2011), http://www.ucl.ac.uk/hazardcentre/resources/working_papers/working_papers_folder/wp28.

the basis of the assessment (see Case Study 3.4: Local elites and VCA). Specific governance analysis is often valuable in order to understand the roles and influence of different organisations within and outside the community.

The types of data collected and the way they are collected must be appropriate to the VCA's scale, scope and purpose. Ideally, the information-gathering methods used should be comprehensive enough to capture the different elements of vulnerability and capacity without the exercise becoming too complex and burdensome. An initial scoping exercise can give a general picture of vulnerability in the project area, highlight key issues and identify information gaps. This usually relies on secondary data that are publicly available (e.g. social and economic surveys by governments, disaster impact data, the news media, analyses commissioned or carried out by international aid agencies and reports or research papers on past disaster events). Subsequently, additional primary data will be collected to complement and challenge the secondary data findings.

VCA will use a variety of sources and types of quantitative and qualitative information to capture the complexity of vulnerability in the project area (see Table 3.1 for examples of the range of methods and sources of information that might be used).

Agencies usually base their understanding on local-level data. At this level, VCA relies heavily on participatory techniques and tools (secondary sources of information – maps and other documents – can easily dominate the investigation and are often best used to cross-check information generated in the field). Such approaches give relatively limited coverage, geographically and in terms of the numbers involved. Because the methods used and data collected vary according to time and place, the results are not standardised and it can be difficult to compare findings. However, these drawbacks are outweighed by the advantages, including more detail and better insights into the multiple pressures that communities face and the causal links between them, local needs and priorities, people's understanding of their own vulnerability, indigenous methods for dealing with risks and community capacity (actual and potential).

Many other kinds of quantitative and qualitative information can be used, such as general social and economic surveys by governments and other agencies, drought and food security early warning systems, situation reports by operational agencies, news media stories, analyses commissioned or carried out by international and bilateral donors and anthropological studies. VCAs often use basic national-level indicators of socio-economic development (e.g. size of land holdings, per capita income, literacy levels, mortality and morbidity rates, access to clean water) for background information. These give insights into vulnerability, but the picture may not be complete, comprehensive or directly relevant to the location and communities the VCA is aimed at. Small agencies are unlikely to have the resources or capacity required for meaningful national-level analysis, and will usually have to rely on the work of larger agencies. Key informants can be very helpful in explaining

Table 3.1 Tools for assessing socio-economic vulnerability

Methods	Application to vulnerability
Secondary data collection and review (official reports, economic surveys, census data, household surveys and other official statistics, research, early warning systems, reports by other agencies, etc.)	Contextual information on a variety of issues including population characteristics, external shocks and stresses (e.g. rainfall and temperature trends), health (morbidity and mortality), the impact of previous disasters
Geospatial data (e.g. maps, satellite images, social mapping, transect walks)	Identify physical and environmental features (including hazards), land use, other resources and infrastructure, location of populations and vulnerable sub-groups
Environmental checklists	Questions to gain information about environmental conditions and concerns, revealing the relationship between vulnerable people and their environment (e.g. What role do environmental resources play in resilience? How do environmental hazards, degradation and changes affect communities?)
Sample surveys	Quantitative data on dimensions of vulnerability (e.g. education, employment, health, nutritional status, household economies)
Interviews (individuals, households, community groups, key informants), focus groups	Information from different perspectives (among communities, other local stakeholders, external experts) on events and trends that cause stress, differential vulnerability and the effectiveness of adaptive behaviour
Individual and household case studies; oral histories	Data on different experiences of vulnerability and abilities to withstand environmental hazards and other shocks
Timelines	Historical occurrence and profiles of longer-term events or trends (e.g. floods, droughts, epidemics, environmental trends and cycles)
Seasonal calendars	Describe seasonal events and trends, identifying vulnerability context, livelihood assets and strategies (e.g. rainfall, food levels at different times of year, crop planting and harvesting schedules, food prices, changes in health status)
Preference, matrix and wealth ranking	Reveal vulnerability of different groups' assets to shocks and stresses, and strategies against this
Problem tree	Identifies problems and their causes, and indicates possible solutions
Venn diagrams and other institutional appraisal/ mapping methods	Social capital, relations between groups, institutional and policy environment
Scenarios and computer simulations	Explore possible future outcomes and model social-environmental interactions over time

Source: C. Benson and J. Twigg with T. Rossetto, *Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations*. Guidance Note 9: Vulnerability and Capacity Analysis (Geneva: ProVention Consortium, 2007), http://www.preventionweb.net/files/7511_toolsformainstreamingDRR.pdf.

systems and filling knowledge gaps, but may have individual biases. A number of online datasets provide information on disaster mortality, economic impact, hazards and other aspects of vulnerability and capacity (see Box 3.4: Disaster, risk and vulnerability datasets). The VCA may need to draw on several such indicator sets.

Case studies of recent events are a valuable supplementary source of information on the impact of disasters, people's vulnerability and agencies' capacities. It may not be easy to find good-quality case studies, however: the published literature may be limited or hidden in academic journals. Agencies' situation reports generated during major disasters are more accessible⁶ but may only have a limited amount of information that is useful for vulnerability analysis.

At both national and local levels, it is essential to understand the 'enabling environment' of policies, institutions, laws, regulations and funding that can support or restrict a project's aims. Assessing the capacity of government and civil society to manage disaster risk can be challenging, although there are a number of widely used indicator sets to assess progress in DRR at national and local levels, including relevant aspects of the institutional environment (see Chapter 18).

VCAs tend to generate more information than is needed and identify more issues than local-level agencies can address. Excessive data collection is expensive and – if not used – wasteful. The task of processing large volumes of information puts pressure on organisations of all sizes. This shows the importance of setting clear and realistic targets for a VCA exercise. To be fair, it is not always easy to judge how much information will be necessary at each stage of project design and implementation, or for whom (community organisations, NGO field staff and headquarters staff will have different information needs). Some fieldworkers have suggested that a picture of vulnerability could be built up gradually through a series of smaller assessment exercises rather than a single intensive, complex VCA. This would also enable an operational agency to fit its work around community activities, thereby reducing disruption. The main drawback to this approach is that the agency might be drawn into one area of intervention before the whole picture is clear and, as a result, find itself unable to address more significant problems should they appear later.

Data analysis usually presents more problems than data collection. Data sets contain a variety of evidence and indicators that are not easily triangulated, collated or analysed. Methodological guidelines have relatively little to say on the subject of analysis. This causes problems for many staff who have used VCA. In addition, organisations tend not to allow sufficient time and human resources for thorough analysis. As a result, the findings of some VCAs are more descriptive than analytical, especially where the evidence is mainly qualitative: this makes it difficult to set priorities for intervention. Where organisations

⁶ Many are online, on the ReliefWeb site at <http://www.reliefweb.int>.

Box 3.4 Disaster, risk and vulnerability datasets

Online datasets such as those listed below provide national (and sometimes sub-national) data on aspects of risk and vulnerability:

- Centre for Research on the Epidemiology of Disasters, EM-DAT database (disaster impact and loss data): <http://www.emdat.be>.
- Munich RE, Natcat Service (disaster impact and loss data): <http://www.munichre.comnce/business/non-life/natcatservice/index.htmlnatcat>.
- South Pacific Applied Geoscience Commission/United Nations Environment Programme (SOPAC/UNEP) Environmental Vulnerability Index (environmental indicators): <http://www.sopac.org/index.php/environmental-vulnerability-index>.
- Transparency International Corruption Perception Index (<http://www.transparency.org/cpi2013/results>) and Country Corruption Profiles (<http://www.transparency.org/country>).
- UNICEF State of the World's Children Reports (socio-economic indicators) <http://www.unicef.org/sowc>.
- United Nations Development Programme (UNDP) Human Development Reports (socio-economic indicators): <http://hdr.undp.org/en>.
- United Nations Office for Disaster Risk Reduction (UNISDR)
 - Desinventar (disaster impacts and loss data): <http://www.desinventar.net>
 - PREVIEW Global Risk Data Platform (hazard events, exposure and risk data): <http://preview.grid.unep.ch/index.php?preview=home&lang=eng>
 - Risk Data Platform (hazard events and exposure data): <http://risk.preventionweb.net>
- World Bank World Development Reports (economic, social, environmental indicators): www.worldbank.org/wdr.
- World Health Organisation Global Health Observatory (health indicators): <http://www.who.int/gho/en>.
- World Wide Fund for Nature (WWF) Living Planet Index (biodiversity indicators): http://wwf.panda.org/about_our_earth/all_publications/living_planet_report.

follow an open-minded, participatory approach, the selection and weighting of indicators are usually left to participants in the VCA process, but this too causes problems for many field staff, who need appropriate training and guidance. Assessment teams should identify and focus on the most useful indicators, remembering that the indicators that are easiest to measure are not necessarily the most useful for analysis.

VCA should lead to action, but in some cases it is seen as an exercise in gathering information for its own sake. Specific actions resulting from VCAs might include:

- preparation of community DRR action plans;
- establishment or strengthening of community organisations to implement DRR initiatives;
- repair, strengthening or redesign of vulnerable infrastructure and facilities;
- relocation of vulnerable communities and facilities;
- new land use, planning or building regulations and practice;
- institutional and community strengthening to implement recommended actions and provide a basis for initiating future actions;
- shift of emphasis to different economic and livelihood activities;
- introduction of economic support mechanisms (e.g. micro-credit, cash for work) and social support systems to increase resilience; and
- formal contributions to policy debates, especially regarding the underlying pressures contributing to vulnerability in the project area.

For many practitioners, one important question will be how much information and analysis is really needed before a project can start. There is an inherent tension in project work between the need for knowledge gathering and understanding on the one hand, and the pressure to act on the other. A rapid VCA can be done in a few days, even occasionally a few hours, although a more deliberative and participatory process is generally desirable. More extensive VCAs may take weeks or months depending on the type of project and the methods used.

Carrying out a VCA can raise community expectations that the organisation concerned will intervene to solve all the problems identified. This is rarely possible. It is therefore very important to discuss its purpose and likely outcomes with communities and other stakeholders at the outset. If this is not done, there is a risk that communities will be disillusioned or even angry, and the organisation's reputation will be damaged as a result. Anecdotal evidence suggests that such problems do arise, possibly quite often. It may also be helpful to consider potential barriers to implementing DRR interventions recommended by a VCA and to identify ways of overcoming these.

Chapter 4

Partnerships, governance and stakeholders

4.1 Introduction

No single group or organisation can address every aspect of DRR. The scale, frequency and complexity of disasters, as both physical and social phenomena, can only be addressed by deploying a wide range of knowledge, skills, methods and resources. Therefore, risk reduction initiatives should be multi-disciplinary partnerships, enabling organisations to share ideas, work more coherently, deliver projects more effectively and influence decision-makers.

DRR partnerships can be of many different kinds: for example, between official/government and civil society organisations, professionals and the public/communities, academics and practitioners, donors and beneficiaries. Partnerships should increase the impact of initiatives by making them more sustainable and replicable. Forming alliances can also make better use of resources. Links with external organisations enable communities to obtain more and better information about hazards, DRR and adaptation. Partnerships can be both vertical (between national and more local actors) and horizontal (e.g. between government, the private sector and civil society). Although partnerships are necessary, they can also be difficult to manage. Some of the challenges in establishing and maintaining partnerships are given in the following sections, together with suggestions of ways to overcome them.

4.2 Creating partnerships

The disaster ‘community’ – those who are professionally engaged in efforts to prevent disasters and deal with their consequences – is diverse, comprising a wide range of disciplines. These include physical scientists (of many different kinds: earth scientists, hydrologists and meteorologists, for instance), social scientists (also of many different kinds, including geographers, anthropologists, sociologists and economists), engineers, architects, doctors, psychologists, development and emergency planners and humanitarian relief workers. It also comprises very different organisations, including international aid agencies, government (at all levels), NGOs and other civil society organisations, academia, consultancies, military agencies and the private sector. All have a role to play in reducing risk – together, of course, with vulnerable communities, who are the main actors in mitigation, preparedness, response and recovery at local level.

Case Study 4.1 A multi-stakeholder partnership for DRR

The Nepal Risk Reduction Consortium (NRRC), launched in 2011, is a partnership of UN agencies, the Red Cross, donors, financial institutions, the Nepalese government, national and international NGOs and technical and research institutes. Its aim is to reduce the country's vulnerability to natural disasters. It has five 'flagship' DRR programmes: school and hospital safety, emergency preparedness and response, flood risk management, community-based disaster risk management and policy and institutional strengthening. Each programme involves a different group of partners, and is coordinated by a government ministry and an international organisation. Collectively, the flagship programmes have activities in most of Nepal's 75 districts. A mid-term review in 2013 found that the NRRC had helped to create and maintain a focus on DRR nationally, and enabled collaboration between a variety of stakeholders. However, this collaboration was complicated, because many of the stakeholders were not used to working together. The programme would therefore need more time to consolidate its results, and more coordination and support would be needed in the longer term.

Nepal Risk Reduction Consortium: <http://www.un.org.np/coordinationmechanism/nrcc>.

Disasters are complex problems demanding a holistic response from these different disciplinary and institutional groups, but in many cases they do not get this. All too often, the disaster community is characterised by fragmentation along disciplinary and institutional boundaries, a lack of understanding and mutual respect between different disciplines, insufficient dialogue between different actors (e.g. between physical and social scientists, between governments and NGOs or between vulnerable communities and so-called 'experts' from outside), a culture of competitiveness and professional jealousy (fuelled by competition for funds) and a greater readiness to talk than to listen.¹ Another critical failing is that disaster specialists and people working on long-term sustainable development programmes tend to act in isolation from each other.

Partnership-building is not simple or straightforward: it requires a great deal of time, negotiation, sustained effort, transparency, trust, commitment and institutional support (see Case Study 4.2: Building and maintaining partnerships). Skilled facilitation is essential, but in some cases strong leadership may be needed to maintain momentum. Organisations

¹ J. Twigg, *Physician, Heal Thyself? The Politics of Disaster Mitigation* (London: UCL Hazard Centre, 2011), http://www.ucl.ac.uk/hazardcentre/resources/working_papers/working_papers_folder/wp1

that take on such leadership roles should seek to support the partnership process, not direct it. Often, it is committed and experienced individual members of staff who play leading roles: this creates a high level of dependence upon those individuals, and partnerships may be damaged if they leave to work for organisations elsewhere. It is also important that a partnership is not over-extended geographically, technically or administratively.

Partnerships that are based upon existing institutions and connections may achieve good results more quickly (see Case Study 4.3: Schools, young people and DRR), although there is

Case Study 4.2 Building and maintaining partnerships

Launched in 1997, Project Impact was a US government initiative to make communities more resilient by bringing local actors – government, businesses, communities and NGOs – together to plan and implement their own DRR initiatives. It marked an explicit shift in the role of government from directing to partnering and facilitating, as well as delegating decision-making to local levels. Pilot projects were set up in seven communities, but many more communities and businesses signed up to the programme nationally.

Evaluations of the seven pilot projects identified a considerable number of DRR achievements, but also pointed out some of the challenges in making multi-stakeholder partnerships work. For instance, all the participants had to make a cultural adjustment to working in a participatory way, particularly government staff and the private sector, who had little experience of this approach. A great deal of time and effort was required to keep initiatives moving. An active and effective local coordinator was vital to help maintain momentum. Outreach work was needed to ensure marginal and vulnerable groups were represented in discussions and involved in the projects.

The evaluations also warned that the pilot projects' high level of dependence on government seed funding raised questions about their long-term sustainability. Shortly afterwards, a newly elected presidential administration brought the programme to a halt. Nevertheless, it appears that Project Impact's ideas and approach have continued to influence DRR practice in some parts of the country.

Project Impact monitoring and evaluation reports in the Disaster Research Center online library (University of Delaware) at <http://udspace.udel.edu/handle/19716/753>; E. Holdeman and A. Patton, 'Project Impact Initiative To Create Disaster-Resistant Communities Demonstrates Worth in Kansas Years Later', *Emergency Management*, 2008, <http://www.emergencymgmt.com/disaster/Project-Impact-Initiative-to.html>.

Case Study 4.3 Schools, young people and DRR

Young people can play an important role as agents of change and promoters of DRR (see Chapter 6). Working with young people opens up the possibility of wider community outreach by communicating DRR information through formal pathways (e.g. local leaders and committees) and informal channels (e.g. families, friends, neighbours). The schools that children and young people attend are also important hubs, with connections to other official institutions.

Plan International's programme in El Salvador to involve young people in disaster prevention worked both with individual school boards and the national Ministry of Education. Linking groups and institutions was central to the strategy. This took a variety of forms, including children's representation on community and municipal DRR committees; integration of DRR into school teaching and protection plans; and promotion of child-centred DRR in the thinking and practice of central government. The initiative began as a pilot project in February 2005, but by July 2007 over 5,000 schools were preparing school protection plans and DRR had been integrated into the national curriculum.

J. Twigg and H. Bottomley, *Disaster Risk Reduction NGO Inter-Agency Group Learning Review* (London: DRR NGO Inter-Agency Group, 2011), http://www.preventionweb.net/files/21185_drrreviewweb5b15d1.pdf.

a risk of such partnerships being too exclusive: inclusion is key to a strong and sustainable partnership. Collaboration around a single common objective is also a good way to start the process of partnership-building (see Case Study 4.4: Developing interagency tools for DRR).

Whatever their focus or scale, DRR partnership-building efforts are likely to face a number of common challenges. Partner agencies may have different aims and mandates, values and ideologies, decision-making structures and ways of working, programming timetables, capacities, skills and funding streams, as well as facing different pressures from their donors. They may also have different perspectives on the problems to be addressed and how to resolve them; even if they use the same core concepts and terminology, they may understand or interpret them differently.

Such issues should be identified and discussed at the outset, when the partnership is being developed. Potential problems should be resolved then, as it is much harder to deal with them when initiatives are under way. Assessment of needs and opportunities could be carried out by an organisation as part of its project planning, through an initial mapping or scoping exercise to identify which aspects of DRR other agencies are currently addressing

Case Study 4.4 Developing interagency tools for DRR

In 2010, a group of humanitarian agencies working in Bolivia began to collaborate on DRR and climate change adaptation. Climate change and associated extreme events are a serious threat to impoverished, minority and vulnerable populations in the country, and agencies needed to work together to tackle such a big and complex issue. The first step was to share knowledge and expertise, from which to build a shared understanding of DRR. From this, a shared Risk Analysis and Participatory Planning (RAPP) tool was developed, derived from existing vulnerability and capacity assessment tools used globally by three of the partners, CARE, Oxfam and World Vision.

The collective development process, facilitated by a consultant from the Emergency Capacity Building Project, ensured staff understanding and acceptance, as well as a product that was adapted to local needs and conditions. As a result, agencies were able to use a common approach when working with communities, local partners and government organisations, and could compare results, pool expertise and communicate more effectively with other stakeholders, including the government.

J. Srodecki, 'Developing Interagency DRR Tools at Field Level: World Vision's Experience in Bolivia', *Humanitarian Exchange*, no. 51, July 2011, <http://www.odihpn.org/humanitarian-exchange-magazine/issue-51>; World Vision, *ECB: Adventures in Partnership, Case Study A: Coming Together To Reduce the Impact of Disasters in Bolivia*, 2011, <http://www.alnap.org/resource/18115>.

in that district. This may be particularly helpful in multi-stakeholder settings, by indicating gaps in agencies' collective coverage and highlighting the potential for new or stronger collaboration on specific issues. Roles and responsibilities may have to be altered during a partnership to respond to needs or opportunities as they are identified.

Finally, it is important to remember that power – the ability to control or influence other people's behaviour and actions – is a component in all relationships between different organisations or groups. This influence can come from possessing formal authority, socio-economic status, education, social capital, specialist knowledge and expertise and money or other material resources. Power imbalances are often found in, for example, partnerships between governments and civil society organisations, international and national or local NGOs, donor agencies and recipient organisations or groups, and technical specialists and the public. Power and influence issues should be identified and acknowledged openly, and clear and effective accountability mechanisms should be put in place to address imbalances.

Box 4.1 Key factors for success in partnerships

The Emergency Capacity Building Project was a global initiative led by six international agencies working through country-level consortia in Bangladesh, Bolivia, Indonesia, Niger and the Horn of Africa. Its aim was to improve the speed, quality and effectiveness of emergency preparedness and response by building capacity at different levels. In reviewing how to make country consortia and other forms of collaboration work effectively, the project identified ten key factors for success:

1. Defining common aims and objectives
2. Ensuring effective leadership
3. Ensuring alignment between partners (e.g. of aims, operating procedures)
4. Demonstrating visible support and reliable commitment
5. Prioritising staff time to facilitate and support the process
6. Ensuring transparent, effective communication
7. Clarifying roles and responsibilities
8. Funding the process
9. Finding common approaches
10. Managing problems within the consortium

Emergency Capacity Building Project, *What We Know About Collaboration: The ECB Country Consortium Experience*, <http://www.alnap.org/ecb/what-we-know-about-collaboration-the-ecb-country-consortium-experience>.

4.3 Governance

Disasters should be seen as a governance issue and DRR as an area of public policy. Broadly speaking, governance is the way in which societies manage their affairs in the economic, political and social spheres. It comprises values, policies, institutions and mechanisms for implementation, and it involves interactions between the state, civil society and the private sector. In the case of DRR, effective governance should include making DRR a policy priority, allocating sufficient resources to it, ensuring effective implementation and facilitating participation by all relevant stakeholders (see Case Study 4.5: Governance and disaster preparedness).²

It is generally agreed that national governments should be the main actors in risk reduction. They have a duty to ensure the safety of their citizens; only governments are likely to have

Box 4.2 Government roles in DRR

Governments play a number of roles in DRR:

- As providers of DRR goods and services (e.g. maintaining early warning systems, emergency response services, evacuation shelters, hospitals).
- As risk avoiders (e.g. ensuring investments in public infrastructure and facilities, such as roads or schools, are protected against environmental hazards).
- As regulators of private sector activity (e.g. creating and enforcing building codes and land use regulation).
- As promoters of collective action and private sector activity (e.g. public education about preparedness and business continuity).
- As coordinators of multi-stakeholder activities and DRR partnerships.

E. Wilkinson, *Transforming Disaster Risk Management: A Political Economy Approach* (London: ODI, 2012), <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/7555.pdf>.

² United Nations Development Programme, Provention Consortium, UN-HABITAT, United Nations Volunteers, *Governance: Institutional and Policy Frameworks for Risk Reduction* (Thematic Discussion Paper, Cluster 1, World Conference on Disaster Reduction, 18–22 January 2005, Kobe, Japan), <http://www.unisdr.org/2005/wcdr/thematic-sessions/WCDR-discussion-paper-cluster1.pdf>, pp. 3–4.

Case Study 4.5 Governance and disaster preparedness

Cuba is often cited as an example of a country with effective DRR planning and operations. It has a well-organised civil defence structure that reaches down to the grass roots, an effective early warning system backed up by good scientific knowledge, well-equipped rescue teams, emergency stockpiles and other resources. These are supported by strong political commitment to DRR at all levels of government, risk-aware planning and land use management policies and regulations, widespread public trust in the government's ability and willingness to act, extensive disaster education and training programmes, considerable experience of mass mobilisation and a strong sense of solidarity and social cohesion. The state is also committed to reducing the social and economic inequalities that contribute to vulnerability, and invests heavily in public services such as education, health and infrastructure.

The system's effectiveness is particularly evident in the case of hurricanes. Six major hurricanes hit Cuba between 1996 and 2002, but only 16 people died. Hurricane Michelle in November 2001 damaged or destroyed 25,000 homes, but only five deaths were reported. Some 700,000 people (out of a population of 11m) were evacuated. In Havana, electricity was turned off to avoid deaths or injuries from electrocution, and the water supply was turned off in case of contamination. Havana's 2m inhabitants stockpiled water and food, and citizens helped to tie loose roofing down and to clear debris that might have been dangerous if picked up by strong winds. The success of these arrangements was due to an effective warning and communication system, memory of previous disasters (encouraged by the authorities), the ability to mobilise people at neighbourhood level and the general population's trust in official warnings and advice.

It has been questioned whether the Cuban model can be replicated elsewhere. Cuba is a single-party political system in which the government plans and directs the economy, controls the market and the media and is the sole provider of social services. It has also been argued that the country's disaster management system is less effective when it comes to long-term mitigation and post-disaster recovery. Nevertheless, the system contains many key features of good DRR practice that can be adopted or adapted for use elsewhere.

M. Thompson and I. Gaviria, *Weathering the Storm: Lessons in Risk Reduction from Cuba* (Boston, MA: Oxfam America, 2004), <http://www.eird.org/isdr-biblio/PDF/Cuba%20Weathering.pdf>; B. Wisner, *Lessons from Cuba? Hurricane Michelle, November, 2001*, 2001, <http://www.radixonline.org/cuba.html>; IFRC, *World Disasters Report 2002* (Geneva: International Federation of Red Cross and Red Crescent Societies, 2002), pp. 41–43; B. E. Aguirre, 'Cuba's Disaster Management Model: Should It Be Emulated?', *International Journal of Mass Emergencies and Disasters*, 2005, <http://www.ijmed.org/articles/316/download>.

the resources and capacity to undertake large-scale multi-disciplinary initiatives, and a mandate to direct or coordinate the work of others. Governments also create the policy and legislative frameworks within which risk reduction can be accomplished. In practice, however, governments may lack capacity and resources, especially in poorer countries, but attitude and management are often the root problems: failure to recognise the importance of hazards and vulnerability to national development, coupled with short-term planning and inadequate organisation.

Governments are not monolithic. They are divided by function, hierarchy and politics, all of which can work against sustained risk management. In most countries, a large number of government agencies have a legitimate role in disaster management, including civil protection organisations, scientific research institutions, environmental protection agencies and finance ministries. Simply coordinating these may be a major task. In many disaster management systems, integration between higher and lower levels is weak.

Although there has been considerable improvement worldwide in government capacities, institutional systems and legislative provisions for DRR in recent years, progress has been uneven. National changes have often not made a significant difference at lower levels of government, where there is likely to be a significant need for awareness-raising, training and capacity-building.

Government policies can sometimes be a major contributor to people's vulnerability to hazards. Disaster management efforts by one branch of government, such as civil defence, may be undermined by the general thrust of economic, social or environmental policies. For example, the value of establishing tropical cyclone early-warning systems and building cyclone shelters is seriously weakened if coasts are being stripped of natural defences such as mangrove forests in order to build commercial shrimp farms encouraged by export-driven economic programmes. Disaster management can also become subject to political pressures. Casualty and damage figures are often used by political parties for their own purposes: opposition parties may try to blame governments for disasters, or make them look inept or uncaring in their management of crises. In the same way, governments may wish to downplay the impact of disasters to avoid blame, or exaggerate the human and economic casualties in the hope of attracting international aid.

Disasters often reveal weaknesses in the current policy and practice of disaster management, and can stimulate change and innovation (see also Chapter 17: Risk reduction after disaster).³ There is certainly evidence for this, although the nature and extent of such change is unpredictable, changes may be unplanned as well as deliberate and the lessons drawn from one disaster experience are not necessarily relevant to other crises. Case Study 4.6 (Reorganising disaster governance after disaster) is an example of how a major disaster led to significant legislative and administrative changes.

Case Study 4.6 Reorganising disaster governance after disaster

The devastating Indian Ocean tsunami on 26 December 2004 killed more than 165,000 people in Indonesia and affected more than 700,000. Reviewing the experience, the Indonesian government decided on major reforms of its national disaster management arrangements. A new disaster management law that came into force in 2007 recognised the need for a comprehensive DRR approach throughout the country, integrated into development planning and with the participation of all relevant stakeholders, including NGOs and communities. In 2008 a new national disaster management agency was established to coordinate activities in all aspects of disaster management, reporting directly to the president. Authority and responsibility for DRR measures was decentralised to an extent from central to local (provincial, district and village) authorities, with a decree requiring the establishment of local disaster management agencies in all provinces by 2009. Subsequently, DRR and climate change adaptation were integrated into national development policies and plans, and into legislation on land use, urban planning and coastal management. New national DRR and disaster management plans and guidelines were issued. International organisations were encouraged to support these processes.

Establishing this radically new organisational structure and implementing the new DRR agenda proved challenging, mainly because of limitations in technical, material and human capacities, as well as resource constraints. Nevertheless, these innovations mark a fundamental change in the way DRR is perceived and implemented in Indonesia.

C. Gaulin, *Disaster Risk Management in Indonesia: From Theory to Practice* (Paris: Action Contre le Faim, 2013); R. Djalante et al., 'Building Resilience to Natural Hazards in Indonesia: Progress and Challenges in Implementing the Hyogo Framework for Action', *Natural Hazards*, 62 (3), 2012.

³ J. Birkmann et al., 'Extreme Events and Disasters: A Window of Opportunity for Change?', *Natural Hazards*, 55, 2010.

4.4 Decentralisation

Over the past 20–25 years, many governments have progressively decentralised a range of their responsibilities from national to local levels. This has had both positive and negative consequences for risk reduction. On the positive side, sharing responsibilities between central, intermediate and local levels of government helps to mainstream DRR across government structures, as well as giving local levels a greater sense of ownership. Decentralisation can also change how communities and local NGOs interact with state institutions. Being closer to the communities involved, staff in local organisations of all kinds are more likely to understand or even share their needs, and they are more accountable. Local government institutions may be less politicised than those of central government, and it may be easier to develop partnerships between the public and NGO sectors to strengthen local capacities. There is no standard mechanism for DRR partnerships between local government and civil society organisations. It takes time and effort to build up levels of trust and cooperation to the point where they can significantly improve capacity to manage disasters and emergencies. Communities seeking to engage local government as a partner or supporter of DRR often need training in how to lobby officials and work in partnership. Joint planning or VCA exercises can provide an entry point to longer-term collaboration.

Decentralisation can lead to DRR becoming isolated from mainstream government decision-making. Good collaboration between sectors and across different levels of administrative and operational responsibilities is therefore essential. Central governments may simply abdicate their responsibilities, leaving local government and NGOs to take on the task of managing DRR, even though they often lack the capacities, technical skills and finances to do so. Communities do not necessarily lower their expectations of local government to reflect this shift. They may continue to expect it to undertake structural mitigation measures, such as building dykes and embankments, just as they expected the national government to do. Local administrations' room for action may be restricted by parallel or competing governance structures (e.g. traditional leaderships, parastatal agencies) or by higher-level planning decisions and regulations.

Another fundamental, but less visible, 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 become fragmented into a series of small-scale initiatives, focusing on individual hazard events and artificially separated from the surrounding vulnerability context. The scale of a disaster may overwhelm local resources and capacities.

Case study 4.7 Challenges to institutionalising DRR in local government in Mexico

Official policy in Mexico is to integrate DRR at all levels of government. The country's disaster management structure is highly decentralised, on paper. In practice, however, local municipalities have very limited capacity, especially in poorer and rural areas. They often have to seek funds from state and federal governments, on a case-by-case basis, and there is heavy reliance on external resources during and after emergencies. Municipal civil protection teams have very few staff and there is little continuity (many civil protection directors, who tend to be political appointees, are replaced after elections).

There is little public pressure on the government to reduce disaster risk. Community organisations focus on more pressing day-to-day needs, such as access to improved services (healthcare, education, drinking water), employment and crime. Effective local-level DRR may rely on intervention by other external actors. For example, in Yucatan after 2003, UNDP supported a major community resilience programme, based on training local 'promoters', that reached more than 260 localities. Although popular with communities and civil society organisations, the intervention was viewed with suspicion by many municipalities. Nevertheless, the involvement of UNDP and other local NGOs did help some communities to build more effective relationships with local government to strengthen DRR.

E. Wilkinson, *Building a 'Culture of Prevention': Challenges to Institutionalising Disaster Risk Reduction in Local Development in Mexico* (London: UCL Hazard Centre, 2009), http://www.ucl.ac.uk/hazardcentre/resources/working_papers/working_papers_folder/wp21.

4.5 Widening civil society participation

NGOs (local, national and international) now feature in many disaster reduction plans. Yet they are often regarded as minor players, especially in countries whose governments remain reluctant to concede authority and resources to civil society. They have also found it hard at times to gain acceptance internationally. Governments do not always welcome the growth of civil society and some resist any expansion of its role, especially where this involves criticism of the government. Disasters can open up opportunities for civil society organisations to take on a greater role, but governments may take firm steps to close these down thereafter (see Case Study 4.8: Civil society and the state after disaster). Under particularly authoritarian regimes, more extreme repressive measures may be taken.

Case Study 4.8 Civil society and the state after disaster

In August 1999 an earthquake devastated the Marmara region of Turkey: over 17,000 people were killed and an estimated 100,000 houses and 16,000 businesses destroyed or severely damaged. The scale of the disaster put enormous pressure on emergency management systems. In the first few weeks after the earthquake, state institutions were ineffective and civil society organisations filled the gap. The government's inability to respond adequately drew sharp criticism from the media, NGOs and affected people. The media focused repeatedly on government corruption as a factor contributing to the disaster.

In the months that followed the central authorities regained control and there was a shift in state attitudes towards civil society, from spontaneous acts of collaboration to systematic acts of control and threats. Only designated state authorities and a few state-friendly NGOs were allowed to deliver aid to earthquake victims. Other NGOs were told to leave: if they refused, their depots for donated goods were closed, they were threatened with having water and electricity supplies turned off and some had their bank accounts frozen. Members of the Turkish Association of Architects and Civil Engineers were refused permission to inspect destroyed and damaged buildings, and some lawyers claimed that evidence to convict the building contractors was being destroyed by the government. A Turkish television channel, Kanal 6, was closed down for a week for being too critical of the government's response.

R. Jalali, 'Civil Society and the State: Turkey after the Earthquake', *Disasters*, 26(2), 2002.

Disasters can also open up opportunities for civil society organisations to operate more freely and collaborate with new partners. In Myanmar, where the government had placed severe restrictions on NGO activities, relief and recovery efforts after Cyclone Nargis in 2008 opened the way for more collaboration between local and international NGOs across a range of development and humanitarian sectors, and the number of local NGOs and CBOs increased.⁴

In addition to conventional NGOs, a wide range of civil society organisations can make effective contributions to DRR. Examples include the following (partnerships with grass-roots groups are discussed in Chapters 6 and 7):

⁴ S. R. Saha, *Working with Ambiguity: International NGOs in Myanmar* (Cambridge, MA: Harvard University, 2011), http://www.hks.harvard.edu/var/ezp_site/storage/fckeditor/file/pdfs/centers-programs/centers/hauser/publications/reports/myanmar_report_final_version_2011_09_08.pdf.

- Trade unions are active in promoting health and safety in the workplace, and also give high priority to protecting the natural environment and socially responsible economic development. They have organisational skills and mass membership that could be mobilised to tackle hazards and vulnerability generally. The same is true of other professional or trade associations and cooperatives (see Case Study 4.9: Cooperatives and disaster preparedness).
- Religious institutions and faith-based groups have traditions of supporting the needy and disaster victims. Local faith organisations with established congregations and membership affiliations are often a source of volunteers and sometimes leaders in emergencies, but there is a risk that such groups will favour people of their own religion, and members of minority religions are among the more vulnerable groups in some societies. Nevertheless, the extensive grass-roots outreach of faith groups gives them a potentially significant role in risk reduction.
- Universities and other research institutions are improving our understanding of hazards, vulnerability and disaster management. Academic networks and publications constitute well-established and effective channels for sharing knowledge between researchers. International networking and information-sharing is particularly strong among scientists and engineers. Better interaction between disaster researchers, technical institutions and practitioners is needed, but there are many examples of collaboration, such as scientists providing information about hazards and long-range forecasting, universities undertaking market research to support livelihood product diversification and technical bodies developing guidelines and standards (see Case Study 4.10: Academic collaboration for DRR in Africa).
- The mass media are potentially important partners in risk reduction (see Chapter 10).
- Professional groups with technical skills and experience often offer support on a voluntary basis. Specialist NGOs can help with this, such as RedR (which provides training for aid workers, facilitates sending technical specialists to assist in relief and rehabilitation and supports capacity-building of local organisations) and Operation Florian (through which UK fire-fighters donate used equipment and provide technical training to fire and rescue services in other countries).⁵

4.6 Networks

Many development and humanitarian practitioners have considerable experience of working with vulnerable people to protect them against hazards and help them recover from disasters. Often, this experience is neither documented nor shared, usually because

⁵ See <http://www.redr.org.uk>; <http://www.operationflorian.com>.

Case Study 4.9 Cooperatives in disaster preparedness

The Japanese Consumers' Cooperative Union (JCCU) represents cooperative organisations across the country. With member cooperatives, the JCCU runs disaster preparedness workshops to educate local residents. Workshop participants identify key emergency facilities (e.g. evacuation shelters, fire stations and hospitals) and vulnerable households, and mark their locations on neighbourhood maps. The completed maps are then used in scenario and simulation exercises to identify appropriate preparedness and response actions for the neighbourhood. The initiative was begun in 2004 in Chiba Prefecture by a group of cooperative workers who had survived the 1995 Kobe earthquake. It subsequently expanded to become a nationwide programme with over 20m members. Two hundred facilitators were trained, and in 2008 150 workshops were held, many of them supported by local and national government organisations.

UNISDR, *Private Sector Activities in DRR: Good Practices and Lessons Learned* (Bonn: UNISDR, 2008), <http://www.unisdr.org/we/inform/publications/7519>, pp. 28–32.

Case Study 4.10 Academic collaboration for DRR in Africa

Established in 2006, PeriperiU is a partnership of African universities established to build local DRR capacity. It has ten member universities (in Algeria, Ethiopia, Ghana, Kenya, Madagascar, Mozambique, Senegal, South Africa, Tanzania and Uganda) and involves more than 70 academics. The members have developed and delivered new academic programmes and more than 50 short courses and training modules for practitioners from government and civil society organisations. The consortium is also a vehicle for knowledge exchange between the universities and between different academic disciplines.

Source: <http://www.riskreductionafrica.org>.

Case Study 4.11 Global and national networks for DRR

Established in 2007, the Global Network of Civil Society Organisations for Disaster Reduction (GNDR) has more than 450 members from civil society organisations, including national and international NGOs, community-based organisations and academic and research institutions. Activities undertaken by the network and its members include sharing information (through meetings, online discussions and field visits), taking part in national and global DRR platforms and other conferences and events, organising meetings and engaging with other networks. Every two years GNDR publishes a major survey, *Views from the Frontline*, on progress in implementing DRR at local level and challenges to achieving resilience. This presents the views of communities, civil society organisations and local authorities in areas most affected by disasters: the 2013 edition collected evidence from more than 21,500 local respondents in 57 countries.

Source: <http://www.globalnetwork-dr.org/home.html>.

The Disaster Risk Reduction Network Philippines (DRRNetPhils) is a nationwide grouping of over 300 civil society organisations, communities and practitioners. It was established in 2008 to advocate for improvements to disaster management legislation then under discussion in parliament. Under the influence of the network, the 2010 Disaster Risk Reduction and Management Act put greater emphasis on community resilience, strengthening local DRR capacities and tackling the root causes of vulnerability, in line with the aims of the Hyogo Framework for Action and internationally accepted good practice. DRRNetPhils has also published guidance on the contents of the 2010 act and how to apply it.

See: <http://www.dap.edu.ph/cshd/drrnetphils/index.htm>; E. Agsaoay-Sano, *Primer on the Disaster Risk Reduction and Management (DRRM) Act of 2010* (Quezon City: DRRNetPhils, 2011), <http://drrknowledge.net/primer-on-the-disaster-risk-reduction-and-management-drrm-act-of-2010>.

project staff are too busy and the institutions they work for do not give sufficient priority to organisational learning. Staff are often unaware of similar work in other organisations, or even in other parts of their own organisation.

Better networking – in the broadest sense of the term – is therefore essential. It improves access to, and exchange of, information and expertise, and can help network members to maximise their impact through the synergy that comes from partnerships and greater cooperation. The proliferation of development and emergency networks in recent years, especially at national and international levels, indicates that agencies have recognised the value of better networking. The Humanitarian Practice Network is one successful example of this: it now has almost 9,000 members from around the world, and there were 250,000 visits to its website last year.

A number of significant DRR networking initiatives have been established at global, regional, national and sub-national levels, typically involving academics, technical specialists and other practitioners for research, publication, training, the promotion of good practice and advocacy. The lack of effective inter-disciplinary networking remains a major stumbling block but is slowly being addressed. The UNISDR has promoted the establishment of formal national platforms around the world, with the aim of involving different stakeholder groups in disaster policy-making, improving practice and integrating DRR into development.⁶ Local-level networks tend to focus on particular risk reduction initiatives, such as early warning or watershed management.

There are many types of network and many practical challenges to networking. Common problems faced by networks include a lack of clear objectives, disparate membership, domination by particular organisations or interest groups, excessive centralisation of network administration and communications, lack of critical debate about achievements, competition between participants, lack of resources (and in some cases donor interference) and the difficulty of monitoring and evaluating impact.⁷

Disparity of membership is perhaps the most important problem in disaster reduction networking. Creating a forum at which all the different viewpoints can be adequately represented has proved beyond the capacity of some networks, and others have struggled because of the perceived dominance of particular interest groups. It is easier to form a network around specific academic or practical disciplines (e.g. social scientists, nutritionists) or themes (e.g. arsenic in Bangladesh), but this should not be at the expense of multi-disciplinary networking, to which everyone should be encouraged to devote some of their time.

⁶ See <http://www.unisdr.org/we/coordinate/national-platforms>.

⁷ P. Starkey, *Networking for Development* (London: International Forum for Rural Transport and Development, 1997).

4.7 Private sector partnerships

Businesses are heavily involved commercially in DRR, providing engineers, consultants, software designers, insurers, transporters and suppliers of goods and services of many kinds. The role of the private sector in disaster management is sometimes a contested issue, especially with regard to potential clashes between commercial interests and broader social and humanitarian objectives. Disasters can create profit-making opportunities for businesses.⁸ Nevertheless, attempts have been made to encourage initiatives to mitigate risks that are both commercially viable and support poor and vulnerable groups, for example through micro-insurance (see Chapter 12). More effort is also going into making businesses aware that they depend on local people, resources and infrastructure, and should take steps to protect these as well as their own premises and goods.

There is much potential for corporate social responsibility (CSR) initiatives in risk reduction. CSR involves businesses recognising their impact on society and the environment, and acknowledging some degree of responsibility for making a more positive contribution to sustainable development. It often involves dialogue and partnerships with other stakeholders in government and society. There are many examples of public–private and CSR-inspired initiatives in DRR, such as hardware stores donating materials or providing them at low cost to encourage homeowners to protect their properties, allowing use of business premises as shelters or distribution centres or providing free technical support. As part of an Indonesian government–private sector initiative to prepare for tsunamis (launched in 2008), members of the Bali Hotel Association agreed to open their hotels in an emergency to local people who could not reach safe evacuation locations; they also supported public education events and putting up evacuation route signs.⁹ In the UK, supermarket chains have agreed to provide disaster response agencies with out-of-hours access to obtain food and essential provisions; a hotel chain has offered its hotels as emergency rest centres and restaurants have agreed to provide food vouchers to displaced people.¹⁰ In Project Impact in the United States (see Case Study 4.2: Building and maintaining partnerships), business inputs to local DRR initiatives included home supplies stores giving discounts on products for household preparedness, employees being given time off to take part in projects and supporting public education activities, for example by paying for materials and providing space for displays and airtime for announcements.

Insurers and other firms publish and distribute information on disaster impact and risk reduction measures; insurance and reinsurance companies have sponsored important hazards

⁸ N. Klein, *The Shock Doctrine: The Rise of Disaster Capitalism* (London: Penguin Books, 2007).

⁹ UNISDR, *Private Sector Activities in DRR: Good Practices and Lessons Learned* (Bonn: UNISDR, 2008), <http://www.unisdr.org/we/inform/publications/7519>, pp. 20–23.

¹⁰ K. Williams, *Emergency Planning in the UK: The Players, the Partnerships and the Pressures* (London: Aon Benfield UCL Hazard Centre, 2009), https://www.ucl.ac.uk/hazardcentre/resources/working_papers/working_papers_folder/wp25.

research, and in some public–private insurance schemes premiums are reduced if households or communities demonstrate that they have taken certain steps to protect their property. Business was active in rehabilitation projects in Gujarat after the earthquake in January 2001, and in the Philippines and the United States businesses have created NGOs to address disaster problems. Private sector involvement in technological innovation, such as electronic cash transfers, telecommunications and remote sensing, also supports DRR and humanitarian efforts.

Although companies of all kinds are often keen to give cash and in-kind support to emergency relief, they appear to be far less involved in longer-term DRR, especially in lower-income countries. The degree of business engagement with DRR issues in a particular country may be related to the general level of awareness of these issues in that country. It also seems that commercial pressures on small businesses everywhere make it hard for them and their employees to find time to take part in local DRR activities. Where there is business activity, it is usually ad hoc and short-term and, significantly, addresses only the immediate symptoms of need or vulnerability, not the root causes – for which businesses may in part be responsible.

In some countries, companies have little confidence in government or the NGO sector, preferring to go it alone. Elsewhere, governments and international organisations have to persuade businesses to take part in collaborative activities. Where businesses take the initiative, this often takes the form of unilateral actions closely linked to their own activities (e.g. provision of materials and information) or interests (e.g. sponsorship of research and training). Business leadership and commitment are most likely to come from sectors most closely linked to issues of risk and safety: insurers, principally, but also engineers, retailers, architects and telecommunications enterprises. Such firms have a large commercial stake in risk reduction and understand the problems associated with it.

4.8 Military involvement in disaster reduction

In most countries, armed forces personnel, equipment, transport and other facilities are called upon to support emergency services during disasters. They may take a prominent role in response to major disasters – for example the earthquakes in Pakistan in 2005 and China in 2008 – especially if civil authorities are overwhelmed. Military engineers have sometimes been involved in risk reduction, usually by putting up structural mitigation measures, such as flood embankments. Many disaster management organisations originated in civil defence, while many civil protection/civil defence institutions have military links (which has led to an often uneasy relationship between disaster planners and civil defence agencies).

Civil society tends to be wary of the military's motives in relief assistance and mitigation work, especially in countries where the armed forces have a history of interference in domestic politics. The military's command-and-control approach also goes against modern risk management philosophy, which stresses coordination, participation and partnership. However,

since the military clearly can play a role, and has considerable capacity, greater dialogue and collaboration are needed. For example, civilian agencies could benefit from military expertise in contingency planning and the development of scenarios and training exercises. Joint contingency planning and development of emergency coordination mechanisms can improve disaster preparedness capabilities, as well as building mutual understanding and trust.¹¹

4.9 Regional and international collaboration

Disasters are often ‘shared events’, crossing national boundaries and affecting whole regions. A Caribbean hurricane may go on to hit Central America; where major rivers cross national boundaries, such as those entering Bangladesh or Mozambique, floods that begin in one country can spread to others; volcanic ash can be blown across a whole continent, affecting agriculture and aviation. Countries in the same region tend to face similar hazard threats and often have similar institutional and social structures.

This creates a strong incentive for national governments to collaborate, especially in sharing forecasting and warning data. Systems for sharing scientific information between countries – particularly hydro-meteorological data for early warning – are well established and can be very effective. More wide-reaching regional agreements include the Association of South-East Asian Nations (ASEAN) Agreement on Disaster Management and Emergency Response (AADMER), signed by ASEAN foreign ministers in 2005, which is a legally binding agreement for member states to promote regional cooperation in DRR and disaster preparedness and step up joint emergency responses to disasters in the region. After Cyclone Nargis in 2008, ASEAN played a vital role in brokering collaboration between the government of Myanmar and the international aid community.¹²

Collaboration on DRR between national governments is less common. Disasters may raise tensions between states. The sudden release of a build-up of floodwater from dams in one country can cause severe flooding in a neighbouring state downstream. In South Asia, where large river systems cross national borders, disputes over water use have hindered the establishment of regional flood forecasting and warning systems.¹³ Concern is growing about

11 E. Ferris, *Future Directions in Civil–Military Responses to Natural Disasters*, Australian Civil–Military Centre, 2012, <http://www.brookings.edu/~media/research/files/papers/2012/5/civ%20mil%20disasters%20ferris/05%20civ%20mil%20disasters%20ferris.pdf>.

12 L. Mercado Carreon, ‘Working with ASEAN on Disaster Risk Reduction and Disaster Management’, *Humanitarian Exchange*, no. 50, 2011, <http://www.odihpn.org/humanitarian-exchange-magazine/issue-50>; <http://www.aadmerpartnership.org>.

13 Navin Singh Khadka, ‘South Asia Disunity “Hampers Flood Warnings”’, BBC, 19 July 2013, <http://www.bbc.co.uk/news/science-environment-23358255>.

Case Study 4.12 Regional cooperation in flood management

The Mekong River Commission (MRC), set up in 1995, is an inter-governmental agency working directly with the governments of Cambodia, Laos, Thailand and Vietnam on the joint management of shared water resources and sustainable development of the Mekong River. It plays a key role in regional decision-making and the development of common rules and procedures; it is also a knowledge hub on fisheries, navigation, flood and drought management, environmental monitoring and hydropower development.

Annual floods play a vital role in agriculture and freshwater fisheries, and provide water that can be stored for irrigation in the dry season; but they can also result in loss of life, damage to agriculture, property and infrastructure, and disruption of social and economic activities. The average annual cost of floods in the Lower Mekong Basin is \$60–70m, with most of the damage in Cambodia and Vietnam.

Drawing on data from 138 hydro-meteorological stations, the MRC's Flood Management and Mitigation Centre, based in Phnom Penh, issues daily flood forecasts and warnings to governments, NGOs, the media and the public during the flood season. A regional Flood Forum coordinates flood-management activities with planners, scientists, international organisations and civil society organisations. It is also a platform for sharing experiences, information and lessons learned through training workshops and exchange visits.

Mekong River Commission website: <http://www.mrcmekong.org>.

the possibility of 'water wars' between states as environmental destruction, population growth and climate change combine to make water scarce in already dry regions.

Disasters can also stimulate improvements in political relations. For example, it is generally agreed that the disaster in Aceh, Indonesia, caused by the December 2004 tsunami was a contributory factor towards the successful conclusion of peace negotiations between the Indonesian government and the Free Aceh Movement to resolve a long-running conflict. Both sides were involved in disaster response and peace was essential for relief distribution and rehabilitation.¹⁴

¹⁴ J.-C. Gaillard, E. Clavé and I. Kelman, 'Wave of Peace? Tsunami Disaster Diplomacy in Aceh, Indonesia', *Geoforum*, 39(1), 2008.

A lack of trust between national governments and international aid agencies can hinder collaborative preparedness efforts: this has often been a problem in responding to famine early warnings in the Sahel, for instance. However, there is an important role for regional and international organisations in coordination, information sharing and resourcing (see Case Study 4.12: Regional cooperation in flood management). For example, the Applied Geoscience and Technical Division (SOPAC) of the Secretariat of the Pacific Community has been providing scientific information and technical assistance for over 40 years to Pacific island countries and territories, helping them to manage natural resources more effectively, adapt to environmental change and strengthen risk management practices. Similarly, the Caribbean Disaster Emergency Management Agency (CDEMA) supports island states in the Caribbean to build disaster management capacities, improve knowledge management, mainstream DRR into other sectors and strengthen community resilience, in addition to coordinating response efforts and promoting policy change. The World Health Organisation (WHO)'s Healthy Cities project is a global initiative to engage local governments in health development through greater political commitment, building institutional capacities, collaborative planning and innovative projects. It has a particularly extensive programme in Europe, where more than 1,400 cities and towns are involved in national and regional healthy cities networks.¹⁵

¹⁵ See <http://www.sopac.org>; <http://www.cdema.org>; <http://www.euro.who.int/en/health-topics/environment-and-health/urban-health/activities/healthy-cities>.

Chapter 5

Inclusion

5.1 Introduction

This chapter looks at how excluded and marginalised people are affected by disasters and cope with them. It considers people who are marginalised by gender, age (the young and old) and disability, and by being ethnic or other minorities (including migrants). Gender issues in disasters have been studied extensively, and there is a growing body of knowledge on age and disability. Nevertheless, there is still much to be learnt about excluded people and the factors that make particular groups vulnerable, as well as their capacities to manage risk and be active in DRR.

The different vulnerabilities of women, old and young people are revealed clearly in data on deaths from disasters of many kinds, in different countries and over time. For example, a study in Aceh, Indonesia, after the 2004 tsunami showed that the mortality rate amongst women was 1.9 times greater than amongst men. The mortality rate for children under ten years of age was 2.3 times higher than for adults aged between 20 and 39; for adults over 60, it rose to 3.1 times higher. Similarly, research after the cyclone in Bangladesh in April 1991 showed that mortality was greatest among children under ten and women over 40 (for women, mortality levels increased sharply with age, reaching 40% among the over-60s).¹ Differential mortality rates such as these are common, but they are not universal: vulnerability varies considerably according to context and culture, and every disaster is different and will have its own impacts.

In real life people do not fit into the neat categories used in many project baseline surveys and VCAs. Their vulnerabilities may be the product of different forms of marginalisation. For example, a woman's vulnerability and capacity, and her experience of disasters, are not due simply to gender roles and differences: they may be influenced by her wealth, age, disability, ethnicity and other socio-economic factors. Case Study 5.1 (Gender and disability after disaster) illustrates how such factors can intersect.

DRR and resilience-building initiatives should not deal with marginal groups separately, but as part of the whole community, taking an inclusive approach from the start that involves all groups in the community in assessment, decision-making and action: in other words,

¹ A. Rofi et al., 'Tsunami Mortality and Displacement in Aceh Province, Indonesia', *Disasters*, 30 (3), 2006; C. Bern et al., 'Risk Factors for Mortality in the Bangladesh Cyclone of 1991', *Bulletin of the World Health Organisation*, 71 (1).

Case Study 5.1 Gender and disability after disaster

An earthquake in northern Pakistan in 2005 killed 80,000 people and injured more than 100,000. Spinal cord injuries from collapsed buildings were common and many people were left permanently disabled. In 2008, researchers visited six affected villages to study the long-term experiences of these disabled people. They found that paraplegic women had largely been abandoned by their husbands and their assistance from family support networks had declined substantially. Their husbands had either married a second wife or planned to do so. Most of the paraplegic men, by contrast, were still fully supported by their wives and relatives. Many girls whose mothers had been disabled were taken out of school to assume domestic roles. A number of girls were married off young, in some cases as replacement wives for husbands of paraplegic women. Men also took their disabled wives' compensation payments.

H. Irshad et al., 'Long-term Gendered Consequences of Permanent Disabilities Caused by the 2005 Pakistan Earthquake', *Disasters*, 36 (3), 2012.

planning *with* them and not simply *for* them. A further key point to note is that, for inclusive approaches to be fully effective (in DRR and other areas), they require the support of an enabling policy and institutional environment that promotes inclusiveness and ensures compliance with laws and regulations.

5.2 Gender

5.2.1 Gender and vulnerability

Gender – the roles, behaviours and activities that society defines and establishes for women and men – is a factor in everyone's daily life. The socially defined relationships and differences between women and men are important in all societies and cultures. Their roles and responsibilities differ, there are differences in their access to resources and control over them, and society gives them different decision-making authority. Men and women are affected differently by economic and social conditions and changes, and they face different degrees of hazard exposure and risk.

In general, disasters hit women harder than men, as the examples above from Aceh and Bangladesh illustrate. In the Bangladesh example, a number of factors were probably at work. Women's physical size and strength were generally less than men's. They may have been less able to swim or climb trees to safety because their culture discouraged girls

and women from learning these skills. They may have been slowed down by clothing and children. They were probably reluctant to venture far from their homes on their own and to be crowded into a cyclone shelter with men and strangers, and so may have delayed leaving for places of safety until it was too late.

Factors such as these are the immediate causes of women's vulnerability. The underlying causes come from women's position in society. Compared to men, women's access to education, resources, income-earning opportunities and land is limited. Decision-making is still largely under male control, be it about the division of household labour and control of household assets, the resolution of community problems or who benefits from official development and relief programmes. In some places, traditions and cultural taboos prevent women from travelling far from their homes without their husbands. Some women are more marginalised and hence more vulnerable than others: they include women who are on low incomes, widows, female heads of households, refugees or migrants, women living alone, members of indigenous communities or women with cognitive or physical disabilities.

Disasters can accentuate such vulnerabilities. During long-running crises, women's workloads may increase as they can be left in charge of households when their menfolk have to migrate in search of work. Even in rapid-onset disasters, women are expected to carry out their normal domestic tasks, in addition to dealing with the consequences of the disaster itself. After disasters, their bargaining position in the competition for relief aid and other scarce resources may be weaker: single women and woman-headed households are particularly likely to lose out. Relief agencies easily lose their gender sensitivity during emergencies, amid pressure to deliver aid quickly in difficult conditions. Many relief and recovery operations target male household heads or give priority to property owners or bank account holders, who are more likely to be men, and jobs and training in recovery projects tend to be provided mainly to men – although women are often expected to work as labourers in reconstruction. The increased economic pressures and psychological stress imposed by disasters may lead to a rise in domestic violence against women, and to men abandoning their families. Women and girls who are displaced or separated from their families and community networks during and after a disaster can be at heightened risk of violence and sexual abuse.

5.2.2 Gender in relief and development programming

Awareness of gender issues is standard in development and relief programmes nowadays – or should be. It is almost impossible to obtain funding without demonstrating some awareness of these issues. Few agencies are without gender policies or stated commitments to gender equity, even if it may be a challenge to put such ideals into practice. Most agencies working on DRR pay attention to gender, but not always in a systematic manner: gender can be seen as an 'add-on' rather than being integrated into programming, and many organisations have too few staff with relevant skills. Interventions may focus on the most visible symptoms of

women's vulnerability and fail to look at underlying problems. For instance, they may seek to ensure that women take part in training courses and community volunteering schemes, but are less likely to look at ways of getting more women into leadership positions in those programmes and in their communities.

Participatory methods of risk and vulnerability analysis (Chapter 3) should identify gender issues, but agencies need to ensure that this happens, applying specific gender analysis tools where necessary. Special care should be taken to ensure that women's voices are heard. Women are very aware of their vulnerability and the forces that create it; they tend to perceive and experience risks differently from men, and many are keen to become involved in participatory assessments and action planning. It has been suggested that women's organisations and groups should train their members as community researchers and carry out their own community assessments to give a more balanced gender perspective.² DRR projects should aim for a balance of men and women among staff and volunteers throughout the project cycle. Some programmes set targets or quotas for women's participation, but these need to cover decision-making roles as well as carrying out tasks.

Gender awareness training is usually necessary within an organisation, and it is often an entry point for work in communities. For example, a Red Cross community disaster preparedness programme in Guangxi, China, in 2006–2009 included a gender sensitisation element in all its training for the Guangxi Red Cross, government and other local partners. This emphasised the importance of identifying the different needs and capacities of women and men and collecting gender-disaggregated data. Women trainees were given opportunities to speak and report to larger groups, to boost their self-confidence. Participants felt this approach to be beneficial, whilst acknowledging that follow-up practical training and technical support would be needed to apply their knowledge to real-life situations.³

5.2.3 Building on women's capacities

Women's resilience and skills in coping with crisis are a valuable resource that is under-utilised by field agencies. Women's efforts in producing and selling goods and as wage earners are central to household livelihoods, and many act as household heads if their husbands have migrated to find work elsewhere, or have abandoned them. They are usually primary caregivers, and hence experienced in looking after others, and they often take on

² E. Enarson et al., *Working with Women at Risk: Practical Guidelines for Assessing Local Disaster Risk*, Florida International University International Hurricane Center, 2003, <https://www.gdnonline.org/resources/WorkingwithWomenEnglish.pdf>.

³ IFRC, *A Practical Guide to Gender-Sensitive Approaches for Disaster Management* (Geneva: International Federation of Red Cross and Red Crescent Societies, 2010), <http://www.ifrc.org/PageFiles/96532/A%20Guide%20for%20Gender-sensitive%20approach%20to%20DM.pdf>.

Box 5.1 Good practice checklist for gender and diversity in organisations

Adopt a gender and diversity policy to guide people, activities and programming at all levels of the organisation.

- Demonstrate a clear commitment to gender and diversity inclusiveness at the senior management level.
- Identify how gender and diversity issues are being addressed in the organisation's programming and procedures, and where further development is needed.
- Develop a strategy or work plan to address identified needs and make sure that adequate human and financial resources are available to implement it.
- Ensure staff and volunteers are sensitised to gender and diversity issues and can carry out gender and diversity assessments.
- Ensure equal opportunities recruitment and working conditions for male and female staff and provide a workplace environment that promotes diversity.

Adapted from IFRC, *A Practical Guide to Gender-Sensitive Approaches for Disaster Management* (Geneva: International Federation of Red Cross and Red Crescent Societies, 2010), <http://www.ifrc.org/PageFiles/96532/A%20Guide%20for%20Gender-sensitive%20approach%20to%20DM.pdf>, p. 41.

informal disaster management roles: managing food and water supplies during drought, for instance, or looking after people who have been injured or displaced. Research suggests that, after disasters, women are much more likely to seek support from informal structures and social networks – other women and their kinship groups – than from officials, but such informal social structures are often invisible to outsiders.

Women also possess considerable technical knowledge and skills that contribute to DRR. They are often expert in traditional farming practices, such as soil conservation and intercropping, which can reduce the damage caused by drought or sudden rainfall. Many women in Africa know a great deal about drought-resistant seed varieties and how to use them, and about roots, fruits and other food growing in the wild that families can turn to when crops fail. They know how to preserve food for use during the hungry season or more prolonged periods of scarcity. Women are often expert in home health care and knowledgeable about traditional medicines. They are likely to be responsible for keeping drinking water clean, and in some societies for building and maintaining houses.

Box 5.2 Women's capacities and DRR

Research suggests that, on balance, women are more likely than men to:

- manage and use natural resources on a daily basis;
- organise locally to address immediate family and community needs, such as lack of clean water;
- have limited economic resources to anticipate, prepare for and recover from disasters;
- respond to needs in the recovery period following a disaster;
- be strong informal leaders but under-represented politically;
- be connected with school systems and children's education;
- have influence over others through strong social networks;
- be effective communicators;
- be attentive to emergency warnings and disaster preparedness; and
- be more safety-conscious and risk averse.

E. Enarson et al., *Working with Women at Risk: Practical Guidelines for Assessing Local Disaster Risk*, Florida International University, 2003, <https://www.gdnonline.org/resources/WorkingwithWomenEnglish.pdf>.

Building upon existing capacities can be very effective. In Sub-Saharan Africa, for instance, a number of successful drought mitigation programmes have drawn on women farmers' and gardeners' knowledge of how to preserve and grow traditional seed varieties. In many places disaster preparedness programmes have trained women as first-aiders, building on their customary role in giving health care. However, there are challenges in ensuring that women are adequately reached by, and represented in, DRR programmes. One of the most immediate practical challenges is to make sure that project activities fit into a woman's working day. Training courses should be held at times when women are most likely to be free from domestic and other tasks; childcare facilities may be needed to encourage attendance. Special attention to the training approach is needed in communities where women have little or no education or experience of taking part in formal group discussions. Even where women acquire knowledge and skills as a result of training, social constraints may not offer them the opportunity to use them fully. For example, first aid training may give women living in hazard-prone areas more confidence in dealing with potential crises, but this does not

necessarily improve women's position in their community and they may still be excluded from influence in local disaster management or preparedness committees.

5.2.4 Disasters and women's empowerment

Participatory methods provide the practical tools for giving women a voice in project planning and implementation, though there is clearly a risk that initiatives may alienate men and traditional leaders. There are examples of women being beaten by their husbands for spending time at community meetings instead of on housework, and older women giving younger women extra domestic chores to stop them going out to meetings or training courses. Such problems may be overcome through discussions in advance with potential opponents, such as village elders, religious leaders, husbands and mothers-in-law, although a good deal of time and persuasion may be needed.

A number of DRR projects seeking to build women's capacity and involvement focus on what are customarily accepted as women's roles, for example by giving female health workers and traditional healers first aid training. But organisations involved in disaster recovery can also take advantage of the temporary weakening of social constraints after some events to press for more fundamental changes in gender relationships and to increase women's control over basic assets such as food, cash, housing and land. As well as presenting new income-earning opportunities, women's involvement in relief and rehabilitation projects can boost their confidence and improve their standing in the community, especially where they take on new roles and responsibilities (see Case Study 5.2: Empowering women as local leaders in DRR). Women's groups formed to respond to disasters can become a resource for longer-term community development and future DRR activities. Development and emergency organisations can do much to support such groups by giving technical, institutional, financial and moral support, provided that this is sensitive to the nature of local society and structures.

The involvement of women's groups and organisations in DRR is essential to underpin individually limited activities and make sure that gender is genuinely mainstreamed into different types of organisation and their work. Building disaster resilience is more than a series of technical interventions: it requires changes in social relationships, challenging inequality and the distribution of power. Collective organisation is a means of mobilising against shocks and stresses of all kinds: environmental, economic and social.

Case Study 5.2 Empowering women as local leaders in DRR

After the December 2004 tsunami, ActionAid launched a two-year project in the Andaman and Nicobar Islands to reduce women's marginalisation and strengthen their resilience to disasters by integrating gender perspectives into post-tsunami recovery. The main elements of the project were a participatory vulnerability analysis (PVA), organising women into groups for action and advocacy, setting up a group savings scheme for women and promoting women's involvement in village self-help groups. The PVA gave women better knowledge and understanding of their vulnerabilities and how to overcome them. It enabled the women and their communities to identify underlying factors contributing to vulnerability, such as poor housing and lack of education, and it also identified community capacities and knowledge. A disaster response plan was developed from the PVA findings. Safe places to evacuate to were identified and emergency task forces were formed.

Women had not been involved in community planning and decision-making before the disaster, so this was their first experience of working in a formally organised structure. Women's collectives were formed at village and district levels, where they could share their problems and discuss issues affecting them, make their own decisions and obtain a voice in the community. One of the issues taken up by the women collectively was learning to swim: they had been prevented from learning by cultural conventions, which led to many deaths in the tsunami. Now, with the support of the collectives, they were able to press successfully for swimming lessons. Some obtained official fishing licences, entitling them to government compensation for loss of livelihood due to floods or tidal waves.

The 32 self-help groups formed through the project undertook a range of activities, including digging and restoring wells and building dykes to prevent farmland from flooding. The groups' gender balance was monitored: nearly half were all-women groups and only six had more men than women as members. The self-help groups were formally registered as local decision-making bodies. Through group activities, women began to take part in public dialogues on community problems and their solutions.

ActionAid International, 'Empowering Women as Community Leaders in Disaster Risk Reduction: An Experience from the Tsunami Response Programme, Andoman and Nicobar Islands', *Gender Perspectives: Integrating Disaster Risk Reduction into Climate Change Adaptation. Good Practices and Lessons Learned* (Geneva: UNISDR, 2008), http://www.unisdr.org/files/3391_GenderPerspectivesIntegratingDRRCCGood20Practices.pdf, pp. 34–38.

5.3 Older people

Older people make up a significant and growing proportion of the world's population,⁴ but they remain largely invisible and marginalised in emergencies. Aid agencies are often insufficiently aware of older people's needs, or treat them as helpless, passive recipients of welfare rather than active members of society. Their needs may not be taken into account in disaster planning or response; they are less likely to receive warnings and obtain help in evacuating; they find it harder to go to distribution centres, queue for relief goods and carry those goods away; and emergency stockpiles often lack items which they may need, such as mobility aids or medication for chronic conditions.

5.3.1 Vulnerability and capacity

Ageing makes people more vulnerable physically: older people are frailer and less mobile; they are more likely to suffer from long-term health problems such as heart or respiratory illness, and from physical disabilities such as poor eyesight and hearing. These characteristics reduce older people's capacity to take action before and during emergencies. They may not, for example, be able to keep their houses properly maintained and hence more secure against hazards, or they may be unable to escape quickly enough to higher ground or shelters when floods or hurricanes threaten. They are more vulnerable physiologically to extremely hot or cold weather. Their chronic health conditions are more likely to worsen during and after an emergency due to poor temporary living conditions and disruption to regular health care.

Socio-economic forces also create vulnerability among older people. Many live alone, isolated from family and community support structures (this has been a significant contributory factor to the high proportion of heatwave fatalities among older people in Europe and North America).⁵ Others have become primary carers of their grandchildren, for example where parents have to work long hours, have migrated to seek work or have died. Lack of education and conservative attitudes may limit their capacity to take independent action. Older women, for instance, may be more likely than younger ones to adhere to social or religious customs that discourage them from going far from the house on their own.

Isolation is a major factor in older people's vulnerability to disasters and their capacity to recover from them. Families, neighbours and social networks play an important role in helping them to prepare for an emergency (for example by securing homes, making sure they receive warnings and helping them to evacuate), during the immediate post-disaster period

⁴ *World Population Ageing 2013* (New York: UN Department of Economic and Social Affairs, 2013), <http://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2013.pdf>.

⁵ *World Disasters Report 2004* (Geneva: IFRC, 2004), <http://www.ifrc.org/publications-and-reports/world-disasters-report/wdr2004>, pp. 36–55.

(for example by going to collect relief supplies for them) and in supporting their psychological recovery after disasters. Displacement to emergency shelters, temporary housing or permanent rehousing often separates them from these social support mechanisms. The creation of appropriate, accessible social spaces (such as community centres and gardens) and opportunities for social interaction (such as cultural events) after disasters may help to restore psychological wellbeing. Some DRR projects establish support groups or ‘buddy’ systems prior to a disaster to assist those without access to social support networks.

In many parts of the world, older people have to remain economically active in order to survive. They are often self-employed or work in the informal economy, though many have limited livelihood options or opportunities. Protecting their livelihood assets is a priority during an emergency, and restoring livelihood activities is essential after the emergency period has passed. Support in building secure and sustainable livelihoods (see Chapter 9) should therefore be an integral part of DRR projects with older people.

Older people also have many valuable capacities, and their knowledge, skills, experience and enthusiasm can be put to good use in DRR and disaster response. In some respects they may be better at dealing with stressful events and crises than younger people. They may well have been community leaders or held other positions of responsibility, and they are economically and socially active – important points that are often overlooked by development and humanitarian organisations. They possess technical skills gained during their working lives. Where they have lived in the same place for a long time, they will have acquired considerable knowledge of their environment and the hazards within it. They are also more likely to have first-hand experience of previous disasters and environmental pressures. They are often the guardians of cultural experience and indigenous knowledge in their communities, and so more likely to possess extensive knowledge of coping strategies.

Participatory approaches (see Chapter 6) are valuable in assessing older people’s vulnerabilities and capacities. VCAs should ensure that older members of the community are identified and their situations understood. Their extensive local knowledge, experience of shocks and stresses and coping skills make them potentially important participants in community risk assessments and in the development of disaster plans. Participation in such processes strengthens a sense of belonging and encourages collaboration between different age groups. The World Health Organisation (WHO) advocates ‘active ageing’ to increase older people’s resilience: this means creating opportunities for them to participate more in society, according to their wishes and capacities, for the benefit of their physical, social and mental wellbeing.⁶ HelpAge International mobilises older people’s associations

⁶ D. Hutton, *Older People in Emergencies: Considerations for Action and Policy Development* (Geneva: World Health Organisation, 2008), http://www.who.int/ageing/publications/Hutton_report_small.pdf.

(OPAs), which provide social support to older people in the community. OPAs have been trained in carrying out risk assessments, giving first aid and providing assistance in emergencies. Older people have been put in charge of assessing needs, distributing food and other relief aid and the construction of shelters and water pumps. Older people's committees also offer an opportunity for their voices to be heard in the community and by decision-makers. Because singling out older people for special attention can lead to resentment among other members of the community, projects should find ways of helping them to make a greater contribution to their families and communities. This not only brings material benefits for the older people concerned, but can also improve their social status.

Case Study 5.3 An integrated approach to building older people's disaster resilience

Older people in Tajikistan and Kyrgyzstan are exposed to many natural hazards, including earthquakes, landslides, floods and cold weather, as well as having insecure seasonal livelihoods. In 2009, HelpAge International began working with Youth Ecological Center (a leading Tajik environmental NGO), the Resource Centre for the Elderly (a Kyrgyz NGO) and 20 remote rural communities to build their resilience by integrating development issues, such as food and income security, with disaster preparedness.

Priority concerns were identified by older people and their wider communities. Some 300 community members (half of whom were older people) were given training in community-based DRR. They shared the knowledge in their communities and used it to produce emergency plans and develop small-scale mitigation projects; through this they also built up better links with local disaster management organisations. Greenhouses were built to grow a wider range of crops and vegetables through the harsh winters, which improved nutrition as well as giving protection against food price rises. Solar panels were installed in communal facilities, reducing fuel costs and providing warm social spaces for older people's groups to meet. Young people from the community installed insulation in older people's homes.

HelpAge International, 'Case Study: Emergency Preparedness and Disaster Risk Reduction with Older People in Tajikistan and Kyrgyzstan', unpublished paper, undated.

5.4 Children and young people

In the past, disaster management professionals and guidelines were likely to start from the position that interventions to help children were best made through the ‘primary caregivers’ – i.e. parents or guardians. There is some logic to this. First, children can be very or even totally dependent on their parents, according to their age, strength, skills or maturity. Second, their daily routines are closely linked to those of adults in the household, and particularly to their mothers’ work: even quite young children help their mothers with domestic and productive tasks. Third, the capacity of groups and individuals to deal with risk is greatly boosted by previous experience of disasters, from which coping strategies are learnt or knowledge of them is reinforced.

This viewpoint also has significant drawbacks. It overlooks any distinctiveness that there may be in the child’s position. It is based on the assumption that parents will always be there to inform, warn and protect their children, whereas in fact children spend a lot of time elsewhere: at school, playing with friends and in many cases working. Children are capable of independent action, providing useful knowledge and contributing to DRR efforts. Many are already taking on adult responsibilities, such as household duties, paid work and caring for other family members. This has led to agencies working increasingly with children and young people to reduce risk, and to more ‘child-centred’ DRR initiatives.

Many factors affect children’s vulnerability to hazards. Nutritional deficiencies have a significant impact on the health and growth of infants and young children. Younger children are particularly likely to suffer from protein deficiency and malnutrition at times of famine. Children are more susceptible to pollutants produced by industry and society because they absorb more in relation to their body weight. Their lack of physical strength and practical skills, such as being able to swim, can prevent them from getting to places of safety. Where they spend a good deal of time in and around the home, they can be at greater risk from sudden-onset hazards such as earthquakes or landslides. In some cases, lack of literacy and

Box 5.3 Definitions

Definitions of ‘children’ or ‘young people’ vary. For some organisations, children are any age up to 15 years (with a concentration on the 7–15 age group where children’s perception and participation are concerned); young people are 15 years and over (sometimes up to 25). A more common distinction is between infants and young children (0–5), children (6–11) and adolescents/young people (12 and over). Legal thresholds for reaching adulthood also vary between countries.

other education limits their understanding of a potentially dangerous situation and how to prepare for or react to it.

Emergency responses often give priority to children's physical needs, such as water, food, clothing, shelter and healthcare, but they can overlook others, such as the need for psychological support to deal with trauma, protection from abuse and harm and recreation and education. Children and young people may be in particular need of psychological or emotional support for dealing with a crisis, especially if they are on their own and cannot rely on older family members. However, they can and do adapt and recover, especially if they receive appropriate help (from parents, family members, counsellors and other professionals) and live in a generally supportive environment. Interventions involving story writing, drawing and plays can help children to draw out their feelings and relieve their emotional pain.⁷

Disasters leave many children without parents or carers, putting them at high risk of abuse and exploitation. The 2004 Indian Ocean tsunami orphaned more than 20,000 children; the 2008 earthquake in Sichuan, China, left over 5,000 children without an adult caregiver.⁸ Very little is known about the disaster vulnerability of street children, of whom there are an estimated 100–150m worldwide, but children orphaned by disasters may well end up on the streets. Here they face numerous everyday threats including malnutrition, road traffic accidents, violence, sexual abuse and police brutality, as well as having no place of refuge during floods or bad weather.

It is important to listen to young people and children. They are close to their environment and observe it acutely, and often have a clear perspective and understanding of the environmental, social and economic risks they face and the relationship between vulnerability and hazard. They can also play an important role as communicators and educators about risk (see Chapter 10). Some community-based projects give them opportunities to present their own views of their needs and the risks they face, for example by drawing risk maps or other images of hazards and vulnerability. This approach can provide new insights to outsiders, as well as helping to raise the children's own awareness and interest.

There are a growing number of examples of child-centred approaches to DRR work. Plan Vietnam has drawn on children's knowledge of the local environment in designing a village flood preparedness initiative, and in El Salvador Plan's long-running programme of support to children's disaster groups has seen a progressive development in their interests and activities. For example, a group in one village identified uncontrolled extraction of stone

⁷ E. C. Oncu and A. M. Wise, 'The Effects of the 1999 Turkish Earthquake on Young Children: Analyzing Traumatized Children's Completion of Short Stories', *Child Development*, 81 (4), 2010.

⁸ A. Ager et al., 'Defining Best Practices and Protection of Children in Crisis-affected Settings: A Delphi Study', *Child Development*, 81 (4), 2010.

Case Study 5.4 Mobilising young volunteers for DRR

In 2012 YCare International helped the Sierra Leone YMCA to implement a pilot DRR project in Kroo Bay and Dworzack, two slum communities in the capital, Freetown, which are prone to hazards such as fires, landslides and flooding. The YMCA had been active in both communities for some years through a youth livelihood and slum upgrading project. Previously, there had been disaster volunteer groups in the two communities, but these were no longer active and young people had not been much involved, even though a large proportion of the population was under 30. The project therefore recruited more young people to join their community-based disaster management committees.

The young volunteers, who received training in DRR and contingency planning from the project, were mainly involved in clearing blocked drainage channels on the hillsides (which were causing flooding), and raising awareness about risk reduction measures at community meetings and workshops, as well as going from door to door. The results were encouraging: community members began to approach the young people for advice and assistance, and the committees were invited to support DRR and response initiatives by other NGOs.

The project provided useful lessons about young people's volunteering, mostly about widening and maintaining participation. There was clearly a need to recruit volunteers from a wider range of young people: many of the volunteers were already members of other community groups and committees before joining the disaster management committees. There was also a need to manage expectations: some volunteers joined for the travel stipends offered them to attend meetings, and left when these were withdrawn. Many young women had to miss meetings because of family and household duties (although these did not affect their participation in other community DRR actions), which meant that support for childcare would be needed.

YCare International, *Sierra Leone Youth Led Community-based Disaster Risk Reduction* (London: YCare International, 2013), <http://www.ycareinternational.org>; A. Cummings, *Youth Volunteerism and Disaster Risk Reduction* (London: YCare International, 2012), <http://www.ycareinternational.org/wp-content/uploads/2013/06/Youth-Volunteerism-and-Disaster-Risk-Reduction-in-Urban-Slums-of-Freetown.pdf>.

and sand from a river bed as increasing the risk of flooding, and ran a successful campaign to ban the practice.⁹ In projects of this kind, it is important to connect child-centred initiatives with other grassroots organisations, integrating children and young people into DRR and community development planning and decision-making processes and supporting collaboration between youth groups and other community-based organisations (see Case Study 5.4: Mobilising young volunteers for DRR).

Interventions to support children must also respond to their needs in the context of their family, community and culture. Agencies whose mandate is to work for children sometimes find it difficult to strike the right balance in their interventions between concentrating on small groups of vulnerable children and more diffuse targeting of communities in which those children live. Setting the balance in favour of the first has an impact on a needy group but reaches fewer people, while a shift towards the second reaches more people but risks spreading benefits too thinly. Tricky decisions of this kind have to be made in the light of local knowledge and experience.

Engagement between children and young people and adult institutions can be a challenge. Members of a DRR youth group in Kathmandu, Nepal, interviewed in 2013 expressed their frustration at being excluded from DRR discussions and initiatives. Research in the Philippines revealed that young people used a variety of methods to communicate their views about risk and DRR to the community and people in authority (including street theatre, art exhibitions, writing newspaper articles and holding class discussions), but found it difficult to engage formally with disaster management professionals and bureaucracies unless they had the support of a sympathetic adult in a position of power.¹⁰ Ultimately, successful participation requires a shift in attitudes within a community and society as a whole. It is nevertheless possible to influence public opinion and official decisions (see Case Study 5.5: Young people's activism for DRR).

⁹ A. Jabry (ed.), *After the Cameras Have Gone: Children in Disasters* (London: Plan UK 2005), https://www.plan.org.au/~media/Documents/Research%20and%20Reports/After_the_cameras_have_gone_children_in_disasters.ashx, pp. 37–43; T. Mitchell et al., 'The Roles of Children and Youth in Communicating Disaster Risk', *Children, Youth and Environments*, 18 (1), 2008.

¹⁰ D. Brown and D. Dodman, *Understanding Children's Risk and Agency in Urban Areas and Their Implications for Child-centred Disaster Risk Reduction in Asia: Insights from Dhaka, Kathmandu, Manila and Jakarta* (London: IIED, 2014), <http://pubs.iied.org/pdfs/10652IIED.pdf>, p. 42; T. Mitchell et al., *Children as Agents of Change for Disaster Risk Reduction: Lessons from El Salvador and the Philippines*, Children in a Changing Climate, 2009, http://www.childreninachangingclimate.org/database/ccc/Publications/MitchellTannerHaynes_AgentsForChange-WorkingPaper1_2009.pdf, pp. 28–30.

Case Study 5.5 Young people's activism for DRR

Following a landslide in 2006 that killed over 1,000 people, official landslide risk assessments were carried out in several locations in Southern Leyte Province in the Philippines. The community of Santa Paz was shown to be at high risk, while Santa Paz High School, with nearly 400 pupils, was found to be in the path of a potential landslide. The provincial Department of Education recommended relocation, but this was opposed by a number of people locally. Some of these opponents earned a living by selling snacks to the schoolchildren at lunchtime, but many parents were also against the move because they were worried about their children having to travel to school in a different neighbourhood. Local politicians in the two districts concerned also joined in the dispute. With the support of their head teacher, students at the school began a letter writing campaign to persuade local authorities of the need to relocate the school. They also started a campaign to educate their communities about the physical processes of landslides and landslide risk. As a result, the school was moved to a safer location. The new school, which opened in 2007, was earthquake-resistant, built above flood levels and designed for use as an evacuation centre in emergencies.

T. Mitchell et al., *Children as Agents of Change for Disaster Risk Reduction: Lessons from El Salvador and the Philippines*, Children in a Changing Climate, 2009, <http://www.childreninachangingclimate.org>, pp. 29–31; A. Fawcett, *Climate Extremes: How Young People Can Respond to Disasters in a Changing World* (London: Plan UK, undated), <http://www.plan-uk.org/resources/documents/100222>, p. 20.

Institutions such as schools, child-care centres and nurseries can provide a focus for child-focused mitigation activity. This can take physical or structural forms (such as strengthening school buildings) and non-structural forms (such as raising awareness of hazards and risks and promoting good practice in risk reduction through the curriculum; see also Chapter 10).

Box 5.4 Children's Charter for Disaster Risk Reduction

The Children's Charter for Disaster Risk Reduction was launched in May 2011 at the United Nations' Global Platform for Disaster Risk Reduction by four international agencies, Plan International, Save the Children, UNICEF and World Vision. It sets out five priorities for DRR identified by 600 children in 21 hazard-prone countries. These are:

1. Schools must be safe and education must not be interrupted.
2. Child protection must be a priority before, during and after a disaster.
3. Children have the right to participate and to access the information they need.
4. Community infrastructure must be safe, and relief and reconstruction must help reduce future risk.
5. DRR must reach the most vulnerable.

The Charter was formally launched in ten countries in October 2011, to coincide with the UNISDR's International Day for Disaster Reduction, and a number of regional and national policy commitments to child-centred DRR have subsequently been made.

E. Bild and M. Ibrahim, *Towards the Resilient Future Children Want: A Review of Progress in Achieving the Children's Charter for Disaster Risk Reduction*, World Vision UK, 2013, http://www.unisdr.org/files/33253_33253towardstheresilientfuture2013l.pdf.

5.5 Disability

The WHO estimates that 15% of the world's population lives with some form of disability.¹¹ Disabled people are highly vulnerable to disasters, on account of social marginalisation as well as impairments. Although their vulnerability is acknowledged, disaster planning often overlooks their needs and capacities, and disaster managers have limited or no contact with disabled people's groups or organisations working on their behalf. Disasters also cause injuries and, in some cases, long-term disabilities: in the 2010 Haiti earthquake, an estimated 2,000–4,000 people had limbs amputated due to their injuries.¹² Disasters worsen existing

¹¹ WHO, *World Report on Disability* (Geneva: World Health Organisation, 2011), http://www.who.int/disabilities/world_report/2011/report.pdf, p. 29.

¹² M. Tataryn and K. Blanchet, *Giving With One Hand ... Evaluation of Post-Earthquake Physical Rehabilitation Response in Haiti, 2010 – A Systems Analysis* (London: London School of Hygiene and Tropical Medicine, 2012), http://www.cbm.org/article/downloads/84419/Evaluation_of_Post-Earthquake_Physical_Rehabilitation_Response_in_Haiti__2010_-_a_systems_analysis.pdf, p. 7.

disabilities, as the health of those with impairments or chronic diseases may deteriorate when medication and medical support are disrupted.

5.5.1 Disability and vulnerability: a social perspective

Traditionally, disability has been viewed from a narrow medical or charity perspective. The medical approach defines disabled people by their individual impairments (which can be of many kinds, physical and mental, including impaired sight or hearing, lack of mobility and difficulty in understanding or communicating). The charity model assumes that they are to be pitied and helped. But disability should be seen in wider social terms: as the social consequence of having an impairment, or as the result of the interaction between a person's impairment and external obstacles such as physical barriers and prevailing attitudes that prevent disabled people from participating in society.

Disability is linked to economic and social vulnerability and exclusion. Disabled people are more likely to be poor, without education, isolated and marginalised, misunderstood or avoided by neighbours, excluded from community structures and either dependent on others or assumed to be so. Some specialists in disability believe that, because disabled people lack status in their communities, little effort is made by those communities to save them from disasters: there is anecdotal evidence of them being abandoned in crises while others flee to safety.

People with disabilities are also frequently overlooked in disaster planning and marginalised in disaster practice. They are often invisible to outsiders, hidden within households by culture and stigma, fearful that identifying themselves as disabled will lead to prejudice or abuse, and missed out of census or other registration mechanisms. It is assumed that they need specialist support and so they are referred to other, usually medical, specialists, although their basic needs are the same as everyone else's. Construction of accessible buildings and public facilities does not take place because it is thought to be too expensive.

5.5.2 Working with disabled people to reduce risk

A number of steps can be taken to support people with impairments. Many are simple and inexpensive. The first step is to identify who is disabled, the nature of their disability and how this will increase their risks to known hazards. In some countries and locations this is done through formal disability or special needs registers compiled by governments, health authorities, universities or NGOs. Pakistan's Information Resource Centre on Disability, set up in 2009, collects data through a network of disabled people's organisations, including such information as identity card numbers, basic facts about their disabilities and their locations. The database was used by responders to the 2010 floods.¹³ Such databases are

¹³ 'Analysis: How To Make Disasters Less Deadly for the Disabled', IRINNews, 16 September 2013, <http://www.irinnews.org/report/98758/analysis-how-to-make-disasters-less-deadly-for-the-disabled>.

not widespread, however, largely due to the difficulty and cost of collecting and updating data. On a smaller scale, VCAs (see Chapter 3) can perform this role, but conscious effort is needed here, since in practice VCAs often overlook disabled people (see Case Study 5.6: Overlooking disability in VCAs). Further steps can then be taken to raise awareness of the risks they face and how to deal with them, improve the security of homes and workplaces, assist them to move to safe places when severe hazards threaten, and attend to their specific needs during and after an emergency.

Disability specialists recommend a ‘functional’ approach to supporting disabled people’s disaster coping. This means thinking flexibly about addressing a broad set of function-based needs (e.g. communication, medical needs, maintaining functional independence, mobility) and reflecting the capabilities of the individual, irrespective of their specific diagnosis or status. Particular effort is needed to support people with mental health needs, as they tend to be even more excluded than people with physical impairments.

Methods for communicating risk and early warnings should be appropriate to the nature of the disability. Examples include printed material in large type or braille for partially-sighted or blind people, sign language on television broadcasts for the deaf and face-to-face discussions with people with learning difficulties or other problems that may affect their understanding of messages. Field staff should be trained to communicate with disabled

Case Study 5.6 Overlooking disability in VCAs

The aims of a VCA should be to identify vulnerable groups, the factors that make them vulnerable and how they are affected, assess their needs and capacities and ensure that projects, programmes and policies address these needs. In theory, therefore, VCA offers a good opportunity to incorporate disabled people’s needs and resources into DRR programming, and disabled people are sometimes mentioned explicitly as a category of vulnerable group in guidelines on how to carry out a VCA. However, a recent study of a number of assessments, carried out in a range of locations and at different scales by a variety of agencies, indicated that, in practice, disability was generally disregarded or received only a passing mention. Even in VCA manuals, disabled people’s capacities were overlooked, and they were not given opportunities to participate in community assessments. The study concluded that there was a need to change the core attitudes of disaster professionals towards disability, as well as those of communities.

J. Twigg, ‘Attitude Before Method: Disability in Vulnerability and Capacity Assessment’, *Disasters*, 38 (3), 2014.

people effectively. Public shelters need to be organised with their needs in mind (see Box 5.5 Good practice in emergency shelter management).

Improvements to the physical environment give greater protection and make evacuation easier. Homes, offices, escape routes and emergency facilities should be designed (or redesigned) with disabled people's needs in mind. This might include securing furniture and providing ramps, handrails, pathway marking systems, special signage and wider passageways and staircases. The concept of universal design is helpful here: this is an approach to the design of products and environments to make them as usable as possible by as many people as possible, regardless of age, ability or situation.

Disaster preparedness plans must recognise that people with disabilities often need more time to make necessary preparations for an emergency and to move to a place of safety. Staff training will be needed here, in communicating with disabled people, assisting them and using relevant equipment; staff also need to be aware of the diversity of impairments and needs, to make sure nobody is left out. Many disability and disaster organisations recommend the formation of personal support (also known as self-help or 'buddy') groups. These groups typically comprise three or more people known to the disabled person and trusted by them – family members, friends, neighbours or colleagues – who are aware of the person's needs, work with them to make preparations for potential disasters (including emergency bags containing essential items such as medication and assistive devices), and support them during crises.

One key principle is that a person with disabilities should always be seen as the expert on their own disability. Another is that they are often able to help themselves, given the right resources and opportunity. Although some do indeed require considerable help, many disabled people have skills, experience and other capacities that can be utilised in a disaster. In some crises they may have a psychological advantage, making them less liable to injury or panic, because they have to deal with difficult physical and environmental limitations daily.

Agency staff and community volunteers ought to be trained to support the independence and dignity of people with disabilities or impairments. Modern approaches to disability and development place greater emphasis on participation. People with disabilities are increasingly demanding that they are not simply treated as problems to be solved by planners, but as part of society, entitled to equal opportunities and rights. Some disability activists believe disabled people should be more assertive and demand to be included in DRR planning. Plans involving disabled people and partnerships between DRR and disabled people's organisations must be developed in advance of an emergency, but it seems that there is little contact between them in normal times. Disaster managers tend to discuss disability questions with other disaster managers; disabled people's organisations tend to discuss disaster issues with other disability agencies.

Box 5.5 Good practice in emergency shelter management

The main elements of good disability practice in communal shelter management include:

- ensuring equal access (this includes accessible parking, exterior routes, entrances, interior routes to the shelter area and toilets serving the shelter area);
- shelter staff (professional and volunteer) are trained in meeting disabled people's needs and plan for them in advance;
- availability of food, including special diets;
- provision of technical support (e.g. access to electricity for medical and mobility devices and refrigeration for medication);
- use of appropriate methods of communication (visual, audio and interpreters);
- appropriate and sufficient medical and volunteer assistance is available (including families, personal support networks, and where appropriate care animals);
- promoting and sustaining disabled people's independence and safety when sheltering;
- involving people with disabilities in shelter planning;
- monitoring and evaluating shelter activity and practice; and
- assistance in returning home, or provision of/assistance in finding temporary accommodation for those unable to return to their homes immediately after an event.

J. Twigg et al., 'Disability and Public Shelter in Emergencies', *Environmental Hazards*, 10 (3–4), 2011.

Like other marginalised groups, disabled people should be involved in DRR planning, implementation and monitoring. Their participation in VCA is key to identifying vulnerabilities, needs and resources. It can also build their confidence, raise their profile within communities and help them to create or strengthen social contacts. However, careful consideration must be given to the most effective ways to engage them, as some standard participatory methods may be unsuitable (for example, transect walks for people with mobility difficulties). Community vulnerability mapping, on the other hand, does appear to be a valuable entry point for developing a collective understanding of whom a community considers to be disabled and why, as well as starting discussion about their situation. Specific questions about disability can also be included in interviews and surveys.

Case Study 5.7 Disabled people and disaster planning

In 2012–13 the Council of Persons with Disabilities Thailand was invited by the Thai military to take part in humanitarian assistance and disaster response training exercises in order to incorporate perspectives on inclusive disaster management.

In Quang Nam Province, central Vietnam, a joint project between the government and the NGO Malteser International engaged disabled people, their caregivers and their organisations in village-level early warning and evacuation planning. Disabled people were given training and support to take part in village disaster risk management committees, with the result that all 47 villages in the project produced disability-inclusive plans that included door-to-door warnings and priority evacuations.

C. Axelsson, *Disability Inclusive Disaster Risk Management: Voices from the Field and Good Practices*, Disability Inclusive DRR Network for Asia and Pacific/Christian Blind Mission, 2013, http://www.cbm.org/article/downloads/54741/Disability_Inclusive_Disaster_Risk_Management.pdf.

5.6 Minorities

Ethnicity, race, caste and other aspects of ‘otherness’ – groups perceived by their neighbours to be different, such as migrants and refugees – are generally acknowledged to be important factors in determining vulnerability. To a large extent, this is because these minority groups are socially excluded. Living on the margins of society before a disaster, they may become even more vulnerable afterwards. There is relatively little good practice guidance on this subject in the context of DRR.¹⁴ Basing projects on the key principles of inclusion and participation is essential. From this, it will be possible to identify particular vulnerabilities and capacities, and develop appropriate responses.

Dominant groups have control over resources and political power, and tend to use these to their own advantage. The needs of minority ethnic groups are likely to be overlooked by decision-makers; so are their capacities, including indigenous knowledge and coping strategies. They may even be deliberately excluded from decision-making. The displacement of communities of all kinds in the cause of socio-economic development – for example forcing them to make way for the construction of large dams, or taking over common land

¹⁴ For an overview of some of the key issues, see N. Dash, ‘Race and Ethnicity’, in D. S. K. Thomas et al. (eds), *Social Vulnerability to Disasters* (Boca Raton, FL: CRC Press, 2013), pp. 113–37.

on which they depend to graze animals or collect food – has become a highly controversial political issue. Development and humanitarian work needs to bear such matters in mind.

The indigenous knowledge and coping strategies of different minority groups can be used as a resource. Some tribal and nomadic communities have considerable experience of coping with stress and crisis, or strong social structures that can adapt to difficult conditions (see Chapter 7). In the area of warnings, one important improvement might be to make greater use of minority languages and media in order to ensure that the warnings reach minority communities.

5.6.1 Race, ethnicity and caste

The exclusion and attendant poverty of ethnic minorities may force them to settle in dangerous locations or on land of poor quality that produces little food, while language, educational and cultural barriers can restrict access to information on risk and risk avoidance. Ethnic minorities that depend heavily on natural resources are highly vulnerable to developments that affect the natural environment. Forcible displacement of ethnic groups for political reasons can make those affected highly vulnerable to all kinds of external pressures.

Case Study 5.8 Supporting indigenous communities' recovery and resilience

After Hurricane Mitch in 1998, Garifuna communities on the north coast of Honduras were neglected by the government and international aid agencies (the Garifuna are an indigenous people of African descent). Initial relief work by community volunteers led to the creation of a formal NGO, the Garifuna Emergency Committee of Honduras, with elected community groups in 16 communities. Early activities focused on disaster recovery: obtaining funds, tools and materials for repair and reconstruction; distribution of seeds and loans of agricultural equipment to farmers. Subsequently, the committee shifted its attention to longer-term livelihood and resilience-building by promoting techniques and skills for soil conservation, organic composting, crop diversification, food preservation and marketing. An extensive reforestation programme was undertaken, both to provide income (from fruit trees) and to protect against erosion. Nine years after the hurricane, it was estimated that more than 9,000 people were benefiting from these ongoing initiatives.

'Indigenous Women's DRR Efforts Trigger Sustainable Development Process: Reducing Vulnerabilities in Marginalized Afro-Indigenous Garifuna Communities', in UNISDR, *Gender Perspective: Working Together for Disaster Risk Reduction. Good Practices and Lessons Learned* (Geneva: UNISDR, 2007), http://www.gdonline.org/resources/UNISDR_gender-good-practices.pdf, pp. 7–11.

Ethnic, caste, political and class divisions often overlap. Ethnicity is a significant political factor in many countries, at local and national levels. Polarisation can result from development programmes that are perceived to favour one community over another. Tensions between communities often emerge when aid for relief and recovery is targeted at one particular group. For example, it is common practice to give food aid, tools and household goods to people displaced by disasters, who have lost their possessions, but communities hosting the displaced are likely to feel that they too deserve some compensation, especially if they have given assistance such as food and shelter. It is also common for relief aid to be captured by dominant social groups, and denied to minorities.

Race and related poverty were significant factors in the Hurricane Katrina disaster in New Orleans in 2005. The city's Afro-Americans, with a history of economic marginalisation and segregation, were concentrated in low-lying districts that were most exposed to the risk of flooding. Consequently, they suffered most when the hurricane storm surge overwhelmed the city's flood defences. Official hurricane evacuation planning assumed that people would evacuate themselves by car when warnings were issued, overlooking the fact that in these poorer districts few families had their own cars. Afro-American families displaced by the disaster also faced bureaucratic and financial obstacles in returning to their neighbourhoods and rebuilding, and as a result have been slower to recover than other sections of the community.¹⁵ Overcoming problems such as these requires greater effort on all sides to communicate and collaborate. Establishing a level of trust is vital. For example, after floods in 2006 the Romanian Red Cross worked hard to build trust with marginalised Roma people, creating sub-branches in flood-affected areas with Roma communities. Red Cross National Societies in other European countries have helped Roma to register with the authorities, obtain identity papers and get access to services.¹⁶

5.6.2 Migrants and transients

Migrants can be doubly vulnerable: as members of minority ethnic groups they may be neglected or even persecuted; as strangers to an area they lack the knowledge and coping strategies to protect themselves. More and more people are expected to become migrants in the coming decades as a result of environmental degradation, loss of land and livelihoods, climate-related disasters and water scarcity. Migrant workers often have to take on hazardous jobs where health and safety standards may be poor, especially if they are illegal or unregistered labour. Transient visitors, including tourists, are also at risk. Even if

¹⁵ Center for Social Inclusion, *The Race To Rebuild: The Color of Opportunity and the Future of New Orleans* (New York: Center for Social Inclusion, 2006), <http://www.centerforsocialinclusion.org/wp-content/uploads/2012/07/racetorebuild.pdf>.

¹⁶ *World Disasters Report 2007: Focus on Discrimination* (Geneva: IFRC, 2007), <http://www.ifrc.org/PageFiles/89755/2007/WDR2007-English.pdf>.

they have more financial and material assets than those who live in the communities they are visiting, they may be more vulnerable. They are unfamiliar with the hazards in the places they visit and do not know how to identify, anticipate and protect against hazard threats. When a tsunami hit the coast of central and southern Chile in February 2010, for instance, most of the deaths were among holidaymakers. Local fishing communities, with knowledge of tsunamis passed down over generations, were quick to recognise the warning signs and go to higher ground.¹⁷ The tourist industry has an important role to play in ensuring that tourists are well informed about potential dangers and how to avoid them.

Camps for refugees and internally displaced people (IDPs) can be exposed to risks if they are sited in hazard-prone areas and lack adequate infrastructure. In 2009, heavy rainfall in IDP camps in Khartoum, Sudan, destroyed 10,800 shelters and over 10,900 latrines: water could not drain away because the camps' drainage canals quickly filled up with soil and garbage washed down by the rain.¹⁸

5.6.3 Sexual minorities

Evidence of discrimination against lesbian, gay, bisexual and transgender (LGBT) people in disaster response is beginning to emerge, including in countries which are relatively tolerant regarding a person's sexual identity. This is particularly apparent in emergency shelters (where sexual minorities may face hostility from other inhabitants and emergency professionals) and in the allocation of relief assistance and housing (where official regulations may restrict distribution to 'traditional' families). Disaster managers do not, at present, consider the needs and capacities of LGBT people in their disaster planning or identify them as a specific audience for preparedness advice. Dialogue between disaster agencies and LGBT organisations can improve mutual understanding and lead to modifications in disaster planning and procedures: there are initial indications of this in Nepal, for example. However, in many countries people are reluctant to be identified as LGBT because of discriminatory legislation and official and social prejudice.¹⁹

¹⁷ A. Marin et al., 'The 2010 Tsunami in Chile: Devastation and Survival of Coastal Small-scale Fishing Communities', *Marine Policy*, 34 (6), 2010.

¹⁸ D. DeVoe (ed.), *The Road to Resilience: Case Studies on Building Resilience in the Horn of Africa* (Baltimore, MD: Catholic Relief Services, 2013), <http://www.crsprogramquality.org/storage/pubs/emergencies/road-to-resilience.pdf>, pp. 36–40.

¹⁹ K. Knight and P. Sollom, 'Making Disaster Risk Reduction and Relief Programmes LGBTI Inclusive: Examples from Nepal', *Humanitarian Exchange*, 55, 2012, <http://www.odihpn.org/humanitarian-exchange-magazine/issue-55>.

Chapter 6

Communities and participation

6.1 Introduction

Communities are key to managing risk. The principal resource available for mitigating or responding to disasters is people themselves, and their local knowledge and expertise. Community-based disaster risk reduction and management (CBDRM) plays a vital role here: it responds to local problems and needs, capitalises on local knowledge and expertise and strengthens communities' technical and organisational capacities. External agents alone cannot deal with the diversity of risks facing vulnerable populations. Local people bring a wealth of resources, especially knowledge and skills, to help reduce risk. Working closely with local people helps professionals to gain greater insight into the communities they seek to serve, enabling them to work more effectively and produce better results. Transparency, dialogue and collaboration between DRR organisations and communities build and strengthen their relationships, enabling projects to endure and expand.

Participatory approaches in CBDRM enable people to explain their vulnerabilities and priorities, allowing problems to be defined accurately and appropriate interventions to be designed and implemented. Participatory work takes a multi-track approach, combining different activities, hazards and disaster phases. It is therefore well placed for dealing with disasters and the diverse factors affecting people's vulnerability to them. Participatory risk reduction initiatives are more sustainable because they build on local capacity, ideas can be tested and refined before adoption, and they are more likely to be compatible with long-term development plans. They may also be more cost-effective in the long term than externally-driven initiatives.

CBDRM empowers people by enabling them to tackle challenges. The process of working and achieving things together strengthens communities. CBDRM reinforces local organisation, building up confidence, skills, capacity to cooperate, awareness and critical appraisal. In this way, it increases people's potential for reducing their vulnerability. It also empowers people more generally by enabling them to tackle other challenges, individually and collectively, through advocacy as well as action. Community participation in planning and implementing projects accords with people's right to participate in decisions that affect their lives. It is therefore an important part of democratisation in society, and is increasingly demanded by the public.

Although many agencies have adopted CBDRM as an approach, there are wide variations in the way they implement it, depending on the agencies' own understanding of what CBDRM is, their ways of working, and local contexts and needs. Many 'community-level' projects are 'community-based' – that is, they rely on the participation of the people who will benefit. However, this is not always the case: some offer few or no opportunities to participate. Even when community members do participate in projects, those projects are not necessarily managed by the communities: they may be directed by others. CBDRM should be both community-based and community-managed.

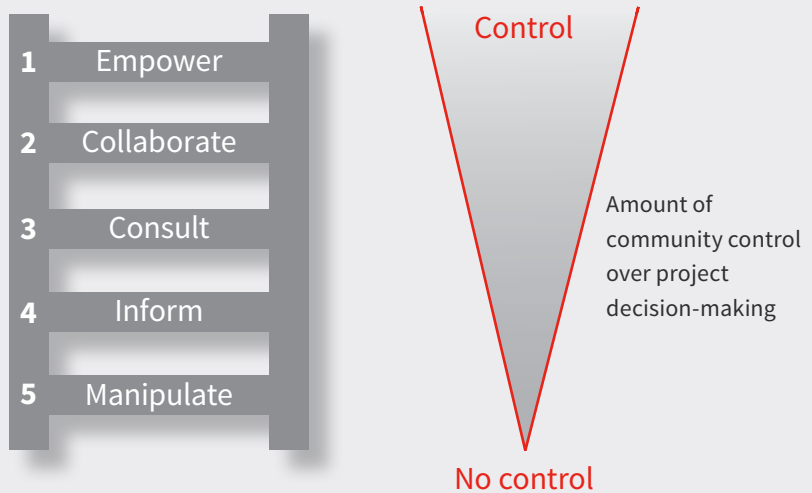
The nature of participation in CBDRM also varies widely, according to the geographical, social and institutional context, the different communities and external agents involved, the scale and nature of the problems to be addressed, and the type of project work that is proposed or undertaken. Broadly speaking, participation can be seen as 'a right held by all people to engage in society and in the decisions that impact their lives'.¹ It is more a package of theories, methods and experiences guided by some broad principles than a single ideology or way of working. The term 'participation' is used in a variety of ways in practice: for example, it may refer to self-help, volunteerism, civic debate, public consultation, political/administrative decentralisation, delegation of responsibility, formal partnerships between groups or organisations, or community planning.

Approaches to participation likewise take many forms, and the degree of community control also varies considerably (see Figure 6.1: Levels of community engagement and participation), but participation is sometimes grouped more simply into two main types: guided and people-centred. Guided (or instrumental) participation seeks to include people in projects, mostly in implementation and sometimes planning. However, although there may be public consultation, projects are still initiated, funded and ultimately controlled by external agencies and professionals; in some cases, community participation may be limited to undertaking prescribed tasks. People-centred (or transformative) participation aims at empowering communities by involving them in defining problems and needs, deciding solutions, implementing agreed activities, evaluating the results and sharing the benefits. In practice, things are often less clear-cut: individual projects may contain elements of guided as well as people-centred participation. Nevertheless, the ideal is to involve community members in discussion, decision-making, implementation, monitoring and evaluation to the greatest extent possible.

Community participation in disaster risk management can be challenging and difficult to manage – indeed, to attempt to 'manage' the process too much may defeat the purpose. Good facilitation is needed, and facilitators need to have skill and sensitivity. There may have to be a shift in attitudes in order to achieve mutual respect and understanding between

¹ Institute of Development Studies: <http://www.ids.ac.uk/team/participation>.

Figure 6.1 Levels of community engagement and participation



C. H. Davidson et al., 'Truths and Myths about Community Participation in Post-disaster Housing Projects', *Habitat International*, 31: 100–115, p. 103. See also S. R. Arnstein, *A Ladder of Citizen Participation*, 1969/2004, http://lithgow-schmidt.dk/sherry-arnstein/ladder-of-citizen-participation_en.pdf.

professionals and community members. Training in participatory principles, approaches and techniques is therefore essential, and agencies should aim to build up a cadre of suitably trained staff.

Building community capacity for organisation should be a central objective of DRM projects. Organised communities are better able to assess problems, work out and implement solutions, share ideas and techniques, take the initiative, support and encourage their members, negotiate with other stakeholders and obtain a stronger voice in arguing for change. But capacity development of this kind is generally a long-term, even ongoing, process that does not fit neatly into project timetables.

6.2 Communities and community action

6.2.1 Understanding the community

Each CBDRM project takes place in a distinct context. Disaster managers often view communities in purely spatial terms, as groups of people living in the same area or exposed to the same hazards and risks. The spatial dimension is an essential element in identifying communities at risk, but it must be linked to an understanding of other significant dimensions of ‘community’, to do with common interests, values, activities and social structures.

It can be difficult to identify clearly what a ‘community’ is. Communities are not single, homogeneous, entities: they are complex and varied. There are differences in wealth, social status and labour activity, and divisions according to gender, ethnicity, age, religion and caste. Tensions always exist. Divergence in needs and priorities can create or worsen divisions. Individuals can be members of more than one community at the same time, linked to different factors such as their location, occupation, economic status, gender, religion or recreational interests. Communities are also dynamic: people may join together for common goals and separate again once these have been achieved. CBDRM programming should consider all of these dimensions. This requires skill, insight, patience and flexibility. (For the specific challenges of understanding and working with communities in urban and conflict settings, see Chapters 13 and 15.)

6.2.2 Community actors and actions

Local people and organisations are often the main actors in DRR, even in the most hostile environments. In low-income countries, where the capacity of the state to protect its citizens may be limited, communities often have to rely on their own local knowledge and coping mechanisms to deal with hazards (see Chapter 7). When a disaster strikes, the immediate response – search and rescue, dealing with the injured, traumatised and homeless – is carried out almost entirely by family members, friends and neighbours. It might be many hours or days before professional emergency or relief teams arrive. In the case of small-scale hazard events, there may be no external support. When it comes to rebuilding homes and livelihoods, communities are often left to their own devices.

Traditional social support structures can play a significant role in disaster preparedness, response and recovery. Projects often create new community organisations dedicated to disaster management or to a particular aspect of it, such as preparedness and response (for example, see Case Study 6.1: Setting up community DRM projects). This is not always necessary. Establishing new groups or organisations generally requires considerable time and effort. It is often much more effective to build on existing community structures, institutions and social capital. Although relatively few communities have formal disaster

Case Study 6.1 Setting up CBDRM projects

CBDRM takes many different forms and each new initiative should be appropriate to its context. However, to ensure a degree of consistency and replicability some agencies have drawn on their field experiences to develop broadly standardised models and approaches. One example is the *Gestão de Risco a Nível da Comunidade* (community risk management) or GERANDO method in Mozambique, designed by World Vision in collaboration with Eduardo Mondlane University, which was piloted in over 30 projects from 2006–2010.

GERANDO is a process for supporting local capacities to identify, predict and manage hazard impacts. The process consists of six inter-related stages, each of which is facilitated by a trained member of the local community:

1. Establish a local DRM committee in each community (the GERANDO facilitator is usually the community coordinator, who then leads the committee and community through the next five steps).
2. Identify the significant shocks and stresses that the community faces.
3. Carry out a vulnerability and capacity assessment.
4. Identify scientific and traditional or indigenous early warning indicators.
5. Develop and implement mitigation plans.
6. Where appropriate, draw up a community disaster preparedness plan.

The full cycle of six steps takes roughly a year to complete. Communities then repeat the process again from step 2, identifying new or growing threats to focus on: this exercise also provides them with the opportunity to consider the effectiveness of their previous interventions, and how to adapt their strategies and activities.

Evidence from the pilot projects showed that community ownership of the GERANDO process stimulated more widespread participation and action in several areas of DRR. But there was a need to improve links with government agencies in order to ensure that their plans were informed by local assessments, and more effort was needed to integrate CBDRM into development programming. It was also important to provide capacity-building support to local facilitators in the first 2–3 years of each initiative.

World Vision UK. See also *Community Based Disaster Risk Management: Facilitator's Manual* (and Annexes) (Maputo: World Vision Mozambique, 2011), <http://www.wvi.org/disaster-risk-reduction-and-community-resilience/publication/gerando-community-based-risk-reduction>.

management committees, many have other established groups for dealing with communal issues, such as water management or the regulation of disputes. Such groups can provide an entry point for outside facilitators and a basis for establishing sustainable local-level organisational capacity to assess and counter risk.

Official disaster management organisations tend to undervalue the potential of informal social organisation or networks, such as neighbourhoods, families and kinship groups. Actions by affected communities or groups (e.g. search and rescue, giving out food and water) have even been viewed as irrelevant or disruptive because they are not directed by the authorities. But in fact, in crises in high- and low-income countries alike, there will be a variety of spontaneous, largely informal responses by self-organising groups within communities, before official organisations are able to mobilise. These ‘emergent’ groups carry out a variety of activities including search and rescue, first aid, damage assessment, handling the dead, distributing relief supplies and presenting survivors’ grievances.² Well-known examples include the 1985 Mexico City earthquake, where nearly 10% of the city’s population took part in voluntary work of some kind, and the 1995 earthquake in Kobe, Japan, where a strong contingent of volunteers emerged to assist in the response. The 2010 and 2011 earthquakes in Christchurch, New Zealand, saw the emergence of the Student Volunteer Army, mobilised largely through social networking, which was active in clearing up silt and debris and distributing assistance.³

Social capital has an important role in CBDRM. The term ‘social capital’ refers to the social resources which people draw upon to pursue their objectives: these comprise networks and connections between individuals, membership of groups and relationships of trust and exchange. It is a foundation for collective action, but is just one of several types of capital or assets on which individuals, households and communities may depend for their security and livelihoods (for other forms, see Chapter 9). Communities use their social capital in self-organising to manage natural resources, adjust to environmental hazards and deal with disasters. The benefits of strong social networks are evident in emergency response and disaster recovery, where communities and groups with high levels of social capital appear to recover more quickly. Crises can also bring people together and stimulate stronger and lasting social connectedness.

2 T. Drabek and D. McEntire, ‘Emergent Phenomena and the Sociology of Disasters: Lessons, Trends and Opportunities from the Research Literature’, *Disaster Prevention and Management*, 12(2), 2003, pp. 97–112.

3 E. L. Quarantelli, ‘Organizational Response to the Mexico City Earthquake of 1985: Characteristics and Implications’, *Natural Hazards*, 8, 1993, pp. 19–38; L. Comfort, *Self-organization in Disaster Response: The Great Hanshin, Japan Earthquake of January 17, 1995* (Boulder, CO: Natural Hazards Center, 1996), <http://www.colorado.edu/hazards/research/qr/q78/q78.html>; http://en.wikipedia.org/wiki/Student_Volunteer_Army.

6.3 Inclusion and expectations

6.3.1 Involving the most vulnerable

The aim of CBDRM is to enable communities to protect themselves more effectively against hazards. Participation is a means to this end. To the extent that it can empower and thereby mobilise the community collectively, it will succeed. If only some parts of the community are involved, its impact will be limited at best, it is quite likely to overlook those most in need, and in some circumstances it may lead to community fragmentation and hence to total failure. To avoid these dangers, there must be a thorough understanding of the community from the start. Good stakeholder and situation analysis is essential to reveal the composition of the community, the relationships between different groups within it, who is vulnerable to disaster and how, and how the community can be mobilised to reduce the risks it faces.

Communities are not homogeneous or united; social relations are not equal. In any society there are winners and losers. Some groups are weaker than others, or in some cases deliberately marginalised. As a result, their voices are less likely to be heard, and more effort will be needed to involve them in community initiatives. As the most marginal groups in society tend to be the most vulnerable, this is an important issue for development, DRR and climate change adaptation projects. Targeting the most vulnerable and marginalised within communities and ensuring their inclusion and participation may not be straightforward: it will probably require continuing effort throughout the lifetime of a project, and possibly beyond.⁴

It is not practical to involve everyone all the time in CBDRM activities, but it is essential that all groups within a community are represented and engaged in some way. Special effort may be needed to facilitate participation, for example by organising meetings and other activities at times of day and in places that make it easier for certain groups to attend, or by creating separate and safe spaces where they are more confident to speak out. Many projects hold separate meetings for women and schedule these to fit as far as possible with their many domestic and other responsibilities. The time and effort required for participatory initiatives can be a barrier to very poor people, whose overriding daily pressures to earn a living and feed a family already place heavy demands on them.

It is essential to be explicit about the objectives of a participatory CBDRM process. Different social groups may have different objectives (indeed, relationships between outsiders and local communities usually involve different ends). The process can then be developed to reconcile those objectives. Where objectives are unstated or unclear, misunderstandings will arise that

⁴ In humanitarian action, there may be some tension between the desire to protect the vulnerable (and, hence, to address the causes of their vulnerability, which may include socio-political structures) and the need to maintain the fundamental humanitarian principles of impartiality, neutrality and independence. This debate is largely driven by experiences in complex political emergencies, but it is also relevant to other types of disaster.

may prove damaging in the longer term. There is also the issue of how to strike the appropriate balance of private and public gains from a project, especially where resources are limited. Sometimes a difficult choice has to be made between action that benefits the community as a whole (e.g. an embankment to protect against floods) and interventions that focus on particular households and groups in need. Communities may have high expectations of what they might receive from outsiders, whilst outsiders may risk giving the impression that they will address all aspects of a problem even though they are not in a position to do so. To some extent this is inevitable, given DRR's holistic aims and principles. Agencies should seek to implement progressive yet manageable programmes with achievable objectives, and they should be open about what they are doing and why.

6.3.2 Information and openness

The more transparent the process, the greater the likelihood of success. This requires sharing information and knowledge, which does not always happen. For instance, many participatory processes simply extract information from people, to be used by others. This sometimes happens with community-level vulnerability and capacity assessment, in which information is acquired from community members through participatory techniques, but the data analysis and subsequent disaster planning are carried out by external agents. The outcomes of participatory appraisal exercises should therefore be shared publicly with all those who take part. This allows knowledge gained from different groups within the community to be shared between those groups and debated by them, leading to better mutual understanding of each other's views and needs. It also gives community members a chance to challenge the conclusions of the appraisal – and the appraisers. The community may insist on such sharing as a precondition of its involvement in participatory work. Openness also generates trust (see Box 6.1: The three Ts). Transparent feedback mechanisms should be integral to every project.

6.3.3 Power relationships

Organisations need to look closely into the nature of community structures and power relationships, the influence of local elites on local decision-making, and the implications of choosing to work with particular community stakeholders. Projects should be aware of the risk of creating tensions within communities by appearing to favour particular groups. Programming tools such as Do No Harm (Local Capacities for Peace Project)⁵ are useful for examining the divisions, tensions and connections within and between communities (see also Chapter 15). Where people-centred participation involves real social change, it leads inevitably to the possibility of confrontation and conflict with those accustomed to holding power and controlling resources. For example, attempts to remove restrictions on women's or other groups' access to decision-making power are often resisted, usually on the grounds of respect for tradition and cultural norms.

⁵ M. B. Anderson, *Do No Harm: How Aid Can Support Peace – Or War* (Boulder, CO: Lynne Rienner, 1999).

Box 6.1 The three Ts

Successful participation is sometimes said to rely on the three Ts: transparency, time and trust.

- Transparency requires clarity, openness and accountability. It respects the need for communities to be informed about the drawbacks of interventions as well as their benefits.
- Time is needed to build meaningful relationships between communities, outsiders and intermediaries, to implement activities and to enable communities to take ownership of the process.
- Trust is the result of transparency and time in the participatory process, creating a sense of shared effort, goals and responsibility.

Adapted from J. Corbett et al., 'Overview: Mapping for Change – The Emergence of a New Practice', *Participatory Learning and Action*, 54, 2006, <http://pubs.iied.org/14507IIED.html?s=PLA&b=d>, pp.13–19.

Agencies and project facilitators need to be careful in their choice of local partners, and when identifying whom to include in project activities. Local authorities, political leaders and business people are often keen to be involved, but in some cases they may have little understanding of the needs and circumstances of marginal and vulnerable groups, or they may have their own agendas. On the other hand, securing their engagement in DRR can be beneficial because of the skills, connections and resources they bring. Members of local elites cannot be disregarded, for they have the power to block or disrupt community-based initiatives. Working out how to acknowledge and include local leaders without putting the weaker members of the community at a disadvantage can be a major challenge. Facilitators may find that some of the groups involved are unwilling to declare all their intentions, especially if these involve capturing resources from other sections of the community or external agencies. Participation cannot always uncover such hidden objectives and unstated agendas, and those involved must remain alert for indications (see Case Study 6.2: Revealing and reconciling different views).

Case Study 6.2 **Revealing and reconciling different views**

An earthquake in the state of Maharashtra in India in September 1993 left 53,000 houses either totally destroyed or seriously damaged; about 10,000 people were killed. Since some of the villages affected had been reduced to rubble and had become burial grounds, the government decided to relocate 49 villages to safer sites, and promised to provide a plot of land and a basic house to every household that had to move. This involved designing layouts for the new villages and houses. Official designs produced for both, based on town planning, were completely different from those of traditional villages and showed no understanding of villagers' needs. Attempts at construction ended in failure and it was finally agreed to involve people more actively in planning.

In one village, facilitators explored how space had formerly been used. Meetings were held with villagers to identify what features they wanted to see in the new village and its housing. The groups also visited the new site. There were heated arguments when the different groups' ideas were shared in a village meeting. The grid layout prepared by officials was strongly supported by the younger, literate men who had studied in towns, who felt that features derived from town designs would make the village look better. The older men, younger non-literate men and most of the women felt that this design was not suited to their way of life and daily activities. The main reason for not liking the grid design was that houses would not be clustered. Women felt that this would lead to the disintegration of social and cultural ties and support networks based on kinship and caste groups. One man pointed out how difficult it was to turn a bullock cart in a grid design where roads turn at right angles. When it came to discussing public facilities, the women's plan focused on water points, which had been overlooked by the men.

Despite these problems, the process arrived at a commonly agreed solution, based on a mixture of the cluster and grid plans – and it took only three days.

M. K. Shah, 'Participatory Planning with Disaster Victims: Experience from Earthquake-hit Areas of Maharashtra, India', *Refugee Participation Network*, 21, 1996, <http://www.fmreview.org/RPN/21>, pp. 15–17.

6.3.4 Insiders and outsiders

Although participation should be community-centred, outsiders do have a role to play. As long as they remain facilitators, and their work is guided by people's needs and aspirations, they can be genuine partners in transformation. This sounds easy enough in principle, but the practice is much harder. The relationship between external disaster specialists and local people involves differences in outlook, power and resources. Outsiders have different educational, social and cultural backgrounds, and they work for organisations that may

have considerable financial, technical and other resources. The possession of material resources, especially funding, conveys enormous power. Because of this power, and the assumption that all participatory efforts are good in themselves, disaster specialists may be tempted to intervene without waiting to find out if they are really needed – or wanted – by the community. In such circumstances, the participatory process is likely to be directed by outsiders, and aimed towards seeking confirmation of decisions made externally. This often happens unconsciously. If funds are made available too widely or easily, this can undermine local initiatives and organisations.

Even where there is dialogue, outsiders find it very difficult to understand the community's environment, needs and points of view. To be sure, some of this can be blamed on the attitudes and approaches of the outsiders themselves, which are the product of their education, institutional culture and so on. But there is a more fundamental factor here, too: the impossibility of ever being able to put oneself fully into somebody else's position and see things through their eyes.⁶ Trying to fit others' views into frameworks of understanding, filtering the knowledge gained and reshaping it, can have the effect of imposing a kind of conceptual uniformity on the diversity of people and their experiences. Outsiders also have to be transparent about their own aims and agendas, what they seek to provide and what they cannot do. Trust, which is a vital ingredient of participatory relationships, will break down if external agencies send out the wrong signals about their aims and capacities, or raise community expectations unduly.

6.4 Facilitating CBDRM

CBDRM requires a number of operational choices about the time and scope of the process, and the methods to be used. It also requires skilled facilitation: these skills must be learnt. The following paragraphs highlight a few of the main issues (appropriate communications methods, which are vitally important here, are discussed in more detail in Chapter 10). CBDRM is often a long process involving several steps from identification and analysis of problems, through decision-making and planning to action and evaluation. Community participation should take place throughout this process, at each of these steps.

6.4.1 Entry points

The first problem for agencies is finding an appropriate entry point to the community. The choice of entry point will depend primarily on the nature of the community concerned. In some cases, it might be through customary local authorities (such as village elders, heads of

⁶ M. R. Bhatt, 'Can Vulnerability Be Understood?', in J. Twigg and M. R. Bhatt (eds), *Understanding Vulnerability: South Asian Perspectives* (London: Intermediate Technology Publications, 1998), pp. 68–77.

clans or religious leaders), local teachers or traditional forms of association such as forums for regulating water, funeral societies or occupational groups. In other cases, it might be directly through the poorest and most vulnerable – for instance women-headed households or landless families.

Decisions of this kind require careful calculation of the likely consequences, based on an understanding of the community's structure and the different needs of its sub-groups. Will working through a particular entry point enable the initiative to reach the most vulnerable, or does it run the risk of the project being 'captured' by local elites? Will some sections of the community (e.g. traditional leaders) be alienated if the process begins with other, traditionally marginal or disempowered, groups? It is not easy for a DRM organisation to maintain neutrality if it appears to some community members that it has taken sides. Some people may simply distrust outsiders.

6.4.2 Processes and methods

Participatory processes for CBDRM must be inclusive, involving all sections of the community in assessing existing and potential situations, creating a common vision of the future, identifying practical opportunities, setting priorities for action and designing interventions. There is a wide choice of participatory learning and action (PLA) methods and tools available to support this.⁷ They can be grouped into six main kinds (see also Chapter 11.4):⁸

1. Spatial – mapping and modelling. This is particularly useful in risk and vulnerability assessment. For example, it can be used to identify hazards and dangerous locations, map water systems and rainfall, identify areas affected by erosion, loss of vegetation or pest infestation and identify vulnerable groups and capacities and assets within the community.
2. Nominal – collecting, naming or listing. These activities can collect information about communities and their environment: for example, naming and sequencing coping strategies used in times of food crisis, listing health problems in order of frequency or importance and identifying the causes and consequences of deforestation.
3. Temporal – putting events in sequence. This could be through personal and ecological histories, disaster timelines, disaster visualisation, seasonal calendars, community

⁷ See www.participatorymethods.org; <http://communityplanning.net>; <http://www.iied.org/participatory-learning-action>.

⁸ These categories, which are applicable to development initiatives in general, are taken from R. Chambers, *Whose Reality Counts? Putting the First Last* (London: Intermediate Technology Publications, 1997), pp. 130–61.

time lines or re-enacting events. These methods can reveal the changing nature of vulnerability and the effectiveness of previous preparedness or response measures.

4. Ordinal – sorting, comparing and ranking. This can be used to identify the most vulnerable individuals and households.
5. Numerical – counting, estimating, comparing, scoring. Methods of this kind could be used in assessing disaster losses or quantifying the value of some kinds of livelihood asset.
6. Relational – linking, relating. This can help facilitators understand how different parts of the community relate to each other and identify power structures. It also allows people to show how their problems relate to one another: for example, how the effects of drought might be linked to land tenure arrangements, or to gender-based divisions of labour, using a problem tree.

The choice of tools needs careful consideration. Users must be clear what aspects of the question they want to investigate, what information they are looking for and what methods will obtain that information. PLA tools do not automatically provide all the answers to what may be complex questions, and important issues can easily be overlooked.

6.4.3 Participation and projects

In some cases participation is an end in itself, enabling men and women to learn, organise, decide, plan and take action without other specific goals in mind. More often it is geared to some kind of formal project or programme supported by outside agencies, usually with external funding. Those responsible for such projects and programmes have to make tricky operational decisions about when to stop analysing and start planning and implementation. The process is not crudely linear: good participatory processes involve ongoing reappraisal and willingness to change project design and activity in response to people's feedback and new insights. Nevertheless, the shift from appraisal to operations is significant within the project cycle, and must be managed carefully.

The timetable for analysis of problems and opportunities, for methods of research and action and for planning new activities should be based upon a careful consideration of the local context, the specific concerns to be addressed, the institutions involved in collaborative efforts and the objectives of local and outside actors. Collaborative actions may be limited to specific initiatives for the immediate future (a few months, one or two years), or they might be viewed as a genuinely long-term programme (ten years or more). Participation works best as a process over long periods of time, allowing for reflection and modification in the light of experience and contextual changes. However, participatory approaches are just as valid in short-term projects and in emergencies. External agencies themselves vary greatly in the extent to which they ensure beneficiary participation within their own programmes. Some

support local partners to build their capacity, others deliver services directly, but all should be prepared to enter into long-term relationships with communities if their interventions are to make a meaningful improvement. The aim should be to facilitate community mobilisation, action and empowerment.

Communities are always undergoing change, as are their circumstances, needs and resources; sometimes these changes are rapid. Participation must therefore be a dynamic process, which implies constant readjustment of understanding, planning and implementation. This is not easy, and may be particularly difficult for external actors who have to work to less flexible schedules and targets set down by managers or donors. Understanding of what participation implies must reach right up the management chain.

6.5 Stakeholder relationships

Community initiatives can arise in response to threats from external forces – for example to challenge development plans or environmental damage. This is an important consideration in the context of DRR, for unsustainable development processes can increase or even create hazard threats. Community participation must be underpinned by recognition of these external forces and their implications.

Community-level activity does not take place in a vacuum: communities are not isolated from the rest of society and there are no neat boundaries between one community and its neighbours. All communities depend to some extent on external resources of one kind or another, particularly emergency management agencies but also other administrative, infrastructural, social and economic services. Other actors, such as government, the private sector and civil society organisations, must also be considered stakeholders. External actors can have a decisive impact on community-level initiatives. The involvement of local government is essential, be it as a partner, facilitator or enabler. Many kinds of community organisation may be active, such as peasants' associations, gardeners' clubs, community kitchens, burial societies, irrigation committees and neighbourhood committees. The relationship between these different actors is dynamic, changing as a result of new knowledge and shifts in attitudes, resources and political power.

Facilitating these often complex relationships effectively is essential for the success of any DRR initiative. Considerable time, effort and diplomatic skill may be needed for this task. Supporting agencies, governmental or non-governmental, may have to assume the role of intermediaries or brokers, facilitating links between community-level organisations and other local, national and international actors. Their brokerage functions might include assisting communication between project beneficiaries and governments, supporting participation and group formation, training and building the capacity of local organisations, channelling resources and helping to identify and voice community needs.

Case Study 6.3 Integrating CBDRM with official development planning

In the districts of Chitwal and Nawalparasi in Nepal, Practical Action has been working with 59 Village Development Committees (VDCs) and municipalities, the lowest administrative units of government, to prepare DRM plans. Ward- and community-level vulnerability assessments were carried out in each VDC and municipality. Their findings formed the basis of local DRM planning workshops with representatives of government, civil society organisations and communities, as well as technical experts. The final plans, agreed by the various stakeholders, were endorsed by the respective VDCs and Municipal Councils, and included in their local development plans. They were then endorsed by District Development Committees (DDCs) for inclusion in District Development Plans. From the local vulnerability assessments, priority DRM plans and projects were also identified at district level. This process was coordinated by local government officials and steered by a task force involving DDCs, other government development agencies and NGOs.

D. Bhandari, Y. Malakar and B. Murphy, *Understanding Disaster Management in Practice with Reference to Nepal* (Kathmandu: Practical Action, 2010), <http://practicalaction.org/nepal/docs/nepal/understanding-disaster-management-in-practice.pdf>.

Creation of multi-stakeholder DRR groups or committees at local and higher levels, involving a range of government, non-government and community organisations, can provide a platform for ongoing planning and action, and a space for discussion about CBDRM policy and practice. Such platforms, groups or committees can take a variety of forms (see Case Study 6.3: Integrating CBDRM with official development planning). DRR should also be linked to development programmes and the organisations and groups that implement them: too often, it takes the form of stand-alone initiatives.

Local and community CBDRM groups should also be connected to one other, both to share experiences and to enable them to lobby government and other agencies collectively. Strong local organisations, formal and informal, are essential for successful DRM, not only in managing and implementing changes on the ground but also in lobbying or negotiating with other institutions. Governments and official disaster management organisations often ignore community organisations and capacity, or resent them because they are outside their plans, systems and, above all, control. Whilst it is essential to empower communities in their relationships with external actors, in many countries articulating demands and asserting rights may be seen as subversive by the authorities.

Early advocates of community-based DRR emphasised its important function in challenging official agencies to support communities or change policies and practices. Nowadays, a less adversarial and more collaborative approach is usually recommended, although the tactics adopted depend on the specific governance context and the prevailing nature of state–civil society relations. In a state where government responsibilities are being decentralised – which is happening in many countries – there may be new opportunities for more equal dialogue between communities and officials. With the retreat of the state from many aspects of socio-economic development, the need for active and influential civil society organisations has grown rapidly and massively, extending the scope for community-level work (see Chapter 4).

Case Study 6.4 Intermediaries in local-level vulnerability reduction

Over the years, the Philippine National Red Cross (PNRC) has put increasing emphasis on preparedness and mitigation, as well as attempting to move beyond its traditional role of service provider to one of facilitating community-driven initiatives. One of the main vehicles for this shift was an Integrated Community Disaster Planning Programme (ICDPP). A study of one ICDPP project, in Tigbao on the island of Leyte, highlighted some of the challenges it faced in doing so. The project gave training in first aid and disaster management, established a community disaster action team and implemented several structural measures (building a seawall, strengthening a river dike, dredging and diverting a stream and planting mangroves). The initiative required considerable coordination with communities as well as members of local government.

As an intermediary body or facilitator, the PNRC faced several challenges and constraints. It had to consider how far it should fill gaps in the disaster management systems that were not being covered by government agencies – yet this meant adopting a traditional service delivery role. To reduce vulnerability, livelihood-support initiatives were needed, but the project’s agenda was limited to more conventional disaster management. The PNRC played an advocacy role, helping communities lobby appropriate agencies, especially for funding. However, this could potentially bring it into conflict with the core Red Cross principle of political neutrality. Donor conditionality and the organisation’s own standardised systems for project design and implementation ran counter to the flexibility required for community-based work. In addition, other stakeholders came into the project with their own expectations of what the PNRC should do, based on its traditional roles as an auxiliary service to local government, distributor of relief goods and charitable organisation. Despite expectations to the contrary, in this project the PNRC did become significantly more of a facilitator of local actors and less a giver of aid.

K. Allen, ‘Vulnerability Reduction and the Community-based Approach: A Philippines Study’, in M. Pelling (ed.), *Natural Disasters and Development in a Globalizing World* (London: Routledge, 2003), pp. 170–84.

In any case, enhanced community knowledge and negotiating skills are an important element of DRR capacity. Government agencies may seek to take over successful non-governmental initiatives: sometimes this helps them to scale up, but there is a risk that bureaucratic influence will undermine the values and relationships that generated the initial success. Government is also more likely to take a compartmentalised, sector-based approach to resilience-building, whereas communities are more aware of resilience as a holistic issue encompassing and connecting many aspects of local development and DRR.

6.6 Scaling up and sustainability

6.6.1 Scaling up impact

The challenge of how to ‘scale up’ successful local-level initiatives has been a pressing issue for many years. This subject has been much researched and discussed in development circles, but it has featured less in writing on DRR, where there is a need for more evidence showing which approaches to scaling up work best in different conditions. Writing on development suggests that scaling up can be achieved through several different approaches, which may be applied separately or in combination (combining them is likely to have the greatest impact):⁹

- quantitative (or additive) – increasing the project’s size, geographical outreach and budget;
- functional – increasing the scope and types of activity undertaken;
- organisational – increasing an organisation’s size and capacity; and
- multiplicative – achieving greater impact through influence, political engagement, networking, policy reform or training.

Scaling up can also be informal and spontaneous, where ideas and innovations are diffused and spread without external direction.

The Cyclone Preparedness Programme in Bangladesh is a classic example of an additive/quantitative approach. Begun in the early 1970s, the programme has grown to cover an extensive part of the country’s coastline. Its overarching structure is the responsibility of the government and the Bangladesh Red Crescent Society, but on the ground it is based on the efforts of nearly 50,000 community volunteers.¹⁰ Plan International’s initiative in schools in

⁹ M. Edwards and D. Hulme, ‘Scaling-up the Developmental Impact of NGOs: Concepts and Experiences’, in Edwards and Hulme (eds), *Making a Difference: NGOs and Development in a Changing World* (London: Save the Children Fund/Earthscan, 1992), pp. 13–27; S. Gillespie, *Scaling up Community-Driven Development: A Synthesis of Experience* (Washington DC: International Food Policy Research Institute, 2004), <http://www.ifpri.org/sites/default/files/publications/fcndp181.pdf>.

¹⁰ See <http://www.bdrcs.org/programs-and-projects/cyclone-preparedness-program>; www.cpp.gov.bd.

El Salvador to encourage young people's involvement in DRR took a multiplicative approach, working through the Ministry of Education to achieve national coverage. Starting as a pilot project in February 2005, it had scaled up dramatically by July 2007: over 5,000 schools had made school protection plans and DRR had been integrated into the national curriculum.¹¹

Interventions need to be well informed, clearly targeted at certain issues or groups, and either supported by communities or able to gain community support. Engaging local stakeholders is an essential foundation for long-term development and expansion. Careful development through piloting is also essential, to identify and establish working models at community level. An appropriate strategy for scaling up should be developed, based on a realistic assessment of local capacities and potential, as well as the time needed to build those capacities to the point where a project can develop by itself.

If CBDRM initiatives are to be sustainable and expand, they also have to be connected to their wider institutional, policy and socio-economic contexts. They develop and grow best where government and other institutions provide a supportive 'enabling environment'.¹² Where a

Case Study 6.5 **Achieving consistency in scaling up**

The Nepal Risk Reduction Consortium, an initiative implemented by the Nepalese government with international partners, consists of five 'flagship' areas: school and hospital safety; emergency preparedness and response; flood management; integrated CBDRM; and policy and institutional support for DRR. The Flagship 4 programme seeks to promote CBDRM by establishing a more consistent and systematic approach at Municipality and Village Development Committee levels. This is based on a standard set of nine minimum characteristics of a disaster-resilient community and a package of common elements to be included in all CBDRM interventions. Agencies that wish to join the programme have to sign up to this approach, and their projects have to address one or more of the minimum characteristics. This consistency makes it easier to share experience, monitor progress and identify gaps.

Flagship 4 Handbook: Nepal's 9 Minimum Characteristics of a Disaster Resilient Community (Kathmandu: Nepal Risk Reduction Consortium, 2013), www.flagship4.nrrc.org.

¹¹ J. Twigg and H. Bottomley, *Disaster Risk Reduction: Inter-Agency Group Learning Review* (London: DRR Interagency Co-ordination Group, 2011), http://www.preventionweb.net/files/21185_drrreviewweb5b15d1.pdf, pp. 18–20.

¹² See J. Twigg, *Characteristics of a Disaster-Resilient Community: A Guidance Note* (Teddington: DFID Disaster Risk Reduction NGO Interagency Group, 2009), <http://discovery.ucl.ac.uk/1346086>.

project identifies underlying problems or contextual factors that inhibit its impact or that it cannot address directly, it may need to put more effort into advocacy.

6.7 Sustainability and external inputs

There are many striking success stories of sustainable DRR projects (for example, see Case Study 6.6: Sustaining livelihoods against environmental change), but the challenges in making projects sustainable should not be underestimated. Successful initiatives adapt repeatedly over time to maximise their outreach and effectiveness and respond to changing circumstances. However, many DRR projects at community level never progress beyond the pilot or demonstration phase. Short-term projects that focus on immediate outputs provide poor foundations for long-term outcomes. Exit strategies are rarely discussed in agency reports, but in some cases they appear to be abrupt, premature and driven largely by donor timeframes. Ideally, a viable exit strategy should be developed at the start of a project, in discussion with other stakeholders, particularly communities (who are often not informed about what is planned). The exit strategy should plan for the security and sustainability of project progress towards its goals. Where initiatives are handed over to local organisations and communities, which is common, there must be sufficient local ownership, commitment and capacity (knowledge, skills and human, organisational and financial resources) to keep the work going.¹³

The level and nature of external inputs will change over time, but the need for such inputs may not go away. The Cyclone Preparedness Programme in Bangladesh may be based on a volunteer army, but depends equally on ongoing government and donor funding for its professional staff, equipment, construction of shelters and other operational costs. Obtaining such government commitment to develop and maintain initiatives may present a major challenge. The Chivi Food Security Project in Zimbabwe (Case Study 14.4) shows that, even with a strongly participatory approach, it can take years for technical and managerial capacity, and the ability to negotiate more effectively with other external agencies, to really take root. In some cases, external inputs will always be required.

Community-based initiatives depend heavily on volunteers. In many places there is a powerful spirit of volunteerism to support local actions, but there may also be a large section of the population whose daily struggle for subsistence means that they cannot afford to give their time and labour to unpaid collective activities. Moreover, continued effort is needed to maintain volunteer numbers and enthusiasm: many programmes that rely on volunteers experience high drop-out rates (see Case Study 5.4: Mobilising young volunteers for DRR).

13 A. Gardner, K. Greenblott and E. Joubert, *What We Know about Exit Strategies: Practical Guidance for Developing Exit Strategies in the Field*, Consortium for Southern Africa Food Security Emergency (C-SAFE) regional learning spaces initiative, 2005, <http://reliefweb.int>.

One way of overcoming this is to link volunteering to livelihoods support, such as Practical Action's project in Bangladesh, which trained its 200 volunteers in disaster preparedness and response as well as providing them with technical skills that they could hire out in their communities (such as poultry vaccination and carpentry).¹⁴

Local community organisers, usually employed by NGOs, play an important role in community-level training, planning and action, but community involvement may drop significantly

Case Study 6.6 Sustaining livelihoods against environmental change

In the late 1980s, the Danish Red Cross began working with Red Cross National Societies in Senegal, Burkina Faso and Mali to reduce widespread soil degradation. In Mali, this grew into a formal Environmental Education Programme (EEP), which aimed to promote better management of natural resources and increase resilience to environmental threats. Working through a variety of community groups, the EEP comprised a range of interventions in education, environmental awareness, food security and livelihood support. The programme ran for five years, between 1994 and 1999.

In 2009 it was observed that fields around villages in the Mopti region of Mali, which had been supported by the EEP, seemed to be less affected by difficult climatic conditions: they were greener and less eroded than those of neighbouring villages, even though they had received no financial support since the EEP closed. An evaluation found that activities started by the EEP were continuing in four out of the five rural communities surveyed, through individual initiative. Community members retained detailed knowledge of the practices promoted by the EEP, which was passed down from one generation to the next. Actions to prevent erosion were protecting arable land and increasing crop yields. Vegetable gardens run by women were improving nutrition and some community members were benefiting from forestry and orchards. Local drought early warning systems had been set up. EEP literacy classes appeared to have had a significant impact: many formerly illiterate people held influential positions in the community or had found new ways of generating income.

Retrospective Disaster Risk Reduction: Strengthening Community Resilience Towards the Impacts of Climate Change. Post Impact Study – Environmental Education Programme, Mali, Danish Red Cross and Mali Red Cross, 2011.

¹⁴ H. M. Irfanulla, S. H. Miah and M. A. Uddin, "Skilled Volunteers": An Innovative Approach to Disaster Management', *Humanitarian Exchange*, 55, September 2012, <http://www.odihpn.org/humanitarian-exchange-magazine/issue-55>, pp. 34–36.

Case Study 6.7 Inter-sectoral partnerships for community DRR

Partners for Resilience (PfR) is an inter-sectoral partnership seeking to ensure that DRR incorporates ecosystem management and awareness of changing climate risks. The partnership comprises five international agencies (CARE Nederland, Cordaid, Netherlands Red Cross, Red Cross/Red Crescent Climate Centre and Wetlands International) and 30 civil society partners in nine countries. Community facilitators from the different partners support each other at local level. In Indonesia, activities include protection of agricultural livelihoods from droughts and floods, through seed conservation and water management techniques; restoration of coastal ecosystems as flood defences by planting mangroves; loan schemes for small businesses; disaster preparedness training; and installation of a biogas unit, to reduce environmental pollution from unmanaged animal waste and reduce tree cutting for fuelwood.

Partners for Resilience: A New Vision for Community Resilience (2012) and *Partners for Resilience: Putting Community Resilience into Practice* (2013), http://www.partnersforresilience.nl/about-us/documents/nlrc_pfr_vision%206p%20web.pdf; A. Heijmans and S. Sagala, *Community Self-reliance Analysis: Final Report*, Australia-Indonesia Facility for Disaster Reduction, 2013, pp. 44–45, 66–67.

without the organisers' continued engagement. Community motivation is essential if DRR is to take root, so CBDRM projects may need to stimulate such motivation before they attempt to implement anything. Project evaluations and research from many different settings demonstrate clearly that community 'ownership' of projects is vital to their success and sustainability.

A critical factor in a community's motivation is the relevance of CBDRM to its wider development needs, such as livelihoods and food security. Where CBDRM is connected to a community's needs in this way, community members are more likely to engage and take part. Community motivation is also likely to be higher in areas with chronic crises or frequent natural hazards, because these are problems requiring regular or ongoing attention. External agencies need to be level-headed about such long-term needs and their implications for their own commitments. They should be honest with communities – and themselves – about what they can achieve.

Evidence is now emerging to show the effectiveness of CBDRM partnerships between agencies working in different sectors (see Case Study 6.7: Inter-sectoral partnerships for community DRR). Community-based projects can also deliver benefits of a less tangible nature (e.g. active citizenship, awareness of rights) that contribute to making people more resilient. CBDRM should be approached in this 'progressive' way (i.e. process-oriented,

building a range of capacities to cope with future threats, both anticipated and unforeseen); it should not be seen simply as ‘corrective’ (i.e. project-oriented, limited to implementing measures that address specific current risks).¹⁵

6.8 Monitoring and evaluation

In a participatory project geared towards community action, it follows that the community must be involved in selecting indicators of achievement, and in collecting and gathering evidence. This works well in some disaster contexts, for instance in food insecurity and famine early warning, where a number of NGOs have established viable community-based warning systems to alert agencies to deteriorating food and livelihood security, and to generate appropriate responses. Sales of animals, sightings of certain insects and birds and failure to carry out funeral ceremonies are among the indicators identified and applied by local people in such initiatives. Nevertheless, it should be borne in mind that the needs of communities in this regard may differ from those of outside agencies – especially their senior management – and of donors, who expect more conventional indicators of success, often emphasising the quantitative at the expense of the qualitative (see Chapter 18 for further discussion of monitoring and evaluation). It is also useful to review the participatory process itself: who participated, how they participated and the outcomes in terms of community empowerment. Box 6.2 (How did people participate? A checklist of questions) suggests ways of thinking about this.

¹⁵ A. Lavell and C. Lavell, *Local Disaster Risk Reduction: Lessons from the Andes* (Lima: PREDECAN, 2009), http://www.preventionweb.net/files/10498_localDRR.pdf, pp. 11–15.

Box 6.2 How did people participate? A checklist of questions

1. How were people involved? List the techniques you used: assemblies, focus groups, meetings with partners, participation in decision-making, etc.
2. Did you work directly with members of the population or in collaboration with another institution (NGO, CBO, etc.)?
3. Did people engage actively in the process? In what ways? If not, why not?
4. Did men and women participate in the same way? Were women and men equally able to actively engage in the process?
5. Were people from marginalised groups within the community actively engaged in the process?
6. How effectively was information transmitted? Did people understand the messages you shared with them, in particular concerning your organisation, the different stages of the project, potential constraints, etc.?
7. How effective was the consultation? Did people succeed in transmitting their ideas to you? Did they feel consulted and that their contributions were taken into consideration? How do you know? Ask them if they feel that they were consulted or involved in decision-making. If participants made requests or demands that couldn't be accommodated, did they understand why?
8. What was the impact of participants' contributions in decision-making and in the project?
9. What was the impact of participation on the quality of the relationship between the aid organisation and the population and other stakeholders? Was mutual respect and trust established?
10. Were participants, other stakeholders or other members of the population exposed to risks as part of the participation process? If so, what did you do about it?

Groupe URD, *Participation Handbook for Humanitarian Field Workers*, 2009, <http://www.alnap.org/resource/8531>, p. 30.

Box 6.3 Features of successful CBDRM

Extensive research carried out for the International Federation of Red Cross and Red Crescent Societies in 2010–11 with communities in four countries affected by the 2004 Indian Ocean tsunami identified nine key determinants of a successful community-based DRR programme:

1. The motivation and capacity of the community and community leaders.
2. The motivation and capacity of the Red Cross/Red Crescent stakeholders and the strength of partnerships between them.
3. The capacity of external actors (government, NGOs, private sector) and the strength of partnerships with them.
4. The level of community participation and ownership of the CBDRM programme.
5. The level of integration of CBDRM programmes with other sectors.
6. Having an appropriate balance between standardisation and flexibility in programme design.
7. Having sufficient time to implement CBDRM programmes.
8. Having sufficient funding to implement CBDRM programmes.
9. Having adequate assessment, monitoring and evaluation procedures.

Arup International Development, *Key Determinants of a Successful CBDRR Programme* (Geneva: IFRC, 2011), http://www.ifrc.org/docs/Evaluations/Evaluations%202012/Global/GlobalKey_Determinants_12.pdf.

Chapter 7

Indigenous knowledge and coping strategies

7.1 Introduction

People who live in hazard-prone places devise methods for protecting themselves and their livelihoods. These methods are based on their own skills and resources, as well as their knowledge of their local environments and experiences of hazard events in the past. Their knowledge systems, skills and associated technologies are generally referred to under the broad heading of ‘indigenous’ or ‘traditional’ knowledge. The application of indigenous or local knowledge in the face of hazards and other threats is generally referred to as a traditional ‘coping mechanism’ or ‘coping strategy’. It is also sometimes known as an ‘adjustment’ or ‘adaptive’ mechanism or strategy, and as a ‘survival’ strategy when applied in extreme circumstances. The choice of skills and resources varies according to the nature of the hazard threat, the individual or collective capacities available to deal with it and a variety of individual, household or community priorities that can change during the course of a disaster.

Indigenous knowledge is acquired through experiences of living in specific environments over a long period of time. It is passed down from one generation to the next and continually added to or modified in the light of new experiences or experiments, as well as in response to external change. It is specific to its particular locality, community or culture, which is why it has been suggested that ‘local knowledge’ is a more appropriate term.¹ However, it can also incorporate outside specialist knowledge of various kinds, such as weather forecasts. It is not limited to any region or socio-ethnic group, although most studies of indigenous knowledge have taken place in low-income countries and communities. It is a form of social knowledge: acquired, shared, preserved and transmitted within communities (hence it is sometimes referred to, in a hazard/disaster context, as a ‘disaster subculture’). However, particular kinds of knowledge may be held by different social groups in those communities. Indigenous knowledge is wide-ranging. It includes technical expertise in seed selection and house building, knowing where to find wild foods, economic knowledge of where to buy or sell essential items or find paid work, and knowledge of whom to call on for assistance. Indigenous or traditional knowledge is not static. People are constantly adding to, adapting and testing their knowledge and skills to

¹ B. Wisner, ‘Local Knowledge and Disaster Risk Reduction’. Unpublished talk at the Side Meeting on Indigenous Knowledge, Global Platform for Disaster Reduction, Geneva, 17 June 2009.

deal with altered or new situations, which is why local communities have been described as ‘workshops of knowledge production’.²

The enthusiasm for sophisticated technological methods of overcoming disasters has often led specialists to overlook and undervalue the effectiveness of local coping strategies and technologies, and they are under-utilised by formal agencies. However, the growing interest in the potential of people’s adaptive capacities, especially in the context of climate change, may help towards a more constructive appraisal of local knowledge and coping. There have been many studies of coping strategies relating to food security, drought and famine, where disaster specialists have come to appreciate their extent, diversity and value. This came about in part from recognition many years ago that agencies’ orthodox approaches to fighting famine were not effective enough. Coping strategies in other natural hazards contexts have not received so much attention, but there is a growing body of evidence and experience demonstrating their value and explaining the circumstances that affect their adoption.

By learning how people perceive and respond to threats, interventions can be developed that build on the strengths of their existing strategies. It is important for development and relief/recovery workers to appreciate the extent of such indigenous skills and practices, and to support them to maximum effect. This approach helps to make communities partners in the risk management process. It can also be cost-effective where it reduces the need for expensive external interventions. It is more likely to lead to sustainable projects because the work is based on local expertise and resources. Identification of local knowledge – and those who possess it – should be one of the starting points for agencies trying to stimulate community-based DRR initiatives.

Indigenous and local skills, knowledge and technologies are not inherently inadequate. New, external technical approaches are not automatically superior. However, the opposite, romantic, trap of assuming that older ways are always better than the modern must also be avoided. Instead, one must look for what is appropriate for specific purposes and in given conditions. In many cases, a combination of different knowledge sets and skills may be useful, and ways of integrating them (or ‘co-producing’ knowledge) need to be found. It is also important to take account of the diversity of individuals’ perceptions and decision-making processes with regard to risk and risk management, which may be influenced by a range of psychological and socio-cultural factors.

² Wisner, ‘Local Knowledge and Disaster Risk Reduction’.

7.2 Forms of coping

There are many ways of categorising coping strategies and indigenous knowledge and it is possible to develop quite complex systems for understanding this. For operational purposes, a relatively simple typology may be sufficient. One example of such a simple typology divides coping strategies into four broad categories, which are described in more detail below:

- economic/material;
- technological;
- social/organisational; and
- cultural.³

Most coping strategies combine elements of all of these (see Case Study 7.1: Complementary coping strategies in times of stress), so categorisations (of whatever kind) should not be used artificially to fix particular strategies under particular headings. Rather, fieldworkers should have a framework for viewing coping strategies and indigenous knowledge as a whole, ensuring that key elements are not overlooked.

Case Study 7.1 Complementary coping strategies in times of stress

Researchers in agricultural and agro-pastoral districts in the highlands of Tanzania found that local people's response to a serious drought in 2008 involved a variety of methods to obtain money to buy food: finding wage labour, moving livestock to other places to graze, selling wood, handicrafts and manure and (illegally) making and selling charcoal. The severity of the drought finally led to widespread 'distress' selling of livestock. This was an effective short-term response because it provided money to feed families, but it was damaging to household economies in the long run because productive assets were lost.

E. Wangui et al., 'Integrated Development, Risk Management and Community-based Climate Change Adaptation in a Mountain-plains System in Northern Tanzania', *Journal of Alpine Research*, 100-1, 2012, <http://rga.revues.org/1701>.

³ C. Clarke Guarnizo, 'Living with Hazards: Communities' Adjustment Mechanisms in Developing Countries', in A. Kreimer and M. Munasinghe (eds), *Environmental Management and Urban Vulnerability* (Washington DC: World Bank, 1992), http://www-wds.worldbank.org/servlet/WDSContentServer/IW3P/IB/1999/12/02/000178830_98101903551467/Rendered/PDF/multi_page.pdf, pp. 93-102.

Box 7.1 Sequence of coping methods in drought and famine

Households threatened by drought and famine deploy a variety of coping strategies progressively as the crisis worsens. First, normal hungry season strategies are brought into play. Grain and other food consumption is cut back. Men travel to towns and cities to look for seasonal work, returning in the rainy season to plough and plant. Some family members go to more distant markets, where grain and other foodstuffs may be cheaper. Women gather wild plants to supplement family diets. When these standard techniques are no longer sufficient, more drastic steps are taken. Livestock are sold, then household goods and sometimes even houses themselves, piece by piece. If these efforts are not enough, people migrate in search of relatives who can give them food. Families may split up or move into towns to beg and look for work. In some cases it is not until this final stage, when people are on the move, that relief operations start to bring food in.

Coping mechanisms are often used in sequence to respond to different stages of adversity or crisis (see Box 7.1: Sequence of coping methods in drought and famine). This is most apparent during famines when the emergency is likely to be prolonged, but it can also be observed in more rapid-onset disasters such as floods. External responses to slow-onset disasters such as droughts often come too late, when communities have already used up most of their strategies and resources.

7.2.1 Economic/material

One of the principal elements in this category is economic diversification. Local knowledge is applied to supporting household livelihoods and securing economic and material assets, in good times as well as bad. During times of stress, when some economic activities become impossible, having more than one source of income (or food) to fall back on is invaluable. Members of a rural household engaged in agriculture may undertake other work, such as making and selling handicrafts, carpentry, building or blacksmithing. Migration is common in many rural areas, especially among males, and is a standard response to shocks such as crop failure or the illness of a working family member. More and more rural communities are coming to depend, at least in part, on cash remittances from family members who have gone to work in towns and cities, or even in other countries.

Crop diversification is a common method of coping. With a single crop there is the danger that a particular hazard or environmental pressure will destroy nearly everything; with many different crops, there is a better chance that some will survive. Vulnerable households also try to store up a 'buffer' of food, grain, livestock and cash that they can draw on in difficult times. Most, if not all, societies have developed a variety of techniques for preserving crops, fish

and meat by storing, smoking, salting, drying or burying them. During periods of shortage, people will eat food of poorer quality or eat less food, and will look for wild foods such as seeds, nuts, roots and berries. If a crisis becomes acute they will begin to sell their assets (animals, tools, seeds for planting next year's crop or even land), but this is a last resort. Even having a large family can be seen as part of an economic coping strategy because it gives a household additional labour. Savings and credit schemes, both formal and informal, are often an important component of economic coping strategies (see Chapter 12).

7.2.2 Technological

This category is quite broad, including land management systems as well as what is more usually thought of as technology, such as building materials and construction methods (Chapter 8 addresses some aspects of this in more detail).

Land management strategies to secure food supplies and generate income are often complex and sophisticated. In Borneo, Indonesia, Dayak Jalai villages put their land to many uses: there are patches of both natural and managed forests and land cleared by slash-and-burn cultivation, as well as permanent fields and fields lying fallow. Land is used to produce cash crops (including pepper, oil palm, rubber, coconut oil and cocoa) as well as food (fruit orchards, rice fields and vegetable gardens).⁴ Poor farmers, especially those working marginal or drought-prone lands, adopt mixed cropping, intercropping, kitchen gardening and other practices that reduce the risk of poor harvests by widening the range of crops grown. Traditional seed varieties are selected for drought or flood resistance and for growing in particular locations. Alternative crops may be kept in reserve for planting if others are ruined by floods. Pesticides made from local plants are applied to crops. Some crop types are chosen specifically for their resilience. Yams, for instance, which are widely grown in Pacific islands, are known to be resistant to high storm winds.⁵

⁴ D. J. Nakashima et al., *Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation* (Paris: UNESCO and Darwin: United Nations University, 2012), <http://unesdoc.unesco.org/images/0021/002166/216613E.pdf>, pp. 46–47.

⁵ J. Mercer et al., 'The Potential for Combining Indigenous and Western Knowledge in Reducing Vulnerability to Environmental Hazards in Small Island Developing States', *Environmental Hazards*, 7, 2007.

Case Study 7.2 Reviving traditional farming practices

Rain-fed agriculture is the main livelihood in the Amazonian region of Beni in Bolivia. However, the land is only productive for 2–3 years due to the prevalence of slash-and-burn agriculture. During the rainy season, topsoil and nutrients are washed away, and in some places land is under water for several months.

In 2007, with support from Oxfam, a local NGO called the Kenneth Lee Foundation started a project to revive and adapt an ancient farming practice, drawing on modern scientific knowledge of hydrology and agriculture. The project worked with farming households to build a series of raised earth platforms, called *camellones*, each covering about 500 square metres. The *camellones* protect seeds and crops by keeping them above flood water in the rainy season (heights range from 0.5 to 2 metres depending on location), and they are surrounded by drainage canals that take flood water away. The practice has led to improved soil fertility, enabling three harvests a year, and fish are raised in the canals. In 2008 the region experienced severe floods, but the *camellones* proved to be resilient and farmers continued to grow crops for consumption and sale.

M. Turnbull, C. Sterrett and A. Hilleboe, *Toward Resilience: A Guide to Disaster Risk Reduction and Climate Change Adaptation*, Emergency Capacity Building Project, 2013, <http://www.ecbproject.org>, pp. 61–62; Oxfam International, 'Rescuing the Past: Using Indigenous Knowledge To Adapt to Climate Change in Bolivia', 2009, <https://static.weadapt.org/placemarks/files/541/51000daf0c081rescuing-the-past.pdf>.

Other land use strategies include avoiding flood- or landslide-prone locations when building a home and keeping away from hazardous places at certain times of year (such as not taking livestock to pasture up mountain valleys during spring floods). To protect against erosion and flooding during the monsoon, villagers in Nepal convert hillsides into level terraces, create outlets to manage water overflow from one terrace into another, make networks of ponds to slow rainwater run-off and save it for the dry season and build stoneworks and plant trees to stabilise slopes and prevent gullies from eroding.⁶

⁶ N. Dahal, 'Coping with Climatic Disasters in Isolated Hill Communities of Nepal: The Case of Rampur Village in Okhaldhunga', in Twigg and Bhatt (eds), *Understanding Vulnerability*, pp. 47–67. See also M. B. Thapa et al., 'Indigenous Knowledge on Disaster Mitigation: Towards Creating Complementarity between Communities' and Scientists' Knowledge', in R. Shaw et al., *Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learned from Experiences in the Asia-Pacific Region*, European Union/UNISDR Regional Office for Asia and Pacific, 2008, http://www.unisdr.org/files/3646_IndigenousKnowledgeDRR.pdf, pp. 30–34.

Case Study 7.3 Living with floods and heatwaves in urban slums

Poor households in Korail, the largest slum settlement in Dhaka, Bangladesh, have adopted a variety of methods to cope with recurrent flooding and heatwaves. Choosing a safe location is not an option for most households, since the district is low-lying and bounded by a large lake to the south and east. The main technological coping strategies for floods are putting the house on a raised plinth; installing barriers in doorways to stop water coming in; raising the height of furniture (usually on bricks); installing high internal storage; and cooking on portable stoves. Houses near the water's edge are usually built on stilts, and wooden flooring is preferred since it allows floodwater to drain away more quickly. To counter heat, creepers are grown outside houses to cover their corrugated iron roofs; inside, there are false ceilings or cloth canopies to trap the heat. Insulating materials under the roof are often recycled products, including paper, Styrofoam, packing boxes, cement bags, bamboo mats and old clothes. Many houses are designed with shaded courtyards. Most households also use electric fans and other cooling devices.

During a flood, income-earning opportunities are greatly reduced, which compels people to draw on their savings or borrow money. Some families share food with their neighbours. Loans and neighbours' assistance support repair and rebuilding afterwards. Many households join savings groups or NGO savings and credit schemes and put money aside for needs such as this. Social networks are strong: immigrants to Korail tend to live close to their extended family or to people from the same village or region.

Households' investment in protective measures is constrained by the fact that Korail's residents do not enjoy security of tenure and so face the constant threat of eviction, even though some have lived there for 20 years. This insecurity of tenure also means that local authorities are unwilling to put in power and water services to the district. There are some community initiatives to clean out drainage channels and move the most affected people to safer places. However, families are reluctant to evacuate during floods because this risks losing assets, access to social and livelihood networks and even the right to the land they occupy.

H. Jabeen et al., 'Built-in Resilience: Learning from Grassroots Coping Strategies for Climate Vulnerability', *Environment and Urbanization*, 22 (2), 2010, <http://eau.sagepub.com/content/22/2/415.full.pdf+html>.

7.2.3 Social/organisational

This category includes indigenous organisations that provide support in countering disasters, such as kinship networks, mutual aid and self-help groups and community-based organisations. All of these are forms of social capital (discussed in Chapter 6). Systems of mutual rights and obligations are part of every household and community's social structure, forming what is sometimes called a 'moral economy'. People who are suffering – from shortage of food, for instance – often call upon kin, neighbours or patrons for help. Sharing labour and food during crises is standard in many societies. Work parties are called up by certain indigenous communities in Latin America to rebuild after floods.

The family is a fundamental social mechanism for reducing risk. Extended kin relations are key networks for exchange, mutual assistance and social contact. In times of stress, relatives living outside the immediate community can become particularly important. Disaster-affected people may also appeal to the wider community for charity. In many communities, gifts or alms are expected at times of hardship. Knowing the strength of the family unit and its ability to provide mutual support, emergency management agencies encourage families to develop their own disaster preparedness plans, covering what they will do in a disaster, where they will go and how they will get in contact with one another. Families can also play an important role in helping individuals to cope psychologically with trauma after experiencing disastrous events.

7.2.4 Cultural

Cultural factors include risk perception and religious views, which are frequently connected, as well as environmental knowledge. Understanding how people view risk is particularly important, as it influences the types of risk management strategy they adopt. Risk perceptions will vary greatly between and within communities according to culture, experience and (for poor people especially) the pressure to secure their livelihoods.

It is very difficult to gain understanding of local views of risk. Simply asking questions about how risk is perceived does not always produce useful insights, because outsiders and local communities are likely to think about and describe risk in very different ways. It is often more constructive to talk to communities about how they live with risks (i.e. the ways in which they deal with particular hazards, or how they manage in their built or natural environment) than to discuss risks in general. But even this approach is likely to miss a great deal, since local people are often reluctant to talk openly to outsiders about their insecurities and the threats they face, especially if they do not trust official and external agencies and their interventions. By spending long periods in communities, talking about and observing their daily lives, researchers can sometimes acquire a good understanding of the subject. Close observation is invaluable, as people's statements of their views can sometimes give a misleading impression of their actual risk perception and risk-avoiding behaviour.

Case Study 7.4 The complexity of risk perception

The centre of the Bolivian capital La Paz is bordered by steep and unstable hillsides (*laderas*) prone to floods, landslides, mudslides and rockfalls. These districts are also densely populated. Most of their inhabitants live in houses that are not well constructed, often on the edges of precipices or in ravines. When asked about the risks they faced, *ladera* inhabitants did not mention natural hazards, but were more likely to talk about violence, poverty and health problems. When asked specifically about the risk of landslides, or of their houses collapsing, they often replied that there was no such risk, the ground was solid, and they felt secure. Even where houses were collapsing, their owners would try to prevent this from becoming public knowledge.

Possible reasons for their apparent underestimation or denial of risk include people's general psychological tendency to downplay high and severe risks and focus on more frequent and manageable ones; pressing everyday social hazards such as unemployment and violence; traditional reluctance amongst the indigenous Aymara Bolivians (a high proportion of the *laderas*' population) to discuss the state of their homes, which was seen as a very private matter; a lack of trust in the government, NGOs and even neighbours; and resignation to or acceptance of natural hazard risks based on a belief that nothing could be done about them.

F. Nathan, 'Risk Perception, Risk Management and Vulnerability to Landslides in the Hill Slopes in the City of La Paz, Bolivia: A Preliminary Statement', *Disasters*, 32 (3), 2008.

Indigenous knowledge is closely bound up with beliefs and worldviews, which are sometimes expressed through cultural events and ceremonies. DRR organisations need to understand how such belief systems work and respect their importance to communities: they should not try simply to extract particular aspects of indigenous knowledge or impose aspects of their own. There is a common assumption among disaster management professionals that many people are fatalistic and regard disasters as acts of God that cannot be prevented. However, statements of belief in divine power are not incompatible with taking actions to reduce risk.⁷

As well as being applied to the management of land and water, traditional environmental knowledge plays a role in disaster warnings and preparedness. Observations of weather conditions, changes in groundwater and animal behaviour are used in many societies to

⁷ For example, see H. Schmuck, "An Act of Allah": Religious Explanations for Floods in Bangladesh as Survival Strategy', *International Journal of Mass Emergencies and Disasters* 18(1), 2000, <http://ijmed.org/articles/167>.

Case Study 7.5 Oral history and tsunami evacuation

People on the island of Simeule, off the coast of Aceh Province in Indonesia, have an oral tradition that preserves the lessons of a tsunami in 1907, which killed many thousands of people. The 26 December 2004 Indian Ocean tsunami caused widespread damage to buildings on the island. There was no official tsunami warning system in operation at the time and, with Simeule lying close to the epicentre of the earthquake that triggered the tsunami, many of its inhabitants had very little time to escape. Nevertheless, only seven of the island's population of 78,000 were killed; the rest evacuated to high ground and in some cases to prearranged safe locations. Knowing what had happened in 1907, the villagers of Langi evacuated spontaneously to high points as soon as the earthquake was felt: every one of the population of around 800 survived, although their village was destroyed.

B. G. McAdoo et al., 'Smong: How an Oral History Saved Thousands on Indonesia's Simeule Island during the December 2004 and March 2005 Tsunamis', *Earthquake Spectra*, 22 (S3), 2006.

identify impending hazard events. Direct experiences of previous events, or knowledge of such events handed down from earlier generations, are drawn upon to ensure timely evacuation to safe places (see Case Study 7.5: Oral history and tsunami evacuation).

People have their own ways of defining when conditions have worsened so much that they constitute a crisis or disaster. This threshold varies between communities, according to their vulnerabilities and the threats they face. Seasonal flooding is not necessarily seen as a disaster in some places. Crop growing may depend on it if flooding deposits fertile silt on fields, and floods can be part of the growing cycle of some crops such as rice. Poor families may supplement their diets with fish that are caught as flood water spreads from rivers over their fields.

7.3 Limitations of coping strategies

Local knowledge, skills and coping strategies must be assessed rationally and scientifically on the basis of their effectiveness. This is not a debate between local/indigenous/traditional and external/scientific/modern systems in themselves, but a question of finding the most appropriate approach for each situation. In farming systems the value of local knowledge (of crops, soils, food preservation, climate and protection against pests) is now widely recognised, and successful projects build on this. Similarly, local knowledge of indicators of drought and famine is now used effectively as a component of some famine early warning systems (see Chapter 14). Anthropological research on communities living by the Jamuna

River in Bangladesh has revealed the extent, complexity and robustness of indigenous understanding of the river and its behaviour.⁸ At the same time, however, geological mapping and monitoring are needed to identify locations liable to seismic activity, and scientific monitoring and forecasting of cyclones offer a far more reliable basis for issuing warnings and planning evacuation than local understanding of precursors (see Chapter 14). It is also unrealistic to expect indigenous strategies to be able to cope with extreme events. A massive earthquake may well overwhelm indigenous construction techniques, for example, just as repeated years of drought will exhaust communities' food and cash reserves. Social support structures can break down under the pressure of the struggle for scarce resources. Traditional coping mechanisms may also be inadequate for events that were not anticipated and of which there is no previous experience, or for multiple shocks and stresses.

In some cases, traditional beliefs can make people more vulnerable. In one example, when Mount Merapi in Java, Indonesia, became active in 2006, many people living on its slopes ignored official warnings to evacuate, partly because traditional Javanese culture gives mountains a sacred status, making those living on them reluctant to leave, and because Merapi is believed to be home to spiritual creatures who can give protection against volcanic activity if offered ceremonial gifts. The traditional precursors that formed part of their indigenous knowledge, such as unusual animal movements, intense lightning storms or premonitions through dreams, were also absent.⁹

Indigenous knowledge and coping strategies are also affected by wider developments in the economy and society, such as changes in land use caused by population expansion or shifts in patterns of land ownership. In many parts of the world, population growth and economic and other pressures push households into living and working in more marginal, hazardous locations and adopting unsustainable practices. For example, the long-term expansion of commercial plantations and ranches often forces peasant farmers onto marginal lands in hills and valleys. Trees and other vegetation that stabilise slopes and retain water are then cut back for smallholdings, thereby increasing the risk of flash floods and landslides. Traditional knowledge, for instance of seed varieties that are resistant to drought and other climatic pressures, has been put under pressure or even lost due to the heavy promotion of new 'improved' varieties or alternative crops by agro-chemical companies and government agricultural extension agents. Economic migration and new job opportunities can take younger people away from their communities and traditional occupations, which means that they do not acquire or use the knowledge their forefathers had. Traditional social support networks and moral obligations also appear to be breaking down under the pressure of market forces and rapid social change.

⁸ H. Schmuck-Widmann, *Facing the Jamuna River: Indigenous and Engineering Knowledge in Bangladesh* (Dhaka: Bangladesh Resource Centre for Indigenous Knowledge, 2001).

⁹ K. Donovan, 'Doing Social Volcanology: Exploring Volcanic Culture in Indonesia', *Area*, 42 (1), 2010.

Indigenous knowledge is often handed down from one generation to the next through indigenous means of communication, such as stories, songs, poems, ceremonies and rituals. Where these methods decline due to social and economic changes – singers and storytellers moving in search of work, for instance, or younger people’s lack of interest in taking on traditional community roles – this transmission is fragmented and knowledge may be lost. There have been calls for indigenous knowledge to be included in school curricula as a way of countering this trend.

Identifying which coping strategies are effective or do not work well, and why, is a major challenge. Local knowledge and coping mechanisms are often invisible to outsiders, and considerable effort may be needed to identify and understand them. This is often difficult for those whose class, upbringing and education have taught them to denigrate indigenous and traditional knowledge as ‘primitive’. DRR programmes can easily fail to address local people’s needs and priorities because programme planners do not understand their knowledge, reasoning and behaviour. It is also important to find out who in the community possesses indigenous knowledge and who does not. Where the holders of such knowledge are themselves marginal or less visible within communities – for instance women (who are often knowledgeable about different seed types), or older people – this can be very challenging. Conversely, valuing and using their knowledge can help to boost their status within their communities. Older people are more likely than most members of the community to possess extensive knowledge of environmental signals, simply because of their greater experience. In some farming communities, for example, groups of elders have a formal role in weather forecasting. There is a risk that indigenous knowledge may not be shared across a community where packets of knowledge are held by different groups and the community lacks cohesion.

Where people are changing or adapting coping strategies rapidly in response to changing events, it may be even harder for outsiders to spot what is going on. All the more reason, then, for building up a close relationship with communities during normal times in order to gain a full understanding of how they cope with crises. There is also a potential for conflict between traditional and modern knowledge systems and cultures linked to power relationships in society. ‘Experts’ in positions of authority do not like to be challenged. For instance, traditional practices in house-building and rainwater harvesting, even if effective, may be opposed by officials because they fall outside the specifications of construction codes that assume the use of more high-tech materials and methods.

There are some innovative approaches to bring scientists, agencies and communities at risk together in order to exchange knowledge, particularly relating to climate forecasting and warning. These include participatory workshops, scenario planning, simulations and games, demonstration studies and learning circles, in which formal scientific information and forecasting tools are combined with local indicators and information-gathering

Case Study 7.6 Effectiveness and limitations of traditional practices

More than three-quarters of Nicaragua, Honduras and Guatemala is hilly or mountainous and ecologically fragile. The extensive clearing of forests for timber, ranching and farming, combined with widespread burning, has left much of the region's mountainous terrain in a degraded state. Hurricane Mitch in October 1998 dropped over 50 inches of rainfall in one week. Barren hillsides could not retain or absorb water and a massive runoff carried away tons of topsoil, rocks and vegetation.

Members of the Farmer to Farmer network, a grassroots movement for sustainable agriculture in Central America, observed that damage to agricultural land was uneven. The network approached the NGO World Neighbors, which agreed to sponsor and facilitate a research project looking at the hurricane's impact on different kinds of farming system. The study compared 'conventional' and 'agro-ecological' farms that were otherwise similar in terms of topography, angle of slope, location, crops grown and the intensity of the storm.

Conventional farming involves clearing and burning before the planting season, ploughing with the slope and planting extensively. It also involves high levels of artificial fertilizers, pesticides, herbicides and hybrid seeds. By contrast, agro-ecological farming involves working with nature to regenerate and conserve nutrients and other natural resources. The study found that sustainably farmed plots had much more topsoil than their conventional neighbours, more soil moisture and less surface erosion. Overall, however, the damage from landslides and eroding gullies seems to have been equally severe on both types of plot, indicating that agro-ecological methods are vulnerable to a storm of Mitch's severity.

World Neighbors, *Reasons for Resiliency: Toward a Sustainable Recovery after Hurricane Mitch* (Oklahoma City, OK: World Neighbors, 2000), <http://www.wn.org>.

methods. These have led to the distribution of scientific information that is more relevant to communities' needs, and to communities having greater trust in that information and using it more effectively.¹⁰ Much work remains to be done to replicate and scale up such approaches.

10 E. Visman, *Knowledge Is Power: Unlocking the Potential of Science and Technology To Enhance Community Resilience through Knowledge Exchange*, Network Paper 76 (London: ODI, 2014), <http://www.odihpn.org/hpn-resources/network-papers/knowledge-is-power-unlocking-the-potential-for-science-and-technology-to-enhance-community-resilience-through-knowledge-exchange>.

Chapter 8

Communities and technology: choice and innovation

8.1 Introduction

Technology is more than construction, equipment, machinery and other forms of hardware and software. It is a combination of materials, tools and equipment, knowledge and skills, organisation and products. DRR planners and project managers have a wide range of technology choices on offer to apply to different aspects of the disaster problem. One of the main areas of technological intervention has traditionally been through structural engineering to control hazards, protect facilities and provide places of safety at times of disaster. More recently, innovations in technical products, processes and services have greatly improved capacity to identify the location and probability of hazard threats, assess risk and vulnerability, provide long- and short-term forecasts of hazard events and estimates of their probable impacts, transmit warnings of impending disasters to populations at risk,

Box 8.1 Choosing technologies for community resilience-building

A simple framework can be used to weigh up a technology's risks/costs against its opportunities/benefits, with regard to five key issues:

- Social: will the technology affect women differently from men? Is it acceptable and accessible to all social groups (religious, caste, age, etc.)?
- Technical: do people have the knowledge or skills to use and maintain the technology?
- Environmental: is the technology likely to benefit or damage the environment, considering both the short and long term?
- Economic: are there market opportunities? Is the technology affordable to those who need it most?
- Institutional: how will the technology be managed to ensure long-term sustainable use? Who has overall control of the technology?

K. Pasteur, *From Vulnerability to Resilience: A Framework for Analysis and Action To Build Community Resilience* (Rugby: Practical Action Publishing), <http://practicalaction.org/media/view/9654>, pp. 38–39.

assess disaster damage and needs and coordinate emergency response. Many organisations are exploring and developing the considerable potential of internet, mobile telephone and social media technologies as data-gathering, communications and coordination tools.

Technology is constantly changing, adjusting to new ideas and skills and to socio-economic pressures. These forces can bring about improvements, and generally do, but the results of change are not necessarily positive. For example, in many parts of the world traditional house-building styles, some of which have been developed over time to provide resilience to known hazards such as earthquakes and cyclones, are increasingly being replaced by modern buildings. The latter may be designed to be more resilient and use more resilient materials, but in practice, like any house, the quality depends on the skills and conscientiousness of the builders who work with them. Where builders are not adequately trained in the use of new construction methods, or build awkward hybrid structures comprising both traditional and modern techniques, there is a strong likelihood that those buildings will fail under stress.

Other factors can undermine advanced technology. For example, many modern apartment blocks and commercial premises have collapsed during recent earthquakes. Construction methods and building standards should have been sufficient to ensure that they did not fail, but, crucially, standards and regulations were not enforced. Where demographic and economic pressures are intense, and government mechanisms weak, regulatory systems may prove inadequate. Technological failures due to weaknesses in design or maintenance can be another major contributor to disasters: examples include the failure of flood defences in the Hurricane Katrina disaster in New Orleans in 2005 and the Fukushima Daiichi nuclear power plant crisis following the 2011 tsunami in Japan.

Just because a technology is effective in reducing risk does not mean it will be adopted by households and communities, or even that it is suitable for every household, since each has its own needs and priorities. Moreover, technology diffusion does not happen automatically. Technologies of all kinds must be promoted and their users must have the necessary resources to obtain them, and the skills to utilise them. Access to technology can be encouraged in different ways, including giving training to communities and local extension workers, sharing information or collaborating with other organisations engaged in scientific and technological work, and improving people's own capacities to innovate and adapt technologies in a changing environment.

8.2 Appropriate technology

In the past, high-tech, large-scale technologies have tended to be prominent in DRR: for example, embankments, dams and dykes for flood control, advanced methods of securing buildings against earthquakes and cyclones, irrigation systems that deliver large quantities of water, and walls and banks to restrain volcanic debris. They are typically applied in wealthy countries and societies, or in poorer countries through large projects financed by international aid agencies.

An alternative approach encourages the development and use of what is often called ‘alternative’ or ‘appropriate’ technology. These terms can be defined and understood in different ways, but in practice they usually refer to smaller-scale technologies that can be owned and managed by households or communities, and that integrate environmental, economic and social sustainability. Appropriate technology has long featured in development programming, where there is a great deal of experience to draw upon.¹ There is also a growing body of knowledge about appropriate technologies in DRR, linked to better understanding of indigenous knowledge and coping strategies. At community level, both development and DRR initiatives can benefit from using appropriate technologies, because:

- they are small-scale, and hence suitable for local-level application;
- they are low-cost, and hence more affordable for poor households and communities, as well as technical assistance programmes;
- they are likely to be suited to local people’s technical and managerial capacities;
- they draw on indigenous knowledge and skills;
- they are owned and controlled by local people; and
- they offer poor and vulnerable communities a wider range of choice than expensive, complex, high-tech solutions.

There are many potential applications of smaller-scale and appropriate technologies to DRR, including making housing more secure against hazards such as floods, earthquakes and high winds; building local-level infrastructure (e.g. footbridges and tracks); and constructing small-scale hazard mitigation structures (e.g. flood or landslide defences, rainwater harvesting structures). Many of the best-known examples come from the fields of food security (see Chapter 14) and housing, where there is an extensive literature, but it is important for project managers to take a broad view of the opportunities for alternative technology.

1 I. Smillie, *Mastering the Machine Revisited: Poverty, Aid and Technology* (London: ITDG Publishing, 2002).

Case Study 8.1 Floating gardens

In Bangladesh, where many people are landless and farmland is flooded for parts of the year, 'floating gardens' provide poor households with food and income. The gardens are relatively inexpensive, generally using aquatic weeds such as water hyacinths as a floating base, overlaid with bamboo topped with mulch, compost or other organic material. Once this material has rotted down, a range of vegetables can be grown. The rafts can be moved to sunnier or shadier spots, and can be re-used and their materials recycled.

The technology is traditional in the wetlands of southern Bangladesh. Since the late 1990s several NGOs have promoted it in other parts of the country. In one project in northern Bangladesh in 2010–12, 700 families built 1,500 floating gardens, which kept them supplied with vegetables during the monsoon season. In 2013 the government of Bangladesh launched a three-year programme to promote the technology in eight districts across the country.

N. Noble, *Floating Gardens in Bangladesh* (Rugby: Practical Action, 2000), <http://practicalaction.org/floating-gardens-in-bangladesh>; H. M. Irfanullah, 'Floating Gardening: A Local Lad Becoming a Climate Celebrity', *Clean Slate*, 88, 2013, <http://practicalaction.org/media/view/30413>.

8.2.1 Cost and materials

While high-tech measures have helped to protect many people in wealthier societies, their high cost means that they are not applied or are even inapplicable to poor and vulnerable communities in the global South. Smaller-scale technological inputs are more likely to be affordable by less well-off households and communities. The materials that are used can often be found locally. For instance, stone is used in a wide variety of hazard-mitigating structures, including dams and water tanks, bunds that hold back water on fields and retaining walls and gabions (wire cages filled with rocks) to support unstable hillsides or protect gullies from erosion. In Bangladesh, earth mounds provide shelter for people and animals as the water rises. These can be built cheaply in most villages, using local labour. Hazard-resistant houses can be built from locally grown wood and bamboo. Recycled materials can also be used. For example, retaining walls made of old car tyres filled with compacted earth and tied together can stabilise slopes.

Outsiders often fail to appreciate that many poor people, who rely on day wages and have little or no savings, may not be able to afford even relatively simple technical improvements that will make them safer. This raises the question of how poor people are to pay for improvements that they cannot normally afford. Simply providing such things free of charge is ineffective: people are less likely to appreciate the usefulness of the donations, which means that they are less likely to use them efficiently, and they tend not to look after them properly. Some

kind of financing mechanism is generally needed, such as soft loans and hire-purchase arrangements (Chapter 12 discusses financing DRR more generally). One commonly used non-financial alternative is to ask project beneficiaries to give their time and labour to a housing or community infrastructure project in return for benefiting from the project.

It can be cost-effective to use cheaper materials or structures that can be more easily replaced by local people. For instance, in irrigation systems in mountainous areas it may be better to build stone and brushwood dams than to install stronger steel and concrete structures. Seasonal rains and consequent landslides are likely to wreck the stone and brushwood dams every year, but they can be replaced using materials readily to hand. More sophisticated structures are unlikely to fail unless rainfall and landslides are exceptionally severe, but one never knows when exceptional weather will occur, and if they do collapse, the money, materials and skills to rebuild them may not be available. A similar argument can be used to justify retaining seemingly flimsy bamboo and thatch housing. Although such houses are much more vulnerable to floods than houses made of more resilient material such as brick, they can be replaced more easily. Parts can even be dismantled and carried away to safety if sufficient warning is given.

8.2.2 Effectiveness

Many disaster managers and their counterparts in development tend to feel that appropriate technologies are somehow second-rate: at best a compromise, at worst ineffective. Decades of development experience in poor and vulnerable communities have shown such views to be misguided.² Appropriate technologies take a wide variety of forms and approaches, drawing on old and new ideas, and there is plenty of technical innovation in this area. Small-scale, low-cost alternative technologies can be highly effective in reducing risk, are highly replicable and can spread over a very wide area. Like indigenous knowledge generally, of which they are part, traditional technologies are often well adapted to prevailing hazards. Many societies have highly effective and sophisticated water capture, storage and irrigation systems which have been in operation for hundreds of years, including the Karez systems in China's Xinjiang region and the connected 'cascade' reservoir systems in Sri Lanka. In the 2005 Kashmir earthquake, the flexibility of traditional timber buildings meant that they tended to stand up well to the shaking compared to other structures.³

2 Smillie, *Mastering the Machine Revisited: Poverty, Aid and Technology*.

3 W. Fang et al., 'Karez Technology for Drought Disaster Reduction in China'; A. A. Khan, 'Earthquake Safe House Construction Practices in Kashmir'; C. M. Madduma Bandara, 'Village Tank Cascade Systems: A Traditional Approach to Drought Mitigation and Rural Wellbeing in the Purana Villages of Sri Lanka', in R. Shaw et al., *Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learned from Experiences in the Asia-Pacific Region*, European Union/UNISDR Regional Office for Asia and Pacific, 2008, http://www.unisdr.org/files/3646_IndigenousKnowledgeDRR.pdf, pp. 1–4, 5–8, 68–72.

Nevertheless, the attraction of what is thought to be ‘modern’ technology is very strong among poor communities. This can hinder the adoption of safe technologies that are perceived to be primitive; it can also lead to the use of unsafe technologies that are perceived to be modern. The chances of short-term success and long-term sustainability are greatly enhanced if technical innovations directly improve poor people’s livelihoods. This link is commonly seen in technical measures for mitigating drought, such as soil and water conservation, multi-cropping and growing indigenous drought-resistant crops. All of these are clearly linked to improving food security and hence livelihoods.

8.3 Green engineering and ecosystems

Natural features, structures and ecosystems can play a significant part in mitigating hazards, and the value of ‘green’, ‘bio’ or ‘soft’ engineering approaches is being recognised. They can also complement structural engineering interventions (this mixture of approaches is sometimes referred to as ‘hybrid’ engineering). In many countries, conventional attempts to control flooding, such as dams or embankments, are being modified in favour of restoring natural flood plains and wetlands that absorb surplus water more effectively (see Case Study 8.2: Room for the River). Green spaces, permeable surfaces, sustainable urban drainage systems and green roofs can all reduce flooding due to rainfall (pluvial flooding) in urban areas.

Planting trees and grass is a well-established method of preventing rapid water run-off and stabilising hillsides. Bamboo, trees and certain kinds of reeds are often grown along river banks to bind soil, collect sediment or protect against water scouring. In Afghanistan, the NGO Concern Worldwide has planted fast-growing trees behind floodwalls to stabilise the soil and reduce erosion as the walls wear.⁴ Planting mangroves along coastlines can provide effective defence against the winds and sea surges generated by tropical cyclones and storms by absorbing and dispersing the force of the oncoming water. The mangrove forests in the Sundarbans in southern Bangladesh are said to have played a significant role in mitigating the effects of Cyclone Sidr in 2007, whereas previous human destruction of mangroves contributed to the damage caused by Cyclone Nargis in Myanmar in 2008. Mangroves can also help to control coastal erosion. Mangrove-planting projects give a boost to local livelihoods: mangroves grow quite quickly and the crabs, shrimps and molluscs that live in them can be sold in local markets.⁵

⁴ A. Clark-Ginsberg, *Concern’s Approach to Disaster Risk Reduction: Afghanistan* (London: Concern Worldwide, 2013).

⁵ See <http://www.wetlands.org/Whatwedo/Mangrovesforcoastalresilience/tabid/174/Default.aspx>; <http://www.scidev.net/global/policy/news/un-mangrove-loss-intensified-myanmar-cyclone-damag.html>; <http://www.scidev.net/global/earth-science/news/mangroves-protect-coastal-villages-during-cyclones.html>.

Case Study 8.2 Room for the River

Flood management has been practised for many centuries in the Netherlands, which is very exposed to sea and river flooding. Extensive land reclamation and major engineering projects were generally effective in controlling water and reducing flood risks. However, in 1993 and 1995 increased river discharges caused by snow melt and rainwater from upstream countries led to the evacuation of a quarter of a million people. These events, and forecasts of more frequent high river discharges in future, resulted in the Room for the River programme, due to be completed in 2015, which complements the flood defence system by allowing space for controlled flooding in more than 30 locations, creating new floodplains and setting dikes further back from the river.

See: <http://www.ruimtevoorderivier.nl/english/room-for-the-river-programme>.

8.4 Community infrastructure and lifelines

Because of the scale and cost involved, protection of public infrastructure and lifeline facilities (e.g. hospitals, power and water supplies) is mostly a matter for national governments and international aid agencies rather than NGOs and local organisations. The Pan-American Health Organization (PAHO), for instance, has a long-running programme to make hospitals in Latin America and the Caribbean more resilient, and UNISDR has run international campaigns to improve hospital and school safety.⁶ Governments also have an important role in setting, monitoring and enforcing design standards, building codes and performance specifications for buildings and engineered constructions.

Owing to their scale, cost and complexity, major structural interventions are usually seen as a government responsibility. In many societies, this means that vulnerable communities have little say when it comes to planning and implementing such projects. Where other actors such as NGOs do become involved, this is often in opposition to large-scale schemes on the grounds that they are ineffective or have adverse social and environmental consequences. There is considerable scope for a more collaborative approach in which communities and civil society organisations advocate and partner with official agencies to identify and choose appropriate technologies and develop partnerships for implementation.

⁶ See <http://www.paho.org/disasters>; <http://www.unisdr.org/2009/campaign/wdrc-2008-2009.html>; <http://www.unisdr.org/we/campaign/schools-hospitals>.

Case Study 8.3 Collaborating on community infrastructure

For many years, flooding from the Mthumba River had destroyed crops and buildings in Chikwawa District in Southern Malawi. In 2005–2006 a local NGO called Eagles consulted villagers and local government officials with a view to establishing a collaborative approach to the problem. A community task force was set up to provide project inputs and negotiate with local government agencies and private sector organisations. An earth dike was built to restore the river to its original course; this, added to other water management interventions (a storm drain, and a woodlot to reduce rainfall run-off), greatly reduced flooding. The collaboration of communities and local government, with NGO facilitation, was key to the project.

Tearfund, 'Small and Medium-Scale Initiatives To Control River Flow', in *Building Disaster Resilient Communities: Good Practices and Lessons Learned* (Geneva: UNISDR, 2007), http://www.unisdr.org/files/596_10307.pdf, pp. 36–39.

Smaller and local organisations can become involved in their own or other projects to protect local infrastructure. One of the most obvious areas of intervention is local water supplies – dams, wells, irrigation channels and water pipes – which in rural areas at least are usually managed by community organisations. Larger-scale community projects, such as flood protection and dams, are likely to require some form of community financing for construction, together with the skills and organisation for operation and maintenance. Many projects fail in the long term because they focus on the technological construction and hardware elements, without paying enough attention to building the community capacities needed to manage technological systems.

Schools and other community buildings are in great need of protection: there may be high numbers of casualties if they fail, and they can be used as evacuation or relief shelters at times of disaster. Programmes to strengthen school buildings to withstand hazards have been undertaken in many parts of the world. This approach helps children in two ways. First, it gives them, and sometimes their families too, a place of safety during a disaster. Second, it ensures that educational facilities are left intact and schooling can resume more rapidly once the emergency is over.

Time and skills are needed to carry out vulnerability assessments of buildings, although methods for rapid visual screening do exist. However, the main obstacle for local organisations is the high cost of retrofitting what are often large buildings. Such expenditure is often well beyond the resources of local governments and NGOs, and so funding by national governments or international agencies is likely to be needed.

It is commonly assumed that measures to protect transport infrastructure are also purely large-scale, to be taken on by government. This is true for the main lines of transportation, but in rural areas most journeys are off-road on tracks and paths.⁷ Women in particular spend many hours daily fetching and carrying fuel and water. Small hazard events can have a disastrous impact on rural tracks and bridges. The importance of local-level transport infrastructure in disaster mitigation is largely overlooked. Villages may be several hours' or even several days' walk from the nearest road, which is a major obstacle to disaster response as well as economic development. Relatively simple techniques to protect hill and mountain paths can make them resilient to severe rainfall. In urban areas, it is common to see raised footpaths that ensure that people can move around during the rainy season.

Such local-level infrastructure can be improved and protected by local institutions, including communities, although external agencies may need to provide funds, materials, machinery and technical support. After a disaster, external agencies can also play a valuable role in the rapid restoration of key infrastructure such as transport links, public buildings and markets. Lack of skills, capacity and resources within the community for ongoing management and maintenance is often a major contributory factor in the deterioration or even abandonment of introduced technologies, so systems need to be put in place to prevent this. Community ownership or joint ownership of infrastructure increases the likelihood of long-term community engagement.

8.5 Information and communications technologies

This area of technology for DRR has expanded and developed rapidly in recent years, particularly for mapping, warning and response. Digital data tools, especially geographical information systems, are revolutionising our potential capacity to analyse hazards, risks and vulnerability, and plan for disasters. Disaster planners create extensive databases relating to needs (for example of vulnerable people and their locations) and resources (such as human capacities and emergency equipment). The transport and distribution of relief goods can be monitored through commodity tracking systems.

Technology is central to improving hazard forecasting and early warning systems. For example, high-performance computers and modelling can produce sophisticated long-range or seasonal forecasts for hydro-meteorological hazards; remote sensing from satellites enables emergency planners to track cyclones; automated gauges monitor rainfall and water levels and transmit data to emergency operations centres; information on food prices

⁷ J. Dawson and I. Barwell, *Roads Are Not Enough: New Perspectives on Rural Transport Planning in Developing Countries* (London: IT Publications, 1993). See also the work of the International Forum for Rural Transport and Development: <http://www.ifrtd.org>.

in local markets provided through SMS text messaging gives indications of crop failures and food shortages. Alerts can be disseminated quickly to large numbers of people through emails, text messaging and social media, complementing more traditional channels such as radio and television, as well as more local means, such as sirens and loudspeakers.

Improved connectivity to the world wide web, the huge growth in mobile telephone use worldwide and the proliferation of various forms of social media have greatly facilitated communications before, during and after disasters. Global Positioning System (GPS) devices record the movements of people and humanitarian goods; satellites can monitor building and environmental damage or mass population displacement. Social media and other digital devices such as smart-phone applications allow people to report on their local conditions after a disaster, helping relief agencies to carry out crisis mapping and rapid needs assessments. The ‘crowdsourcing’ of data from large numbers of affected people is becoming increasingly common in crisis management, supported by online tools such as OpenStreetMap, a project to create a free and open map of the world, which allows data such as hazards, roads and buildings to be entered by volunteers using a range of data sources and information-gathering techniques.⁸ Humanitarian and DRR organisations are beginning to set up their own small specialist teams to input, collect, synthesise and disseminate such data, but online volunteers play a major and increasingly important role, particularly during and immediately after disasters. One of the best-known software and data platforms is Ushahidi, a non-profit company which has created interactive information sites for a number of disasters, including the Kenyan election crisis of 2007–2008, the Haiti and Chile earthquakes in 2010 and the Christchurch earthquake in New Zealand in 2011.⁹

8.5.1 Geographical information systems

Geographical information systems (GIS) are computer-based systems for storing, combining, analysing, modelling and displaying different kinds of spatial data (e.g. about topographical features, hazard locations, areas and structures at risk, location and socio-economic status of vulnerable populations, evacuation routes and shelters, stockpiles of relief goods). Data can be searched, analysed and presented in a variety of ways, according to users’ needs, and in accessible visual forms.

Mapping plays an important role in risk assessment and disaster planning, and GIS data are presented as maps on which different kinds of data can be overlaid: this makes the technology particularly helpful in multi-hazard assessment, for example. Trends as well as current conditions can be viewed and analysed, and new evidence of changes in the environment or

⁸ See <http://www.openstreetmap.org/about> and <http://hot.openstreetmap.org/about>.

⁹ See <http://www.ushahidi.com>; <http://en.wikipedia.org/wiki/Ushahidi>.

human activities can be incorporated. GIS also allows different kinds of evidence – ranging from satellite images to local knowledge gathered through participatory methods – to be integrated.

Use of GIS technology in DRR dates back to the 1980s, but it has grown rapidly in recent years as hardware costs have fallen and software systems have become more user-friendly. An increasing amount of open-source data has also become available (for example Google Earth, which provides free satellite images, and Google Maps, a web-based mapping tool which can integrate data from other web sites: these are commonly used by humanitarian workers in situation assessment).¹⁰

GIS technology can still be relatively sophisticated and expensive for smaller, local agencies, although some open-source software is available; the cost of back-up maintenance and support should also be considered. A certain level of technical skill is required to use the technology and staff will need training in collecting, inputting and analysing data. The temptation to save costs by training only a few people in GIS should be avoided, since travel, illness or job changes may leave an organisation without people who can operate the system. Data collection and entry are time-consuming tasks and hence can be costly. Ideally, GIS should have reliable and extensive data: in reality these may not be available, or it may be difficult to obtain and process them. Datasets also need to be kept up to date. Organisations need to consider how they collect and manage such information. GIS offers the possibility of combining many different kinds of data, be it from satellite images, research studies or participatory risk assessments, but systematic data management of this kind – for project design, priority setting or disaster response – is rare. Partnerships between local-level operational organisations and technical specialists (in universities or research institutes, for example) are one way of overcoming some of these challenges.

Participatory GIS (PGIS) approaches have been used successfully for a number of years. PGIS combines GIS technologies with participatory appraisal to assist communities and other local stakeholders in decision-making, communication and advocacy. The approach has been applied to a range of issues, including land use demarcation and conflicts, collection of local environmental knowledge and monitoring slum conditions (see also Section 8.6: Ownership, control and participation).¹¹ In DRR PGIS is used to identify local knowledge of hazards; to map and assess vulnerability, coping and adaptive strategies; to understand people's risk perceptions and priorities; for spatial planning, including the siting of shelters and escape routes; and in assessing post-disaster needs.

¹⁰ See <https://earth.google.com> and <https://maps.google.com>.

¹¹ For information on PGIS in general, as well as DRR applications, see the Integrated Approaches to Participatory Development (IAPAD) website: www.iapad.org.

Case Study 8.4 Building capacities for participatory mapping

Since 2011, the Humanitarian OpenStreetMap (HOT) team has been helping to build up mapping capacities for DRR in Indonesia. The data from the mapping can be used in an open-source GIS platform and software for modelling hazard exposure and risk, which produces disaster impact scenarios for emergency planners and responders (this software, called InaSafe, was developed by Indonesia's National Disaster Management Agency and the Australian government, through the Australia–Indonesia Facility for Disaster Reduction and the World Bank's Global Facility for Disaster Reduction). The software needs baseline data on features such as critical infrastructure. HOT's work has focused on training in how to collect and map the relevant data.

The project's pilot phase ran workshops for students and government officials on mapping roads, buildings and other features in urban and rural areas. The next phase trained teams in six disaster-prone provinces in the tools and techniques for collecting data. Subsequently, students in 13 universities received training in data-gathering and participatory mapping. The project has also created a website where people can obtain resources, read about the project's aims and contact trainers for further support.

See <http://hot.openstreetmap.org/projects/indonesia-0>; <http://inasafe.org/en>.

GIS needs to be managed sensibly to make the most of its potential. Common operational problems that cause GIS initiatives to fail include:¹²

- Underestimating the workload required to input, retrieve and analyse data, and the fact that much of the work is routine and tedious. This can lead to incomplete databases.
- Inadequate technical facilities (software, hardware, networks), often because the lowest-cost option is chosen.
- Selection of data based on cost rather than usefulness.
- Too much time spent playing with systems and software, and on routine tasks, at the expense of practical applications.

¹² C. Feldkötter, 'GIS – What Can Go Wrong?', in Workshop Proceedings: Application of Resource Information Technologies (GIS/GPS/RIS) in Forest Land & Resources Management. October 18–20, 1999, Hanoi, Vietnam, GTZ, <http://www.mekonginfo.org>.

- Lack of systematisation in collecting, inputting and storing data, leading to data sets that are hard to retrieve or do not match well.
- Inadequate training or staff who are not sufficiently qualified to manage GIS, and a failure to upgrade skills.
- The risk that individuals with specialist GIS skills will gain power informally within their organisations.
- Loss of faith in GIS in the light of the practical problems listed above.

GIS should not be expected to provide answers to every question. For example, spatial representation may give only a partial picture of vulnerability because different dimensions of vulnerability operate on quite different scales – for instance, root causes have an impact on a much bigger geographical area or social group than locally unsafe conditions, but both interact to create local vulnerability. At a very local level, GIS may not always be necessary because the problems may not be sufficiently complex to justify a GIS approach. It must be remembered that GIS is a tool for collecting and presenting information, but it is for the users of the technology to analyse that information and reach conclusions about what actions to take as a result.

8.6 Ownership, control and participation

Technologies for DRR are more likely to be appropriate – and used – if local communities have been involved in their choice and development, and if due priority is given to building local capacities to use and adapt them. This approach should underpin any efforts to reduce vulnerability through technical measures. However, it still happens all too rarely. More usually, a standard ‘technology transfer’ approach is adopted: technical specialists from outside are deployed to identify problems, develop and test new or improved technologies and promote their use among communities through conventional training and public education programmes. Even though these technologies may be relatively cheap, use local materials and be suited to use by local people, they are still generated externally; they are not the result of a participatory process; people do not ‘own’ them; they may not be what people want or need; and uptake may be limited. This problem can be overcome by adopting a more participatory approach to technology development that gives potential users the decisive role in selecting and developing alternatives. Participatory technology development (PTD) approaches have been applied in a number of development contexts, mostly in agriculture but also in some aspects of DRR, including drought mitigation and safe housing (e.g. Case Study 8.5: Participatory technology development in reconstruction).

Case Study 8.5 Participatory technology development in reconstruction

In May 1990, the Alto Mayo district in north-east Peru was hit by an earthquake that destroyed over 3,000 houses. Most damage was done to homes built with rammed earth that were poorly built or maintained. Community groups, local government and NGOs spent two months drawing up a long-term reconstruction plan for the region which covered economic and environmental aspects as well as disaster mitigation. As part of the plan, meetings were held between national and local organisations, and with communities, to identify and select a construction technology that was more earthquake-resistant. Building consensus over this took six months. The technology selected, *quincha mejorada*, was a modified form of a traditional style based on light timber frames, with wall panels of bamboo plastered with mud, on concrete foundations. In April 1991, when a second earthquake struck the area, only 70 of the new houses had been built. However, all stood up well to the shock, whereas 10,000 other houses were damaged. With this demonstration of its resilience the technology began to take off quickly. An evaluation in 1995, after the project had ended, found that *quincha* was widespread across Alto Mayo.

Following an earthquake in the coastal Ica region of Peru in 2007 a similar reconstruction project was undertaken by Practical Action (the NGO that had led the Alto Mayo initiative), again using the improved technology. A review of this project in 2013 found that the houses were liked by their inhabitants, and many had made improvements. But in the area that was studied there had been no more building using the technology once the project ended. There appeared to be two main reasons for this. One was that the municipality did not adopt the suggested building codes for *quincha*, so that it remained outside formal regulations; the other was that local inhabitants subsequently got access to government housing funds and subsidies, which required them to build in bricks and cement. It was also suggested that some residents wanted a house that was more ‘modern’-looking than traditional *quincha* housing.

T. Schilderman, ‘Disasters and Development: A Case Study from Peru’, *Journal of International Development*, 5(4), 1993, pp. 415–23; T. Schilderman, ‘Adapting Traditional Shelter for Disaster Mitigation and Reconstruction: Experiences with Community-based Approaches’, *Building Research and Information*, 32(5), 2004, pp. 414–26; T. Schilderman, ‘Peru: Building on the Vernacular’, in T. Schilderman and E. Parker (eds), *Still Standing? Looking Back at Reconstruction and Disaster Risk Reduction in Housing* (Rugby: Practical Action Publishing, 2014), pp. 217–31.

One of the main characteristics of participatory technology development is that it takes time, as the approach must be inclusive and allow for extensive discussion and testing of different technical options. Gaining the confidence of communities can be time-consuming and difficult. Where the working environment is tough, or there are problems with technical innovations, it may take a long time before a project begins to make much impact. Even a project that runs relatively smoothly may take some years to reach a wide number of beneficiaries.

In an increasingly networked world it has become much easier to find partners, resources and opportunities. This stimulates collaboration and helps organisations and individuals that are new to DRR to become involved. Modern ICTs also have the capacity and potential to engage affected communities as participants, and to make DRR interventions more accountable and effective. Communities all around the world are increasingly using ICTs to investigate problems, organise themselves for action in response to those problems, obtain resources and communicate and coordinate with other stakeholders. These same capacities for information gathering and communications also enable them to monitor external agencies' performance more thoroughly, making those agencies more accountable as a result. The humanitarian sector has experimented with the use of ICTs in this way: for instance, in Somalia, where conflict obstructs conventional monitoring and evaluation methods, the Danish Refugee Council has piloted an accountability mechanism in which beneficiaries submit feedback by SMS text and the data are collated on an online platform.¹³ The growing availability of open-source data, as the result of participatory mapping and 'citizen science' initiatives, strengthens people's capacities to explore problems, explain situations and press for change.

This way of working has significant potential for community DRR, but it also brings challenges. One of the main ones is that access to technologies is not equal within societies. Mobile phones, especially the more technologically advanced models, tend to be used more by younger people, and men are more likely to own the only mobile phone in the family. Those least likely to have access to technology – the poor, the uneducated, women, people with disabilities – are often also the most vulnerable to disasters. Many people lack what is known as 'digital literacy' – the knowledge and skills to use new communications technologies – which, together with lack of literacy more generally, restricts their ability to communicate and interact. Local organisations in low-income countries, which have to respond when disaster strikes, are also less likely to possess such technologies, to have the capacities to use them effectively and to be able to afford commercial data.

One final, but important, point to remember is that communities may not necessarily trust outsiders to act in their best interests, even if those outsiders have specialist technical expertise. For example, in Istanbul, which is at high risk of earthquakes, a very large number

12 Humanitarian Innovation Fund, *Case Study: SMS Feedback and Accountability in Somalia* (undated), http://www.humanitarianinnovation.org/sites/default/files/36951_hif_case_study_-_drc_somalia_proof_v7.pdf.

of unauthorised, self-built homes are likely to collapse when an earthquake strikes. However, a research study found that residents believed the formal housing market to be corrupt and, as a result, were unwilling to use professional engineers and contractors to build or upgrade their homes. They were not prepared to pay high fees with no guarantee of high-quality, safe buildings, preferring to manage the design and construction process themselves and hire family members or local labourers and builders. Some even doubted that engineers had expert knowledge, and engineers offering free advice were ignored.¹⁴ Trust also shapes community reactions to new information technologies. Communities may be reluctant to share information if they are unsure where that information will go, who will see it and what it will be used for.

¹⁴ R. A. Green, 'Unauthorised Development and Seismic Hazard Vulnerability: A Study of Squatters and Engineers in Istanbul, Turkey', *Disasters*, 32 (3), 2008.

Chapter 9

Livelihoods and DRR

9.1 Introduction

Poor and vulnerable people face a number of risks in their everyday lives, and their livelihoods are unlikely to be sustainable unless they can cope with the different shocks that affect them. Shocks are generally grouped into two kinds: household-level shocks, such as illness, injury and unemployment (in technical language, these are called ‘idiosyncratic’ shocks) and community-level shocks, such as disasters, epidemics and conflicts (‘covariate’ shocks). Both types can have sudden or severe impacts on individual households’ incomes, consumption and resources, as well as household members’ wellbeing.

Possession of assets (or capital) gives households a wider range of options and livelihood opportunities in times of crisis, and it can speed their recovery from some kinds of hazard event (although the most extreme events may be highly destructive). These assets/capital may be of many kinds: human (e.g. skills, knowledge, ability to labour, good health); physical (e.g. livestock, transport, tools and equipment, shelter, water supplies and sanitation); natural (e.g. possession of land, forests, marine/wild resources, water resources); financial (e.g. income and savings, earnings, credit, remittances); human (e.g. skills and education); social (e.g. networks and connections, membership of groups, relationships of trust, reciprocity and exchange); and political (e.g. connections to power structures, political systems and governmental processes). However, even a relatively mild shock or stress can have a severe impact on chronically vulnerable households: for example, irregular or unexpected rainfall at a key stage in the crop growing cycle, which ruins the harvest. Vulnerable households have little or no capacity to absorb losses of assets and income or to recover from them, driving them further into poverty and vulnerability.

The natural environment provides resources and livelihood opportunities, as well as presenting risks. Hazardous locations may be used for farming, grazing and extraction of natural resources such as timber and minerals. Volcanic soils, for example, tend to be very fertile, as are the alluvial soils of flood plains; space for workshops and factories is likely to be cheaper in flood-prone locations. The most marginal groups in society are generally forced to accept the greatest risks in seeking to make a living on unproductive or risk-prone land. Their choices are restricted by the socio-economic systems they live under, particularly with regard to land tenure and distribution. Lack of land rights and titles inhibits household investment in risk reduction measures and reduces economic opportunities.

This chapter looks at ways of protecting and supporting livelihoods through DRR. It should be read alongside chapters 7 (Indigenous knowledge and coping strategies), 12 (Financial mechanisms and services for risk reduction) and 14 (Drought, food security and famine), which cover other important aspects of making livelihoods more resilient and sustainable.

Livelihoods are constantly having to adapt to a wide variety of factors, including costs, prices, supply and demand and the availability of natural resources, materials, labour and credit, as well as environmental conditions and access to markets. Livelihood opportunities are also influenced by status, gender, education, technical skills and social networks. Poor households adopt carefully calculated financial management strategies to maximise their use of resources and mitigate their exposure to risks.¹ Government agencies and other institutions provide the policy and enabling environment that can support or constrain livelihood development and wealth creation.

9.2 Disaster risk reduction and livelihoods

Thinking about poverty, sustainable development, vulnerability, social protection and livelihoods has increasingly converged in recent years. The links between livelihoods, vulnerability and DRR are well understood by many agencies, who recognise that strengthening livelihoods contributes to reducing vulnerability and poverty. The ideal is a virtuous circle, in which vulnerability reduction and livelihood promotion reinforce each other to generate resilient livelihoods, where households can anticipate and plan for changes of different kinds and adapt to them. Interventions should build on existing coping and livelihood strategies, where these have been shown to be effective.

Some strategies may be no more than enforced or short-term responses to poverty or external stresses. These may do little or nothing to reduce poverty in the longer term. For example, farmers without secure land tenure will not invest in land improvement, and children of poor families may have to go out to work instead of acquiring an education and skills in school. Strategies can also increase risk: for example, land degradation and rapid water run-off due to overgrazing or felling of timber, resulting in reduced yields of food crops or flash floods and landslides.

Livelihood support is an important component of many agencies' DRR work, but it requires expertise in a wide range of relevant areas. These include agriculture, environmental management, health, food security, nutrition, finance, marketing, education and training, infrastructure provision, community mobilisation, organisational development and advocacy. Individual

¹ D. Collins et al., *Portfolios of the Poor: How the World's Poor Live on \$2 a Day* (Princeton, NJ: Princeton University Press, 2009).

agencies working on DRR are unlikely to possess the full range of skills required, which means that partnerships between different organisations are essential.

Interventions to sustain and protect livelihoods can take place at any stage in the disaster cycle. Long-term livelihood strengthening can be part of pre-disaster mitigation strategies, integrated into development work. Shorter-term disaster preparedness initiatives can include steps to protect material assets or move them to safety as part of contingency planning. When a disaster strikes, emergency relief can be used to maintain livelihood activities – for example, by providing seeds or tools that have been lost to the disaster – in addition to supplying essential assets such as food, water or shelter. Livelihood support enables longer-term rehabilitation and recovery from disasters to proceed more rapidly, and humanitarian agencies are increasingly involved in this kind of work (see Chapter 17: Risk reduction after disaster).

Box 9.1 Livelihoods analysis in DRR planning

Livelihoods analysis should be used in planning projects to identify groups whose livelihoods are most vulnerable and who are least able to cope with and recover from disasters. The analysis can be carried out using participatory information-gathering tools and secondary data. Questions to ask about livelihoods include:

- What are the principal livelihood groups within the community, and which of these groups are socio-economically vulnerable or unable to cope and recover when a particular hazard or stress occurs? Are there particularly vulnerable people within livelihood groups (e.g. women or people with disabilities might be a vulnerable group across a range of occupations)?
- What coping strategies do people use when they are affected by hazards or stresses (particularly the most vulnerable livelihood groups)? How sustainable are they?
- What are the key constraints and opportunities faced by each vulnerable livelihood group (e.g. organisational capacity, access to productive resources, skills, technologies and markets, secure living conditions)?
- Are their livelihoods affected by particular hazards, climate change or other long-term trends?
- What are the gaps and opportunities in relation to external institutions which affect their livelihoods (e.g. technical and financial services, social safety nets)?

Adapted from K. Pasteur, *From Vulnerability to Resilience: A Framework for Analysis and Action To Build Community Resilience* (Rugby: Practical Action Publishing, 2011), <http://practicalaction.org/from-vulnerability-to-resilience-framework-v2r>, pp. 76–77.

In principle, sustainable livelihoods approaches (see Section 9.4 below) reduce vulnerability, but there is still a need for careful planning about the choice and combination of livelihood practices to promote. Such planning should take into account the characteristics of household assets and their vulnerability, the economic viability of interventions, the material and other resources required, the potential social impacts and the level of institutional support that can be expected. As with all programming, better understanding of the local context (particularly markets, coping methods, social exclusion and power relationships) should be prioritised.

9.3 Types of intervention

DRR work with livelihoods is sometimes divided into three main areas of intervention: livelihood protection, livelihood promotion and livelihood recovery. There is also growing interest in what has been called livelihood ‘transformation’, which means changing social relations by challenging the policies, legislation, institutions, social practices and cultural attitudes that keep people vulnerable and restrict their livelihood opportunities.

Livelihood protection seeks to reinforce existing household coping and livelihood management strategies. It often focuses on conventional initiatives, such as hazard mitigation and disaster preparedness, but it can also comprise other support, such as food or cash transfers, providing seeds and tools and public works programmes. Typical physical measures include embankments to protect land, houses, grain stores and workshops from river flooding, and improved land use, slope stabilisation and forest management to reduce the threat of flash floods and landslides. Since many poor people’s livelihoods are home-based, improving domestic buildings and homesteads can also strengthen physical and economic resilience. Early warning systems give households time to move or defend their assets, as well as evacuate themselves. In the case of regular hazards such as seasonal floods, poor people often have well-established methods for protecting material assets. Ideally livelihood assets should not be too concentrated geographically, to reduce the risk of everything being destroyed by a single hazard event. This is often impossible for individual households, but the dispersal of key assets may be feasible in community-level projects.

While it is usually true that possession of assets automatically reduces vulnerability, this is not always the case. For example, if a household takes out a loan to set up a small income-generating enterprise, this may increase its earnings and enable it to acquire other assets that will make it more resilient. However, if that enterprise and its assets (such as buildings, equipment and raw materials) are in a hazard-prone location or not protected adequately, and as a result are destroyed by a hazard event, the household could find itself in a worse position than if it had not set the business up because it would still have to pay off the loans it had taken out. Valuable livelihood assets may also be seized or stolen: for instance, there is a history of cattle raiding in parts of East Africa.

Livelihood promotion is a developmental approach aimed at building adaptive capacity. It is less hazard-focused than livelihood protection and more likely to address risks in the broad sense, and to build household and community capacities that deliver multiple benefits. Evidence from DRR projects suggests that there is no standard approach to livelihood promotion – it has to fit local contexts and needs – but it tends to concentrate on improving existing livelihood practices and diversification into new areas of economic activity. This might include skills and vocational training, providing technical support and information, improving access to markets and services and supporting local institutions. Much of the livelihood programming in DRR to date has been in rural communities, with an emphasis on promoting off-farm activities to reduce dependence on agriculture, together with better management of crops, livestock and natural resources such as water and forests. Financial support through savings and credit schemes, micro-finance and micro-insurance (see Chapter 12) also has an important role to play in livelihood promotion.

Case Study 9.1 Beekeeping and DRR

A beekeeping project begun in 2007 with villages in Nawalparasi District, Nepal, sought to boost household earnings and discourage families from engaging in environmentally damaging slash and burn farming activities that had removed ground cover, causing slope instability, erosion and rapid water run-off, increasing the risk of landslides. Some households kept bees to make honey for sale, but traditional methods, using hollow logs as hives, were not very productive, the quality of the honey was poor and it did not keep for long.

The project organised group meetings to explain the benefits of improved beekeeping in terms of earnings, agriculture and the environment. Training courses in beekeeping techniques were arranged for farmers who showed interest. The project provided funding towards the cost of improved hives, which produced considerably more honey than traditional ones, and of much higher quality, which led to a growth in demand. Farmers earned more than twice as much for their honey as they had in the past. All the trainees received follow-up technical support and a beekeeping group was formed. Higher earnings from improved beekeeping methods, together with environmental awareness-raising meetings organised by the project, led families to turn away from slash and burn agriculture.

D. Bhandari and Y. Malakar, *Strengthening Livelihood Capacities to [sic] Disaster Risk Reduction in Nepal: Compilation of Change Studies* (Kathmandu: Practical Action Nepal, 2011), <http://practicalaction.org/strengthening-livelihood-capacities-to-disaster-risk-reduction>, pp. 36–41.

Livelihood diversification plays a key role in promoting economic resilience and reducing vulnerability. Households diversify as a deliberate strategy. Individual household members often perform several different livelihood activities (e.g. farming, labouring and trading); farmers plant a variety of crops with different tolerances to weather extremes, to improve their chances of being able to produce some food for consumption and sale; smallholders who farm their own land will often work for pay on someone else's land some distance away, in the expectation that a hazard event will only affect one of these locations. In many societies there are customary arrangements for sharing labour. However, diversification can also be a sign of desperation and poverty. Households may concentrate deliberately on a range of lower-risk activities, but this can mean that their production and financial returns are also relatively low. Faced with acute problems and scarcity, they may be forced to adopt damaging coping strategies, such as overgrazing and deforestation.

Case Study 9.2 Livestock, livelihoods and disasters

Livestock plays a significant role in the livelihoods of farmers and herders around the world. Loss of livestock due to hazard events damages or undermines the livelihoods of farmers and herders. Drought can be particularly devastating: the 1999–2001 drought in Kenya is estimated to have killed more than two million sheep and goats, 900,000 cattle and 14,000 camels.

The Livestock Emergency Guidelines and Standards (LEGS) project is a response to the need to protect this valuable livelihoods asset. LEGS seeks to integrate developmental, livelihoods approaches into disaster planning, response and recovery, and so break through the boundaries that traditionally separate relief and development programming. The LEGS Handbook, a companion volume to the Sphere handbook,² focuses on protecting and rebuilding livestock assets during and after disasters. Based on best practice, it contains participatory tools and guidance on technical interventions to support livestock-keepers affected by crisis, including the provision of veterinary services, animal feed, water, shelter and restocking, all of which can and in most cases should be linked to longer-term development and resilience-building programmes.

Livestock Emergency Guidelines and Standards (Rugby: LEGS & Practical Action Publishing, 2014), <http://www.livestock-emergency.net/news/legs-handbook-2nd-edition-2>; *LEGS and Resilience: Linking Livestock, Livelihoods and Drought Management in the Horn of Africa*, <http://www.livestock-emergency.net/wp-content/uploads/2012/01/LEGS-and-Resilience-Discussion-Paper-final2.pdf>, 2012.

² See <http://www.sphereproject.org/handbook>.

After a disaster, restoring livelihoods and earning income quickly is a priority for poor people. During a damaging crisis, it may be necessary to give direct material support (livelihoods provisioning) by supplying food, water and shelter to meet urgent needs, together with essential livelihood assets such as seeds, tools, fertiliser and livestock to replace losses. Increasingly, cash transfers are used to enable disaster-affected people to make their own choices about what they need to rebuild their livelihoods, and remittances from family members can play an important role in stimulating self-recovery.

9.4 Sustainable livelihoods approaches

A livelihood is regarded as sustainable when it can cope with, and recover from, external shocks and stresses, and maintain or expand its asset base. Successful livelihood strategies should lead to a variety of economic and non-economic benefits, including greater income and more economically sustainable livelihoods; increased well-being (comprising non-material elements, such as self-esteem, sense of control and inclusion, personal safety, community participation and political enfranchisement and maintenance of cultural heritage); better access to services such as health, water, power and education; reduced vulnerability to external trends, shocks and seasonality; improved nutrition and food security; and more sustainable use of natural resources.

9.4.1 Concepts and frameworks

Sustainable livelihoods concepts, frameworks and definitions vary,³ but many are derived from DFID's sustainable livelihoods framework,⁴ which has been very influential and widely used and adapted. Generally, they identify the following as key and interconnected elements:

- **Vulnerability context.** Vulnerability frames the environment in which poor people live, is responsible for many of the hardships they face and has a direct impact on their assets and the livelihood options open to them. Their vulnerability can be the result of long-term trends and stresses (demographic, economic, political, environmental), shorter-term shocks (epidemics, natural hazards, conflict) or seasonal changes in prices, production, food availability, employment opportunities and health. These can be enduring sources of hardship, destroying people's livelihood assets or forcing them to dispose of assets as part of coping or survival strategies.

³ See K. Hussein, *Livelihoods Approaches Compared: A Multi-agency Review of Current Practice* (London: Department for International Development, 2002), <http://www.eldis.org/go/home&id=40301&type=Document#.VYvEbPIViko>.

⁴ DFID, *Sustainable Livelihoods Guidance Sheets* (London: Department for International Development, 1999), <http://www.eldis.org/vfile/upload/1/document/0901/section2.pdf>.

- Assets, capabilities, capital. These are the wide range of resources which poor people possess or have access to and use to gain a livelihood. Livelihood assets can be broken down into several different categories, commonly described as different forms of ‘capital’: human, social, natural, physical, financial and political.
- Livelihood strategies. These are the ways in which poor and vulnerable people deploy their assets and capabilities to improve their livelihoods (for consumption, production, processing, exchange and income-earning activities).
- Policies, institutions and processes. These are the institutions, organisations, policies, legislation and power relationships that provide the enabling environment for livelihoods, development and DRR. They have great influence on vulnerable people’s access to assets and resources, and hence on their choice of livelihood strategies. These forces operate at all levels, from the household to the international arena, and in private as well as public spheres.

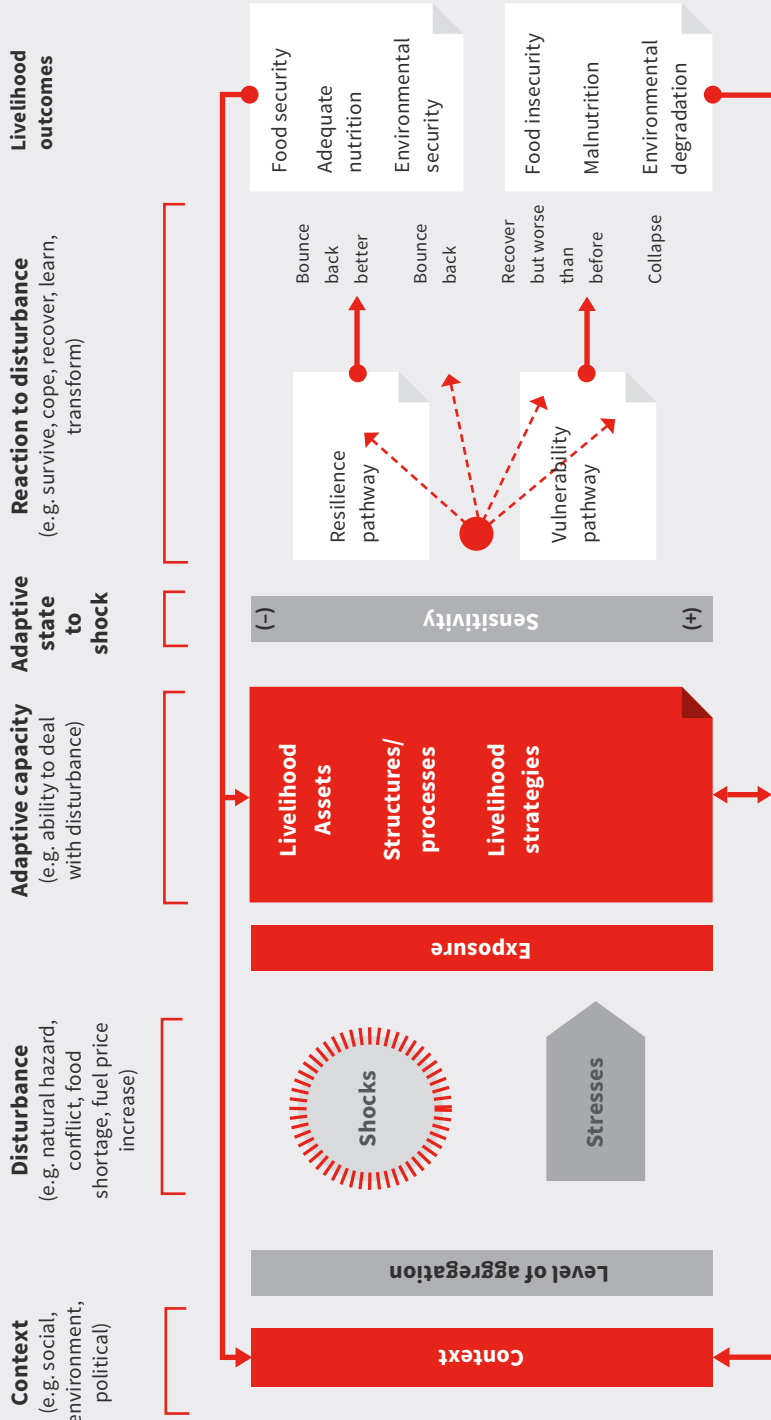
Livelihoods approaches identify the extent and nature of poor people’s livelihood assets, and their vulnerability to hazards as well as other external forces. From this it should be possible to identify entry points for protecting assets that are most at risk or that could be most valuable in a crisis. They also give insights into the factors influencing people’s choice of livelihood strategy, and why they are willing to tolerate hazards and risk.

Livelihoods thinking has also contributed to our understanding of resilience. Figure 9.1 (Livelihoods and resilience in the context of food security) is an example of a recent framework, derived and adapted from earlier sustainable livelihoods models, that links livelihoods and resilience in the context of food security. Figure 9.2 (p. 178) (Components of resilient livelihoods) is another recent model with an alternative perspective of what resilient livelihoods consist of.

9.4.2 Assessments

Sustainable livelihoods analysis (or assessment) is used to consider people’s vulnerability to the impact of shocks and stresses, the nature and effectiveness of their livelihood strategies in protecting and improving livelihoods, and the various actions that can be taken to increase their resilience. Sustainable livelihoods models and frameworks can be used in combination with other appraisal tools to design assessments or create checklists of issues to be considered. Alternatively, other types of analysis can be adapted to take account of livelihoods issues, or the findings from assessments that have already been carried out can be re-examined from a livelihoods perspective. By integrating different types of assessment, it is possible to obtain a more complete view of people’s situations and needs, and from this to design more holistic programmes to help them become more resilient.

Figure 9.1 Livelihoods and resilience in the context of food security



T. Frankenberger et al., *Enhancing Resilience to Food Security Shocks* (Tucson, AZ: TANGO International, 2012), http://www.isnnetwork.org/sites/default/files/revise_resilience_paper_may_28.pdf.

Figure 9.2 Components of resilient livelihoods



Christian Aid, *Thriving, Resilient Livelihoods: Christian Aid's Approach* (London: Christian Aid, 2012), https://www.christianaid.org.uk/Images/Resilient-livelihoods-briefing-October-2012_tcm15-67261.pdf, p. 2.

There are many similarities between sustainable livelihoods assessments, vulnerability and capacity assessments (VCAs) and methods used to explore the nature and impacts of climate change: they cover many of the same issues and tend to use similar data-gathering tools (see Table 9.1: Tools for assessing hazard-induced vulnerability in sustainable livelihoods analysis). It is not difficult to incorporate a livelihoods perspective in VCAs or a vulnerability perspective in sustainable livelihoods assessments, whether they are carried out for research or project baseline studies. VCAs often consider hazard threats, vulnerabilities, the assets that households and communities possess for pursuing their livelihood strategies and the social networks and institutions that can support this. The Household Economy Approach (HEA), which is widely used in food security programming, investigates vulnerability through livelihoods analysis (see Case Study 14.7: Monitoring household food security). Power relations and politics, at local as well as higher levels, are important issues which often do not receive sufficient attention in livelihoods assessments.

A number of agencies are developing tools and frameworks specifically to integrate DRR, livelihoods and social protection, conceptually or in programme design (see Box 9.2 for examples).

Table 9.1 Tools for assessing hazard-induced vulnerability in sustainable livelihoods analysis

Methods	Application to vulnerability
Secondary data collection (reports, research, statistics, etc.)	Contextual information on a variety of issues including external shocks and stresses likely to affect livelihoods (e.g. rainfall and temperature trends, location and features of natural hazards), health (morbidity and mortality), prices, resource stocks – to complement but not replace primary data
Environmental checklists	Questions to gain information about environmental conditions and concerns, revealing the relationship between the poor and their environment (e.g. what role do environmental resources play in livelihoods; how do environmental hazards, degradation and changes affect livelihoods, and vice versa?)
Sample surveys	Quantitative data on household economies (income, costs etc.), livelihood assets and strategies
Interviews (individuals, households, community groups, key informants), focus groups	Information from different perspectives (communities, other local stakeholders, external experts) on events and trends that cause livelihood stress, differential vulnerability and the effectiveness of adaptive behaviour
Individual and household case studies	Data on different livelihood experiences and resilience to environmental hazards and other shocks
Timelines	Historical occurrence and profiles of longer-term events or trends (e.g. floods, droughts, epidemics, local environmental trends and cycles)
Seasonal calendars	Describe seasonal events and trends, identifying vulnerability context, livelihood assets and strategies (e.g. rainfall, food levels at different times of the year, crop planting and harvesting schedules, food prices, changes in health status)
Preference, matrix and wealth ranking	Reveal vulnerability of different groups' livelihood assets to shocks and stresses and strategies against this
Mapping	Identify physical and environmental features (including hazards), land use, natural and social resources (assets/capital)
Venn diagrams and other institutional appraisal/ mapping methods	Social capital, relations between groups, institutional and policy environment

C. Benson and J. Twigg, *Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations* (Geneva: ProVention Consortium, 2007), Guidance Note 10: Sustainable Livelihoods Approaches, http://www.preventionweb.net/files/1066_toolsformainstreamingDRR.pdf, p. 7.

Box 9.2 Tools for integrating DRR, livelihoods and social protection

- M. Ovadiya and C. Costella, *Building Resilience to Disasters and Climate Change through Social Protection: Synthesis Note* (Washington DC: World Bank 2013), <http://documents.worldbank.org/curated/en/2013/05/18019809/building-resilience-disaster-climate-change-through-social-protection>.
- K. Pasteur, *From Vulnerability to Resilience: A Framework for Analysis and Action To Build Community Resilience* (Rugby: Practical Action Publishing, 2011), <http://practicalaction.org/from-vulnerability-to-resilience-framework-v2>.
- K. Vincent and T. Cull, *Adaptive Social Protection: Making Concepts a Reality. Guidance Notes for Practitioners* (Brighton: Institute of Development Studies, 2012), http://www.ids.ac.uk/files/dmfile/ASPGuidanceNotes_FINAL.pdf.

9.5 Issues to consider in livelihoods-centred DRR

9.5.1 Integration

Livelihoods are interdependent and all productive enterprises depend on other people or facilities. For example, farmers need buyers for their produce and transport providers to get to markets; small businesses need goods to sell or tools and equipment for manufacturing, as well as clients; and everyone needs labour. At community level, even small problems have knock-on effects: bad weather could push the price of agricultural produce up, but also restrict farmers' purchasing power for other goods and services; if a footbridge is washed away by a flood, this can add considerably to the time and cost of getting to market to buy and sell.

DRR projects need to adopt a similarly integrated approach where livelihoods are concerned. Livelihood promotion must be supported by livelihood protection. Many different kinds of intervention can help to make livelihoods more resilient, but choices should be made with a specific purpose in mind and as part of a package of measures that will reinforce each other. Sometimes a single area of intervention can produce multiple benefits in terms of livelihood gains and risk reduction. For example, community-managed reforestation projects lead to increased supplies of wood, fodder and wild fruits for consumption or other uses in the home, or for sale; they also contribute to a more resilient environment by reducing soil erosion, lessening landslide risk and conserving water.

Box 9.3 Livelihood adaptation to climate variability and change

Because livelihoods are interconnected, local adaptation to shocks and stresses requires a range of complementary approaches, both long and short term. These might include:

- adopting physical adaptive and mitigation measures, such as excavation or re-excavation of canals, ponds, irrigation channels and storage facilities for retaining rain water;
- adjusting existing agricultural practices: changing cropping patterns, planting drought-tolerant crops, better storage of seeds and fodder and adopting alternative, cash crops;
- adjusting economic activities, including livelihood diversification, facilitating access to markets, developing small-scale cottage industries;
- strengthening local institutions, including self-help programmes, capacity-building and awareness-raising for local institutions;
- strengthening formal institutional structures, such as local disaster management committees and financial institutions; and
- formulating policies to promote adaptive livelihood opportunities.

Adapted from R. Selvaraju et al., *Livelihood Adaptation to Climate Variability and Change in Drought-prone Areas of Bangladesh: Developing Institutions and Options* (Rome: Asian Disaster Preparedness Center and UN Food and Agriculture Organisation, 2006), <ftp://ftp.fao.org/docrep/fao/009/a0820e/a0820e01.pdf>, p. v.

9.5.2 Communities

The household is the basis for many livelihood activities and hence is often the focus of livelihood interventions. However, there is also a collective dimension that should not be overlooked. Individuals and households depend to varying degrees on the support of the community at large and its institutions, for example those that manage water sharing and access to land or that arbitrate disputes. Larger-scale communal facilities that play an important part in protecting and promoting livelihoods, such as tree nurseries, greenhouses and grain stores, have to be managed collectively. Community and local organisations can also generate collective action and promote social cohesion.

At the same time, as Chapter 6 (Communities and participation) shows, communities are not homogeneous. There are differences and sometimes divisions within them, and they contain both elite and marginalised groups. Those holding wealth, power and authority

Case Study 9.3 Integrating livelihoods and resilience programming

The Chars Livelihoods Programme (CLP) works with households on river islands (*chars*) in north-west Bangladesh. It aims to improve the livelihoods, incomes and food security of at least a million poor people. The CLP supports disaster resilience through five complementary areas of activity:

1. Household infrastructure. Homesteads are raised on a plinth to put them above expected flood levels: this protects houses, gardens and livestock. Latrines and tube wells are also raised to ensure uninterrupted access to water and prevent contamination.
2. Asset transfer. The programme provides the poorest families with livelihood assets, mainly cattle (the type found on the *chars* can swim well and can be kept on plinths for long periods during the flood season). Fodder crops are planted around the edges of the plinths, which also gives added protection against erosion by flood waters.
3. Social development. Families receiving CLP support have to attend group meetings and training on community and socio-economic development topics and disaster preparedness.
4. Disaster relief. CLP has an emergency fund to respond to food price rises, provide blankets during cold spells and repair houses after cyclones. Families are sometimes evacuated to the mainland during floods. In the bad floods of 2007, CLP provided food and animal feed to over 11,000 households.
5. Building financial capital. Village savings and loan groups enable families to build up savings against future shocks and provide access to credit in times of hardship.

Studies and evaluations indicate that participating families have become more resilient to a range of shocks and pressures than similar families in villages not covered by the programme.

A. Barrett et al., *Impact of the Chars Livelihoods Programme on the Disaster Resilience of Chars Communities* (Bogra: Chars Livelihoods Programme, 2014), <http://www.gdnonline.org>.

may dominate local institutions, control access to resources and discriminate against or exclude other parts of the community. In addition, local institutions, including those that are broadly representative of the whole community, often lack capacity and require technical and financial support.

Extended family support, social capital and reciprocity and social networks are very important, especially in crises and among poorer households. They play a role in home construction, repair or improvement, and even in relocating houses. They also come into play during disaster events, for instance to help move or store possessions at risk. Social capital is more effective in smaller events which affect only a few households; in larger disasters, where whole communities are affected, capacity to assist others may be more restricted. Livelihoods approaches can help in creating social capital and social organisations because they focus on communities' immediate everyday needs, whereas the threat of disasters may appear remote.

NGOs and other agencies generally support community ownership and management of DRR efforts. However, there can be no certainty that a community will favour such programming, or that it is willing and able to participate. Even communities that do support a programme's aims may be reluctant to take responsibility for managing it, providing labour for construction, purchasing materials or looking after ongoing operations and maintenance. These issues have to be investigated and, where necessary, negotiated with community institutions. It can also be difficult to encourage very poor people to invest their time and labour in activities that benefit the community as a whole, such as repairing roads and irrigation systems, because their immediate household needs have to take precedence. In such cases, food, cash or vouchers may be needed as an incentive to participate. It tends to be the most prosperous people in the community who get involved in voluntary community committees, increasing the likelihood that interventions will favour people who are most active on the committees.

9.5.3 Local infrastructure

Local or community infrastructure (such as irrigation channels, storm drainage, tube wells, water pipes, sewerage and sanitation systems, flood defences, retaining walls, reservoirs, roads, bridges and footpaths) is vital in protecting livelihoods and stimulating economic activity. Other facilities, such as schools, health centres and public shelters, also make important contributions to community well-being and resilience. Construction, rehabilitation and strengthening or retrofitting of such infrastructure forms an important part of many DRR interventions and often has a rapid and significant impact. It also creates jobs locally, provides opportunities for skills training and can make use of local materials and technologies.

However, planners have to consider how to set priorities regarding individual infrastructure components and their contribution to livelihood development and resilience. Whereas large-scale infrastructure programmes are planned and implemented by central governments, sometimes with support from bilateral and multilateral aid agencies, building local-level infrastructure is sometimes a piecemeal process and a wider variety of organisations may be involved. Nevertheless, experience shows that it is possible to fund and implement some forms of infrastructure provision or upgrading (e.g. water and sanitation, drainage, tracks and paths) through local partnerships involving communities, NGOs, local government and businesses.

Obtaining the right materials can be costly and may require some form of external financing, but communities commonly make some contribution, particularly their labour and locally available materials. Traditional and indigenous knowledge can be applied effectively to infrastructure building, though it often requires engineering expertise to ensure that structures are built and repaired properly to make them as hazard-resistant as possible, and hazard and risk assessments will be required to ensure they are placed in safe locations. Moreover, agencies working on infrastructure often invest only in construction, with little provision being made for ongoing operation and maintenance or for transferring relevant technical skills to communities and their organisations. Ownership of, and responsibility for, infrastructure also need to be established and agreed from the start.

9.6 Social protection and safety nets

Livelihood support can come through a range of interventions to defend households and communities against hazards, as well as through wider social protection initiatives aimed at reducing the economic and social vulnerability of poor, marginalised and excluded individuals or households experiencing transitory livelihood hardship or long-term, chronic, poverty. Social protection can take a variety of forms, including policies and programmes to promote employment and protect jobs (e.g. skills training, micro-credit services), income support, pensions, social insurance (for unemployment, ill health, disability, injury and old age) and direct transfers of cash, food or other resources (see Chapter 12 for other financial mechanisms that support DRR).

Safety nets are a particular form of shorter-term social protection. They play a vital role in helping people to meet their immediate needs in different kinds of crisis and protecting them against falling back into long-term poverty as a result of the losses they suffer. They have been established in many countries in response to shocks and pressures of different kinds (for an example, see Case Study 9.4: Creating a national social safety net). In disasters they often focus on cash transfers, the provision of food (e.g. through supplementary feeding programmes or food stamps) and public works that provide employment and income.

Box 9.4 Types of community infrastructure

Roads and bridges	Local roads, walkways and small-scale pedestrian and road bridges which provide physical, social and economic connectivity (e.g. access to markets and services) as well as the local and national road system beyond
Water and sanitation	Drainage ditches, channels and drains, piped and boxed culverts, embankments, retaining and protection walls, small water reservoirs, ponds and earthen dams, river inlets and minor irrigation works, shallow wells, pump houses and localised distribution systems, locally improvised waste disposal and composting plants
Education and health	Modest educational and health facilities, often in remote areas or informal settlements. These may have been constructed, adapted and managed by the communities themselves with little or occasional outreach or oversight support provided by the respective authorities
Social and cultural	Locally run resource centres, childcare facilities, playgrounds, religious centres, graveyards, community centres, multi-purpose halls
Energy	Off-grid community and household based energy generation and distribution systems, including diesel generators, biogas plants, solar home systems for electrification and micro-hydros
Economic	Community- and household-level capital, such as the buildings, capital, assets and stocks within micro-enterprises and home-based industries (e.g. agriculture, workshops) that produce goods and deliver services. Local marketplaces, including covered markets and community shops
ICT	Small ICT-based installations exist in some communities catering to their need for information, communication and early warning messages. Community telephone/internet access points, local communication masts and other improvised communication devices

Adapted from UNDP, *Guidance Note: Community Infrastructure Rehabilitation* (New York: United Nations Development Programme, 2013), <http://www.undp.org/content/undp/en/home/librarypage/crisis-prevention-and-recovery/signature-product--guidance-note-on-community-infrastructure-reh.html>, p. 30.

Case Study 9.4 Creating a national safety net

Ethiopia's Productive Safety Net Programme (PSNP) was set up in 2005 following a series of droughts. Initiated and implemented by the Ethiopian government through regional and local administrations, it uses community mechanisms (based on criteria set by the government) to identify beneficiaries and promote local ownership and accountability. It is supported by several international donor agencies.

The programme is one of the largest social safety nets in Sub-Saharan Africa, making cash or food payments to 7.8m people who are chronically short of food. In return, recipients usually work on projects to benefit their communities, such as soil and water conservation, road building, reforestation and construction of clinics and schools; cash or food are given to people who are physically unable to work. The PSNP provides support to households for several months of the year for up to five years, ensuring that they can provide for their daily needs without having to sell off valuable assets, as well as giving them the time and opportunity to build up their livelihoods and overcome their need for external support.

The PSNP has a \$25m contingency fund and a Risk Financing Mechanism (RFM) which allows the programme to expand in short-term crises. In 2011 the RFM was activated to help families cope with food shortages resulting from drought, assisting 9.6m people in districts covered by the PSNP (a third of whom were not existing PSNP clients) to obtain food for up to three months. The response was rapid: from initial request through needs verification to distribution took only six weeks.

The PSNP has been effective in reducing the amount of time households spend without food between harvests and improving wellbeing more generally. The income provided by the programme is a vital resource in building up livelihood assets. However, the programme cannot protect recipients fully against sudden and severe shocks, and many people not reached by the programme require emergency food aid each year.

C. Béné, S. Devereux and R. Sabates-Wheeler, *Shocks and Social Protection in the Horn of Africa: Analysis from the Productive Safety Net Programme in Ethiopia* (Brighton: Institute of Development Studies, 2012), <http://www.ids.ac.uk/publication/shocks-and-social-protection-in-the-horn-of-africa-analysis-from-the-productive-safety-net-programme-in-ethiopia>; DFID, *Building Resilience in Ethiopia* (London: Department for International Development, 2012); M. Hobson and L. Campbell, 'How Ethiopia's Productive Safety Net Programme (PSNP) Is Responding to the Current Crisis in the Horn', *Humanitarian Exchange*, 53, 2012, <http://www.odihpn.org/humanitarian-exchange-magazine>, pp. 9–11; World Bank, *Designing and Implementing a Rural Safety Net in a Low Income Setting: Lessons Learned from Ethiopia's Productive Safety Net Program 2005–2009* (Washington DC: World Bank, 2010), <http://www.worldbank.org>.

By helping poor individuals and households to protect and strengthen their livelihoods and coping strategies, social protection programmes build resilience to future crises and shocks. They can also focus more specifically on DRR (e.g. through targeted public works programmes for soil and water conservation, road improvements and strengthening infrastructure) or protecting people in crisis (e.g. with cash, food and asset transfers or public works projects to provide employment).

National governments are the leading actors in formal social protection programmes, sometimes with support from international financial institutions and other international agencies. In certain circumstances, this level of capacity and financial resources can enable programmes to mobilise and expand operations to meet the immediate needs of large numbers of people in the event of a disaster. Countries with social protection systems in place before a shock may be able to cope better in such circumstances, but the ability of systems to respond varies considerably according to context and resources. Well-established programmes with extensive coverage and capacity for contingency planning and pre-positioning are more likely to be able to scale up effectively in disaster response, but systems still need to be well integrated with existing development and DRR planning, and the roles of implementing agencies need to be clearly defined and agreed.

Informal social protection draws on traditional coping strategies, social capital and community-based actions. These can be effective at local level, and in many cases they provide an important source of security, but their outreach may be limited. Different groups have access to different social and political networks and sources of support. These networks may be strong or weak in a crisis. They may also compete with one another over access to social protection support and other forms of aid.

There has been considerable debate about how social protection and safety net programmes will adapt to the unpredictable weather patterns and extreme weather events associated with climate change. Those that focus on purely economic interventions will probably have to take a wider developmental approach that puts more emphasis on issues such as public accountability, social vulnerability, exclusion and marginalisation and equity and rights. There is plenty of scope for further integration of social protection mechanisms with DRR and climate change adaptation on the ground, and much to be learnt about the best approaches.

Chapter 10

Communications, information, education

10.1 Introduction

Communicating with communities is central to disaster risk management, in order to share information about the hazards and risks that people face and the wide range of measures they can take to mitigate and prepare for potential disasters. Development and disaster professionals also need to know about the views and priorities of the people they are supporting and the risks those people are facing.

Communications, awareness raising and public education are also key to scaling up DRR from individual projects and programmes. Strategic, coordinated work to generate and communicate knowledge about DRR brings benefits to significant numbers of vulnerable people. Good communication also has an important role to play in public decision-making processes. Most DRR communications initiatives aim to promote behavioural change amongst communities and their organisations, but there are also opportunities to achieve social change by supporting community dialogue or collective action on issues of risk and vulnerability. Like participation, communication should aim to shift the balance of power towards communities by enabling people to investigate, define and explain their own problems.

10.2 Principles of good communication

DRR can learn from the experience of agencies working in sustainable development and humanitarian programming, where there has been a growing emphasis on dialogue with communities. Many, if not most, organisations now accept that they have to listen to vulnerable people, and that problems and solutions must be identified collectively. The emphasis therefore needs to shift from one-way information dissemination by specialists to genuine communication (i.e. dialogue and exchange of information) between specialists and communities. Participatory methods (see Chapter 6) have played a central role in this change of approach.

This way of communicating is not universal, but it is becoming much more widespread. Nevertheless, more effort is needed to incorporate the dialogue approach into DRR communications. Some disaster management professionals persist in the belief that they alone understand and assess risk and risk management objectively (i.e. scientifically). They assume that people do not fully understand the risks they face or how to deal with them, and that popular understanding of risk is subjective or even irrational. From this they conclude

that people must be better educated about risk; where existing messages are not understood, they simply need to be repackaged to make them easier to understand. This approach sees risk education as a kind of public relations exercise, where messages are transmitted from small groups of experts to the uninformed masses. The result is that knowledge sharing remains top-down, driven by DRR professionals and their institutions' agendas, whereas it should be more responsive to communities (and to whole communities – communication must be inclusive, with multiple communications channels to reach different groups). We have also seen (in chapters 3 and 6) how important it is to involve communities in the entire process if projects are to be relevant and sustainable.

The dialogue approach to communication is not easy. It often involves 'cross-cultural' communication between outsiders (disaster professionals) and people at the grass roots. Outsiders and local communities can express themselves in very different ways. For local people, visualisation and talk are often important in analysing and transmitting knowledge; for outsiders, especially educated and professional people, the written word is dominant. For outsiders, precise and quantifiable calculation confers weight and authority on information; for local people, comparing is often more important than measuring, especially for practical purposes.

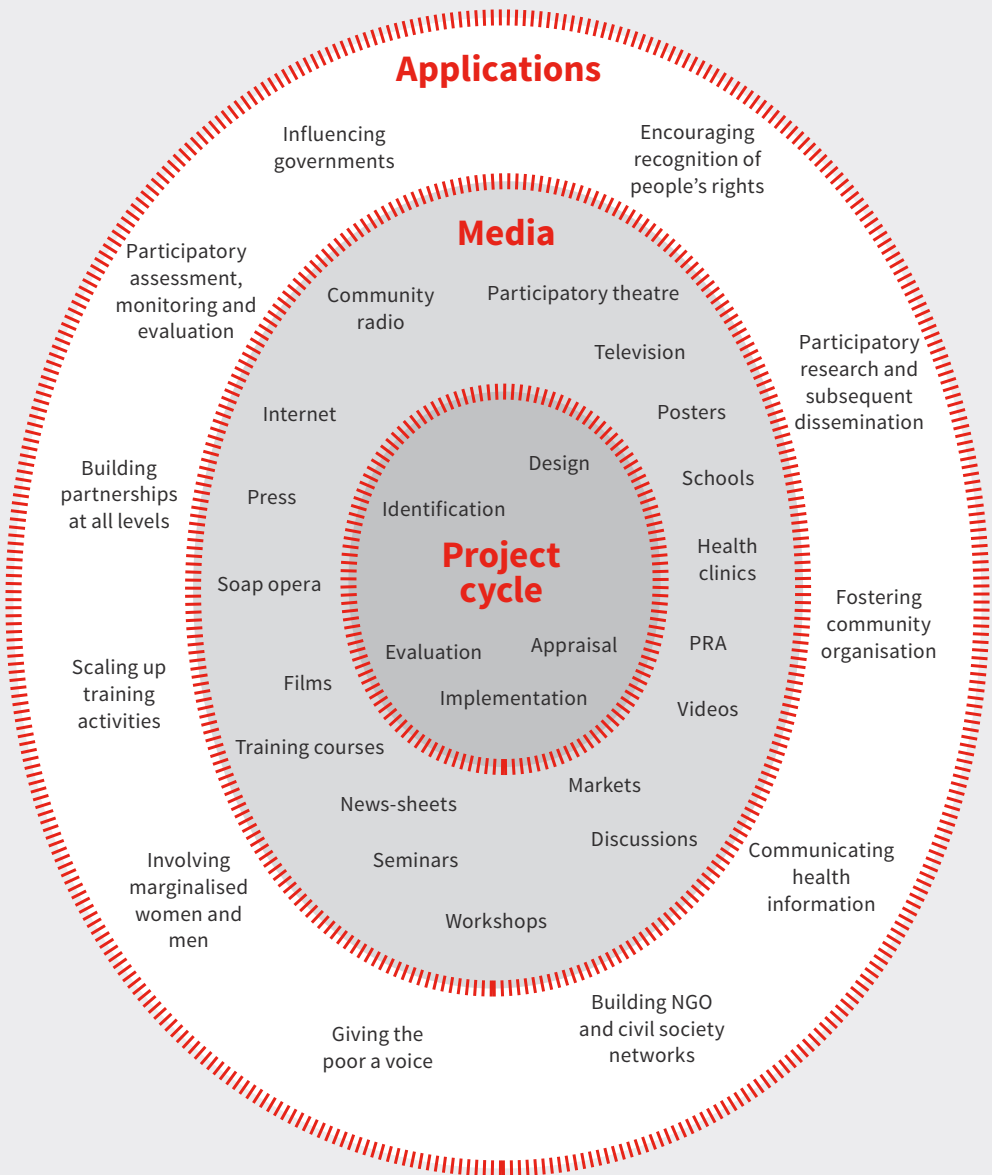
Professionals also like to arrange their information into definable categories, where it can be subjected to recognised methods of quantification and analysis. It can be hard for them to understand the complex, diverse and dynamic realities of community life, and equally difficult to translate that information into projects that tackle a variety of interconnected

Box 10.1 Some aims of risk communication

- Stimulating community participation and empowerment in DRR.
- Facilitating discussion between specialists and communities, and joint problem-solving.
- Identifying aspects of risk.
- Presenting and explaining risk information to relevant target groups.
- Supporting the risk management strategies of people exposed to risks.
- Warning individuals and communities.
- Developing disaster management strategies for authorities.

Developed and adapted from B. Rohrmann, 'Effective Risk Communication for Fire Preparedness: A Conceptual Framework', *Australian Journal of Emergency Management*, 10(3), 1995, pp. 42–46.

Figure 10.1 Communications and the project cycle



A. Burke, *Communications and Development: A Practical Guide* (London: Department for International Development, 1999, <http://www.eldis.org/vfile/upload/1/document/0708/Doc7389.pdf>, p. 24.

risks. Dialogue is often a messy business. It involves discussion, debate and sometimes argument between different stakeholders. Consensus cannot be guaranteed. Dialogue can also be time-consuming – and therefore resource-consuming.

Even where there is dialogue, outsiders will often find it difficult to understand the community's environment, needs and points of view. The process of dialogue requires some humility on the outsiders' part: they have to recognise their ignorance of other people's lives and accept that they can never fully understand the vulnerable person's point of view. Vulnerable people can explain their perspectives clearly to outsiders if they are given an opportunity to do so.

10.3 Communications strategies

The aim of public education programmes should be to create what is often called a 'culture of safety', where awareness of risk and adoption of risk-reducing measures are part of daily life. It is relatively easy to improve knowledge of hazards and risks and how to deal with them, but harder to change people's behaviour so that they take appropriate measures, individually or collectively. Achieving a culture of safety is a long-term process, therefore; it cannot be achieved through a one-off intervention. A programme of activities is needed to reach different target groups, explain and reinforce messages (repetition of messages can be an important element in successful public education campaigns), and give people opportunities to think about, question and validate the information they receive. It may be a long time – perhaps several years – before behaviour changes. Nevertheless, the experience of public education initiatives in other fields, such as public health, shows that it is possible to change behaviour in positive ways.

Research also shows that people are unlikely to take action to reduce their risks unless they know what specific actions can be taken, they believe that those actions will be effective and they are confident in their ability to carry them out. Another point to remember is that people must be encouraged to act, not simply told to do so. Nevertheless, it is also well established that people only respond to awareness-raising initiatives by specialists to the extent that they believe the information supplied and trust those providing it. Trust is vitally important. Public distrust of policymakers and officials can undermine risk communication initiatives; if lost, trust is difficult to regain.¹

All DRR programmes should include communications and awareness-raising as a central, ongoing element, and they should have a clear strategy for doing this. In practice, relatively little time and effort is invested in this area. It is often just a component added to the end

¹ R. Lofstedt, 'Risk Communication: Pitfalls and Promises', *European Review*, 11 (3), 2003, pp. 417–35.

Box 10.2 Eleven steps in a communications strategy

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 communication material.
9. Participatory pre-testing.
10. Implementation.
11. Evaluation.

A. Burke, *Communications and Development: A Practical Guide* (London: Department for International Development, 1999), <http://www.eldis.org/vfile/upload/1/document/0708/Doc7389.pdf>, p. 25.

of individual projects, undertaken by people without specialist training or skills. Public education therefore becomes fragmented into separate, one-off, short-term interventions whose impact is rarely assessed. Ideally, it should be a long-term, sustained process that seeks to raise awareness and stimulate protective action progressively and sustainably.

Box 10.2 sets out 11 steps to be undertaken in developing and implementing an effective communications strategy. Note that most of the steps involve planning and testing – implementation does not begin until Step 10. Pre-testing of methods and materials is essential to ensure their appropriateness and effectiveness. Involvement of communities throughout the process is also a key factor in making it relevant and successful.

Communications and public education strategies should use a wide range of complementary methods to reach different target groups and maximise their outreach. Successful campaigns choose methods that complement one another (e.g. mass media messages complemented by interpersonal or group communication). The mix of methods is likely to change over time as some are found to be more effective than others, or their effectiveness is diluted as they become too familiar to public audiences. There must be a clear understanding of the people the initiative is aimed at: who the target groups are, why they have been chosen, their

current levels of understanding and interest in risk reduction, what changes in attitude and behaviour can be expected from them and how they can best be reached.

There is no perfect medium or method for communicating, but in any situation the best methods will be those that are appropriate to the target audience. People the world over have their own preferred ways of receiving and sending information. Communities are not homogeneous, and methods that work well for one group may be inappropriate for others. Communications with the poorest, most marginalised and vulnerable groups can be particularly challenging. Generally, they cannot access the full range of relevant information and knowledge that is available on account of factors such as illiteracy, language barriers, disability, cultural marginalisation, displacement, physical remoteness and poor transport, social isolation and lack of access to technologies such as televisions, radios, social media and mobile phones. For such groups, their own social networks are often the most important channels of communication. Projects should identify these differences within societies and try to use the methods that are most suitable for reaching all sections of the community.

Case Study 10.1 **Communicating weather forecasts to farmers**

Over 70% of Ugandan households depend on rain-fed agriculture. They need reliable forecasting information to plan their farming activities and protect their crops. The government's Department of Meteorology is responsible for issuing weather forecasts and advisory messages. However, in the past many people did not receive these in time, the terminology used was too complex and technical, guidance was unclear, information was in English only and neither the Meteorology Department nor local government had the resources and coordination capacity to disseminate forecasts adequately. As a result, many communities did not receive or trust official weather forecasts.

In June 2012, the Meteorology Department began issuing simplified seasonal forecasts and advisories, translated into local languages (initially four, later rising to ten). Advisory messages were also prepared for specific sectors (such as health, agriculture, water and energy) and dissemination to communities became more thorough and targeted, using a range of communications channels including radio, meetings, churches and markets. Most of the target areas received forecasts in time.

Case Study: Weather and Climate Forecasting for Community Resilience to Climate Related Risks and Shocks (Kampala: Ministry of Water and Environment, Department of Environment, undated).

Box 10.3 Questions to ask when choosing communications methods

Communications strategies must be planned with care. Questions to consider include the following:

- What is the purpose of your message?
- Who are the key people you want to communicate with?
- What facts must be presented to achieve your desired effect?
- What are the audience's current attitudes towards the issue?
- What are the preferred communication styles of the audience (e.g. formal versus informal, written versus verbal)?
- Are you sufficiently familiar with the subject matter that pertains to the message?
- Are there constraints that affect the selection of the method (e.g. time availability, necessary skills, logistical arrangements, access to the medium, shared language, literacy, existing knowledge of the subject, cultural sensitivity)?
- Are there visuals that will convey the message better than words, or that will supplement words to strengthen the impact of the message, making it more engaging, easily interpretable and memorable?

AfricaAdapt and Stockholm Environmental Institute, *Risk Communication Guide for Climate Change Practitioners in Africa* (Dakar: AfricaAdapt, 2013), <http://www.africa-adapt.net/media/resources/875/resource-guide-on-risk-communication-1.pdf>, p. 4.

Many risk communication initiatives are based on 'active' information – i.e. exhortations to people to do something. But it may be just as important to use 'passive' information: making sure that when people do want more information or have questions, the material or answers they need can be obtained easily. A combination of active and passive information is often useful.

Personal experience of a recent disaster is a powerful force in inspiring people to take protective action. Purchases of emergency resources – radios, torches, canned foods, bottled water – and interest in obtaining official information on good practices often increase considerably after an event. This 'window of opportunity' for public education and mobilisation may not remain open for long, as anxiety about disasters is supplanted by everyday concerns or complacency sets in.

There are obstacles to maintaining public information facilities such as documentation centres and networks for distributing materials. The main one is the difficulty of securing

ongoing funding. Another problem is that the growing demand for information as a result of successful dissemination increases staff workloads and may require extra capacity. Charging users for materials and services rarely produces enough income to cover costs, and excludes the poor. More attention should be given to helping communities themselves to acquire, keep and share information between their members and with other communities. Finally, it is always advisable to get help from communications specialists when planning and implementing initiatives.

10.4 Communication methods

The individual methods that can be used to raise awareness about risk reduction are very diverse. A few commonly used ones are described in this section, but the range of possibilities is wide.

10.4.1 Interpersonal communication

Face-to-face communication – formally and informally, through field workers, community mobilisers, extension workers, local meetings and workshops – is generally reckoned to be one of the most effective approaches to communication, in terms of knowledge sharing, learning and dialogue. Community mobilisers and educators are important channels of communication: some may be project workers; others are community leaders and local volunteers. Participatory vulnerability analysis and community action planning events develop common understanding and encourage interest and action at the grass roots.

Exchange visits are an excellent way of allowing people to learn from their peers about new or alternative practices and technologies. They have been used in many contexts, notably in agriculture and food security, where farmer-to-farmer exchanges have encouraged the transmission of knowledge about such matters as seed varieties, land use practices, irrigation technologies and crop storage. Agencies often facilitate these processes, for instance by making arrangements and providing transport, but the discussion and information-sharing take place between community members.²

Games can engage and motivate people, especially young people, to think about risk reduction: they are increasingly being used in participatory project planning, for example using scenario exercises. The UNISDR has developed *Stop Disasters*, an open-access online simulation game which sets challenges of decision-making and priority-setting in defending

² For exchange visits and how to organise them, see *Capitalising on Local Knowledge: Community Knowledge Exchange* (two online toolkits by the World Bank Africa Region Indigenous Knowledge for Development Programme: http://www.worldbank.org/afr/ik/commun_toolkit/Toolkit1/introductionI.htm and http://www.worldbank.org/afr/ik/commun_toolkit/Toolkit2/introductionII.htm).

against a range of hazards. With UNICEF, UNISDR has also developed a disaster board game for children, *Riskland*, which has been translated into several languages.³

Projects should be aware of how information is normally shared within and between communities, and who may be left out of the process. A great deal of information exchange takes place informally, for example within families, at village meetings, while collecting water at the well or at markets. It is oral, not written. It reaches people who are often not reached by newspapers, radio or government extension workers. These communication mechanisms cannot be managed or directed from outside, but by knowing how informal communication takes place it is possible to feed information into social networks through key stakeholders or communicators. Project workers should be imaginative here. For example, in the early 1990s an NGO in Peru seeking to promote alternative technologies for earthquake-resistant housing focused on local taxi drivers after it discovered that they played an important role in spreading information when talking to their passengers.⁴ In the field, informal and casual conversations between project staff and local people – in cafes and markets, on the street, at public events and roadsides – are often mutually productive and far less likely to be dominated by local leaders and elites. However, it is often difficult to document and assess the impact of informal communications channels.

10.4.2 Printed, visual and audio-visual media

The production and distribution of printed public information materials (e.g. leaflets, magazines and newsletters, posters, factsheets, fliers, brochures, information cards, bookmarks) is still one of the main communications methods used because it is relatively cheap and easy to manage, and in theory reaches large numbers of people. However, the impact of many activities of this kind can be seriously weakened because of inappropriate presentation. If presented in a clear, understandable format, hazard and risk maps can be a good way of explaining threats to communities and stimulating action, but careful thought should be given to how people interpret and understand maps (see Box 10.4: Maps as a communications tool).

³ See <http://www.stopdisastersgame.org/en/home.html>; <http://www.unisdr.org/we/inform/publications/2114>.

⁴ A. Maskrey and J. Vicuna, 'Taxi Drivers – Communicators on Wheels', *Appropriate Technology*, 19(2), 1992, pp: 30–31.

Box 10.4 Maps as a communications tool

Community mapping is widely used in participatory, community-based DRR projects, particularly to identify hazard threats, vulnerable people and property, and to plan interventions (see chapters 3 and 7). Maps are also widely used by disaster management organisations as a communications tool to warn communities about hazards and risks, identify dangerous locations and mark evacuation routes and safe places such as shelters.

Formal maps use a variety of visual conventions to identify features of the landscape and built environment. These are not necessarily obvious or intuitive, and in many cases must be learnt. Where community members do not have this prior learning (which is often related their level of formal education), maps will not be understood, they will cause confusion and may even mislead. There are many examples of such ineffective applications of maps in emergency planning and DRR projects. There is some evidence that aerial photographs are easier to understand, even by people who have not used them before.

K. Haynes et al., 'Volcanic Hazard Communication Using Maps: An Evaluation of Their Effectiveness', *Bulletin of Volcanology*, 70 (2), 2007; C. Zarcadoolas et al., 'GIS Maps To Communicate Emergency Preparedness: How Usable Are They for Inner City Residents?', *Journal of Homeland Security and Emergency Management*, 4 (3), 2007.

Print and broadcast media (e.g. newspapers, television) can be used to promote safety messages and share information about new initiatives. These reach large audiences and can be cost-effective if used well and targeted carefully. Mass media communication is most likely to be successful if linked to other actions on the ground and if audiences can get involved (e.g. through community radio stations, audience feedback or competitions). Disaster professionals sometimes make use of the broadcast entertainment media to provide what is called entertainment education – that is, embedding educational messages in entertainment programmes, such as TV and radio soap operas (see Case Study 10.2: Uses of radio in DRR).

Visual communication transcends language, and in the digital age images can be transmitted widely. It is often assumed that images are easy to understand and will be widely understood, but this is not necessarily the case, and in many cases images can be misleading. It takes time and skill to create images that are appropriate and clear in their messages (see Box 10.5: Presenting and interpreting images).

Case Study 10.2 Uses of radio in DRR

Radio can be an effective tool in DRR, particularly if broadcasts are professionally produced. Programmes are relatively cheap to make, and radio sets are affordable, portable and widely used. This case study contains examples of two different approaches to radio in DRR.

Public information broadcasting

In 2001, a radio project was launched in Central America to highlight risks from hurricanes and disseminate advice about hurricane preparedness. The initiative was funded by several regional and international agencies. The broadcasts took the form of short dramas (*radionovelas*), each consisting of five half-hour instalments, with the series title of *Tiempos de huracanas* ('Hurricane Season'). Programmes were broadcast in the morning and reached mostly women managing their households and younger people. The Costa Rican NGO Voces Nuestras (Our Voices) coordinated the project.

In the first year of broadcasting, 2002, 46 radio stations took part; in the second year there were 86, from six Central American countries. The broadcasts were supplemented by a broader awareness-raising campaign, which included community workshops. Audience feedback and evaluations indicated that listeners related the stories to their own daily lives, valued the guidance given and generally understood the key messages. There was also evidence of people mapping risk zones in their localities for the first time as a result of the programme.

Participatory radio

To test the effectiveness of participatory radio, Farm Radio International and World University Service of Canada set up the African Farm Radio Research Initiative (AFRRI) in partnership with 25 radio stations in Ghana, Malawi, Mali, Tanzania and Uganda. The project partners created a series of radio programmes to help farmers improve their agricultural practices, using a participatory model that allowed farmers to contribute at every stage.

Each radio station established an Active Learning Community (ALC) of local farmers, who were surveyed about their needs and agricultural practices, as well as their radio listening habits. The ALCs then took part in designing radio programmes that focused on specific practices to improve food security and livelihoods. The three-and-a-half year initiative reached 40m farmers. Evaluation showed that farmers had learnt a great deal from the broadcasts, and that a significant proportion of them had adopted agricultural improvements and were continuing to practice them.

World Disasters Report 2005: Focus on Information in Disasters (Geneva: IFRC, 2005), p. 152; *Tiempos de huracanas*, <https://www.iom.int/jahia/webdav/site/myjahiasite/shared/shared/mainsite/projects/documents/radionovela.pdf>; K. Perkins, D. Ward and M. Leclair, *Participatory Radio Campaigns and Food Security: How Radio Can Help Farmers Make Informed Decisions* (Ottawa: Farm Radio International, 2011), <http://www.farmradio.org/wp-content/uploads/farmradio-prcreport20111.pdf>.

Box 10.5 Presenting and interpreting images

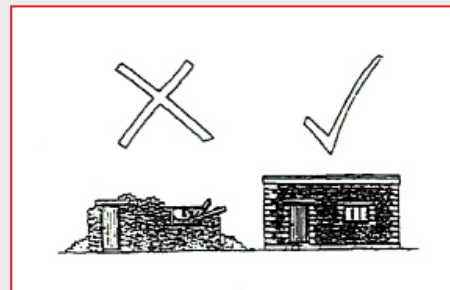
Pictures have a powerful impact. People are moved by visual messages more than verbal or written ones, and tend to remember them better. This is obviously likely to be the case in societies with low literacy levels, but it is also true in well-educated communities. However, it is easy to go wrong in producing material based on visual images. Do not assume that images speak for themselves: they must be interpreted. The way in which they are interpreted is strongly conditioned by local cultures and visual traditions. A diagram that is easily understood by a community in one place may not make any sense to another group of people somewhere else (see Figure 10.2: Interpreting images). Trainers and field workers can use images effectively in their work, but they must take time to explain them and answer questions. Their skills as communicators will determine how effective the images will be.

E. Dudley and A. Haaland, *Communicating Building for Safety: Guidelines for Methods of Communicating Technical Information to Local Builders and Householders* (London: IT Publications, 1993).

Figure 10.2 Interpreting images



In a study in Nepal only 3% interpreted the tick and the cross as indicating good and bad ways to feed a baby.



In this drawing indicating good and bad houses in northern Pakistan, the cross was interpreted as a ceiling fan and the tick as an Urdu 7.

E. Dudley and A. Haaland, *Communicating Building For Safety: Guidelines for Methods of Communicating Technical Information to Local Builders and Householders* (London: IT Publications, 1993), p. 43.

Video is an effective and increasingly accessible method of conveying information. Modern digital technologies have reduced the cost and difficulty of making videos, and the internet has greatly increased their potential reach. Although videos can now be made quite cheaply and easily, a high level of technical and editorial skill is needed to make good ones. Video can supplement community exchange programmes by allowing communities to see what is actually happening elsewhere. Participatory video (like participatory mapping and photography) can also be a means of giving poor and vulnerable people a voice. It allows them to tell their own stories and present their own concerns, and to share these with other communities or disaster professionals through public events such as film screenings and workshops.

Many agencies working on DRR post videos on video networking sites, including YouTube: these include case studies, technical guidance and more general ideas, and are becoming an effective means of communication. By the end of 2009 the IFRC's YouTube channel had received 75,000 visits, 750,000 videos had been viewed and the most-viewed video had been seen 130,000 times; some of the most popular videos were on building hazard-resistant houses.⁵ Video is often favoured by decision-makers as a quick and convenient way of obtaining information. Scientists monitoring Mount Pinatubo in the Philippines before its eruption in 1991 used a video with footage of other similar eruptions to brief government officials (from the President down to local staff), students, teachers, religious leaders and communities about what was likely to happen. It proved highly effective in overcoming scepticism and persuading people to prepare for the impending event.⁶

ICTs, which play an important part in DRR (see Chapter 8), are now extensively used worldwide to raise public awareness of hazard risk and support household and community action, especially in preparedness and response. A growing number of websites provide long-range forecasts, warnings or real-time hazard information; examples include Tropical Storm Risk, the Famine Early Warning Systems Network (FEWSNET) and the UK Environment Agency's flood warning site.⁷ There is evidence that such sites receive large numbers of visits when there is a perceived hazard threat.

⁵ IFRC, *Public Awareness and Public Education for Disaster Risk Reduction: A Guide* (Geneva: IFRC, 2011), http://www.ifrc.org/Global/Publications/disasters/reducing_risks/302200-Public-awareness-DDR-guide-EN.pdf, pp. 51–52.

⁶ R. S. Punongbayan et al., 'Eruption Hazard Assessments and Warnings', in C. G. Newhall and R. S. Punongbayan (eds), *Fire and Mud: Eruptions and Lahars of Mount Pinatubo, Philippines* (Quezon City/Seattle, WA: PHIVOLCS/University of Washington Press), <http://pubs.usgs.gov/pinatubo/punong2/index.html>.

⁷ See <http://www.tropicalstormrisk.com/tracker/dynamic/main.html>; www.fews.net; <http://apps.environment-agency.gov.uk/flood/31618.aspx>.

10.4.3 Public events and activities

Other approaches are based on public events and performances. Folk media such as plays, songs, story-telling, dance and festivals are widely used. These methods are based on indigenous communications practices and traditions, use local languages and are often interactive occasions allowing people to share their own views and experiences. Art and photography competitions on relevant themes are also popular, especially for young people.

Public exhibitions are another often-used way of highlighting risks, advocating protective measures and promoting new initiatives. For example, projects introducing alternative ways of building to withstand hazards may erect demonstration houses, to raise awareness and provide an informal forum for discussion with community members. Model houses are sometimes put on shaking tables in public displays to show how they stand up to earth tremors. Similar approaches are often used in food security work: for example, demonstration plots showing the benefits of alternative crops, irrigation methods or other agricultural techniques. Emergency services open days make communities familiar with emergency management systems and personnel, and are an opportunity to introduce risk and safety issues. Simple, inexpensive visual devices in public places give permanent reminders of hazards and disasters: warning signs can be put up or painted onto walls; flood levels can be marked on bridges, telegraph posts or buildings.

The anniversaries of major disasters are commonly marked through public ceremonies and publicity in the media, as a way of reminding people of the hazards in their environment and the damage they can cause. Anniversaries can be potent reminders, as well as having psychological value as rituals of grieving and healing. Some organisations hold annual events to highlight disaster issues. UNISDR has designated the second Wednesday in October as the international day for natural disaster reduction. Agencies in many countries plan events for this day, which gives them an opportunity to work together to spread public messages. Other countries may have their own special days annually; Fiji has a national disaster awareness week.

Public campaigns can be highly effective, especially if they focus on a specific issue or problem and a clear solution is identified, such as building new flood defences, clearing rubbish blocking drains, wearing seat belts in cars or introducing new safety regulations. Successful campaigns also benefit from a sustained and consistent set of messages repeated over a long period of time.

10.4.4 Social media

Social media is the term used to describe a wide range of online tools that allow people to network and communicate independently. These include email, listservs, social networks, file sharing (documents, photographs, video), wikis (collective authoring), blogs and text/

Case Study 10.3 Use of social media in floods

During the 2011 floods in Queensland and Victoria in Australia, social media played a significant role in providing flood-related information. The Queensland Police Service facebook page became a key source, but several facebook community pages were also created to post real-time information on what was happening in different localities. Subsequent research showed that the users of the facebook pages sought principally to obtain information relating to their communities, families and friends. This knowledge was then shared within family and friendship groups. Information received in this way was generally regarded as accurate, trustworthy and timely. The pages also played an important role in rapidly refuting rumours.

D. Bird, M. Ling and K. Haynes, 'Flooding Facebook: The Use of Social Media During the Queensland and Victorian Floods', *Australian Journal of Emergency Management*, 27 (1), 2012, https://www.em.gov.au/Publications/Australianjournalofemergencymanagement/PastIssues/Documents/Flooding_Facebook, pp. 27-33.

SMS messaging. Social media are widely used by people affected by emergencies to share information about what is happening; identify sources of support, equipment and resources; seek technical, material and financial assistance; hold assistance organisations to account for their actions (or inaction); and stimulate public debate about what is happening and what could and should be done. In this way, they give a public voice to people who might not otherwise be heard. This use of social media is an extension of the spontaneous self-help efforts that characterise disasters: people in affected communities are always the first responders, before external assistance arrives. Electronic information networking is also a form of social capital, drawing on existing social connections and creating new ones.

Disaster responders can benefit from social media, particularly crowdsourcing of information on disasters' impact, and about areas and people in need. Free, open-source software is now available for data collection, visualisation and interactive mapping (see Section 10.5). Emergency management systems have adopted social media techniques: crisis information websites are becoming increasingly common, for instance, and in many places it is possible to subscribe free of charge to SMS emergency messaging services. New York's text notification system, Notify NYC33, has over 140,000 subscribers, who receive alerts about emergencies, public health issues, major events and school closures.⁸

⁸ L. Elstow, *Beyond Z-Cards and Grab Bags: Community Resilience in Urban Communities*, Report for the Winston Churchill Memorial Trust, 2013, http://www.wcmt.org.uk/sites/default/files/migrated-reports/1121_1.pdf, p. 28.

10.5 Managing information

Many emergency managers are anxious to have standardised information on risk and disasters in order to ensure that messages are reliable and consistent. This is a particular concern with forecasts and warnings of imminent events, where mixed and inaccurate messages can prompt inappropriate responses, may lead to confusion or even chaos and, ultimately, magnify the impact of the disaster. Messages should be reliable, consistent, easy to understand and act upon and credible (i.e. from trusted sources).

Agencies should therefore coordinate their messages. For example, in the United States a number of organisations have come together to develop standard messages relating to hazards, preparedness, evacuation and shelter; the IFRC has produced a set of key messages on DRR to be used in public education; and the Communicating with Disaster Affected Communities (CDAC) Network hosts an online searchable database of messages for use in preparedness and emergencies.⁹

In practice, people seek to validate information they receive by cross-checking it with other people and sources, such as friends, neighbours, family, community activists or leaders, radio, social media, websites and television. They may well follow the actions of other people they know. This can happen even when emergency warnings are issued and swift response action is required. Furthermore, in an age where people have access to more and more sources of information – in the media and on the internet – controlling and centralising information is no longer feasible, except perhaps under a few authoritarian regimes, where in any case the public may not trust official sources.

Disaster managers nowadays have to work with communities that are increasingly able to choose and question the information they receive. They need to acquire more extensive skills in media management. They will also have to move away from the old supply-side approach to communications, where experts at the top or centre issue information outwards and downwards to target groups, and adopt a more demand-led approach that sees communities at risk as consumers of information from different sources, exercising a right to choose what information to use and where to obtain it. This may require DRR organisations to become knowledge brokers and facilitators of discussion, as well as being producers and disseminators of information. This will make their task more difficult, without doubt. Communities are able to use multiple sources of information effectively to reduce the impact of potential disasters, although their capacities to do so will often need to be reinforced.

⁹ See <http://www.cdacnetwork.org/tools-and-resources/message-library>.

10.6 Evaluating impact

It is difficult to attribute and measure the direct impact of communications initiatives on promoting DRR and reducing risk. This is particularly the case with evaluating behavioural change. Shifts in knowledge and attitude can take place quite quickly and are relatively straightforward to assess. Changes in behaviour are slower to reveal themselves and it can be harder to identify them. There is also the problem of attribution: it is hard to tell how much people learned from a specific public information programme or project intervention, and how much from other sources. Other social, cultural or economic factors may have a strong influence on behavioural change – just as a range of external factors may prevent behavioural change despite the best efforts of a project. The ultimate test of success may be how people behave when a real disaster threatens or strikes.

Chapter 18 discusses M&E in DRR methods in more detail: many can be used to assess the impact of communications work as well. For example:

- Well-established ‘audience research’ methods can be used to find out how many people received particular information and what impact it had on their thinking and action. These include questionnaires, structured interviews and more qualitative in-depth interviews.
- Valuable information can be collected from informal and relaxed conversations with people receiving messages, or through more participatory initiatives. Direct observation of how (or if) people adopt risk mitigation measures can also be highly informative.
- Participatory communications approaches can be applied to evaluation. Folk drama or other community-based methods can be used to give people an opportunity to present their own views on an issue or on how well a project is doing. Focus groups are also commonly used. In the broadcast media, listeners’ letters and responses to quizzes and competitions provide useful qualitative indicators.
- Rather than carrying out large-scale surveys, it may be easier to work with less direct indicators, relying more on triangulation (cross-checking) of a number of simpler evaluation techniques. This is likely to be cheaper as well as faster, and indicators can be based on verbal or other evidence of change.
- The value of impact evaluations is limited if baseline data about attitudes and behaviour have not been collected.

Knowledge, attitudes and practice (KAP) surveys or studies, which are widely used in health and other programmes, might perhaps be applicable to hazard, risk and DRR communication, although it is not clear how much they have been used in this field. There are many ways of carrying out KAP surveys, with the general aims of generating information on current

knowledge, attitudes and practice; improving understanding of the key cultural and other socio-economic factors influencing behaviour; identifying appropriate communications methods and networks for stimulating changes; and designing awareness-raising projects on the basis of this knowledge.

10.7 Schools, disaster education and school safety

10.7.1 DRR education in schools

In many countries issues around health, safety, hazards, risk and the environment are incorporated into the formal education curriculum as a way of increasing children's understanding of risk and teaching them how to prepare for hazardous events and react when they occur. Individual teachers may choose to introduce particular aspects that are relevant to their community. Schools also arrange educational visits to or by local emergency services. The potential value of the school-based approach is obvious. It can reach large numbers of people who are already gathered to learn and are essentially teachable. Children are believed to be more receptive to new ideas than adults and they can influence their peers and parents (see Chapter 5).

Nevertheless, projects working with schools should be realistic about what they can achieve. Ideally, DRR should be presented as a total package equipping children to deal with all hazard and emergency situations, which could be carried into a range of core curriculum subjects, such as science, geography and citizenship. However, this depends on being able to adapt the formal education system to incorporate a broad range of perspectives on disasters, such as adding an understanding of socio-economic vulnerability to conventional teaching about natural hazards. Where the curriculum is rigid and centrally imposed, this may be difficult to change without sustained advocacy.

In many low-income countries, where class sizes are large and teaching resources are limited, teachers may be reluctant or unable to do much to adapt the basic curriculum. The outreach of the formal education system itself may be restricted in places where there is a shortage of schools and trained teachers, attainment and attendance rates are low and certain groups, such as girls and children from poor families, are likely to drop out at an early age.

Emergency managers and national and local NGOs working on disaster reduction could probably be more active in visiting schools, talking to staff and pupils, developing educational materials, running workshops and giving technical advice and support to school preparedness initiatives. This could be through extra-curricular activities such as school assemblies, after-school clubs and competitions (see Case Study 10.4: DRR clubs). A more strategic approach would be to work with teacher training institutions to raise teachers' awareness of the issues and ways of teaching them. Independent or small-scale initiatives may be adopted at higher level.

Box 10.6 Checklist of good practice in risk communication

1. Think strategically.
2. Plan and prepare carefully, with communities.
3. Devise a series of actions to build up awareness and mobilise communities in the long term.
4. Ensure that you understand how people process and evaluate information about hazards and risks.
5. Focus risk communication on changing behaviour rather than merely improving understanding.
6. Use methods of communication that are most acceptable to the communities concerned. Be prepared to spend time and effort to find out which methods are most suitable.
7. Adapt the information and communications method to the needs and tastes of each target group, and set priorities where you do not have the capacity to communicate with everyone effectively.
8. Ensure that technical information is presented in accessible formats.
9. Check that the materials or advice being given are comprehensible, credible and consistent.
10. Ensure that the actions suggested are feasible and that people will be motivated to act (and not panic).
11. Pre-test materials and methods to make sure they are effective.
12. Acknowledge the likelihood that apathy and information overload will affect people's response to messages.
13. Acknowledge that people's attitudes to hazard risks are influenced by other factors, such as cultural traditions or the need to maintain insecure livelihoods.
14. Provide interactive communication and pathways for dialogue, questions and requests for further information.
15. Reinforce the message over time, and add new information and ideas as part of an overall strategy.
16. Evaluate your work and share the findings with others.

Based on R. Steen, *A Guide to Information Preparedness* (Oslo: Directorate for Civil Defence and Emergency Planning, 2000); B. Rohrmann, 'Effective Risk Communication for Fire Preparedness: A Conceptual Framework', *Australian Journal of Emergency Management*, 10(3), 1995; pp. 42–46; S. Nathe et al., *Public Education for Earthquake Hazards* (Boulder, CO: University of Colorado, 1999), <http://www.colorado.edu/hazards/publications/informer/infrmr2/informer2.pdf>.

Case Study 10.4 DRR clubs

A World Vision project in Ethiopia seeking to integrate DRR into schools found that teachers had little knowledge of the subject, which was not well covered by the formal curriculum. Initially, the project concentrated on training more than 150 teachers and school leaders, who then shared their knowledge with other staff in their schools. The second phase of the work focused on children's empowerment by establishing and supporting extra-curricular DRR clubs comprising children of both sexes, aged from ten to 18. The objectives were to raise awareness among club members, encourage them and support them in becoming peer educators and advocates for DRR education in schools. The club members took part in first aid training, risk assessments, response drills and environmental projects, and they were taught about wider disaster risk issues. After this, they held weekly meetings to discuss these ideas and develop activities for promoting DRR. The project began as a pilot initiative in ten schools, but it then expanded, with clubs and complementary activities reaching an estimated 24,000 teachers, and DRR training becoming a regular part of schools' extra-curricular activities.

World Vision International, *Disaster Risk Reduction and Community Resilience Case Study Series*, 2011.

Although there is widespread agreement on the potential value of schools initiatives, there has been little systematic evaluation of their impact. It seems that risk/hazards education at school does lead to more accurate perceptions of risk and better understanding of protective measures. It can also reduce fear of hazards (children appear to be worried about not knowing how to respond to an event). But it is much harder to evaluate children's subsequent behaviour with regard to risk and risk reduction – still less, whether they have influenced the attitudes and behaviour of their families. It is difficult for educators and disaster planners to judge which approaches are most likely to work well in particular circumstances.

10.7.2 School safety

Disaster preparedness and response can be managed relatively efficiently in the controlled school environment. Teaching and practicing emergency evacuation drills in school does improve the speed and effectiveness of response. All schools should have their own risk and emergency management plans and procedures, including evacuation drills, and should test these regularly.

Sudden-onset hazards can be very dangerous where large numbers of students are collected together. Many school buildings are vulnerable because they are poorly constructed or located in hazardous areas. In 2008, more than 2,000 schools in Myanmar were destroyed by Cyclone Nargis, and in the same year an estimated 10,000 school students in China were

killed by the collapse of school buildings in an earthquake.¹⁰ Fire is a common hazard in schools, requiring safety precautions such as smoke detectors, sprinklers and evacuation planning and drills. As well as improving and expanding teaching and learning on DRR, therefore, safer buildings and school environments are needed. Every school should have an emergency plan and practice it regularly. Some countries hold regular regional or national practices: in Iran, for example, there is an annual earthquake safety drill for all schools.

Ensuring continuity of education in schools after disasters is a major challenge. Buildings may be destroyed or unsafe, teachers dead or injured, and text books, teaching materials and school records lost. Seasonal flooding in many countries forces schools to close down for weeks or even months, disrupting education. School disaster preparedness planning should seek to resume teaching as soon as possible after an emergency. This includes making sure that reserve sets of books and other essential items are kept in safe places.

DRR education and school safety planning should be connected as part of a coherent approach to reducing risk. School governors and managers should take a holistic view of school safety that covers teaching and learning on the subject of risk and disasters; relevant school policies, plans and procedures; the human, material, information and financial resources required; the siting and construction of school buildings; school events and activities; and the local environment (such as the safety of routes children use to get to and from school). They should also work with pupils' families to promote awareness of safety issues and good practice.¹¹ In many communities, schools serve more than one purpose. In parts of Bangladesh and India, for example, cyclone shelters double as schools or community centres during normal times. Children's nurseries or kindergartens may grow food to supplement poor children's diets, and their capacity to do so can be supported during times of food shortage or crisis.

Box 10.6 Organisations, initiatives and networks for school safety and DRR education

Coalition for Global School Safety and Disaster Prevention Education:

<http://cogssdpe.ning.com>

Edu4drr: Effective Education for Disaster Risk Reduction: <http://www.edu4drr.org>

INEE: International Network for Education in Emergencies: <http://www.ineesite.org>

Risk RED: Risk Reduction Education for Disasters: <http://www.riskred.org>.

¹⁰ M. Petal, *Disaster Prevention for Schools: Guidance for Education Sector Decision Makers* (Geneva: UNISDR, 2008), http://www.unisdr.org/files/7556_7344DPforSchoolssm1.pdf.

¹¹ J. Twigg, *'Staying Safe': A Conceptual Framework for School Safety* (London: UCL Hazard Centre, 2011), <http://www.ucl.ac.uk/hazardcentre/resources/working-papers2>.

Chapter 11

Policy, regulation, accountability and advocacy

11.1 Policies and regulations

An appropriate policy, regulatory and implementation structure is an essential part of disaster risk management: one of the Sendai Framework for Disaster Risk Reduction's four priorities is 'Strengthening disaster risk governance to manage disaster risk'.¹ This 'enabling environment' is primarily a government responsibility, because governments are ultimately responsible for public safety and have the mandate, resources and capacity to create such an environment and to undertake or stimulate large-scale DRR initiatives, but citizens and civil society organisations can do much to influence it.

Every country should have an appropriate national policy, a strategy for attaining policy goals, a legislative framework (creating the necessary administrative structures and financial instruments, and setting relevant laws and regulations), and administrative structures and systems with the human, technical and financial capacity to implement the disaster management strategy, at all levels of government (see Box 11.1: Key features of DRR governance).

There are many different ways of reducing risk through policies and regulations, and DRR structures and systems can be built up incrementally. A large number of countries around the world have revised their disaster management policies, laws and administrative structures in recent years to incorporate new thinking on vulnerability, communities, DRR and resilience. These changes do not take place overnight: in post-apartheid South Africa, for example, the mainstreaming process of stakeholder discussion, policy and legislative development and establishing and financing national structures for implementation took 11 years (1994–2005), and considerable effort was required to maintain the momentum for reform.²

Within the overall DRR structure, a variety of policies, regulations and procedures can be used to address particular kinds of risk and hazard. They include:

¹ See http://www.wcdrr.org/uploads/Sendai_Framework_for_Disaster_Risk_Reduction_2015-2030.pdf.

² M. Pelling and A. Holloway, *Legislation for Mainstreaming Disaster Risk Reduction* (Teddington: Tearfund, 2006), <http://www.tearfund.org/webdocs/website/Campaigning/Policy%20and%20research/DRR%20legislation.pdf>.

Box 11.1 Key features of DRR governance

DRR policy, planning, priorities and political commitment:

- Political consensus on the importance of DRR
- DRR a policy priority at all levels of government
- National DRR policy, strategy and implementation plan, with clear vision, priorities, targets and benchmarks
- Local government DRR policies, strategies and implementation plans in place
- Official (national and local) policy and strategy of support to community-based disaster risk management (CBDRM)
- Local-level official understanding of, and support for, community vision

Legal and regulatory systems:

- Relevant and enabling legislation, regulations, codes, etc., addressing and supporting DRR, at national and local levels
- Jurisdictions and responsibilities for DRR at all levels defined in legislation, regulations, by-laws, etc.
- Mechanisms for compliance and enforcement of laws, regulations, codes, etc., and penalties for non-compliance defined in laws and regulations
- Legal and regulatory system underpinned by guarantees of relevant rights: to safety, to equitable assistance, to be listened to and consulted
- Land-use regulations, building codes and other laws and regulations relating to DRR enforced locally

Integration with development policies and planning:

- Government (all levels) takes a holistic and integrated approach to DRR, located within wider development context and linked to development planning across different sectors
- DRR incorporated into or linked to other national development plans and donor-supported country programmes³
- Routine integration of DRR into development planning and sectoral policies (poverty eradication, social protection, sustainable development, climate change adaptation, desertification, natural resource management, health, education, etc.)

³ Poverty Reduction Strategies, national Millennium Development Goal reports, National Adaptation Plans of Action, UNDP assistance frameworks, etc.

Box 11.1 (cont'd)

- Formal development planning and implementation processes required to incorporate DRR elements (e.g. hazard, vulnerability and risk analysis, mitigation plans)
- Multi-sectoral institutional platforms for promoting DRR
- Local planning policies, regulations and decision-making systems take disaster risk into account

Integration with emergency response and recovery:

- National policy framework requires DRR to be incorporated into design and implementation of disaster response and recovery
- Policy, planning and operational links between emergency management, DRR and development structures
- Risk reduction incorporated into official (and internationally supported and implemented) post-disaster reconstruction plans and actions

Institutional mechanisms, capacities and structures; allocation of responsibilities:

- Supportive political, administrative and financial environment for CBDRM and community-based development
- Institutional mandates and responsibilities for DRR clearly defined. Inter-institutional or coordinating mechanisms exist, with clearly designated responsibilities
- Focal point at national level with authority and resources to coordinate all related bodies involved in disaster management and DRR
- Human, technical, material and financial resources for DRR adequate to meet defined institutional roles and responsibilities (including budgetary allocation specifically to DRR at national and local levels)
- Devolution of responsibility (and resources) for DRR planning and implementation to local government levels and communities, as far as possible, backed up by provision of specialist expertise and resources to support local decision-making, planning and management of disasters
- Committed and effective community outreach services (DRR and related services, e.g. healthcare)

Box 11.1 (cont'd)

Partnerships

- DRR identified as responsibility of all sectors of society (public, private, civil), with appropriate inter-sectoral and coordinating mechanisms
- Long-term civil society, NGO, private sector and community participation and inter-sectoral partnerships for DRR and emergency response
- Links with regional and global institutions and their DRR initiatives

Accountability and community participation:

- Basic rights of people formally recognised by national and local government (and civil society organisations): to safety, to equitable vulnerability reduction and relief assistance, to be listened to and consulted (implies responsibility to guarantee these rights where appropriate)
- Effective quality control or audit mechanisms for official structures, systems, etc., in place and applied
- Democratic system of governance enabling society to hold decision-makers to account
- Government consults civil society, NGOs, private sector and communities
- Popular participation in policy development and implementation; political space and mechanisms allowing citizens to contribute to decision-making
- Citizen demands for action to reduce disaster risk
- Existence of 'watchdog' groups to press for change

Adapted from J. Twigg, *Characteristics of a Disaster-Resilient Community: A Guidance Note* (London: DRR Interagency Coordination Group, 2009), <http://discovery.ucl.ac.uk/1346086/1/1346086.pdf>, pp. 29–31.

- Engineering and construction measures. These comprise design standards, building codes and performance specifications. They ensure that engineered structures can stand up to particular hazards and forces.
- Legal measures. In addition to formal disaster management legislation, the law can be used in many other ways to provide appropriate penalties and incentives. For instance, enforcement of engineering standards, health and safety regulations or environmental protection will be weak if there is no adequate legal back-up that authorises penalties for non-compliance. Legalisation of land or property ownership,

and laws protecting tenants' rights, are good examples of legal incentives. By giving greater security, they encourage people to invest more in protecting their property (e.g. by strengthening houses or improving drainage systems). Laws can also define rights to protection and post-disaster assistance.

- **Planning regulations.** These can be used to prevent the use of hazardous areas (such as flood plains or unstable hillsides) for housing or commercial development, and to keep hazardous industrial activities away from population centres. Many urban plans involve land zoning of this kind. Planning should also ensure that public facilities (hospitals, emergency services, schools, water and power supplies, telephone exchanges, transport infrastructure) are kept away from hazardous zones as far as possible, and that they are not over-concentrated in a few places. For the same reason, regulations may restrict population density in a given area. Ensuring escape and access routes, creation of open spaces as areas of refuge, separation of buildings to reduce fire risk and creation of green or wooded areas to assist drainage are among other risk-reducing measures governed by planning regulations.
- **Financial and economic measures.** Financial incentives such as the provision of grants, 'soft' loans or tax breaks to companies, communities and individuals can be used to encourage investment in safer construction and mitigation measures, including location in safer areas. Alternatively, financial penalties – fines and taxes – may be used to discourage bad practice. Chapter 12 describes the economic and financial mechanisms that non-governmental agencies can deploy. One of the most valuable measures that can be taken is economic diversification. This reduces risks to the economy as a whole by reducing over-reliance on sectors that may be particularly vulnerable to certain hazards.

Other sectoral policies and laws may contribute to DRR, for example in agriculture, forestry or water resource management. Integration of DRR with other sectors is essential.

Every approach to DRR and its different components presents its own practical problems, but there are also basic challenges to making policy and regulatory mechanisms effective. One is institutional capacity. The methods described above add up to a comprehensive package of risk-reducing measures. Extensive political and legislative skills may be needed to deal with powerful groups whose interests may be affected, and to design effective laws and regulations. Government capacity to implement these laws, regulations and measures will have to be built up, particularly that of local governments, which play a major role in implementation and enforcement. To put such a package in place requires a lot of time – perhaps decades – and it will need refining frequently in the light of experience. This is a major challenge for any government.

Another challenge is enforcement. Laws and regulations are useless if they are not enforced. For example, engineers and builders must be aware of building codes and design standards,

understand them, know how to use them and accept their importance. For this to happen, awareness-raising and further professional training may be needed, and there must be a sufficient number of trained officials to ensure that the codes and standards are adopted. Formal implementation and oversight systems need to be reliable, trustworthy and free from corruption. Society's cultures and values may also need to shift towards recognition of the need for safety and protection standards.

11.2 Accountability: general principles and approaches

DRR requires collaboration between governments, citizens and other stakeholders such as NGOs and the private sector (see Chapter 4). Communities and individuals have an important role to play (see Chapter 6), but will often require some level of external support to reduce risks and manage crises, as well as to scale up local and community-based initiatives and agencies' individual projects. The root causes of disasters often lie in political, economic and social conditions and trends, which must be addressed at national, regional and international levels.

This is a question of accountability. In general, accountability refers to the ways by which citizens ensure that governments and others in positions of power and influence fulfil their obligations to society as a whole. It means that those in power should be:

- compliant: accepting that it is their duty to account for their decisions and actions;
- transparent: giving an account and making relevant information available (easily and in an accessible format) so that this can be monitored; and
- responsive: reviewing decisions and actions, and making the necessary improvements.⁴

In DRR, accountability is a mechanism for ensuring public institutions and other organisations fulfil their duties and responsibilities to vulnerable people. The principle of accountability lies at the heart of genuine participation and community involvement in disaster reduction (see Chapter 6). It can be applied to everyone, from village elders to the United Nations. It applies to state institutions, which are expected to be accountable through the democratic process, and to private sector and non-profit organisations, which are not subject directly to democratic control. Although a universal principle, it allows for plenty of variation in method.

The humanitarian sector has recognised the importance of accountability for a number of years, and established and influential institutions and processes support and promote humanitarian

⁴ E. Polack, E. M. Luna and J. Dator-Bercilla, *Accountability for Disaster Risk Reduction: Lessons from the Philippines* (Brighton: Institute for Development Studies, 2010), <http://www.alnap.org/resource/91110>.

accountability actions and standards internationally. These include the Humanitarian Accountability Partnership (HAPI) and the Active Learning Network for Accountability and Performance (ALNAP).⁵ Accountability is still an emerging issue in DRR. More examples of practical approaches in different contexts, and further comparative study and analysis, are needed before comprehensive guidelines of good practice can be developed.

Accountability is not straightforward. Agencies are accountable in many different ways: to the people they aim to help, to partners, to donors, to their own mandates and to the legislative frameworks in which they operate. Accountability functions in three main directions:

1. Downwards – to beneficiaries, local partner agencies, staff and supporters.
2. Upwards – to boards of management, donors and higher levels of government.
3. Horizontally – to partner organisations, principally through sharing of information and resources and joint decision-making.

In practice, most interventions involve all three kinds of accountability, but the balance is crucial. All too often, disaster (and other) professionals concentrate on upwards accountability at the expense of horizontal and downwards accountability. This reflects the dominant influence of donors and national governments in disaster and development work, manifested most visibly in the movement towards rigid formats, bureaucratic reporting, short-term quantitative targets and standardised indicators. The very fact that there are multiple lines of accountability can lead to confusion operationally, and problems often arise from the difficulty of setting priorities and reconciling competing demands. Accountability should be primarily towards those who are vulnerable to hazards and affected by them. Listening to disaster-affected people is essential in identifying problems and priorities, as we have seen, as well as being an essential step towards letting people take part in, and exercise some control over, DRR decision-making and processes.

External forces are not the only drivers of accountability. Many organisations – especially not-for-profit ones – see improved accountability as valuable in itself, because it improves their performance. Value-driven organisations are more likely to adopt accountability for principled reasons.

⁵ See <http://www.alnap.org>; <http://www.hapinternational.org>.

11.3 DRR monitoring frameworks and the enabling environment

The emergence of DRR implementation and monitoring frameworks presents an opportunity to develop greater accountability in this area. The most significant internationally has been the Hyogo Framework for Action 2005–2015, which set out a broad programme of action for national governments and regional organisations. Although it was non-binding, 168 national governments signed up to it and the UN system provided a monitoring mechanism for reviewing progress (a similar global reporting process is proposed under the Sendai Framework). Governments and regional bodies were expected to report on their progress towards the HFA's goals every two years: these reports could be viewed online, and the collective results were reviewed in the *Global Assessment Reports* published by UNISDR. An HFA self-assessment tool developed for local governments was applied in several countries.⁶ Independent researchers and NGOs also used the HFA as a monitoring tool for questioning government action and holding governments to account.⁷ A number of other frameworks and indicator sets have also been applied (see Chapter 18: Monitoring and evaluation).

Frameworks, policies and programmes that are commonly used by international institutions to support national-level development can also be monitored to assess the extent to which DRR issues are incorporated, the approach taken to mainstreaming DRR and the likely effectiveness of the steps taken. These include Poverty Reduction Strategy Papers (PRSPs), which are widely used by international financial institutions, UN agencies and bilateral donors in designing their assistance programmes, and National Adaptation Programmes of Action (NAPAs), produced under the UN Framework Convention on Climate Change, which address climate vulnerability reduction. The Inter-Parliamentary Union and UNISDR have produced guidance for parliamentarians seeking to ensure that DRR and resilience are incorporated in steps towards achieving the Millennium Development Goals (MDGs).⁸ At the time of writing, there is considerable discussion about how they will be incorporated into

⁶ <http://www.unisdr.org/we/coordinate/hfa>; http://www.preventionweb.net/files/594_10382.pdf; <http://www.preventionweb.net/english/hyogo/progress/>; http://www.wcdr.org/uploads/Sendai_Framework_for_Disaster_Risk_Reduction_2015-2030.pdf.

⁷ See Christian Aid, *Community-Led Policy Monitoring for Disaster Risk Reduction: Implementing the Hyogo Framework for Action at Local Level* (London: Christian Aid, undated), <http://www.christianaid.org.uk/images/clpm-drr.pdf>; P. Newborne, *Accountability and Non-discrimination in Flood Risk Management: Investigating the Potential of a Rights-based Approach. Honduras Case Study* (London: Overseas Development Institute, 2008), www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/3443.pdf.

⁸ C. Benson and J. Twigg, *Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations* (Geneva: ProVention Consortium, 2007), http://www.preventionweb.net/files/1066_toolsformainstreamingDRR.pdf; http://unfccc.int/national_reports/napa/items/2719.php; *Disaster Risk Reduction: An Instrument for Achieving the Millennium Development Goals. Advocacy Kit for Parliamentarians* (Geneva: Inter-Parliamentary Union and UNISDR, 2010), http://www.unisdr.org/files/15711_parliamentariankitfinal.pdf. For DRR and the SDGs, see Chapter 18.

the Sustainable Development Goals (SDGs) that will be approved at a high-level UN summit in September 2015 to replace the MDGs, with the possibility that a number of SDG goals and targets will relate to DRR, directly or indirectly.⁹

There remains the question of what can rightly and reasonably be expected from governments and others, whose capacities and resources are not infinite. What are the responsibilities of state and non-governmental actors? How realistic is it to expect them to address every aspect of DRR? What types of DRR should be given priority in a given context? On what basis are those priorities decided? Should it be based on cost–benefit analysis, the utilitarian approach of seeking the greatest benefits for the greatest number of people, or on the principle of social justice that focuses on the most vulnerable? There are ethical as well as practical issues here.

11.4 Accountability methods

Many methods have been used to make risk and disaster managers more accountable to the vulnerable. They vary greatly in approach. The choice of methods in a given situation must be determined by local circumstances and contexts. Many accountability initiatives are voluntary: those who subscribe to or take part in them wish to make themselves and their actions more accountable. But when key actors are not interested in accountability or dialogue, more forceful or even confrontational approaches may be adopted. The sections that follow indicate some of the options available and comment on their application. This coverage is not comprehensive. There is room for much more research on the subject, especially to identify the most effective approaches.

11.4.1 Giving disaster-affected people a voice

For all the advances in participatory approaches discussed in Chapter 6, the views of those affected by disasters and those at risk are still rarely listened to, valued or understood. However, a number of techniques can be used to give people a voice and so help disaster agencies make their interventions more appropriate.

Life stories and oral histories, which are commonly used in participatory learning and action, reveal people’s vulnerabilities and capacities as well as their experiences of coping with disasters. These methods and others used in participatory vulnerability analysis (see Chapter 3) or other participatory learning and action practices (see Chapter 6) can provide a starting point for awareness-raising and advocacy at local and higher levels. They can help make external actors in DRR more aware of people’s needs and capacities, and responsive

⁹ See <http://www.sustainabledevelopment2015.org>.

to them, especially where institutional stakeholders have been involved in the process. However, they do not guarantee this, and more sustained mechanisms may be needed.

Disasters sometimes stimulate the creation of organisations of affected people to engage in reconstruction and other DRR or development activities. These often originate through intervention by external NGOs and are specific to particular places or communities. Building vulnerable communities' awareness and organisational capacities makes them conscious of their entitlements, improves their bargaining power and enables them to engage more effectively with local authorities. Formal participation in decision-making bodies helps to consolidate this. Sometimes, broader coalitions of disaster victims are formed, either for mutual support or to lobby for policy change, more effective vulnerability reduction and post-disaster assistance (see Case Study 11.1: A voice for disaster-affected people). Nevertheless, there is plenty of scope for policymakers and practitioners to engage more extensively and deeply with those who are vulnerable and at risk, to understand their perspectives and priorities and stimulate more collaborative problem-solving.¹⁰

Case Study 11.1 A voice for disaster-affected people

Disaster Action is a UK charity founded in 1991 by disaster survivors and people bereaved as a result of disasters. It is an informal network with membership open to anyone in the UK with direct personal experience of a disaster, wherever it took place. It offers support through information, contact through email and telephone and family and survivor support groups. It also raises awareness of their short- and long-term needs, gives advice to government, emergency services and NGOs and takes part in formal consultations about policy and legislative change.

The National Flood Forum, established in the UK in 2002, represents communities and individuals at risk from flooding, supporting 160 local flood groups. It aims to help flood victims recover from and improve resilience to flooding. In its advocacy, it works with government agencies, the insurance industry and other organisations to ensure that the views and needs of people at risk are taken into account in policy- and decision-making.

Disaster Action: www.disasteraction.org.uk; National Flood Forum: www.nationalfloodforum.org.uk.

¹⁰ One model for this could be CDA's work with recipients of international aid: see M. B. Anderson, D. Brown and I. Jean, *Time To Listen: Hearing People on the Receiving End of International Aid* (Cambridge, MA: CDA Collaborative Learning Projects, 2012), www.cda-collaborative.org.

Box 11.2 Standards and codes for humanitarian and emergency response

Code of Conduct for the International Red Cross and Red Crescent Movement and NGOs in Disaster Relief: <http://www.ifrc.org/en/publications-and-reports/code-of-conduct>

Inter-Agency Standing Committee (IASC) Operational Guidelines on Human Rights and Natural Disasters: <http://www.preventionweb.net/english/professional/publications/v.php?id=1617>

International Network for Education in Emergencies (INEE) Minimum Standards for Education: <http://www.ineesite.org/en/minimum-standards/handbook>

People in Aid Code: <http://www.peopleinaid.org/code>

Sphere project: <http://www.sphereproject.org>

11.4.2 Standards, charters and codes of conduct

Several codes of conduct and sets of common standards have emerged in the emergency and humanitarian response field since the 1990s, although their humanitarian response focus means that they tend to say relatively little about DRR (see Box 11.2: Standards and codes for humanitarian and emergency response).

The idea of developing charters or standards specifically for DRR has been talked about a good deal in recent years. This has not led to much concerted action, but there have been a few individual initiatives. In 2009 an international standard for risk management (ISO 31000) was issued by the International Organization for Standardization to provide businesses and other organisations with principles and general guidelines for identifying and dealing with risks. More recently, gender standards for disaster risk management have been developed in Afghanistan. The Sendai Declaration contains a call for action to ‘Promote the development of quality standards, such as certifications and awards for disaster risk management’.¹¹

¹¹ ISO 31000: *Overview and Implications for Managers*, InConsult, <http://www.inconsult.com.au/wp-content/uploads/ISO-31000-Overview.pdf>; *Gender Standard for Disaster Risk Management, Badakhshan, Afghanistan*, Department of Women’s Affairs and Afghan National Disaster Management Authority, 2013, <http://www.solutionexchange-un.net/repository/af/gen/DRMGenderStandardBadakhshan-GovernorOffice-01Aug2013.pdf>; http://www.wcdrr.org/uploads/Sendai_Framework_for_Disaster_Risk_Reduction_2015-2030.pdf.

11.4.3 Bringing pressure to bear on decision-makers

Over many years, disaster workers have been engaged in activities that bring pressure to bear on governments, politicians and other institutional decision-makers. Non-state actors in particular have an important role to play in lobbying for better policies and regulations, and for the enforcement of those already in place: this includes challenging decisions and plans that may increase risk. They can also press governments, international aid agencies and NGOs to respond more effectively to the needs of people at risk from hazards or who are victims of disasters. Advocacy initiatives should be well informed and well prepared. Direct experience and information gathered from the field (e.g. through VCAs or community-based projects) can be influential here. Advocacy can take many forms, from large-scale public campaigns to confidential meetings or private conversations with key decision-makers; often it involves a mixture of complementary activities.

Disasters can create opportunities for change by prompting critical reflection on how and why the disaster occurred. Major disasters may stimulate new policies and legislation, the restructuring of disaster management institutions and revisions of codes and regulations. Civil society organisations can take advantage of these openings, but they need to have good evidence and analysis of existing weaknesses, workable ideas and plans for improvement and a strong collective voice: this seems to have been the case in the passing of the 2010 Disaster Management Act in the Philippines, for example (see Case Study 11.2: Advocacy for policy and legislative change).

11.4.4 Auditing DRR

Some innovations in accountability take the form of an auditing process by independent organisations, civil society groups or communities. They include social audits, report cards, citizens' juries, public expenditure tracking and policy monitoring. Case Study 11.3 (Social audit after Hurricane Mitch) describes an unusual example of national-level social auditing of reconstruction plans after a major disaster. Report cards have been given out to disaster victims during relief operations to evaluate the performance of the agencies that have come to help them. Financial tracking systems and complaints mechanisms have been set up in the aftermath of disasters to provide more accountability concerning the use of relief and recovery assistance. For example, the IFRC and British Red Cross set up free phone lines for questions and complaints relating to their shelter and community regeneration initiatives in Haiti after the 2010 earthquake. A large number of calls were received, and this feedback led to improvements in programme delivery and quality.¹²

¹² IFRC, *Beneficiary Communication and Accountability: A Responsibility, Not a Choice. Lessons Learned and Recommendations, Indonesia, Haiti, Pakistan* (Geneva: International Federation of Red Cross and Red Crescent Societies, 2011), <http://www.ifrc.org/en/what-we-do/beneficiary-communications>.

Case Study 11.2 Advocacy for policy and legislative change

The Philippines is a very hazard-prone country, with considerable experience of disasters. Many local NGOs have been working in DRR for a number of years, particularly in support of community-based action. However, until 2010 the government's approach to disaster management was based on legislation passed in the 1970s. There was some decentralisation, with local governments being given calamity funds, but these could only be used for post-disaster relief and recovery. Reform of the disaster management system was not a political priority, and several formal proposals for new legislation had become bogged down in Congress.

A combination of factors served to break the deadlock. The main influence, probably, was widespread and effective lobbying, particularly by Disaster Risk Reduction Network Philippines (DRRNetPhils), a broad-based coalition of civil society stakeholders (see Case Study 4.11: Global and national networks for disaster reduction), but the need for reform was generally acknowledged among both government and civil society. A series of severe tropical storms in 2009 finally stimulated action. A bill submitted early the following year quickly passed through Congress and came into law in May 2010 as the Philippines Disaster Risk Reduction and Management Act.

The act commits the government to addressing the root causes of vulnerability, building community resilience, strengthening institutional capacities for disaster risk reduction and management (especially at local levels), promoting the involvement of all sectors and stakeholders (particularly communities), mainstreaming DRR and CCA into development processes, and integrating DRR into school curricula and the mandatory training given to public sector employees. Local government calamity funds can now be applied to a wider range of DRM activities. A new disaster risk management framework has been established to support an all-hazard, multi-sector, inter-agency and community-based approach, and NGOs are represented on the National Disaster Risk Reduction and Management Council.

C. Benson, *Mainstreaming Disaster Risk Reduction into Development: Challenges and Experiences in the Philippines* (Geneva: Provention Consortium, 2009), http://www.preventionweb.net/files/8700_8700mainstreaming_philippines1.pdf; IFRC, *Disaster Risk Reduction: A Global Advocacy Guide* (Geneva: International Federation of Red Cross and Red Crescent Societies, 2012), p.39, http://www.ifrc.org/Global/Publications/disasters/reducing_risks/DRR-advocacy-guide.pdf, p. 39; Congress of the Philippines, *Republic Act No. 10121*, 2012, http://www.preventionweb.net/files/22035_17303ra10121drmmact1.pdf; World Vision International, *Disaster Risk Reduction and Community Resilience Case Study Series*, 2011, pp. 23–26.

Public scrutiny or tracking of national or local government plans, service delivery, budgets and expenditure can bring issues of cost-effectiveness and equity into the open, and expose weaknesses in planning and gaps between plans and practice. Participatory budgeting has proved to be an effective development tool for improving basic services in many parts of the world.¹³ There is considerable experience of these approaches in development contexts that could be applied to DRR. Policy monitoring involves gathering evidence on specific policies, using that evidence to evaluate the policies' strengths and weaknesses and using the evidence and analysis to lobby for policy change and improved implementation. Community-led policy monitoring can be particularly effective with local government. Different approaches to community-led DRR policy monitoring, and their effectiveness in different contexts, need to be studied further, but some practical guidance is beginning to appear.¹⁴ At the global level, the 'Views from the Frontline' initiative (see also Chapter 4) collects a broad range of perspectives from communities, local authorities and civil society organisations, and feeds these into the UN system's biennial reviews of progress.¹⁵

Case Study 11.3 Social audit after Hurricane Mitch

Hurricane Mitch, which struck Central America in October 1998, was one of the deadliest Atlantic hurricanes in history. In February 1999 a coalition of over 320 Nicaraguan non-governmental and social organisations carried out a 'social audit' in order to incorporate communities' points of view into reconstruction planning. The audit surveyed more than 10,000 homes in 16 municipalities affected by Mitch. Community leaders, mayors and leaders of other local organisations were also interviewed. The audit provided evidence of the extent and nature of the losses suffered (both economic and psychological), but was particularly valuable in allowing victims to express their views about the quality, value and equity of the aid they had received, and how far victims' views were taken into account.

CIET International, *Social Audit for the Emergency and Reconstruction Phase 1* (Managua: Coordinadora Civil para la Emergencia y la Reconstrucción de Nicaragua, 1999).

¹³ Y. Cabannes, *Contribution of Participatory Budgeting to Provision and Management of Basic Services: Municipal Practices and Evidence from the Field* (London: International Institute for Environment and Development, 2014), <http://pubs.iied.org/pdfs/10713IIED.pdf>.

¹⁴ Christian Aid has produced a set of practice notes based on its field experiences in a number of countries: Christian Aid, *Community-Led Policy Monitoring for Disaster Risk Reduction: Implementing the Hyogo Framework for Action at Local Level* (London: Christian Aid, undated), <http://www.christianaid.org.uk/images/clpm-drr.pdf>.

¹⁵ See <http://www.globalnetwork-dr.org/views-from-the-frontline.html>.

The International Organisation of Supreme Audit Institutions (INTOSAI) has developed an international standard for auditing governments' DRR performance (ISSAI 5510).¹⁶ Auditing approaches such as these can be effective in persuading governments to listen and respond to people's needs and aspirations. However, a good understanding of political structures, policy actors and processes is needed in order to know whom to influence, how to influence them and when it is appropriate to act. It also takes time and organisational commitment to keep up the pressure on decision-makers.

11.4.5 Access to information

Access to relevant information is an essential element in improved accountability. Effective advocacy requires good information on hazards, risk and vulnerability, and the decisions, systems and processes that are used to plan and implement DRM. As we saw in Chapter 3, such information may not have been collected in many cases, or if it is can be inadequate or unavailable to the public. Moreover, access to information requires government support for the right to information and citizens' awareness of their legal right and willingness to assert it.

11.4.6 Litigation

The law provides a potentially valuable tool for enforcing accountability. Legal action is obviously of value in gaining redress after a disaster, for example to ensure that victims of disasters are treated fairly in the allocation of relief resources and to secure compensation from those whose actions or negligence have led to disasters. Compensation and liability claims are often filed after industrial or environmental accidents, but they also feature in natural hazard events, for instance where physical mitigation measures such as flood embankments fail or warning procedures are not followed.

It is not clear how effective legal action can be as an instrument to ensure greater safety by reducing a potential risk. However, this may be possible through public interest litigation (i.e. seeking to remedy an actual or potential public grievance through the courts). In some countries this has been used to tackle issues such as human rights, environmental destruction, the handling of hazardous substances, pollution and the social and environmental consequences of development projects.

The extent to which the law has been invoked at different times and in different places to enforce DRR accountability and raise standards is unknown. Many countries' disaster risk management legislation is relatively recent, and there has been little opportunity to test or challenge it in the courts. There may be considerable potential for using environmental law

¹⁶ ISSAI 5510: *The Audit of Disaster Risk Reduction* (Vienna: INTOSAI, 2013), <http://www.issai.org/media/79451/issai-5510-e.pdf>.

to stimulate and improve DRR. Environmental management is a key element in vulnerability reduction and environmental law is well established and wide-ranging, covering pollution and hazardous substances, planning, agriculture and biodiversity, conservation and land and water resource management.¹⁷

It is probable that the number of lawsuits brought by disaster victims and those who feel that they are being exposed to hazards will increase in the years to come. There are examples of success, such as legal action by communities and civil society organisations in New Orleans against a plan to put a waste dump of unsorted debris from Hurricane Katrina in a location close to human habitation and vulnerable to storm surge and flooding.¹⁸ However, legal action may also be an obstacle to more sustained, comprehensive disaster reduction because its adversarial nature can undermine opportunities for collective action.

11.4.7 Accountability and rights

The subject of rights occupies an important place in the debate about accountability. Many organisations working in international aid and development have committed themselves to a 'rights-based' approach. This tends to encompass both human rights (i.e. those that are internationally accepted through international agreements) and other rights that an agency believes should be accepted as human rights. In such contexts, the language of rights can sometimes be used vaguely, with a risk of causing confusion. Those advocating rights-based approaches to development tend to steer clear of definitions, focusing instead on frameworks for analysis, discussion and action. Terms such as 'basic rights' and 'equal rights' are often used in the development context to cover issues of access to aid and participation in decision-making.

International covenants on political, social, economic and cultural rights as well as national human rights legislation can be invoked on behalf of those affected by disasters, typically to challenge discriminatory practices that might increase risk or prevent equal access to humanitarian and recovery assistance after disasters. Security against disasters is not generally regarded as a right, although it is addressed in some international codes, usually indirectly. The idea of a 'right to safety' has been suggested: this is not the right to be completely safe, which is clearly unattainable, but the right to 'the highest attainable standard of protection against natural and man-made hazards'.¹⁹ This appears to be consistent with some international human rights agreements, but poses problems in practice; safety is

¹⁷ A. K. Gupta and S. S. Nair, *Environmental Legislation for Disaster Risk Management* (New Delhi: National Institute for Disaster Management and Deutsche Gesellschaft für Internationale Zusammenarbeit, 2012), <http://www.preventionweb.net>.

¹⁸ J. Handmer, E. Loh and W. Choong, 'Using Law To Reduce Vulnerability to Natural Disasters', *Georgetown Journal on Poverty Law and Policy*, 14 (1), 2007.

¹⁹ J. Twigg, *The Right to Safety: Some Conceptual and Practical Issues* (London: UCL Hazard Centre, 2003), <https://www.ucl.ac.uk/hazardcentre/resources/working-papers2>.

difficult to define, the precise nature, magnitude and extent of a hazard or risk may be unclear or disputed and the concept of a right to safety is likely to be challenged by those who fear it will increase their own liability (e.g. government and the private sector).

11.4.8 Accountability by proxy

Disaster agencies rarely give an account directly to disaster victims or potential victims. Although in the case of government agencies a degree of accountability can be achieved indirectly through the democratic process, the vulnerable and powerless – who make up the bulk of disaster victims in much of the world – are often not strong enough to call such agencies to account. They have to rely on others with more power and influence to speak out on their behalf. This can be called ‘accountability by proxy’.

NGOs or other disaster professionals may take it upon themselves to speak out on behalf of disaster victims. They may believe that there is a need to become involved in such work, and may argue that they have a responsibility to do so on behalf of those whose voices are not heard by decision-makers. However, they do not necessarily have a mandate from the people for this role (community associations and other membership-based organisations, on the other hand, can speak with some legitimacy). The issue is particularly important to NGOs, who are always vulnerable to challenge from elected authorities on this count. All non-state actors considering involvement in processes of this kind need to think about this carefully.

The media form an important proxy group, although their role in promoting disaster reduction is the subject of some debate. Sometimes they are clearly beneficial, for example in highlighting the failure of official relief services to reach those most in need, and in disseminating forecasts and warnings. However, the media tend to take a stereotyped view of disasters. They prefer stories of human tragedy to human ingenuity and they like to find people or organisations to blame, rather than considering the real causes of vulnerability. They may also perpetuate dangerous myths about disasters: one is that people affected by disasters are passive, helpless victims, when in reality they are active responders, both individually and collectively; another is that chaos, self-interest and criminality dominate the post-disaster scene, even though research shows consistently that altruism and mutual assistance are far more characteristic. They are also often influenced by other agendas, their own and those of other interest groups.

There has been much talk about educating the media to cover disasters in a way that more accurately reflects the reality, but the commercial pressures of international news-gathering are so great that such moves can make only slow headway. Significant, sustained efforts are needed to change media attitudes. Few NGOs are likely to have the resources to undertake this. Alternative news services run by non-profit organisations can take a more principled and strategic approach to the subject, but their outreach is likely to be very limited in comparison to that of the commercial media sector.

11.4.9 Organisation and association

Without participation and organisation advocacy is seriously weakened. Community-based organisations are more powerful than individuals; collective action by organisations is more effective than agencies acting alone. Coalitions and movements for change must be formed. In DRR, the growing number of national, regional and international networks involving NGOs and researchers has provided a powerful platform for advocacy on policy and practical issues (see Chapter 4). Much can be learned from the experiences and successes of collective action in other sectors.²⁰

Lobbying is difficult and requires sustained effort. Many calls for change fall on deaf ears. Many governments do not tolerate criticism and exert firm control over civil society organisations. In some countries advocacy can prove dangerous for those involved, especially if they challenge powerful vested interests. Even in more tolerant places advocacy needs to be objective and evidence-based: an overly confrontational approach can be counter-productive. The aim should be to seek critical engagement and partnership with government institutions.

Case Study 11.4 Informing implementation through community risk profiling

The Global Network of Civil Society Organisations for Disaster Reduction (GNDR)'s Frontline programme creates community risk profiles to provide monitoring and advocacy evidence for more effective implementation of DRR. The programme is implemented by members of GNDR's network of 750 civil society organisations. The key activity is a 'conversation' in which individuals and groups in a community identify the main threats facing them, their impacts, local actions that can be taken to reduce those impacts and barriers to effective action. These responses form risk profiles covering natural, economic, social and political threats. The profiles are used at local level to develop collaborations, build capacity and implement action plans. Local-level findings are then aggregated to produce national risk profiles, which can be used to inform and influence decision-makers and to monitor progress in DRR, CCA and sustainable development. Frontline was piloted in ten South American countries in 2014, involving more than 7,000 respondents, and in 2014–15 covered 21 countries in other parts of the world.

GNDR, 'The Frontline Proposition (concept note)', Global Network of Civil Society Organisations for Disaster Reduction, 2014, <http://www.globalnetwork-dr.org/tableau>.

²⁰ Examples include the Self Employed Women's Association in India and Shack/Slum Dwellers International. See <http://www.sewa.org>; <http://www.sdinet.org>.

Chapter 12

Financial mechanisms and services for risk reduction

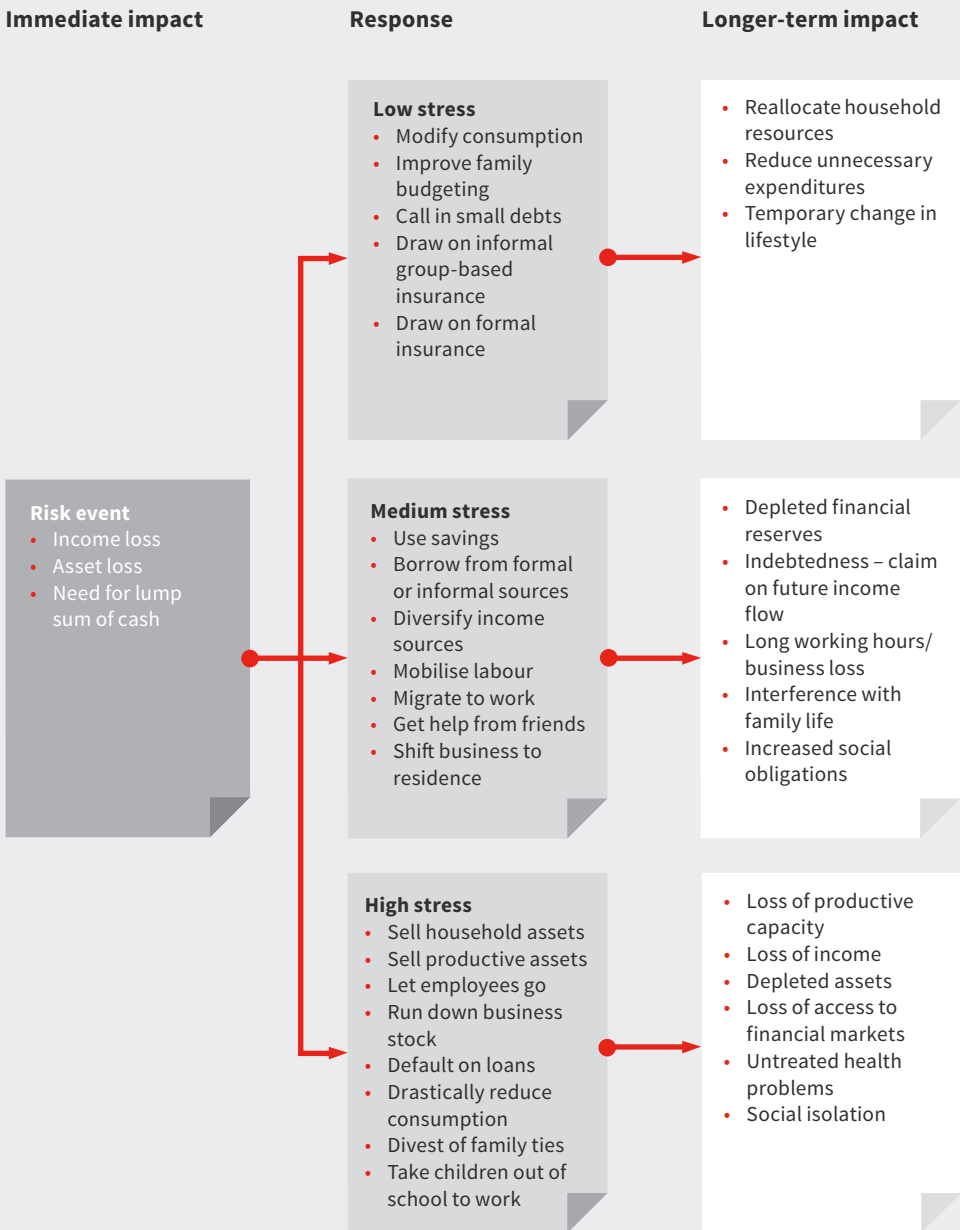
12.1 Introduction

Economics and finance are central to DRR because poverty can make people vulnerable to many different hazards, and certain patterns of socio-economic development can expose people to greater risks. It follows that appropriate economic development and the reduction of poverty are essential elements of any risk reduction strategy, as are more targeted measures to provide financial security in risky environments and support recovery after disasters. This chapter focuses on financial services that are important contributors to DRR at local and community levels, in particular insurance, micro-credit and other kinds of micro-finance.

Financing arrangements and services can support households' financial resilience before and after disasters; they can also play a role in expanding local initiatives. Loans, which are primarily invested in productive enterprises that generate income, are also used to cope with present or potential crises that threaten livelihoods – for instance, by laying in stocks of food, making improvements to farmland, repairing houses, buying tools or other productive equipment, digging wells and irrigation systems, acquiring new skills and making gifts to family and friends so that reciprocal favours can be asked later. Money is often borrowed to deal with household crises – especially those caused by sickness or a death in the family (which has both emotional and economic consequences), but also by such shocks as food shortages, sudden price increases, loss of employment or theft. After a disaster, credit is used to speed up recovery by replacing lost assets and helping people to get back to work. In urban areas, community savings funds are used to pay for slum upgrading, housing improvements (which often includes strengthening homes against hazards) and income generation. Urban communities also use their collective savings to defend themselves against the threat of eviction, negotiate for secure tenure and finance their own improvement schemes.

Disasters hit poor households particularly hard financially because they have little or no savings to see them through the worst of the event and support their recovery. If their savings are kept at home they may be lost in the disaster. If they need to rebuild homes as well as livelihoods their financial needs can be considerable. If the disaster's impact is severe and widespread, they find it harder to borrow from friends and relatives or obtain credit from shops; clients may no longer be willing to pay for their goods and services and local markets may not be functioning. Money held by informal savings groups may have been lost, and local bank branches where they have deposited money may be destroyed or closed. As a result they may have to sell productive assets such as tools, equipment and livestock, which

Figure 12.1 The financial impact of disasters on households



C. Churchill (ed.), *Protecting the Poor: A Microinsurance Compendium* (Geneva: International Labour Organization and Munich Re Foundation, 2006), <http://www.munichre-foundation.org/dms/MRS/Documents/ProtectingthepoorAmicroinsurancecompendiumFullBook.pdf>, p.28.

they rely on for their livelihoods. Cut off from cash income, they are forced to turn to informal money lenders, whose normally high interest rates may well rise still further in a crisis.

At present, most people living in poor communities, in hazardous locations and in low-income countries have little access to formal financing options for DRR. Moreover, only a small proportion of disaster recovery needs are met by external humanitarian assistance. However, provision of finance is a complicated, technical area of work. DRR agencies do not generally have the specialist skills and experience required, while many providers of financial services know little about poor communities' needs or how to work effectively at community level. Partnerships between the two kinds of organisation are necessary. This will take time, as there is a great deal of understanding and learning to be shared.

12.2 Government and international finance for DRR

Public investment in DRR and climate change adaptation, in the form of grants or loans provided by national, district and local governments, is likely to be the main financial support mechanism in most countries. Such funding may be specifically for risk reduction initiatives, or it may be part of broader poverty reduction or sectoral development programmes: here the ideal is to incorporate risk reduction measures into existing funding streams, rather than having stand-alone DRR budgets, and some countries are now taking steps towards this (see Case Study 12.1: Climate change risk management in public investments).¹

In turn, national governments obtain grants from bilateral donors, or loans from international financial institutions such as the World Bank, Asian Development Bank and Inter-American Development Bank. Although it can be difficult for local governments and other organisations to get access to some of these funding streams, trained and organised community organisations have succeeded in obtaining resources from mainstream funding programmes (see Case Study 12.2: Resourcing community resilience).

¹ See also C. Benson and J. Twigg, with T. Rossetto, *Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations* (Geneva: ProVention Consortium, 2007), www.preventionweb.net/files/7511_toolsformainstreamingDRR.pdf.

Case Study 12.1 Climate change risk management in public investments

Climate change affects Peru in several ways: low-lying areas and ecosystems along the country's approximately 3,000km coastline are becoming increasingly vulnerable, water availability is becoming less consistent and there are regular floods, landslides and extreme droughts. The Peruvian government is taking concerted action to reduce vulnerability to climate change. One goal is to integrate a systematic climate risk management approach into the national public investment system (Sistema Nacional de Inversión Pública, SNIP). Between November 2011 and April 2015 the €3.2m Public Investment and Adaptation to Climate Change project (Inversión Pública y Adaptación al Cambio Climático – IPACC) was implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in cooperation with the Peruvian Ministry of Economy and Finance (MEF) and Ministry of Environment (MINAM) and the regional governments of Piura and Cusco. The project is financed by the German government through the International Climate Initiative.

The government's aim is that public investments take future climate risks into account by 'screening' sector programming (i.e. agriculture, transport, health, energy, housing, sanitation and tourism – around 70% of overall public investment) with specific tools to make sure that sectors make investments with respect to climate change and DRR. The project developed a conceptual framework for integrating DRM and CCA and produced a series of interactive maps containing data on climate change, hazards, land use and ecosystems. Climate change risks were analysed and adaptive measures identified for several investment projects. Cost-benefit analysis tools were developed and tested. Official guidelines for project design were revised to ensure that heightened risks were considered at national and sectoral levels. A number of training workshops were held.

MEF, MINAM and GIZ also identified entry points and change agents for incorporating disaster risk management into the SNIP. Pilot case studies on reducing risks from climate change have been introduced into the design of public investment projects. The initiative has led to the redesign of projects and changes in programming approaches.

Information provided by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ); M. Scholze, *Climate Change Risk Management in Peruvian Public Investment: Strengthening Adaptation in Development Decision Making* (Lima: Public Investment and Adaptation to Climate Change Project, 2015).

Case Study 12.2 Resourcing community resilience

In 2009, UNICEF started a community-based DRR programme in the Indian state of Bihar. Under the programme, which covers more than 250 villages and over 150 schools, village and school disaster management committees raise awareness of risks and carry out local DRR activities. UNICEF and its local NGO partners act mainly as facilitators, ensuring that communities acquire the knowledge and skills for preparing and implementing projects, accessing resources and making connections with decision-makers. Through training, workshops and meetings, the programme targets disaster management committees and their volunteers, together with local leaders and officials. Meetings between committee members and duty bearers are particularly important in sensitisation, building mutual understanding and developing working relationships. The committees have learnt how to obtain funding from central government development programmes, and have developed successful proposals for projects aimed at reducing specific vulnerabilities. These projects are integrated with *panchayat* (village-level government) plans through community meetings and in coordination with *panchayat* leaders. Substantial government funds have been secured to build flood embankments and all-weather roads, raise the plinths of houses above flood levels, build toilets for safe sanitation and construct new or improved school building and boundary walls. A field study of committees in 12 villages and 11 schools in 2013 found that the ratio of UNICEF financial support (for training, capacity-building and the committees' administration costs) to government programmes' funding inputs was 1:191. Committee members had also become more confident in lobbying higher-level officials.

K. Lloyd et al., *Leveraging Resources for Community Resilience Building: A Study of Multi Hazard Affected Villages in Bihar*, Knowledge Community on Children in India Initiative, 2013, <http://kcci.org.in/Document%20Repository/2013-KCCI%20CBDRR%20Bihar%20final.pdf>.

Recent research into international DRR financing from 1991–2010 shows that DRR accounts for a tiny proportion of overall international aid (0.4%), as well as a small proportion of international funding for disasters triggered by natural hazards (12.7% compared to 21.8% for reconstruction and rehabilitation and 65.5% for emergency response). Funding concentrates on a small number of middle-income countries; in high-risk countries, disaster-related aid focuses on emergency response, and there is very little money for drought-affected countries. The great majority of DRR funding has gone to relatively small projects and programmes.²

² J. Kellet and A. Caravani, *Financing Disaster Risk Reduction: A 20 Year Story of International Aid* (London/Washington DC: Overseas Development Institute and the World Bank, 2013), <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8574.pdf>.

12.3 Micro-credit and micro-finance

Micro-finance can play an important role in reducing vulnerability before disasters and supporting post-disaster recovery. It can be used as a mechanism for coping with many different kinds of disaster or shock, whereas conventional DRR projects tend to focus on specific hazards. Organisations that manage credit and savings programmes specifically for the poor – usually referred to as micro-finance institutions (MFIs) – come in many different types, ranging from formal institutions (government, private and non-profit) to semi-formal and informal savings and loan groups. There is a similarly wide variety in loan terms and conditions.

In low-income countries, most financial support in times of need comes from within households and extended families, or by borrowing from neighbours and local money lenders. These sources are easily accessible, but they can only provide relatively small amounts; and in the case of money lenders, they are costly, as interest on repayments is high. Savings and loan groups are common in many parts of the world. They are organised in a variety of ways, with differing degrees of formality, often by community members themselves or with the support of external organisations. They often begin with poor people pooling their savings; some evolve from other types of self-help group, club or association. The rules of individual savings and loan groups vary widely, but the basic principle is that members who pay in regularly are entitled to draw on the group for loans, in turns or according to need, when sufficient funds are available. Well-established groups sometimes attract additional finance from NGOs or other agencies.

A number of NGOs run savings and credit schemes, which often form an important element in their development programmes; some are starting to develop a wider range of financial services for poor people. More formal MFIs tend to operate like conventional credit institutions, lending money at interest over fixed terms. However, they are accessible to the poor because they accept small deposits, charge lower fees to savers and have lower or no collateral requirements.

The principles and rules of savings and credit schemes can be difficult for users to understand. There is a general need for improved financial literacy to increase people's understanding of the different financial institutions and services available to them. This enables them to make informed choices, but is also important in maintaining trust and ensuring the reliability and continuity of financial services.

MFIs use a variety of methods to help their clients deal with disasters. Rescheduling loans after disasters have struck is a common practice. Writing off loans is undesirable because it undermines clients' long-term commitment to repay as well as being a loss to the microfinance scheme itself. Many MFIs provide emergency loans to clients to meet immediate needs for food, clean water or medicine (programmes often set a percentage of total savings aside as

an emergency fund for loans and grants to clients in crisis). These are made at lower interest rates, or even without interest, although many clients still prefer to borrow informally from friends, relatives and money-lenders. Even where credit programmes are available, informal borrowing remains important in poor communities, especially if the money is to be spent on consumption rather than invested in productive activity (at times of crisis families go to great lengths not to use up their savings or sell off their livelihood assets). They are more likely to take up emergency loans from MFIs if the loans can be made rapidly and come with few or no restrictions on how they can be used and lower or no collateral requirements. Some post-disaster loans are made to replace or repair physical livelihood assets: equipment for income-generating activities, such as cooking utensils or sewing machines, and rebuilding business premises. They tend to be relatively large and are usually made once the relief period is over, at normal interest rates and with a longer repayment period. Only large MFIs can afford to make a large number of asset replacement and housing loans, and there is some evidence of higher than usual failures to repay. For this reason, MFIs often prefer to provide standard short-term working capital loans, seeing these as best suited for disaster recovery.

MFIs need to react quickly in a disaster, in assessing the situation and planning their response. This is not always easy: local branch offices may be damaged or inaccessible, electricity supplies and transport networks disrupted and communications broken down. Disaster victims may be physically unable to withdraw savings, take out new loans or renegotiate old ones. Branch staff need training to manage in such circumstances; crisis management plans should be drawn up, and clear guidance given on lending policy and practice. MFIs should be linked to early warning systems, and ensure that their clients are informed about potential disasters. Client assessment and market research help MFIs to understand how disasters will affect their clients and how to support the revival of small enterprises and local markets. MFIs also often undertake short-term relief work, though this can cause problems for staff who are not trained as aid workers. MFIs engaged in relief need to communicate clearly to their clients that their efforts are temporary and one-off, and do not influence their primary role as providers of finance.

In some countries where disasters are a regular occurrence, it is common practice for MFIs to make savings and credit groups or individual clients pay a percentage of their 'compulsory savings' into an emergency fund (compulsory savings are regular deposits made by borrowers to build up collateral against their loans: normally they cannot be withdrawn while loan repayments are still outstanding). Money from the fund can be made available quickly to disaster-affected borrowers in the form of emergency loans. After a disaster, many MFI clients will withdraw these savings, but such rapid, large-scale withdrawals can cause problems for smaller MFIs, especially if they have reinvested compulsory savings in their standard loan programmes. The stricter the conditions attached to the use of compulsory savings in emergencies, the more likely it is that poor people will look elsewhere for other sources of money, including money lenders.

Financial practice is currently geared more towards managing response than promoting DRR, but MFIs can and do introduce preparedness and mitigation initiatives for their clients. This is more likely where the micro-finance programme or institution is part of a larger NGO's portfolio. For example, MFIs in Bangladesh have made subsidised loans for emergency preparedness purchases such as food, fuel and water purification and rehydration tablets. Housing loans may be provided to help clients build in safer locations. MFIs can encourage their clients to form welfare or disaster insurance funds, or arrange for clients to rent space in seed and grain banks. Some MFIs insist that their members develop their own contingency plans. There is also potential for using non-financial credit – loans of seeds, tools or materials – to help reduce risk.

One important lesson from large-scale disasters is the need to protect MFIs themselves from failure. Many MFIs do not have sufficient capital to support their existing clients during and after a major crisis; small-scale savings and loan schemes or revolving funds in particular can find themselves critically short of funds if disaster-affected borrowers fail to keep up with repayments. During extensive floods in Bangladesh in 1998, the micro-credit system was put under severe strain: loan recovery rates fell from 92% to 43%, and MFI staff could not locate borrowers or arrange group meetings. Informal savings and loan schemes in Haiti were badly

Case Study 12.3 **Community savings schemes and post-disaster recovery**

The Homeless People's Federation Philippines (HPFPI), founded in 1998, is a national network of 200 community associations and savings groups representing over 19,000 households. In 2000, the collapse of a massive rubbish dump in Patayas, Quezon City, killed around 300 people and displaced several hundred families. HPFPI had been working in the community for several years. Members of HPFPI savings groups helped to provide immediate support, and HPFPI negotiated the resettlement of over 500 families to safer locations, establishing a savings scheme that enabled them to rebuild on the new sites and pay ground rents. In 2008, a typhoon hit the city of Iliolo, with more than 50,000 people affected by flooding. In response to the need for financial assistance for relocating and rebuilding its member communities, HPFPI mobilised its Urban Poor Development Fund (UPDF) to procure building materials for affected families. Costs of labour for house reconstruction were shared between the city government and HPFPI.

J. C. Rayos Co, *Community-driven Disaster Intervention: Experiences of the Homeless People's Federation Philippines, Incorporated (HPFPI)* (London: International Institute for Environment and Development, 2010), <http://pubs.iied.org/10587IIED.html>.

Box 12.1 Emergency lending to MFIs

The Emergency Liquidity Facility (ELF), launched in 2005, provides loans to Latin American MFIs so that they can respond quickly to disaster-affected clients. It has a loan fund of \$12m, financed by the Inter-American Development Bank, the Swiss government and a range of other institutions that support micro-finance. To ensure speedy decision-making in times of crisis, MFIs are preselected for ELF support through an evaluation of their capabilities, structure and financial situation: over 50 MFIs from 13 countries have qualified for the scheme. By 2012 the ELF had disbursed \$36m to 37 MFIs in a variety of disasters and emergencies, including the 2010 Haiti earthquake.

<http://www.omtrixinc.com/en/elf.html>; K. Jacobsen, A. Marshak and M. Griffith, *Increasing the Financial Resilience of Disaster-affected Populations*, Feinstein International Center, Tufts University, 2009, <http://fic.tufts.edu/publication-item/increasing-the-financial-resilience-of-disaster-affected-populations>; <http://fic.tufts.edu/assets/Increasing-Financial-Resilience-2009.pdf>.

affected by the January 2010 earthquake, with savings trapped under the rubble of collapsed buildings, stolen or simply lost; people responsible for looking after cash had often been killed or had moved away.³ MFIs can spread their risk by making sure that they serve poor clients in areas less likely to be affected by hazards, or by lending to people involved in more than one sector of the economy. For this, they need to undertake their own risk assessments. But even well-prepared MFIs are unlikely to be able to cope with massive disasters. Obtaining new sources of credit takes too long, although the creation of emergency lending facilities for MFIs can speed things up (see Box 12.1: Emergency lending to MFIs).

12.4 Cash transfers and remittances

Cash transfers are increasingly used as part of humanitarian assistance programmes. Cash gives people more choice and flexibility than in-kind assistance, allowing them to make their own decisions about what goods and services to buy, according to their own needs and priorities. Delivering cash avoids the often high transportation and distribution costs of other forms of humanitarian aid. Injecting cash into local markets can also help stimulate local economies and encourage economic recovery. The contribution of cash transfers to DRR and

³ Microenterprise Best Practices Project, *Loan Rescheduling After a Natural Disaster* (Washington DC: Development Alternatives Inc./USAID, 1998), http://www.gdrc.org/icm/disasters/rapid_onset_brief_1.pdf; Feinstein International Center and Interuniversity Institute for Research and Development, *Disaster Risk Reduction and Financial Strategies of the Poor: Demand for, Access to, and Impact of Cash in Haiti Following the 2010 Earthquake* (Somerville, MA: Feinstein International Center, 2013), http://fic.tufts.edu/assets/TUFTS_1385_Haiti_2_online-UPDATED.pdf.

vulnerability reduction in general is still being developed and discussed. The approach can be effective in helping households to cope with short-term shocks such as poor harvests, rises in food prices and unexpected expenses. There is also a role for cash transfers as a component of wider social protection programmes, which can be linked to humanitarian response.⁴

Remittances from family members working in another place or country total many billions of dollars worldwide and form a vital element in many household incomes. In normal times remittances contribute to DRR by helping to diversify livelihoods, provide health care and education and build better (and stronger) houses. They are also an important source of financial support during crises. Money is sent through a variety of formal and informal channels. Because remittances go directly to family incomes they have a direct impact on livelihoods, and households themselves choose how to use the money. There is evidence that remittances from family members abroad increase after disasters. Families that have access to remittances are less likely to have to sell off their livelihood assets to cope with crises, and they recover more quickly.

Money transfer systems depend on transport and communications infrastructure. Where these are damaged in a disaster, remittances may not arrive quickly enough to meet emergency needs and it may be difficult to locate families if they have been displaced by the disaster. In some circumstances, mobile phone banking or e-payment systems can be an effective method of transferring money quickly. Payments, transfers and withdrawals are made via mobile phones and cash can be drawn down from local money agents, which makes financial services and remittances more accessible to people in remote locations and places where banks do not have branches. The transaction costs are relatively low (with a particular saving in time and money getting to distant branch offices), savings are in safe locations and customers have access to a wider range of financial service providers.

These new technologies have been tried in emergencies, including the post-election violence in Kenya in 2008 and the Haiti earthquake in 2010, and the results are encouraging.⁵ However, there are a number of challenges: money transfer systems of this kind are complex, requiring time, effort and technical skill to set up; they depend on reliable network coverage; and the high demand for cash may cause problems for local money agents who

4 S. Bailey, *Cash Transfers for Disaster Risk Reduction in Niger: A Feasibility Study* (London: Overseas Development Institute, 2008), <http://www.cashlearning.org/downloads/resources/documents/cash-transfers-for-drr-in-niger.pdf>. See also *Is Cash Transfer Programming 'Fit for the Future'? Final Report* (London: Humanitarian Futures Programme, 2014), <http://www.cashlearning.org/downloads/calpfffinalreport.pdf>.

5 D. Datta, A. Ejakait and C. Odak, 'Mobile Phone-based Cash Transfers: Lessons from the Kenya Emergency Response', *Humanitarian Exchange*, 40, 2008, <http://www.odihpn.org/humanitarian-exchange-magazine/issue-40/mobile-phone-based-cash-transfers-lessons-from-the-kenya-emergency-response>; K. Sossouvi, 'Innovation in Emergencies: The Launch of "Mobile Money" in Haiti', *Humanitarian Exchange*, 54, 2012, <http://www.odihpn.org/humanitarian-exchange-magazine/issue-54/innovation-in-emergencies-the-launch-of-mobile-money-in-haiti>.

normally manage much smaller sums. Other barriers to access include illiteracy and lack of familiarity with the technology. Formal identification documents are needed to register for schemes and collect payments, but the poorest may not have such documents, or may have lost them in the disaster.⁶

12.5 Disaster insurance

Insurance is a standard and effective method of sharing risk. Individuals and organisations buy it so that they can be compensated when hazards lead to death, injury or ill-health, or loss of property or income. This gives policy-holders the promise of some financial stability, and hence the confidence to invest (e.g. in home improvements) or expand (e.g. a business enterprise). Insurance companies protect themselves against major catastrophes by basing their insurance premiums on sophisticated mathematical calculations, spreading their own exposure across many different areas and types of risk and buying their own insurance cover (reinsurance).

Insurance is predominantly commercial. Decisions about whether to buy and sell insurance, what kinds of cover to provide and what premiums to set are determined by market forces. Governments do sometimes intervene, either through state schemes (to protect farmers against crop losses, for example), providing subsidies or by making some kinds of insurance cover compulsory (such as employers' liability or motor insurance). In Japan private insurers are obliged by law to offer earthquake insurance, but are protected by a government-backed scheme, the Japanese Earthquake Reinsurance Programme: this enabled insurers to pay out quickly after the 2011 earthquake and tsunami.⁷ Governments also have a key role in policy-making and regulation for the financial sector generally, and can take on more active roles regarding risk-related financing. Other institutions can also force people to take out insurance: companies making loans to people to buy houses usually insist that they are insured.

Insurance can stimulate further risk reduction actions. Insurers may only provide cover in high-risk areas if governments provide adequate mitigation measures and emergency management systems. State crop insurance schemes allow farmers to take the risk of planting different crops, leading to greater diversification and security against individual hazards. In the United States, the National Flood Insurance Program, started in 1968, is a partnership between communities and the public and private sector that links the premiums paid to the

⁶ G. Smith, 'New Technologies in Cash Transfer Programmes and Humanitarian Assistance', *Humanitarian Exchange*, 54, 2012, <http://www.odihpn.org/humanitarian-exchange-magazine/issue-54/new-technologies-in-cash-transfer-programming-and-humanitarian-assistance>.

⁷ O. Mahul and E. White, *Knowledge Note 6-2: Earthquake Risk Insurance* (Washington DC: World Bank Institute, undated), <http://wbi.worldbank.org/wbi/content/knowledge-notes-cluster-6-economics-disaster-risk-risk-management-and-risk-financing>.

level of protection. It offers flood insurance to home owners, renters and business owners if their community takes part in the programme. Once government emergency management specialists have certified that communities and households have put particular flood management and mitigation plans and measures in place, they are eligible for lower rates from the many commercial insurers involved in the scheme.⁸ Many companies offer reduced premiums to individual clients who undertake mitigation measures, such as retrofitting houses against hurricanes or floods.

Because of the size of the global insurance industry and its obvious value in reducing risk through risk sharing and stimulating mitigation, DRR agencies have become interested in its potential for protecting the most vulnerable. However, because the industry is market-driven its success is based on confining its coverage to places where the risks can be calculated with some accuracy and certain minimum standards, such as building codes, can be enforced, and to people who can afford to pay. In effect, this means that coverage is largely limited to higher-income countries, and to wealthy people and larger businesses in middle- and low-income countries; the poorest and most vulnerable find it hardest to obtain insurance, and insurance companies have shown little interest in extending their coverage to such groups. Major disasters may cause companies to raise premiums substantially or even withdraw cover in high-risk areas. State insurance is available in many low-income countries, but premium levels still tend to be high and policies are aimed at the professional classes in urban areas. Even in wealthy societies, many people do not take out insurance. In such circumstances, the burden of financing recovery is often passed on to governments (which have access to risk transfer mechanisms such as insurance, regional risk pools and insurance-linked securities such as catastrophe bonds). Many people who do not take out insurance cover calculate that, in the event of a disaster, their national government will be obliged to compensate them for their losses anyway. All insurance schemes have to face up to the problem of 'moral hazard': where the sense of security and confidence of having insurance cover leads to people failing to take steps to reduce risk, or even to take greater risks.

Where insurance schemes for poor groups and individuals have been successful, they have generally originated in development programmes that have aimed at financial sustainability rather than profit. Such schemes are run mainly by MFIs but also by NGOs, cooperatives, governments and even some companies. Business involvement is often in partnership with non-profit organisations, where the business – usually an insurance company – typically provides technical expertise (e.g. actuarial calculations regarding risks and their likely costs), assistance with marketing, or underwriting. Some schemes have an outreach of a few hundred families but they can reach large numbers of people – millions, in a few cases. Terms and conditions vary widely, as do the administrative and financial structures used, but life insurance, which is one of the main forms of insurance on offer, is often compulsory: people

⁸ See https://www.floodsmart.gov/floodsmart/pages/about/nfip_overview.jsp.

who wish to borrow money or open a savings account have to take out an insurance policy. The other main kinds of coverage are health and property insurance.

The evidence available to date indicates that insurance programmes for poor people, especially life insurance, can be financially viable. Nevertheless, insurance is a risky business. To maintain financial stability, life policies generally exclude high-risk groups such as the elderly, and certain causes of death such as epidemics. Health insurance may exclude health care costs for AIDS-related treatment or injuries arising from involvement in riots or other civil unrest. All-risk coverage for property is rarely available. Schemes may have to be amended repeatedly to achieve the right balance between broad coverage and financial sustainability. This is particularly true of health insurance services, whose financial performance is much lower than that of life insurance. Another problem is delays in settling claims. This is partly the result of bureaucratic slowness, but partly inevitable where claimants live in remote villages or communications break down because of technical failures, environmental hazards or civil unrest.

Insurers have to put considerable effort into marketing their schemes to people unfamiliar with the concept and workings of insurance. Local-level approaches involving community meetings and regular discussions with field workers tend to be most successful. Once households understand insurance interest seems to be strong. People are also more likely to buy insurance when they see others in their community purchasing it and obtaining financial benefits from having done so. Non-economic factors can be important, especially trust in the product and the organisations selling and managing it. Where there is already a relationship of trust between the insurer and the community – notably where the insurer is an established MFI or NGO – a base of policy-holders can be built up quite quickly. There are also examples of successful mutual benefit societies, where insurance funds are set up by groups to provide cover for their members (see Case Study 12.4: Mutual insurance for farmers).

Micro-insurance⁹ is specifically aimed at people living on low incomes. It follows accepted insurance practices, but there are significant differences in the way it operates. It charges low premiums and provides limited coverage, usually against specific risks. A variety of institutions provide micro-insurance: they include community savings and credit schemes, women's associations, NGOs, credit unions, MFIs and commercial insurers. Micro-insurance procedures are adapted to their clients' needs and capacities, being much simpler than those for conventional insurance and facilitating quick payouts in response to claims. This combines the convenience and flexibility of informal insurance, while retaining the security and reliability of formal programmes. Micro-insurance can play an important role in helping poor households to cope with everyday or extensive risks.

9 V. Tan, *Microinsurance* (London: Advocates for International Development (A4ID), 2012), <http://a4id.org/sites/default/files/files/Short%20guide%20to%20Microinsurance.pdf>.

Case study 12.4 Mutual insurance for farmers

Fondos are non-profit mutual insurance funds for farmers in Mexico, formed by groups of farmers and growers and providing insurance only to their own members. Each member pays an annual premium, and surplus funds at the end of the year are reinvested in contingency reserves or spent on social projects. Over the years, the sums insured have increased significantly and insurance premiums have fallen. By 2012 there were 388 *fondos*, and nearly 1.5m hectares and over 16m animals were covered by the insurance programme. Insurance is available for crop failure and loss of livestock, damage to farmers' property, death and accident or illness. For many years the government provided all of the reinsurance cover needed, but private reinsurers have begun to join. Admission to a *fondo* depends on its perception of a farmer's capacity, and the scheme has been criticised in the past for excluding poorer, more vulnerable farmers.

World Bank, *Fondos: Mexico's Unique Agricultural Mutual Insurance Funds* (Washington DC: World Bank, 2013), <http://documents.worldbank.org/curated/en/2013/10/19538858/fondos-mexicos-unique-agricultural-mutual-insurance-funds>; E. Adamsdale, *Transferring Risk: Potential Partnerships between the Insurance Industry and the Humanitarian Sector* (London: British Red Cross Society, 2002).

Micro-insurance can also be used to stimulate mitigation activities. Health insurance is sometimes linked to preventive and primary health care programmes run by the insurer concerned (if an NGO) or a partner organisation, and policy-holders may be expected to use such services. Technical support can be given to policy-holders to help them protect their property against common hazards. Non-profit and community organisations can also play a part in lobbying governments and others to establish non-profit insurance schemes or to encourage the spread of commercial insurance cover – if not for the poor, then at least for lifeline facilities such as hospitals, schools, power plants and bridges.

Micro-finance and micro-insurance can complement one another: while insurance can be effective for covering less frequent, larger shocks, other forms of financing such as savings and credit may be more flexible and efficient in addressing smaller shocks that occur on a more frequent and regular basis. Many MFIs have begun to offer insurance on micro-credit loans so that borrowers (and the MFIs themselves) will not be stuck with debt if their business is damaged by a disaster. There are also examples of linking micro-insurance to savings programmes, by allowing members of savings and credit groups to save for insurance through fixed deposits in savings accounts.

MFIs should proceed carefully if they wish to enter the micro-insurance business. They may lack the skills for assessing risk and computing appropriate premiums and contributions. They should have sufficient reserves and reinsurance for large as well as smaller disasters,

bearing in mind that large events will also affect clients' ability to pay their regular insurance premiums. There are concerns that micro-insurance may not be economically viable for the MFIs or NGOs that support them without subsidies (many micro-insurance schemes are subsidised). Schemes with large numbers of policies and clients are usually more secure in terms of exposure to risk and ability to obtain reinsurance. However, all micro-insurers need to be able to adapt to rapidly changing conditions in the financial services market and the regulatory environment. They cannot afford to stick to a fixed model, and they will inevitably have to balance their social goals against financial viability. Even the low costs of micro-insurance programmes may still be too high for very poor households.

Informal insurance and social security systems are already widespread among the poor in disaster-prone societies, especially in rural areas where communities and social structures are well established. Borrowing and sharing of goods, cash and labour are part of the social fabric in good times and bad. They comprise an important coping strategy during crises when those who are suffering can call on neighbours or kinsfolk for food, materials or other support. Exchanges of food form an important part of famine mitigation strategies in Sub-Saharan Africa. Funeral or burial societies are found throughout the world, their members pooling funds to cover expenses related to the death of another member. Traders and artisans may lend small amounts of money to one another to cover short-term cash flow problems.

In recent years, governments, financial institutions and international development agencies have become interested in using index-based insurance to protect assets, particularly in the agricultural sector. Index insurance is linked to an index, such as rainfall, temperature, humidity or crop yields and revenues, or to a combination of these, rather than to actual losses from droughts, floods or other hazards. Thresholds for these indices are set in advance, based on analysis of historical scientific, production and economic data: when the thresholds are exceeded, insurance payouts to farmers are triggered automatically, regardless of their actual losses. This makes the approach much simpler administratively, quicker, cheaper to operate and less expensive to purchase than conventional insurance, where each individual claim has to be assessed. It is therefore more affordable for small-scale and poor farmers.

Index insurance schemes have been piloted and promoted in a number of countries, including the Philippines (with programmes supported by Germany's international development agency GIZ and the global reinsurance company Munich Re),¹⁰ Malawi, Vietnam, India, Ethiopia, Brazil, Mongolia and Mexico (see Case Study 12.5: Index insurance for farmers). Index insurance requires certain conditions to be met. The indices and thresholds must be calculated objectively and reliably, and the process of calculation and premium setting must

¹⁰ S. Prabhakar et al., *Promoting Risk Financing in the Asia Pacific Region: Lessons from Agricultural Insurance in Malaysia, Philippines and Vietnam* (Hayama: Institute for Global Environmental Strategy, 2013), www.asiapacificadapt.net.

Case Study 12.5 Index insurance for farmers

A flood and drought index insurance programme by Mexico's state reinsurance company Agroasemex is designed to improve the distribution of government assistance to farmers in the event of climate-related crop failure. The scheme targets poor farmers, giving assistance for up to 5 hectares of land per farmer. It uses a rainfall index, with different payment thresholds according to the type of crop, stage in crop growth and geographical region. These indices are adjusted each year. The programme's coverage grew from 75,000 hectares and five weather stations in 2002 to 1.9m hectares and 251 weather stations in 2008. By 2008, 800,000 low-income farmers had insurance cover and the total sum insured was \$132m. Take-up was constrained by the limited number of weather stations producing usable data and by limited technical capacity. Rainfall and temperature simulations were used to replace missing historical data and develop projections of future rainfall.

M. Helmuth et al. (eds), *Index Insurance and Climate Risk: Prospects for Development and Disaster Management* (New York: Columbia University, 2009), <http://iri.columbia.edu/wp-content/uploads/2013/07/Climate-and-Society-Issue-Number-2.pdf>.

be transparent and public, in order to give farmers and others who purchase the insurance confidence in the system. Relevant data must be available and the data collection systems must be reliable: in the case of meteorological data, this can often be collected remotely from automatic measuring stations. However, in many places the quality and quantity of relevant data are limited, and this remains the main constraint on expanding the outreach of index insurance.

Chapter 13

Managing urban risk

13.1 Introduction

More than half of the world's population lives in towns and cities. About two-thirds of the current urban population live in low- and middle-income nations in Africa, Asia, Latin America and the Caribbean. The DRR issues and themes discussed elsewhere in this book apply equally to urban settings; but, at the same time, managing urban risks presents its own challenges. If managed well, growth and urbanisation bring many economic and social benefits to towns and cities and the people who live and work in them. Cities and towns generate wealth and provide jobs, for example. It is also more straightforward to provide basic needs and social and cultural services where large numbers of people live closely together. However, achieving such gains depends on the context in which urbanisation takes place and how the process is managed. Poverty and poor urban management mean that many cities are expanding in an uncontrolled way. This has led to severe social, economic and environmental problems. It is also putting greater numbers of people at risk from natural and technological hazards.

Urban populations in high-income nations tend to be well protected by government institutions and regulations, together with robust infrastructure and effective services (although these can fail: the Hurricane Katrina disaster in New Orleans in 2005 is a good example). However, many inhabitants of towns and cities in low- and middle-income countries lack good-quality infrastructure and services, such as water and sanitation, drainage, roads, healthcare and emergency services. Perhaps as many as a billion people worldwide live in informal settlements (or slums), with poor living conditions; their incomes and access to employment opportunities may be limited and insecure.

13.2 Urban hazards and risks

Environmental hazards are the main cause of ill-health, injury and premature death in many urban areas. People living in towns and cities in low-income countries face a large number of such hazards. These may be biological (e.g. diseases caused by unclean water and poor sanitation), chemical (e.g. polluted water, indoor and outdoor air pollution from fires, chemicals, industrial processes and vehicles, garbage and hazardous wastes), physical (e.g. fire, floods, landslides, earthquakes, cyclones, extreme temperatures, droughts) and socio-political (e.g. politically organised violence, social tensions and conflicts, criminality and gangs and terrorism). Many such hazards are also present in rural locations, but they can become particularly threatening in built-up and densely populated urban areas.

There is a strong likelihood of major urban disasters in future. For example, many cities around the world (in rich as well as poor countries) are sited in earthquake zones or along coastlines exposed to cyclones and tsunamis; or, as they grow, they expand into hazard-prone areas such as floodplains, deserts and hillsides. Urban growth can also threaten ecosystems that contribute to resilience. Earthquakes in large urban centres have been responsible for some of the greatest disasters in recent times, in both low- and high-income countries: the earthquake in Haiti in 2010 killed more than 220,000 people; damage resulting from the 1995 Kobe earthquake in Japan amounted to over \$100bn.¹ Flooding is a major hazard in many cities: in the Indonesian capital Jakarta, floods in January 2013 displaced more than 14,000 people, some for weeks, and damage to homes and business disruption cost an estimated \$1bn.² Even where fatalities are low, the economic and social impact of a hazard may be considerable. For example, in 2009, when four coastal municipalities in Colombia were flooded, there were only two fatalities and 20 people reported missing, but more than 25,000 were displaced; 1,125 houses were destroyed (along with schools, health centres and roads) and 1,400 damaged.³

Frequent, smaller-scale hazard events such as fires and industrial and road accidents can have a considerable cumulative impact on wellbeing and livelihoods in high-density urban settlements, where there may also be particularly acute public health problems arising from pollution and inadequate sanitation, together with risks from high levels of violence and crime. These smaller events do not feature in many disaster datasets and so tend to go unnoticed by decision-makers and have a low priority in disaster planning. In some rapidly growing cities there is growing concern about water scarcity, and outdoor air pollution, particularly in high-altitude cities, can present problems, notably for the elderly and children.

Cities also tend to be much warmer than the surrounding countryside, and night-time cooling is lower than in rural areas. This 'heat island' effect is caused by the concentration of large heat-retaining structures, asphalt and concrete landscapes, physical obstruction of cooling breezes by buildings and heat produced by industrial and domestic activities. Many cities are not designed to deal with this problem. Ventilation and heat management are rarely considered seriously in urban development or taken into account in emergency planning, even in high-income countries.

1 EM-DAT database: www.emdat.be.

2 J. Taylor, *When Non-climate Urban Policies Contribute to Building Urban Resilience to Climate Change: Lessons Learned from Indonesian Cities* (London: IIED, 2013), <http://pubs.iied.org/pdfs/10630IIED.pdf>.

3 D. Dodman et al., *Understanding the Nature and Scale of Urban Risk in Low- and Middle-income Countries and Its Implications for Humanitarian Preparedness, Planning and Response* (London: IIED, 2013), <http://pubs.iied.org/pdfs/10624IIED.pdf>.

13.3 Urban vulnerability

Poverty, gender, class, caste and ethnicity are powerful influences on urban vulnerability, just as they are in rural areas. Poor and marginalised people are more likely to live in poor-quality housing, in neighbourhoods without adequate infrastructure (clean water, drains, paved roads, power supplies and health facilities), and where sanitation systems, garbage collection and public health services are inadequate. This makes them vulnerable to a variety of environmental hazards. High housing and population densities also magnify the effects of pollution and disease.

Poverty forces many people to live in the most polluted and dangerous areas: steep-sided valleys, floodplains and hillsides, and next to roads, waste dumps and hazardous industries. Where they lack legal title to their property – as in many low-income urban settlements – and live in fear of eviction, they have little incentive to invest in private or communal mitigation measures, and in any case have little money for doing so. Landlords are often unwilling to invest in their properties, and may raise the rents of properties improved by their tenants. Local governments may refuse to provide services to informal settlements on the grounds that this will imply recognition of people's right to the land they have settled on.

Domestic fires, which are a significant risk in houses made of materials that burn easily, such as wood, thatch and cardboard, can, where homes are packed tightly together, easily get out of control. Urban spaces with irregular layouts and narrow streets, crowded with buildings (including high-rise), waste and vehicles and densely populated, can present particular challenges to service provision (such as water supply and waste removal) as well as to emergency response, evacuation and rescue (as in Port-au-Prince, Haiti, after the 2010 earthquake). Industrial accidents can be devastating in populous urban settings. One of the most well-known, the explosion at a chemical factory in the Indian city of Bhopal in 1984, resulted in around 5,000 deaths in the following days, with many more subsequently; around 60,000 people required long-term treatment.⁴

Uncontrolled urban development damages the environment and increases risk. Deforestation, land clearance and subsequent construction may expose hillsides, making them more vulnerable to landslides. Natural drainage is impeded when floodplains are built upon. Unregulated construction leads to unsafe buildings, and here it is not only the poor who are vulnerable: many of the fatalities in earthquakes have been in badly built middle-class apartment blocks. Poor land use planning may lead to critical infrastructure such as hospitals, electricity sub-stations and water treatment plants being built in high-risk locations. It may also increase risks, for example by permitting construction that blocks natural drainage systems, leading to increased flooding.

4 R. Varma and D. R. Varma, 'The Bhopal Disaster of 1984', *Bulletin of Science, Technology and Society*, 25 (1).

Urban life has a profound impact on livelihoods and coping strategies. Town-dwellers rely on cash income from their labour to a much greater extent than people who live in the countryside. Livelihood strategies are therefore heavily based on finding paid work (which can also be an advantage if households have several different sources of income and do not depend on a single economic activity). The poor are also more likely to undertake dangerous work such as scavenging on unstable rubbish dumps or labouring in industries where working practices are unsafe, such as garment making and construction.

Social cohesion and social capital in the form of community organisations and support networks may be weak in new urban communities, especially ones that comprise many different social groups, where there are no extended family structures or where people

Box 13.1 Urban risk and vulnerability assessments

Risk and vulnerability assessments are carried out frequently in towns and cities as part of DRR planning, just as they are in rural areas, often using similar assessment approaches and tools. In recent years, more thought has been given to developing approaches specifically for urban contexts, for example by including infrastructure and urban services in addition to the areas covered by conventional assessments. There are many examples of such approaches and methods, developed for different agencies and types of intervention; recent examples include:

- F. Dickson et al., *Urban Risk Assessments: Understanding Disaster and Climate Change in Cities* (Washington DC: World Bank, 2012), www.worldbank.org.
- A. Kumar, *Urban Risk Assessment: A Facilitator's Guidebook* (Dhaka: Plan Bangladesh and Islamic Relief Bangladesh, 2010), <http://www.narri-bd.org/documents/training/Urban%20Risk%20Assessment-URA.pdf>.
- E. Levron, *Identification of Vulnerable People in Urban Environments: Assessment of Sustainable Livelihoods and Urban Vulnerabilities*, Action Contre la Faim International, 2010, <http://www.actionagainsthunger.org/publication/2010/12/identification-vulnerable-people-urban-environments-assessment-sustainable>.
- J. Parikh, G. Sandal and P. Jindal, *Vulnerability Profiling of Cities: A Framework for Climate-resilient Urban Development in India* (London: IIED, 2014), <http://pubs.iied.org/10657IIED.html>.

The rapid pace of urban expansion and development, together with the growth and mobility of populations and the existence of large informal settlements, make it very difficult to collect accurate, comprehensive information and keep it up to date.

are frequently moving in and out of rented accommodation. Newcomers are likely to lack experience and understanding of specifically urban hazards and avoidance strategies. Many towns and cities have large populations of refugees or internally displaced people who may be particularly marginalised, neglected or discouraged by municipal authorities and other aid and development agencies, and whose presence is sometimes resented by established residents.⁵ Camps for refugees and internally displaced people, originally planned as short-term emergency settlements, assume semi-permanent status, becoming in effect new towns.

Dependence on public services and structures (e.g. power, water supplies, public transport infrastructure and emergency services) and external food supplies is much greater in urban areas. Hazard events can cause severe damage to critical infrastructure such as power supplies and transport systems, even in large and wealthy cities, as in the case of Hurricane Sandy in New York in 2012. Politicians and officials have to be lobbied to make improvements to services, although the poor tend to have the least political influence here. City and municipal authorities often lack the financial resources and political will to control pollution, provide adequate infrastructure and services, make suitable land available to poor people and implement large-scale mitigation measures.

13.4 Urban disaster risk reduction: constraints and opportunities

13.4.1 Urban systems

Urban centres are complex socio-technical systems, made up of communities, institutions, the built environment, the natural environment or ecosystem, infrastructure (such as transport, communications, water, sewerage and power), services (such as healthcare, education, police and waste collection) and economic and social activities.⁶ These different components of the overall system are linked and often depend upon one another (for example, hospitals and water pumping systems need electricity; people need transport to get to work and to access services), so that problems in one area have an impact elsewhere. They are also linked to resources, infrastructure and institutions outside town or city boundaries. Practical interventions to reduce urban risks and vulnerabilities that focus on just one aspect of the system may bring benefits, but their overall impact will be limited without addressing other aspects as well.

⁵ S. Haysom, *Sanctuary in the City? Urban Displacement and Vulnerability* (London: Overseas Development Institute, 2013), <http://www.odi.org.uk/hpg>.

⁶ See J. da Silva, S. Kernaghan and A. Luque, 'A Systems Approach to Meeting the Challenges of Urban Climate Change', *International Journal of Urban Sustainable Development* 4 (2), 2012, <http://www.tandfonline.com/doi/full/10.1080/19463138.2012.718279#.U4izBfldWAU>.

Case Study 13.1 City resilience framework

In partnership with the Rockefeller Foundation, Arup International Development has developed a framework for use by planners, decision-makers and other stakeholders to arrive at a common understanding of city resilience. The framework is the result of an extensive review of existing research and guidance, together with fieldwork in six cities in Africa, Asia and the Americas. It identifies 12 key indicators that describe the fundamental attributes of a resilient city. The indicators fall into four categories: the health and wellbeing of individuals (people); infrastructure and environment (place); economy and society (organisation); and leadership and strategy (knowledge).

The 12 indicators are:

1. Minimal human vulnerability: indicated by the extent to which everyone's basic needs are met.
2. Diverse livelihoods and employment: facilitated by access to finance, ability to accrue savings, skills training, business support and social welfare.
3. Adequate safeguards to human life and health: relying on integrated health facilities and services, and responsive emergency services.
4. Collective identity and mutual support: observed as active community engagement, strong social networks and social integration.
5. Social stability and security: including law enforcement, crime prevention, justice and emergency management.
6. Availability of financial resources and contingency funds: observed as sound financial management, diverse revenue streams, the ability to attract business investment, adequate investment and emergency funds.

It is easier to assess individual components within an urban system (e.g. building quality, power supply lines) than to assess and understand their inter-dependencies and the overall resilience of that system. Towns and cities are a complicated combination of assets, systems and actions undertaken by institutional and community actors (the links between physical assets and human behaviour are often overlooked). Nevertheless, municipal authorities and other agencies need to have this big picture in mind if they are to act effectively, which is why attempts have been made to develop frameworks for viewing a resilient urban system as a whole (see Case Study 13.1: City resilience framework).

Case Study 13.1 (cont'd)

7. Reduced physical exposure and vulnerability: indicated by environmental stewardship, appropriate infrastructure, effective land use planning and enforcement of planning regulations.
8. Continuity of critical services: indicated by diverse provision and active management, maintenance of ecosystems and infrastructure and contingency planning.
9. Reliable communications and mobility: indicated by diverse and affordable multimodal transport systems, ICT networks and contingency planning.
10. Effective leadership and management: involving government, businesses and civil society, and indicated by trusted individuals, multi-stakeholder consultation and evidence-based decision-making.
11. Empowered stakeholders: indicated by education for all and access to up-to-date information and knowledge to enable people and organisations to take appropriate action.
12. Integrated development planning: indicated by the presence of a city vision, an integrated development strategy and plans that are regularly reviewed and updated by cross-departmental working groups.

At the time of writing a much more detailed City Resilience Index was being developed, with an extensive list of qualitative and quantitative indicators.

Arup International Division/Rockefeller Foundation, *City Resilience Framework* (London: Ove Arup & Partners International, 2014), http://publications.arup.com/Publications/C/City_Resilience_Framework.aspx.

Resilience thinking (see Chapter 1) is now being widely adopted as a tool for understanding and managing risks in towns and cities.

Infrastructure is a key component in urban systems, particularly the critical infrastructure that delivers services such as water and sanitation, energy, communications and transport. Infrastructure needs to be protected against potential hazards by siting it in safer locations where possible and strengthening it structurally; contingency plans must also be in place in case of damage, disruption or failure of infrastructure during a disaster.

Box 13.2 Vulnerability of infrastructure and the built environment to hazards

Buildings and physical infrastructure which may be vulnerable to the effects of natural hazard events include:

- Older residential buildings in densely populated areas that have been poorly maintained, altered or extended, or are overcrowded.
- Buildings erected before adequate standards and controls were designed, or that have been built without observing standards and regulations.
- Unplanned, 'informal' settlements in marginal, hazard-prone areas.
- Modern buildings of poor design or construction quality.
- Communication and control centres concentrated in one area.
- Hospital facilities that are insufficient for treating large numbers of casualties or which may not be accessible in a disaster.
- Schools and other community buildings that have been built to low construction standards or which cannot be used as emergency shelters.
- Poorly designed or built roads, railways, bridges and viaducts, embankments and culverts, whose collapse could prevent access by emergency services, movement of relief supplies and evacuation of casualties.
- Narrow streets that become blocked with debris and stalled traffic, also impeding emergency assistance.
- Water mains that are liable to rupture, resulting in pollution and disease.
- Sewers that flood, spreading disease.
- Electrical supply lines and systems that are liable to failure.
- Gas mains that rupture, with the risk of fires.
- Industrial facilities that are damaged, leading to leaks of hazardous chemicals or fires and explosions.

Institution of Civil Engineers, *Megacities: Reducing Vulnerability to Natural Disasters* (London: Thomas Telford, 1995).

13.4.2 Governance and stakeholders

Collective action is needed for effective DRR in complex urban systems. Many different actors have important roles to play, including local and national government, civil society organisations, the private sector, community groups or associations and international funding agencies. In towns, there are often more official and other agencies of various kinds than in the countryside, and there is, accordingly, a more complex and diverse network of relationships between them. These bodies need to develop shared visions of the future and set priorities for action. Strategies and interventions in urban settings have to be planned in the context of the relationships (including power relationships) between the different actors involved. In addition, local and grassroots organisations and higher-level decision-making forums should be connected to one another. This can be challenging, especially where there is no tradition of community engagement, but a growing number of initiatives are demonstrating that it is possible (see Section 13.4.3: Local-level and community-based initiatives). Decentralisation policies can also give municipal governments the opportunity to develop their own DRR strategies (for example in regulating land tenure, land use and construction standards). However, this needs adequate policy and financial support from higher levels of government, which is lacking in many countries. Most municipal governments in low-income countries have very little investment capacity of their own.

City governments (municipal authorities, mayoral administrations, etc.) are the main actors in urban DRR, with a very wide range of responsibilities (see Table 13.1: The role of municipal governments in DRR). The private sector can also play an important part, particularly in the provision of infrastructure and structural mitigation measures, and businesses are more likely to invest in towns and cities that are active in minimising disaster risk. Community-level organisations and local NGOs may be involved across a wide range of DRR activities, although in practice organisations dedicated to disaster risk management tend to focus on smaller-scale interventions that are easier to implement, such as educating the public about risk, disaster preparedness and evacuation planning, search and rescue and other emergency response actions.

DRR needs the support of strong local leadership and political will, in the face of competing demands for capacity and resources. Continuity in leadership is also vital: in many towns, the high turnover of people in key leadership and technical positions has been identified as a major barrier to sustaining DRR programmes. Local-level activity must also be linked to town- or city-wide measures to improve services and mitigate the impact of hazards, making it particularly important to develop risk management partnerships between communities, grass-roots organisations, NGOs, municipal authorities and others (see Case Study 13.2: Integrated urban DRR). International organisations can also contribute through funding, technical support, advocacy and coalition-building (see Case Study 13.3: Making Cities Resilient Campaign).

Table 13.1 The role of municipal governments in DRR

Built environment:

- Setting and enforcing building codes
- Land use regulations and property registration
- Construction and maintenance of public buildings
- Urban planning and zoning

Infrastructure:

- Piped water (including water treatment)
- Sanitation
- Drainage
- Roads, bridges, pavements
- Electricity
- Solid waste disposal
- Waste water treatment

Services:

- Fire protection
- Public order, police, early warnings
- Waste collection
- Schools
- Health care and public health services
- Public transport and transport management
- Social welfare
- Emergency planning and response

Adapted from D. Dodman et al., *Understanding the Nature and Scale of Urban Risk in Low- and Middle-income Countries and Its Implications for Humanitarian Preparedness, Planning and Response* (London: IIED, 2013), <http://pubs.iied.org/pdfs/10624IIED.pdf>.

Case Study 13.2 Integrated urban DRR

The city of Manizales in Colombia is a well-known example of urban development programming that integrates environmental and risk management. Manizales has been implementing this approach since the 1980s. The programme involves a wide range of stakeholders – local and regional government, the private sector, universities and community organisations – involved in discussing and devising plans for urban development. Coordination with national government is helped by Colombia’s long-running decentralisation programme, which transfers considerable responsibility and resources to lower administrative levels.

Municipal DRR actions include risk mapping, micro-zoning, setting and implementing building codes, relocating houses away from unsafe places, public education, community preparedness, research and institutional coordination. Observatories across the city monitor environmental conditions. There are tax reductions for people who take measures to protect their homes in areas at risk of floods and landslides, and the houses of low-income groups are covered by a city insurance scheme. An environmental tax on properties is reinvested in protecting infrastructure, disaster mitigation, public education and relocation.

J. Hardoy et al., ‘Local Disaster Risk Reduction in Latin American Urban Areas’, *Environment & Urbanization*, 23 (2), 2011.

Urban centres are diverse, ranging from megacities (with populations of 10m or more) to small rural townships. Much of the attention being given to disaster risk in urban areas has concentrated on the problems of large cities. Here, the scale of the problems makes the involvement of municipal and even central governments particularly important. But it should not be forgotten that most of the world’s urban population lives in smaller towns and administrative centres, and it is in such places that most urban growth is taking place. Areas on the fringes of towns and cities (peri-urban areas) are also extensive and growing rapidly around the world, although this is often not in a planned or managed process and can involve expansion into hazardous locations. Smaller urban centres tend to have weaker municipal authorities and poor provision of infrastructure and services; they also lack capacity, technical skills and resources. On the other hand, it is often easier to address problems of disaster risk and vulnerability on a smaller scale.

Case Study 13.3 Making Cities Resilient Campaign

UNISDR's Making Cities Resilient Campaign was launched in 2010 to encourage more effective local governance for urban risk reduction. It supports local action planning, learning and cooperation between cities. By 2012 more than 1,200 cities and towns worldwide had joined the campaign and a large number of initiatives had been launched. A detailed self-assessment tool has been developed to help city administrations and other stakeholders to monitor progress.

- Making Cities Resilient campaign website: <http://www.unisdr.org/campaign/resilientcities>.
- *Overview of the Local Government Self-Assessment Tool for Disaster Resilience* (Geneva: UNISDR, undated), <http://www.unisdr.org/applications/hfa/assets/lgsat/documents/Overview-of-the-LGSAT-English.pdf>.
- *A Practical Guide to Local HFA: Local Self-assessment of Progress in DRR* (Geneva: UNISDR, 2011), <http://www.unisdr.org/applications/hfa/assets/lgsat/documents/GuidanceNote.pdf>.
- UNISDR, *Making Cities Resilient Report 2012* (Geneva: UNISDR, 2012), http://www.unisdr.org/files/28240_rcreport.pdf.

13.4.3 Local-level and community-based initiatives

The preceding discussion suggests that options for reducing urban risk through local-level initiatives may be limited. It is true that only municipal and higher authorities can reduce pollution and other sources of risk on a significant scale, build and maintain critical infrastructure, set and enforce planning and building regulations, implement large-scale slum upgrading, manage mass evacuations and maintain emergency services. National governments set the legal and budgetary parameters within which local urban administrations operate, and local administrations depend on the financial and technical support they provide. The underlying socio-economic forces that make urban-dwellers vulnerable can only be addressed on a larger scale.

This does not mean that it is impossible to make a difference at a local level. Even small-scale interventions can have a meaningful impact on local risks and vulnerabilities. These interventions might be targeted at reducing specific risks, or they may be more general development actions to improve the built environment and strengthen local capacities. For example, low-cost technologies for putting up stand pipes and building latrines and drains have long been available and, with full community participation, extensive and durable water and sanitation systems can be installed (see Case Study 13.4: Community-based urban infrastructure). In areas regularly visited by floods, water pipes and pumps can be raised

Case Study 13.4 Community-based urban infrastructure

The Orangi Pilot Project (OPP) in Karachi, Pakistan, is well known internationally as an example of a large-scale, long-term initiative based on the skills and resources of the urban poor. Established in 1980 in Orangi, one of Karachi's poorest districts and the city's largest informal settlement, the OPP gave technical and organisational support to a community-based sanitation programme that sought to remove waste by helping residents build and maintain latrines and a network of underground sewers.

By 2008 the programme had reached 865,000 people (about 90% of Orangi's informal housing). With the elimination of the old open sewers, infant mortality rates fell, moving around became easier and the cleaner open spaces in front of houses created safer play areas for children and space for social contact and recreation.

Although Orangi's sloping terrain helped drainage and hence made construction of the sewerage system easier and cheaper than it would have been on flatter ground, the main reason for the initiative's success was the OPP's insistence on making community organisations the primary players, keeping the costs of the technology as low as possible and avoiding dependence on external funding.

OPP's approach has spread to other settlements in Karachi and other cities in Pakistan. OPP has provided training and advice to municipal government and other projects. Projects are directed by community groups and use local labour and materials. Households and communities are responsible for raising the funds to invest in the work. OPP has lobbied successfully against proposals for donor-funded sewerage schemes, presenting lower-cost alternatives. OPP's approach also influenced the development of a national sanitary policy adopted in 2006.

A. Zaidi, *From the Lane to the City: The Impact of the Orangi Pilot Project's Low Cost Sanitation Model* (London: WaterAid, 2001), www.wateraid.org/~media/Publications/from_the_lane_to_the_city.pdf; G. McGranahan, *Research Report: Community-driven Sanitation Improvement in Deprived Urban Neighbourhoods*, 2013, <http://r4d.dfid.gov.uk/Output/194201>.

above anticipated water levels, latrines can be sited where they are less likely to be flooded, drains and sewers can be designed to cope with large volumes of water and regularly spaced manholes can give easy access to them if they need to be unblocked. Blocked drains and litter are a major cause of urban flooding and water contamination, but can be resolved through municipal and community action to clear and maintain them. Some activities, such as sorting household waste, can be managed relatively easily at community level, although ideally this should be as part of a larger-scale integrated waste management scheme.

Case Study 13.5 Flood response in an urban setting

An Action Contre la Faim (ACF) project in low-income settlements in Jakarta, Indonesia, set up a system of pillars joined by ropes along evacuation routes to help people wade through flood waters. This system also made it easier for volunteers to bring food and other relief assistance to people trapped in their houses. The ropes were checked and replaced before each rainy season. Loudspeakers were distributed to schools and these, together with existing loudspeakers in local mosques, were used to broadcast flood warnings.

C. Gaulin, Disaster Risk Management in Urban Areas: The Slums of Jakarta. Visit of the Kelurahan of Cipinang Besar Utara and Kampung Melayu (Paris: Action Contre La Faim, 2013).

In poor neighbourhoods, especially where people do not have legal title to their property, houses and local infrastructure tend to be informal, and are often adapted to prevailing hazards. Many urban households and communities implement small-scale structural improvements to protect against flood water. Houses are put on raised plinths or, where this is too costly, doorsteps and house fronts are raised; concrete slabs or rubble and other landfill materials are used to create paths through standing water. Inside homes, there are shelves and raised platforms to store goods safely, and electricity connections are put at head height. In the wider community, low-lying land may be filled in to prevent waterlogging, footbridges may be built and evacuation routes created. Flooding can be curbed by planting trees and other vegetation to absorb rainwater; creating open spaces assists this. (See also Case Study 7.3: Living with floods and heatwaves in urban slums.)

Formal and informal social organisations exist in every part of a town or city where people live and work. But the notion of a ‘community’ may be quite different from that of rural areas, because in an urban district there is often a complex mix of very different social groups within a small area. The locus of organisation for local people may be their neighbourhood – the district where they live – rather than a social community. This presents problems for NGOs and other agencies trying to establish locally-based mitigation initiatives. The mutual suspicion that often exists between officials and people living in informal settlements adds to the difficulty. A further complication is that many of the urban poor have to travel long distances to work, restricting the time they have for community activities in their own neighbourhoods. Nevertheless, many communities are willing to undertake risk-reducing measures collectively where they are able to do so. The Orangi Pilot Project (Case Study 13.4) and other schemes inspired by it demonstrate that community-based action is possible on a large scale. Although community organisations are limited in what they can achieve in urban centres – they cannot implement planning regulations, manage land use or develop building codes – community action can be a basis for encouraging and supporting local authorities

to act in these areas. Grassroots activism may also persuade local and higher levels of government, or other funding agencies, to invest more in DRR infrastructure or provide land in less hazardous locations to poor families.

Participatory initiatives (see Chapters 6 and 7) can help to break down barriers between social groups as well as identifying opportunities for local action. Community vulnerability analysis and action plans can be used in advocacy, and other actors – city government, NGOs, academic institutions – can be brought into urban action planning processes. There are indications that such approaches have galvanised community action in risk reduction and stimulated greater cooperation with officials (e.g. Case Study 13.6: Urban resilience planning by community organisations).

Addressing everyday hazards offers an entry point into DRR for social development organisations that might not normally engage in disaster work. An example is the NGO Refugee Social Services (RSS), which works with refugee communities in Durban, South Africa, supporting them through counselling, education, health and income-generating activities. RSS has trained its outreach workers to give advice to women on their routine home visits about how to reduce the risk of domestic fires and what to do if a fire breaks out.⁷

It is useful to distinguish between ‘private’ and ‘public’ space when implementing community-level risk reduction measures in urban areas. Most people will take steps to protect their own homes, as far as they are able, but the extent of their responsibility for protecting public spaces may be less clear. Urban residents may feel that it is the municipal authorities’ responsibility to take care of streets, drains and other communal facilities. Yet the boundary between private and public space may be drawn differently in different areas. In one community, keeping lanes clear of refuse and debris may be seen as a community responsibility; in another, it may be seen as the authorities’ task.

A community’s willingness to take on responsibility for managing environmental risks also depends on how far it feels government should, and can, do this. In some cases it may choose to advocate for better environmental and risk management, for instance by calling for improved water and sanitation, health and safety at work, and curbs on polluting industries and practices. Actions such as this usually require targeting private-sector polluters as well as public authorities. This is a necessary task but a difficult one, as the private sector is powerful and often resistant to pressure, while public authorities may be unable or unwilling to support community groups to challenge industrial practices that create risk.

⁷ Case Study: South Africa. *Urban Disaster Risk Reduction* (Carlton: Oxfam Australia, 2014).

Case Study 13.6 Urban resilience planning by community organisations

Gorakhpur, a city of 700,000 people in north-east India, is prone to flooding and waterlogging, and many areas suffer from poor sewerage, sanitation and waste management and blocked drains. The city administration has limited capacity to coordinate and implement development and DRR programmes, and little experience of participatory, community-based processes. In a pilot initiative under the Asian Cities Climate Change Resilience Network (ACCCRN), a local NGO, the Gorakhpur Environmental Action Group (GEAG), worked in one of the city's 70 wards, Mahewa Ward, to facilitate community-led action to address some of these problems.

One of GEAG's first tasks was to help build up local institutions. These took the form of neighbourhood, thematic and ward-level committees, with volunteer membership, which met monthly to identify problems and plan and implement interventions in health, water and sanitation, drainage, urban agriculture, building and livelihoods. Committee activities included organising residents' meetings, carrying out needs assessments, disseminating technical information, liaising with local officials, monitoring the municipal government's performance, managing waste collections and composting, public health and hygiene education, helping residents to obtain water connections, lobbying for improvements, ensuring community participation in collective activities such as drain repairs, and linking poor households to micro-credit organisations. Households contributed small regular payments towards some of these services. Obstacles faced by the project included a lack of data to inform planning, limited resources, difficulty in changing people's behaviour (e.g. over hygiene and waste disposal practices), the low capacity of the municipal government, weak social cohesion and the challenge of obtaining public land for new community services.

N. Mani and S. A. Wajih, *A Participatory Approach to Micro-resilience Planning by Community Institutions: The Case of Mahewa Ward in Gorakhpur City* (London: International Institute for Environment and Development, 2014), <http://pubs.iied.org/10656IIED.html>.

13.5 Relocation and avoiding hazardous areas

Relocation is often suggested as a solution to disaster risk, but there are serious problems associated with it (see also Chapter 17, which discusses relocation after a disaster). Relocation to less hazardous areas is effective in reducing physical risks, but overlooks other important factors that cause vulnerable people to occupy hazardous land. People settle in hazardous locations for a variety of reasons, usually related to livelihoods and access to services. Relocation schemes, on the other hand, tend to involve sites on the edges of cities. Land may be more readily available

Case Study 13.7 Community participation in relocation

In November 2007, seasonal rains caused flooding on the Bengawan River in the city of Solo in Indonesia. More than 6,300 riverbank houses were damaged. The high cost of providing emergency services and repairing flood damage led the city's mayor to decide to relocate at-risk households. To win acceptance for the relocation proposal, the mayor visited the settlements, attending meetings in community centres and listening to local views. Working groups were formed at city and neighbourhood levels; community representatives collected information, investigated alternative sites and presented evidence and ideas to the city government.

Eventually a compensation package was worked out. Households were given cash grants to buy land and to build new houses and shared infrastructure. People were encouraged to find their own plots and negotiate with the owners, and groups of neighbours were encouraged to move together in order to maintain a sense of continuity and social stability. The key element in the package was that the government guaranteed ownership rights over the new plots. A park was also created in the low-lying riverbank area to protect against flooding and provide public green space.

Over five years, 70% of the more than 1,570 families considered at greatest risk were relocated. They were able to move to locations not too far from their old homes, with adequate access to public services and amenities. Some families remained, believing the compensation offered was not enough, but all the families felt that they had been given a choice.

J. Taylor, *When Non-climate Urban Policies Contribute To Building Urban Resilience to Climate Change: Lessons Learned from Indonesian Cities* (London: IIED, 2013), <http://pubs.iied.org/pdfs/10630IIED.pdf>.

and affordable here, but jobs and many other facilities are not. For this reason, relocation is often resisted. There may be a suspicion that the relocation of communities to safer sites is being used as a means of clearing land for commercial development – this was a contentious issue in both Thailand and Sri Lanka after the 2004 tsunami, for example. There are also instances of people selling or renting out their new, relocated, homes and returning to their former properties. Handled sensitively, and with full community participation, relocation can bring benefits, but it is a complex process (see Case Study 13.7: Community participation in relocation).

13.6 Urban food security

Food security is discussed in more detail in Chapter 14, but it is important to note here that food insecurity is increasingly becoming an urban problem. Urban populations depend

on food brought in from outside and purchased in markets. Serious problems can arise where food supplies are cut or prices rise beyond the reach of the poor. This may happen suddenly as the result of a range of economic and environmental factors, including declines in agricultural productivity, extreme weather events, shifts in agricultural production from food to other crops such as biofuels or increased transport costs.

Until recently, little attention was paid to this risk in disaster management circles, despite the obvious social and political consequences of food insecurity, the difficulty of identifying vulnerable groups in this context and the considerable challenges involved in purchasing and distributing large amounts of food. However, sudden and significant fluctuations in food prices in many countries in recent years have demonstrated the dependence of urban populations on the global food supply, exchange and distribution system. There is concern that climate change may make levels of food production (and hence food prices) more erratic and less predictable.

Urban food insecurity is largely the result, not of food shortages but of poor households' inability to buy food. This may be because the price has risen, because earnings are low or erratic or because money has to be spent on other pressing needs, such as medicine or house repairs. Food represents a significant proportion of poor urban households' expenditure (often well over half). Overcrowded housing may mean that food can be bought and stored only in small amounts, which is more expensive than buying in quantity.

Towns and cities have come to depend on actions at national and even international levels to ensure adequate and affordable supplies of food. NGOs do not have the capacity to manage acute, large-scale urban food crises; however, local-level agencies can play a role in food monitoring and distribution. In some places, city dwellers also make use of informal food 'safety nets' provided by relatives living in rural areas, who send food they have produced themselves.

There is also potential for reducing food insecurity through urban agriculture. Several hundred million urban dwellers are also urban farmers, growing food, medicinal and other plants and raising animals, for consumption and sale, in many different urban locations, ranging from rooftops and backyards to school grounds, parks and vacant public land, in the centre of towns and cities and their peri-urban edges. Women make up the majority of urban farmers, growing mainly for their households, with men more involved in commercial farming. There is evidence from cities in many low-income countries that urban agriculture can make a significant contribution to local food production and consumption, as well as livelihoods. There is much that can be done to promote and develop it, for example through technical advice on crop production, processing and marketing, and helping communities to negotiate with local authorities and landowners. At the same time, urban agriculture can bring its own hazards, such as creating breeding sites for mosquitoes through irrigation, exposure to pesticides and contamination of crops by chemicals, heavy metals, untreated water or human waste. Land for growing may also come under threat from developers, be taken over by slum landlords or occupied by squatters.

Chapter 14

Drought, food security and famine

14.1 Introduction

There have been many high-profile food crises in recent decades, triggered by drought, floods, harsh winter weather and diseases affecting crops and livestock. Climate change research indicates that areas already prone to drought and other weather extremes are likely to suffer more severely in future. However, natural hazards are only one factor: food crises and insecurity are complex events involving political, economic and social factors, including conflict (see Box 14.1: Key determinants of food insecurity). Today around a billion people are undernourished and the sustainability of current food production systems is in question.¹ In some countries food aid is a regular component of government development programmes.

Box 14.1 Key determinants of food security

1. Food stability: factors that create fluctuations in food supplies and prices, including extreme weather events and conflicts.
2. Food availability: factors affecting the production, distribution and sale of food, ranging from the availability of land and labour to functioning transport systems and markets.
3. Food access: factors affecting the ability to purchase or otherwise obtain food, including affordability and cultural preferences.
4. Food utilisation: factors affecting the human body's ability to use the food it digests, including nutritional value and food preparation, quality and hygiene.

IISD, *Climate Resilience and Food Security: A Framework for Planning and Monitoring* (Winnipeg: International Institute for Sustainable Development, 2013), http://www.iisd.org/pdf/2013/adaptation_CREFSCA.pdf.

¹ Practical Action, *Hunger, Food and Agriculture: Responding to the Ongoing Challenges* (Rugby: Practical Action, 2011), <https://practicalaction.org/media/download/12469>.

Case Study 14.1 Socio-economic factors in resilience to drought

In the Gao and Mopti regions of Mali, changes in rainfall patterns have put pressure on pastoralist and agro-pastoralist livelihoods by contributing to drought, water shortages, lack of pasture and food insecurity. A study in 2009 found that, although households were equally exposed to these problems, their ability to adapt to them varied according to their social and economic resources. Some coping strategies, such as improving irrigation systems and planting alternative crops, were only available to wealthier members of the community; others, such as buying and selling livestock, were exclusive to men. Even though the poorest families were more likely to be involved in activities not affected by the weather, such as bricklaying, they remained dependent on wealthier households for employment, gifts and borrowing. They also found it harder to join cooperatives and credit schemes because they could not afford contributions or meet membership conditions. Women were marginalised when it came to obtaining external support, in addition to having to take on heavier workloads where male family members had migrated in search of work.

L. O. Naess et al., Changing Climates, *Changing Lives: Adaptation Strategies of Pastoral and Agro-pastoral Communities in Ethiopia and Mali*, Action Contre la Faim, Tearfund and Institute for Development Studies, 2010, <http://www.ids.ac.uk>.

Development agencies can play a significant role in managing drought and food security initiatives. They are often skilled at linking livelihood issues with disaster management, facilitating participatory and community-level approaches and building upon indigenous coping strategies and appropriate technologies. Food crises tend to occur in countries with ongoing food security and related developmental challenges. In such cases, humanitarian organisations should complement existing, longer-term food security activities and objectives, and there are repeated calls for better coordination in this area. DRR perspectives, and agencies, can help to bridge this gap.

14.2 Understanding food security

The 1996 World Food Summit defined food security as: ‘when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life’.² This depends on people being

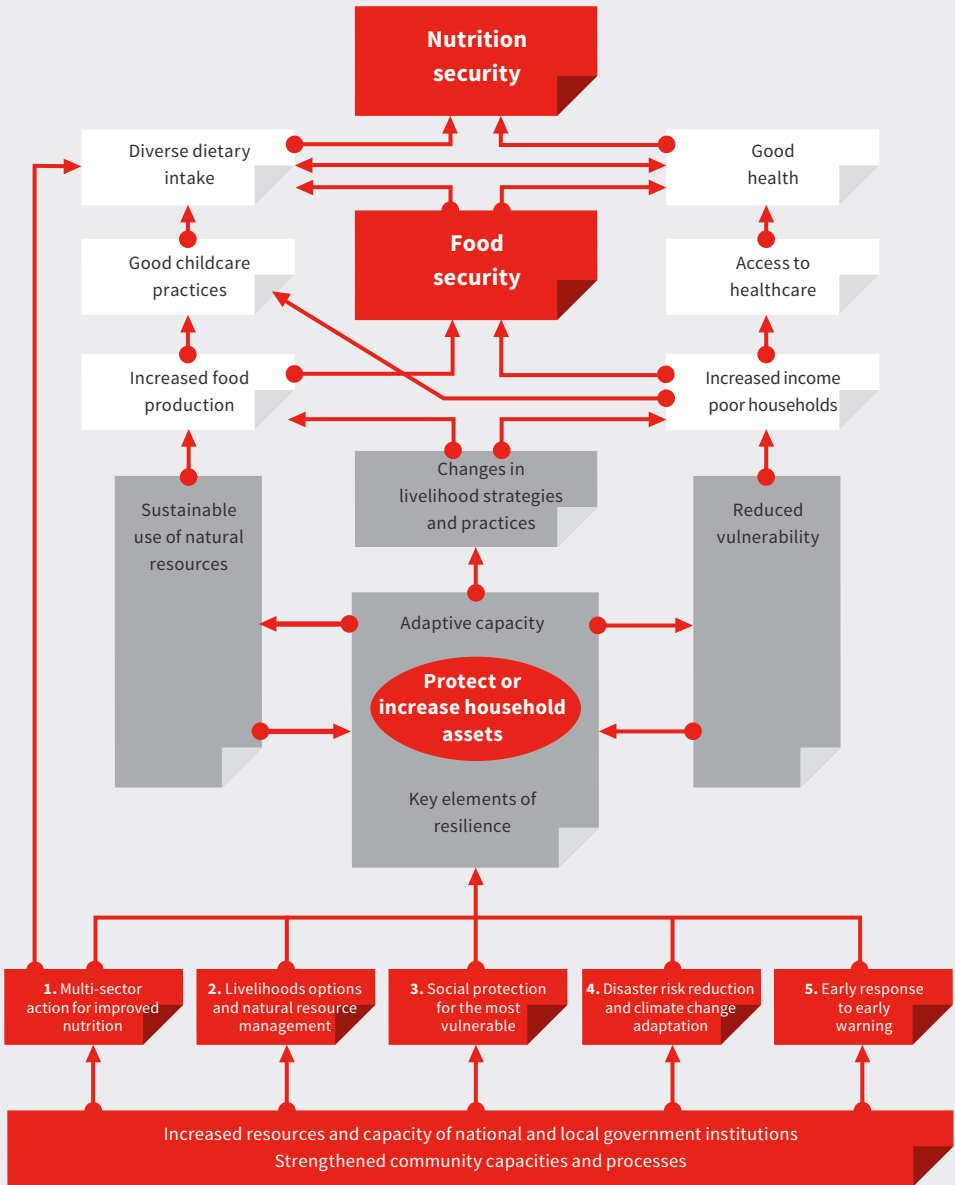
² ‘Rome Declaration on World Food Security’, World Food Summit, 13–17 November 1996, http://www.fao.org/wfs/index_en.htm.

able to buy food or obtain it in other ways, such as in exchange for their labour or other services, or by borrowing from their extended family or community. This, in turn, depends on them having sufficient income, savings and other material assets, skills or social connections to obtain food. Food security is not just a question of there being enough food available – rather, it reflects the fact that people do not have equal *access* to food because of differences in the resources they possess and other economic, social and political factors, including the price of food in local and global markets.³ Control of the distribution of food within individual households is another important dimension: children depend on what adults give them; male children and adults often get more food than females; and providing adequate food for elderly family members may not be a priority when times are hard. There can be pockets of food insecurity almost anywhere – within countries, communities and families. Food shortages can be transitory or long-term.

All of this means that there are many different ways of improving people’s ability to obtain food (for ways of visualising the variety of approaches, see Figures 14.1: Pathways to food security; and 14.2: Drought Cycle Management). These include improving farming and food production techniques, drought mitigation measures (such as soil and water conservation) and better management of natural resources such as forests and watersheds. They also include actions to support livelihoods in general, such as projects to create jobs and increase incomes, cash transfers, savings and credit programmes, crop insurance, social protection, ensuring security of land rights or access to common land, clean water and better sanitation (poor health is an important contributor to malnutrition), education for women (an important factor in reducing malnutrition at household level), supporting local markets for food and other products (through better access roads and footpaths, or better methods of packaging and preserving perishable products for sale) and encouraging wider community participation in economic and social development initiatives to improve the situation of marginalised groups. Such initiatives can be undertaken locally, to tackle pockets of food insecurity, or contribute to more widespread programmes. There is ample opportunity for local-level organisations to become involved.

3 This theory of people’s differing ‘entitlements’ to food was first advanced by the economist Amartya Sen in the mid-1970s.

Figure 14.1 Pathways to food security



Concern Worldwide, *Confronting Crisis: Transforming Lives through Improved Resilience: Concern Worldwide's Learning from the Sahel and the Horn of Africa* (London: Concern Worldwide 2013), http://reliefweb.int/sites/reliefweb.int/files/resources/2114_concernresiliencereportv4_2.pdf, p. 7.

Figure 14.2 Drought Cycle Management

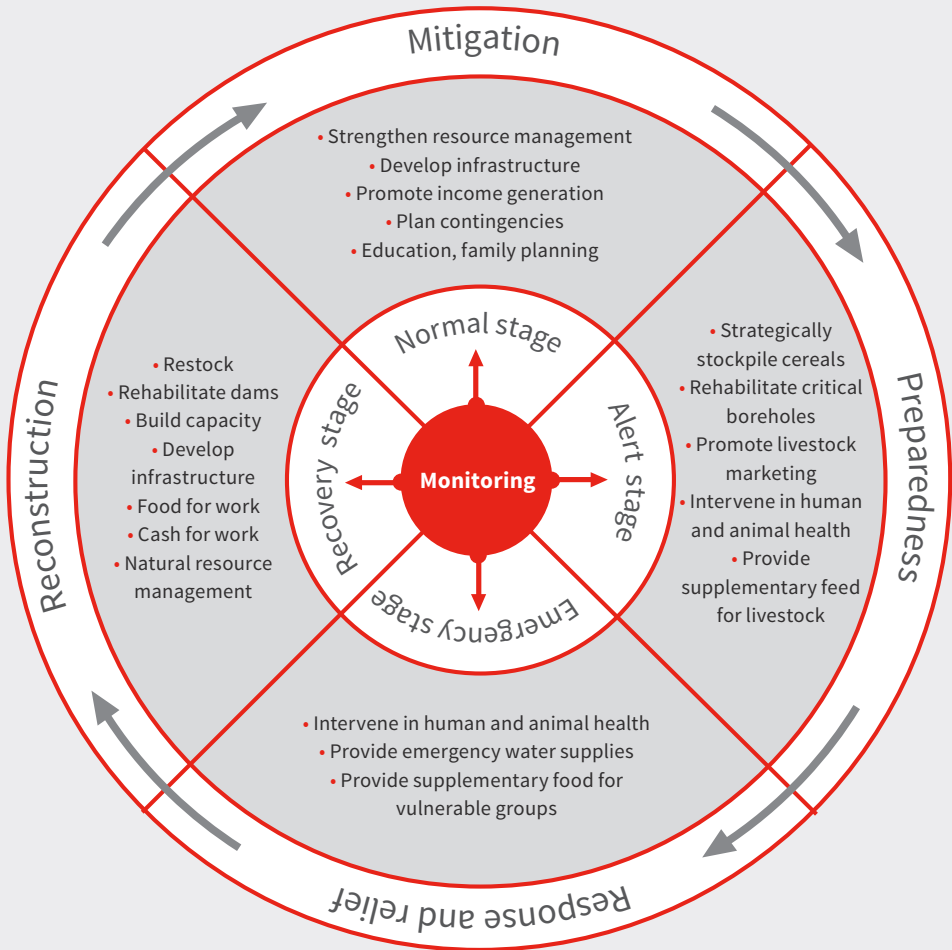


Diagram from http://akvopedia.org/wiki/Drought_cycle_management, citing IIRR, ACACIA and CordAid, *Drought Cycle Management: A Toolkit for the Drylands of the Greater Horn*, 2004, p. 41.

14.2.1 Drought

Although the causes of food insecurity include political, social and economic factors, natural hazards, especially drought, remain important. There are different kinds of drought:

- Meteorological drought is when rainfall drops below a certain level.
- Hydrological drought involves a reduction in water resources such as rivers, lakes and underground water.
- Agricultural drought is the impact of the previous two kinds of drought on crop yields.
- Socio-economic drought is when the supply of water cannot meet the demands of farmers, herders and communities.

Whilst it is obvious that places that receive little rainfall are drought-prone, drought can also occur where rain is normally sufficient. A few weeks with little or no rain at a critical time of year for crop growth can be devastating, even if the rest of the year is not dry. The important point is whether the amount of rainfall is sufficient for agriculture, livestock and other human needs at the time in question. Some of the measures needed to mitigate water shortages and their effects are outlined below. Here, a more general problem should be noted: the difficulty of assessing the relative importance of drought on food insecurity compared to broader socio-economic factors. It can be hard to disentangle these causes because they interact with each other. For example, a fall in crop yields may be due partly to lack of water, but may also be the result of lack of fertilisers or weeding, pests and crop diseases or labour shortages at critical periods.

14.3 Coping with food insecurity and famine

Seasonal food insecurity is normal in many poor households, which suffer a hungry period shortly before the harvest, as food gathered from the previous harvest runs out. This recurrent problem is known as ‘chronic’ food insecurity, as opposed to one-off shortages which are classified as ‘transitory’ food insecurity. When food insecurity is acute and prolonged it can lead to starvation and finally to famine (when there is a significant increase in sickness and death rates resulting from starvation and associated factors). The descent into acute food shortage and thence into famine can take weeks, months or even years.

Except where conflict is a major contributing factor, famine should not be seen as inevitable because of the range of measures available to improve food security and strengthen livelihoods in the long term at all levels. Take, for example, the mitigation strategies used by communities to protect themselves against drought and resulting food insecurity. These can be divided into two main types: agricultural and non-agricultural.

- Agricultural mitigation strategies are measures to maintain crop and livestock production. They include sowing again after a crop has been ruined by drought, sowing alternative crops or moving livestock to other locations.
- Non-agricultural mitigation strategies include seeking off-farm employment in the locality or elsewhere, eating seeds or roots that were saved to be sown in the next growing season, reducing the amount of food consumed, eating wild food such as berries and roots, postponing social functions such as weddings, using up savings, selling assets (such as livestock, household goods and personal possessions), buying on credit, borrowing money or calling in favours from communities and kin.

Families only sell their livelihood assets if they are forced to, when other methods such as growing alternative crops or finding alternative employment are insufficient. Sale of assets is a good indicator of how severe the consequences of drought are. Poor families, those with small landholdings and the landless, are the first to resort to such methods. Only when all else has failed will whole families and communities migrate in search of food. The severity of a food crisis can therefore be judged by looking at food and livelihood coping strategies as well as food supplies. Food insecurity is likely to be acute if:

- People experience a large reduction in their major source of food and are unable to make up the difference through new strategies.
- The prevalence of malnutrition is abnormally high for the time of year, and this cannot be accounted for by health or care factors.
- A large proportion of the group is using marginal or unsustainable coping strategies.
- People are using coping strategies that are damaging their livelihoods in the longer term or incur some other unacceptable cost, such as acting illegally or immorally – stealing, for instance.⁴

The most effective way to protect communities against food insecurity and famine resulting from drought is to strengthen these mitigation strategies in advance, especially those that enable them to preserve their productive assets, such as animals, seeds and tools. Despite this, many external interventions are in response to drought. Moreover, they often come at a late stage, when communities are in crisis and may already be destitute, having been forced to dispose of productive assets. Typical interventions in such circumstances are to provide food, seeds, fertiliser, animals and agricultural equipment to replace what has been used or sold, and to lend money. Where a crisis has become acute, with widespread starvation and migration, aid agencies' interventions focus on emergency response, especially feeding and health care. Food-for-work and cash-for-work schemes are also common responses.

⁴ H. Young et al., *Food Security Assessments in Emergencies: A Livelihoods Approach* (London: ODI, 2001), <http://www.odihpn.org/hpn-resources/network-papers>.

The boundary between disaster preparedness and response is blurred in the case of food crises because they can develop over such a long time. Some would argue that an emergency begins when hungry people are forced to dispose of their livelihood assets; others put it at the point where destitute, starving people leave their homes to beg for food, or even where large numbers begin to die of starvation. In this chapter, the emphasis is on longer-term mitigation measures to maintain food production and incomes.

14.4 Promoting food security

14.4.1 Integrating approaches

Drought-related food insecurity initiatives should address the different dimensions of the problem, using an appropriate range of methods. An example of this range is given in Table 14.1, which highlights the main interventions in a joint UNICEF/World Health Organisation project some years ago that covered 600 villages in Iringa, Tanzania. The project was a response to persistent food insecurity and malnutrition rather than to an individual disaster, and specifically nutritional aspects are emphasised in the interventions, but the basic approach is one of risk management, seeking to limit the likelihood of future disaster. Measures to combat chronic food insecurity are an important element of anti-famine initiatives.

As far as possible, interventions should be linked to household coping strategies. As affected people employ a variety of strategies, and may alter the type and mix of coping methods they use, agencies need to be flexible in their approach. Some of the components that might make up an integrated approach are outlined in the following sections. The overall aim should be to diversify crop production and other food production activities in order to maximise opportunities and spread the risks from environmental stress.

14.4.2 Protecting food production

The improvement and protection of soils is crucial in supporting agricultural ecosystems in the face of weather variability and extremes. Regeneration of degraded land through tree-planting, improved land use management and other agro-ecological interventions can have a significant impact on soil fertility and hence on crop yields (see Case Study 14.3: Land regeneration and food production).

Table 14.1 Interventions against malnutrition in Tanzania

Problem	Possible causes	Programme interventions
1. Inadequate food in households (most severe a few months before the harvest)	<ul style="list-style-type: none"> • Lack of household planning • Wrong crops chosen • Failure of rains • Poor crop management • Storage losses • Shortage of agricultural inputs • Lack of income to buy food 	<ul style="list-style-type: none"> • Training of trainers in household food planning • Promotion of drought-resistant crops • Improved storage
2. Inadequate nutrient intake (especially in children)	<ul style="list-style-type: none"> • Poor economic resources • Nutritionally poor diet • Shortage of fuelwood • Shortage of fruits and vegetables • Scarcity of meat • Scarcity of beans and other legumes • Too heavy workload for mothers 	<ul style="list-style-type: none"> • Promotion of income-generating activities • Nutrition education, especially to mothers, through health workers • Training and other inputs for village afforestation and home gardening • Training and inputs for small animal keeping • Promotion of grain milling and appropriate technology
3. Lack of awareness of good weaning practices	<ul style="list-style-type: none"> • Lack of awareness of children's nutritional needs • Inadequate feeding frequency • Scarcity of energy-dense foods • Dietary bulk 	<ul style="list-style-type: none"> • Provide weaning recipes based on local foods • Mobilise communities to provide extra food at child care posts • Campaign on use of <i>kimea</i> (flour with high nutritional value)

M. Hubbard, *Improving Food Security: A Guide for Rural Development Managers* (London: IT Publications, 1995).

Case Study 14.2 An integrated approach to food and livelihood security

Marginalised communities in Nepal's mid-western districts face chronic food shortages due to frequent droughts, declining harvests and the rising cost of imported food. World Vision has been working with a community in Jumla to improve long-term food security and household resilience. A large part of this work focused on methods for improving agricultural production: terracing slopes to make land available for agriculture, distributing seeds, building greenhouses to grow crops and saplings, setting up seed banks, training in composting techniques and repairing and maintaining irrigation canals. World Vision also supported the creation of community groups, such as greenhouse groups and seed banks.

Farmers involved in the project reported increased yields of 50–100%. They grew a variety of crops – barley, wheat, beans, potatoes, maize and apples – on the terraces. This helped to change local diets and reduced child malnutrition. Members of the Jumla greenhouse group achieved food security all year round, as well as setting up a savings and credit scheme with money from the sale of surplus vegetables, which is used to maintain the greenhouses, build new ones and make loans to group members.

The community was encouraged to identify and document local climate changes – there is often considerable local variation – and indigenous coping practices. Some farmers were already adapting to climate changes by creating apple orchards. However, the apples needed appropriate storage to stop them rotting before they could be brought to market. The project worked with farmers to construct 12 apple cellars, each with a storage capacity of seven tonnes, enabling them to preserve the apples and take advantage of higher off-season prices for their produce. The project also helped to improve local roads to markets. However, it remained difficult to get people to take part in activities benefiting the community as a whole, such as maintaining irrigation systems, because they remained more concerned with the short-term food insecurity many of them faced for several months a year.

M. Ibrahim and N. Ward, *Promoting Local Adaptive Capacity: Experiences from Africa and Asia* (Milton Keynes: World Vision UK, 2012), http://community.eldis.org/.5af30949/Adaptive%20Capacity_LORES.pdf.

Case Study 14.3 Land regeneration and food production

In parts of Niger, a great deal of land has become unproductive because of land degradation and erosion, largely due to extensive deforestation. Since 1985, farmers in southern Niger have been managing the regeneration of trees and bushes on their land as part of a farmer-led movement called Farmer Managed Natural Regeneration (FMNR). Where FMNR is practised, degraded land has been restored and crop yields have increased. Some 5m hectares have been 're-greened' in this way. As a result, small-scale farmers are producing an additional 500,000 tons of cereals a year, helping to feed 2.5m people. Financial benefits from increased grain and livestock production and sales of tree products are estimated at up to \$250 a hectare and income has risen by 18–24% per household member.

P. Gubbels, *Escaping the Hunger Cycle: Pathways to Resilience in the Sahel* (London: Sahel Working Group, 2011, <http://www.groundswellinternational.org/wp-content/uploads/Pathways-to-Resilience-in-the-Sahel.pdf>).

Methods of protecting the soil against erosion from wind and water and preventing water run-off include terracing, digging furrows and ridges, planting grasses, bushes and trees, building walls of stone or earth, planting in holes and pits and mulching. The most appropriate method for each location depends upon its physical features (the nature of the soil, the terrain and climatic conditions) and local capacities (the materials, skills and other resources available).

Intercropping (mixing different crops in the same plot) is a traditional coping strategy. Where the crops chosen differ in their resilience to drought, diseases or pests, intercropping increases the probability that some crops will survive. It can also be beneficial to growth: some plants give shelter or shade to others, or provide nutrients to the soil. Other beneficial agricultural practices include crop rotation, composting, application of green manures and planting cover crops. Integrated pest management, based on intercropping and the use of insect-repelling plants, crops or pesticides (including those made from traditional recipes using local plants) is another feature of many successful food security initiatives.

Research has revealed extensive indigenous knowledge of agricultural plants and how to grow them. By protecting and sharing such knowledge, and the traditional seed varieties concerned, food security projects can widen the options open to communities and increase their resilience to hazards. Seed banks, fairs and demonstration plots are effective methods of preserving, promoting and sharing traditional plant varieties (e.g. Case Study 14.4: Improving food security in a drought-prone area). Local genetic diversity protects crops and

Case Study 14.4 Improving food security in a drought-prone area

Chivi District, in Zimbabwe's Masvingo Province, is an area of poor soils and low rainfall. In 1990, Intermediate Technology (now Practical Action) began to explore methods of working with communities and local organisations in the district's Ward 21 to improve food security among the 1,300 households there. This coincided with a period of drought that killed many cattle in Chivi.

The project intended a strongly participatory approach from the start, but had to overcome considerable local cynicism about the value of outside agencies. Many villagers were puzzled that the NGO had not come with a pre-formulated programme and was not offering financial or material support. An extensive assessment process carried out with the community identified a wide range of problems in producing food and sustaining livelihoods. Only after six months of consultation did the project begin to set priorities and make plans – again, involving the community, many of whom had never gone through a participatory process of this kind. It worked with two main local institutions: farmers' clubs and women's garden groups, as these were most directly involved in food production.

The first phase of implementation addressed the need for water for fields and gardens, pest and disease control and fencing to protect gardens from animals. At the same time, over 1,800 community members took part in training to improve their capacity to identify problems and solutions, communicate and manage their own organisations.

During the first two years, a range of technologies was tried out by farmers and gardeners, and those found to be most effective were quickly taken up by other community members. They included sub-surface irrigation using clay pipes, pots and bottles; terracing, rock catchments, 'tied' ridges, infiltration pits, mulching and underground plastic sheeting to increase water retention; digging and improving wells; winter ploughing, intercropping and use of termite soil as fertilizer and moisture retainer; and growing 'live' fences of sisal. Seed fairs were held to revive local crop varieties, share information on them and demonstrate

livestock against diseases and environmental changes. Government agricultural extension services and NGOs have sometimes promoted new, hybrid versions of staple food crops at the expense of traditional varieties. These newer varieties can give higher yields, but in many cases require favourable conditions with ample water and fertilizers, whereas traditional varieties tend to be more resilient to environmental stresses such as drought. Promoting new commercial seed varieties can also threaten biodiversity and undermine traditional knowledge of alternative varieties.

Food production is inseparable from issues of improved access to land and more secure land ownership. Many of the problems poor communities face in drought-prone areas arise from

Case Study 14.4 (cont'd)

their value. Surveys and discussions showed that many farmers knew of local plants that could be used to make effective pesticides, but were reluctant to tell others because they feared their knowledge would be thought too old-fashioned in an age of modern chemical pesticides. The project made sure that their knowledge was recorded and shared.

All of these methods were widely adopted and effective in boosting production. However, as the project progressed it was clear that it needed to pay more attention to marketing. Women gardeners carried out surveys of demand and prices for various vegetables, and as a result the groups began diversifying their production to meet these opportunities.

As the project took off, with widespread adoption of the various techniques and growing numbers of local people taking part, it also expanded into other wards. Reviews and evaluations found increased and more reliable crop yields and a steady increase in the variety of crops being grown. Buyers began bringing trucks into the area to purchase surpluses, and women began sending their husbands to neighbouring areas to sell the produce from their vegetable gardens. Some garden groups set up a revolving loan fund, and community organisations became more confident in managing their own affairs and in their relationships with outside agencies and government agricultural extension workers. After the project formally came to an end, local farmers formed a trust to continue the work. The trust was managed and directed by local people, though it relied to some extent on external support and resources.

K. Murwira et al., *Beating Hunger: The Chivi Experience* (London: IT Publications, 2000); A. Masendeke, *SARD Initiative Retrospective Study – Chivi Food Security Project* (Harare: ITDG Zimbabwe, undated), <ftp://ftp.fao.org/docrep/fao/009/ag252e/ag252e00.pdf>.

unequal distribution of land and natural resources. Determined advocacy may be needed to protect common resources such as forests and grazing land.

14.4.3 Storing food and seeds

Crop stores and seed banks help to ensure that there is food to eat and that there are seeds to plant. They offer security against rising food prices during the hungry season, and by storing a wide variety of local seeds they maintain biodiversity. They can also protect crops and seeds against other natural hazards, such as floods.

Many drought mitigation projects include crop and seed storage among their interventions, and there is plenty of guidance on this subject.⁵ This storage falls into two main categories: household stores and community grain and seed banks. Inadequate storage can lead to crops rotting, becoming diseased or contaminated, or being eaten by pests. Low-cost techniques and materials can often be used to make stores, and traditional knowledge and methods can be adopted or adapted: examples include sealed clay pots, baskets lined with clay or plaster, plastic sheeting, sacks, metal bins and underground storage such as lined and covered pits. Stores can be raised above the ground on wooden poles to protect them against rats and mice (with guards made of tin cans on the poles to prevent the animals from climbing up). Some varieties of crop and seed may be more resistant to pests and disease than others, and it is useful to explore traditional knowledge on this. Traditional pesticides such as ash, some types of edible oil and certain local plants may preserve crops against insect attack. Some crops can be preserved for longer by drying or smoking them. In other cases crop processing – into flour, oil, jams or pickles, for instance – is an effective preservative, as well as creating a product for sale. Exchange visits enable farmers to see different storage and preserving practices and discuss their effectiveness.

A few words of caution are needed here. First, it is important to identify whether crop losses in storage result from poor storage, or from harvesting and post-harvest preservation practices. If the latter are inadequate and introduce disease or contamination into the crops, good storage systems will make little or no difference. Second, community seed or grain banks present storage and management challenges that are quite different from domestic stores. The storage problems are technical, arising from the scale on which produce has to be stored, but in many cases similar technologies to those employed by households can be used. The real challenge is management. A seed or grain bank is a *bank*, not merely a store. These banks can be run in different ways but the principles are standard: usually they buy grain from their members and sell it back at below-market rates, or they run as savings and credit schemes. Procedures governing how households deposit seeds or grain with the stores, how to sell or lend seeds and grain back to them and how to deal with defaulters must be worked out carefully, and must be transparent.

Grain/seed banks must be planned with communities, built by them and managed by them and, crucially, run on behalf of the whole community. This may require training in organisational development, literacy and accounting procedures. Start-up funding may be needed to build stores and purchase initial grain stocks, and top-up funds or grain may be necessary. Outside organisations attempting to introduce such schemes need a high level of skill and experience in community development, and there has to be a high level of trust

⁵ For example, I. Carter, *Improving Food Security: A PILLARS Guide* (Teddington: Tearfund, 2001), http://tilz.tearfund.org/-/media/Files/TILZ/Publications/PILLARS/English/PILLARS%20Food%20security_E.pdf; M. Hubbard, *Improving Food Security: A Guide for Rural Development Managers* (London: IT Publications, 1995).

between the community and the organisation that is helping it, which may take years to build. Seed or grain banks should also be part of an integrated food security or rural development programme. On their own, they cannot provide complete food security.

14.4.4 Water conservation

Water shortages affect crops, livestock and people. Town dwellers rely on large-scale water infrastructure, but in the countryside communities may have access to a variety of sources: rivers, ponds, wells and dams. The extent of access depends on distance, ownership of the water resource and the cost and technical difficulty involved in collecting or extracting water.

There are two main options for increasing water supplies. The first is to improve access to underground water sources, for instance by deepening wells or digging new boreholes. Such measures may be beyond the financial or technical resources of poor communities, but there have been many successful water supply projects involving external support. If the water is fed into irrigation schemes, then the cost of installing and maintaining irrigation pipes and channels must be added. The second method is 'rainwater harvesting'. There are many different methods of harvesting rainwater for agricultural and domestic use. They include:

- building water-storing dams and percolation dams (dams that slow the rate of rainwater run-off and so increase absorption into the soil, thereby recharging local groundwater);
- building community or domestic storage tanks;
- lining ponds with plastic to improve water retention; and
- putting up stone or earth bunds to improve absorption and reduce soil loss (brushwood and strips of grass or other plants can also be used).

Many of these methods are traditional and the knowledge and skills needed to build and maintain them are present in the community. In other cases, it is relatively easy to acquire the relevant technical expertise, such as site surveying and designing structures, though perhaps harder to know how to choose the most appropriate techniques for different geographical and socio-economic contexts. The choice of approach to water provision varies according to location, and may vary over even a small area according to such factors as the topography, the level of dependence on irrigation compared to rainfall and the moisture-retaining capacity of different soils.

Most rainwater harvesting methods are cheap compared to digging wells and pumping water from more remote sources. Communities can provide labour and in some cases building materials – bunds and dams use just stones and earth. Many readily available materials can be used to catch, channel and store rainwater, including tin sheets, palm leaves, plastic

sheets, the stems of plants such as bananas and bamboos, tree trunks and more conventional gutter pipes and tanks. The task of constructing larger-scale structures such as tanks and dams is substantial, and collective action is needed. Construction of community rainwater harvesting structures may require the community or external agencies to provide labour, materials or financial resources. Some of these activities, such as digging water-retaining earthworks, are time-consuming and labour-intensive. Design, construction and ongoing maintenance need to be managed carefully, ideally through community ownership and collective effort.

In some cases, the problem may be one of access to water, not its physical availability. Equitable water distribution is the goal. Communities in drought-prone areas often have sophisticated systems for this. Local management structures should be reinforced where necessary.

Rainwater harvesting can be highly effective. India, for example, appears to have had considerable success: there are over 120,000 small reservoirs in the country's semi-arid regions, providing irrigation water for more than 4m hectares.⁶ The expansion of rainwater harvesting in India has been assisted by the existence of centuries-old traditions and techniques, coupled with technical support and vigorous advocacy from Indian NGOs.

14.4.5 Preserving livestock

Livestock are a valuable asset, providing food, income and agricultural inputs (manure, pulling ploughs and carts). Some livestock, such as goats and camels, are good at withstanding water shortages. A one-year drought may have little effect on the size of a herd since the animals can be moved. But when the drought is prolonged poor people are often forced to sell animals to raise money for food (breeding animals are usually kept and others sold). If this happens on any scale it drives livestock prices down, generally at the same time as grain prices are rising with scarcity. This can result in severe depletion of herds, from which it may take many years to recover.

Agency interventions to protect livestock-dependent communities during drought crises are generally of the following main kinds:

- Increasing grain and fodder supplies to the area (the former to help keep grain prices down, the latter to keep animals fed).
- Removing surplus animals (e.g. by buying, slaughtering and processing them).

⁶ V. Anbumuzhi et al., 'Towards Improved Performance of Irrigation Tanks in Semi-arid Regions of India: Modernization Opportunities and Challenges', *Irrigation and Drainage Systems*, 15, 2001, <http://link.springer.com/article/10.1023%2FA%3A1014420822465>.

- Giving broader support to communities' livelihoods, so that they do not have to sell their breeding animals.
- Restocking with new animals.

Pastoralists have long-established methods of coping with drought, based largely on moving animals to other areas and partly on livestock sales. But with traditional grazing lands increasingly under threat from privatisation for ranching or other forms of development, coupled with the spread of conflict in African countries in particular, it is becoming harder for them to put these coping strategies into practice (see Chapter 15). Where communities are heavily dependent on livestock that cannot easily be herded elsewhere (e.g. dairy cows), collective schemes might be established to maintain fodder supplies during droughts through bulk purchase and community-managed plantations. This can be effective, but is likely to need strong institutional support.

14.4.6 Food aid and nutrition

Monitoring and combating malnutrition is an important component of food security work, including early warning. Assessment of nutritional deficiencies requires specialist expertise and is beyond the scope of this book, but several major agencies have produced technical guidelines for the management of nutrition in crises: the Emergency Nutrition Network website (<http://www.enonline.net>) is a good place to look for this kind of information.

Advances in nutritional assessment methods have increased agencies' ability to monitor and manage crises as they enter the acute stage. Since the early 1990s nutritionists have widened the focus of their work from malnourished individuals to larger populations, and from a narrow set of technical interventions to combat malnutrition to a broader range of strategies, policies and programmes that take account of related causal factors such as water, sanitation, health and social care. Multi-sectoral approaches are ideal in theory, but their complexity causes problems. In practice, nutrition initiatives often have to make the difficult choice between concentrating their resources on the direct alleviation of malnutrition – usually through feeding programmes – or addressing underlying causes.

14.4.7 Protecting livelihoods

Where support to livelihoods is concerned, many of the steps that organisations will need to take in drought-prone communities can be regarded as general development interventions as much as DRR (see also Chapter 9). A broad range of interventions is needed to stimulate local economies so that poor people are no longer so dependent on agriculture for their food and income. Economic diversification is the key here, through on- and off-farm enterprises. Where a family's income comes from a range of different economic activities, there is a greater degree of protection against the failure of any one activity (e.g. harvest failure due to drought). Diversification of agricultural production is part of this. Many food security

projects encourage farmers to grow a wider range of crops, establish kitchen gardens and orchards, keep poultry or set up fish ponds. This has the twin objectives of improving food supplies and generating produce that can be sold. Technical assistance, if needed, must be supplemented by training in business skills and marketing, and organising production to meet market demands.

Many drought mitigation projects support household gardens in addition to farms. The gardens are typically used to grow vegetables that will give a more varied diet and can be sold. In many cases they are managed by women, who thereby gain more control over household food supplies and income. Another common approach to enhancing livelihoods is the processing of agricultural products – for example grain milling, oil processing, making jam and peanut butter, fruit and vegetable drying or bee-keeping. Processing preserves crops and often adds value.

Off-farm employment may be regarded as more secure against drought than agriculture, but this impression can be misleading. Local industries that depend on water or agricultural products are vulnerable too: for instance, a grain mill stops working when there is no more grain to mill. In such cases the impact of the drought may be delayed until some time after crops have failed, but this is only a delay. The collapse of the agricultural economy also affects rural people's purchasing power and so has a knock-on effect on shopkeepers and traders supplying goods. Plans for local economic diversification must take hazards into account and, where possible, find productive activities that are unlikely to be directly affected. Artisanal crafts may be a suitable activity, as the supply of raw materials may not be affected by a drought or other hazard and markets may be some distance from the affected area. Creating alternative enterprises is a complex task, requiring specialist support in technical and business skills, credit and market access.

Well-functioning local markets make it easier for vulnerable people to buy and sell in times of need and, by distributing efficiently and moderating shortages, help to keep the prices of essential items down. Development and disaster planners may need to act to strengthen local markets and improve poor producers' access to them, for instance by improving local transport infrastructure, helping to disseminate information about prices, lobbying against damaging market restrictions, promoting more efficient methods of storing, preserving and transporting perishable goods such as food products, supporting small-scale decentralised processing facilities (e.g. grain milling) and providing credit and training in small enterprise management.

While communities with high incomes generally suffer less from malnutrition, the link between wealth and nutrition is not clear-cut: there can be considerable differences within communities and households. Other factors play an important role. For example, the level of education among women has a great influence on dietary, hygiene and health practices. The benefits of increased income also depend on who earns and controls the money.

14.4.8 Maintaining natural resources

Maintaining natural resources such as forests, grazing land and sources of water is very important to food security, especially where these are held in common. More intensive use of common property – for grazing, collection of wild food and roots or fishing – is a valuable drought coping strategy and is important for the very poor and landless at any time. Preserving these resources against encroachment by private interests or their destruction by alternative forms of commercial or state-sponsored development, such as farming, logging and dam construction, is usually difficult. Local voices are unlikely to be heard unless their campaigns are supported by other organisations with resources and lobbying skills.

Reforestation to mitigate drought or other hazards can be highly effective (see Case Study 14.3: Land regeneration and food production), but can also present significant challenges. Communities need to be convinced of the need for it, and must have strong incentives for investing in trees that may not produce anything of economic value for many years. Expertise in forest management is essential. There are many anecdotal accounts of tree-planting initiatives as part of DRR programmes (protecting land from erosion or providing wood for disaster-resistant housing) that failed because project managers lacked experience of this kind of work.

14.5 Monitoring and warning systems

There are many kinds of warning system for droughts and food shortages. They often combine hazard/meteorological monitoring, assessments of food production levels after the harvest season and other indicators of household stress, such as sales of livelihood assets. Warning systems have increasingly shifted their emphasis from the simple availability of food to considering which groups do not have access to food: this takes them logically into vulnerability and livelihoods analysis.

National and regional systems are best managed by governments and international organisations. They are also geared to large-scale disasters requiring international aid. However, local early warning systems also have an important role to play in monitoring impending food crises. They tend to draw on a wider range of indicators of food and livelihood insecurity than larger systems, rely far more on qualitative data and involve higher levels of community participation. They are better able to take account of local variations in food security and more sensitive to local coping strategies and vulnerability. They can recommend appropriate interventions to local decision-makers, who will have a better understanding of conditions on the ground and a greater sense of urgency in responding to problems. They are easier to manage than large-scale, centralised systems, but they also tend to suffer from a lack of skilled personnel and are more open to manipulation by local interests.

Drought monitoring systems look at two main indicators: rainfall and vegetation. The former is monitored by rain gauges, the latter mostly through remote sensing by satellites. In both cases, large amounts of high-quality data can be generated. These are supplemented by other meteorological data (such as rainfall forecasts) and hydrological data (such as monitoring of groundwater supplies and the level of water tables). Although rain gauges are relatively simple technologically, and collecting data often depends on local staff or volunteers, rainfall monitoring needs to take place on a large scale if it is to be of value in assessing overall needs and priorities. Management of such systems is generally taken on by government meteorological services and feeds into the well-established and effective national and international meteorological information systems. There is also growing use of telemetric rain gauges that transmit data automatically to distant monitoring stations, using radio signals or other electronic means of communication. The cost of procuring and analysing satellite data on vegetation cover is so high that this task too is generally left to international and government services.

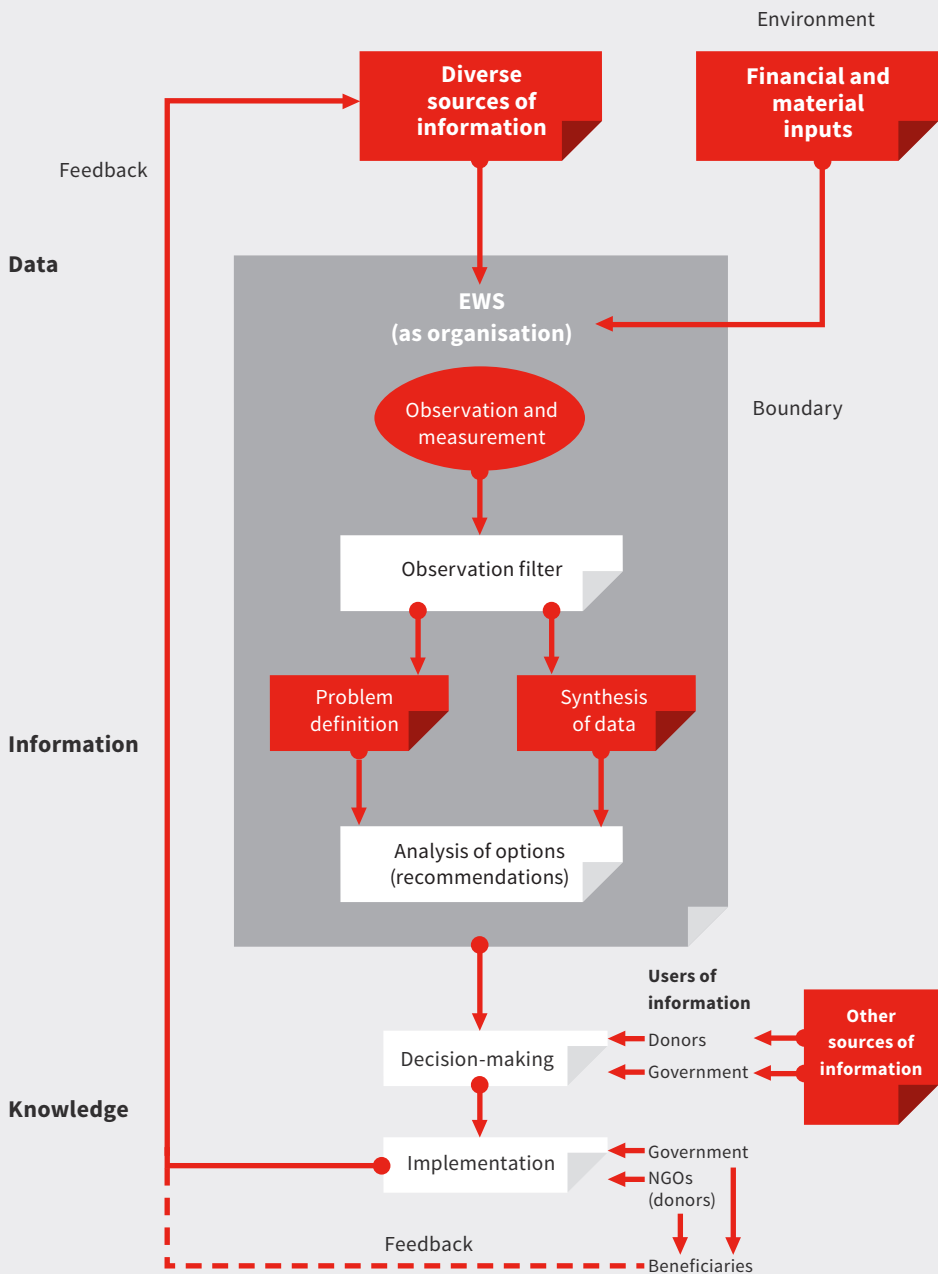
Monitoring of rainfall and vegetation does not tell us how much food people have or need. Remote sensing does not distinguish between different kinds of vegetation, so it does not show how well crops are growing. Since different food crops vary in their levels of tolerance to drought, rainfall monitoring is of limited value as an indicator of the availability of food. It is for this reason that food security or famine information and warning systems have become an increasingly important tool for disaster managers.

Early-warning systems take many forms in terms of their institutional set-up and location, the resources available to run them and the information that they collect and process. However, all are designed to stimulate action by informing decision-makers about food security conditions and people's needs. An efficient, effective early warning system for drought-related famine should have the following characteristics:

- It should be capable of warning of large-scale famine, sensitive to changes in food security status before famine threatens and able to detect localised pockets of acute food stress.
- It should generate a response that provides assistance at an early stage, before families and communities are reduced to destitution.
- It should stimulate interventions that protect livelihoods before lives are threatened. This implies providing a wider range of relief than food aid, as well as a more developmental approach.

7 M. Buchanan-Smith and S. Davies, *Famine Early Warning and Response – The Missing Link* (London: IT Publications, 1995).

Figure 14.3 An early warning system as information system



M. Buchanan-Smith and S. Davies, *Famine Early Warning and Response – The Missing Link* (London: IT Publications, 1995), p. 14.

The effectiveness of early warning systems varies. There are four main reasons for this:

1. The nature of the system and the information provided – the range of indicators used, the accuracy of the data, the timeliness of warnings.
2. The institutional context within which the system is located, and its institutional links to decision-makers.
3. The broader political environment. Decisions about when and how to intervene are political and therefore influenced by many other factors.
4. Logistical obstacles to launching a timely and adequate response.

Research in a number of food crises has shown that reasons 2 and 3 are the most important in explaining if and how early warning information is used, together with variations in performance between different warning systems. Early warning systems do sound the alarm about impending food crises, but response systems often fail to act early enough.

14.5.1 Data and indicators

Food security information and famine early warning systems incorporate a wide range of indicators of the availability of food and ability to procure it. This includes data on the market price of food and other essential goods, family and community behaviour (the adoption of particular coping strategies) and employment opportunities, as well as more conventional data on rainfall and levels of groundwater, crop production (surveys before and after the harvest), nutritional status and food supplies. However, many warning systems rely too much on indicators of food production and supply, and too little on indicators of access to food, particularly purchasing power. Socio-economic indicators, which can be harder to collect and draw more on qualitative data, are less influential in overall decision-making. Coping strategies, which are difficult to monitor and interpret accurately, are also difficult to incorporate systematically into early warning systems. Officials are more likely to be impressed by conventional quantitative monitoring than community-based systems and local knowledge.

Multi-indicator systems are sensitive to the complexity of famine processes and therefore more likely to detect worsening food security early enough for interventions to protect livelihood assets and prevent starvation. However, information does not speak for itself: data have to be interpreted, and different types of data are not easily compared. For example, how does one weigh up the relative significance of data on grain prices in local markets compared to levels of rainfall or farm crop production, or sales of livelihood assets? To add to the problem, most systems depend to some extent on proxy indicators of food stress (e.g. the timing and extent of adoption of particular coping strategies). Different methods are needed to collect different kinds of information, each requiring its own skills. Formal measuring systems can be

used for some aspects of food security, such as crop production and food prices. Monitoring of nutritional status has its own methods, and assessments of wider household food security status require skills in interviewing and participatory appraisal. All of these skills can be learnt and transferred, but this takes time and specialist assistance will be needed as it is unlikely that any one local organisation or project team will have all of the relevant skills in-house. Rapid staff turnover often prevents skills from becoming fixed within an organisation.

Relevant information may have been collected by other people and for other purposes (e.g. a Ministry of Agriculture will collect agricultural production data). It will have to be obtained from those users, which may not be easy, especially in countries with very bureaucratic administrations. Information from other sources may have been collected or aggregated on a different basis from that of the local monitoring system. For example, government officials prefer to use administrative areas as their units of analysis and their sampling methods may not take account of geographical or social differentiation within those areas, but food insecurity can be very localised and unevenly distributed. Disaggregation of data by age, sex or occupation is likely to vary between different data sets, as will the timing and frequency of data collection. Warning systems tend to overlook the value of community-based data collection, drawing mostly on local technical services: communities and even local governments are often left out of the process. Information can be gathered for its own sake, without sufficient thought being given to what field agencies need to know. Systems may be unable to process all the information they collect, especially where they use a wide range of data sources and indicators.

At the end of this process, information has to be packaged in a way that is intelligible to decision-makers and that helps to guide them towards appropriate action. This link to action must be kept firmly in mind when planning and running early warning systems. The system may have to supply information to a wide variety of users, ranging from government policy-makers to field managers. Each group may want different kinds of data, which may have to be presented in different ways.

14.5.2 Assessment tools

A number of tools can be used to assess food insecurity and warn of impending crises. Vulnerability and capacity assessments (see Chapter 3) are widely used by agencies working in drought-prone areas. The Household Economy Approach (HEA), which collects and analyses food security information, has been used extensively since it was first developed in the early 1990s (see Case Study 14.5: Monitoring household food security). A number of other approaches are available, including a food security and resilience ‘screening tool’ developed by the International Institute for Sustainable Development.⁸

⁸ See <http://www.iisd.org/cristaltool/download.aspx#cristal-food-security>; IISD, *Climate Resilience and Food Security: A Framework for Planning and Monitoring* (Winnipeg: International Institute for Sustainable Development, 2013), http://www.iisd.org/pdf/2013/adaptation_CREFSCA.pdf.

Case Study 14.5 **Monitoring household food security**

In the early 1990s Save the Children developed the Household Economy Approach (HEA) to analyse household food security. The approach has been taken up by many other agencies. The best known application of HEA is to emergencies, for instance in early warning systems, needs assessments and scenario planning, but it is also widely used in poverty reduction to guide development plans and assess the impacts of social protection, market and other livelihood interventions.

Central to the HEA is understanding households' livelihoods and everyday circumstances as an essential part of predicting how they will react in a crisis. Baseline data collection provides information on how households normally obtain food and cash income, their connections with the market and social or kinship networks, their assets (land, food stocks, livestock, cash, goods, tools) and expenditure patterns. Data collection is based mainly on fieldwork using participatory techniques that involve community members, individually and in groups, though a very broad range of assessment tools can be used.

The next steps are to identify potential problems – hazard threats and changes in agricultural, economic or security conditions – that could affect access to food, and to develop scenarios showing what the impact of such changes would be. For example, the impact of reduced crop production, milk yields and income from livestock sales or wage labour can be translated into an estimate of the likely impact on food availability. Similarly, the potential role of various coping strategies can be estimated.

P. Holzmann et al., *The Household Economy Approach: A Guide for Programme Planners and Policy Makers* (London: Save the Children, 2008), https://www.savethechildren.org.uk/sites/default/files/images/HEA_Guide.pdf.

Where appropriate, data should be exchanged between vulnerability/food security assessments and early warning systems, to avoid duplication of effort. However, there is no single measure of food security that is valid and reliable, comparable over time and space, and which captures its diverse elements. In practice, many different approaches and means of measurement are used, focusing on different aspects. Relying on just one measure of analysis in project design risks missing important dimensions of food insecurity, but agencies find it difficult to know which indicators are best suited to particular situations.

14.5.3 Maintaining local systems

Food security information systems are complex and difficult to manage. They can also be costly because of the considerable staff time required to collect and interpret data. This is true even with participatory data-gathering methods that involve community members, because the information still has to be drawn together from different sources, analysed and then packaged for decision-makers and field workers. As data often have to be gathered from people dispersed over a wide geographical area, transport and subsistence costs can also be high.

Systems need to be maintained continuously to give reliable data of patterns of food supply and demand over time. A secure funding stream is therefore needed. Lack of resources has damaged a number of government and NGO-run warning systems. The project-based approach that NGOs generally adopt is an insecure foundation for such work because of its fixed time spans and the difficulty of obtaining repeat funding from donor agencies.

Both national and local warning systems must be integrated into the institutions that manage them. Many systems are purpose-built and tend to stand alone. Those who set up early warning systems should plan their external links as carefully as their internal mechanisms. Local systems often feed into national ones, but unless decentralised data are available for all the areas at risk, this can distort decision-making by giving undue prominence to particular districts.

Other problems include the lack of integration between different agencies' early warning systems, which hinders collective analysis and action. Failure to standardise data across systems is a major issue. Agencies fail to learn lessons from each other's experiences and even from their own similar programmes elsewhere.

Chapter 15

DRR, social crisis and conflict

15.1 Introduction

Social crisis, insecurity, state fragility and conflict are major development problems in many parts of the world. They create poverty, reverse development gains, and undermine social cohesion and human rights. Disasters and conflict often interact: conflict can create or increase vulnerability to other hazard events, whilst natural hazard events and other environmental stresses can exacerbate social crisis and conflict. Many conflicts and complex political emergencies are in areas which experience recurrent natural hazards. Economic and political pressures can be powerful drivers of social tension as well as over-exploitation of natural resources. Slow-onset threats, such as drought and desertification, accumulate pressure on natural resources such as water and forests, thereby degrading the environment (e.g. through deforestation and loss of pasture and topsoil from overuse), producing greater competition for these resources and thereby increasing the risk of conflict. Long-running droughts or seasonal floods reduce crop yields or wreck harvests, undermining agricultural livelihoods. This may lead ultimately to displacement and migration, which in turn can increase competition for resources with host communities where the displaced settle.

Many community-level conflicts are the result of competition for natural resources, or ineffective governance or management of resource use – particularly in the case of pasture, farmland and water, which are essential to livelihoods. Although environmental stress can sometimes lead to greater cooperation between social groups over natural resource management, disputes and conflict are a more common outcome. Access to common lands and other common resources may not be equitable, with minority and vulnerable groups losing out, whilst land disputes are often manipulated by political and other factions.

Conflict leads to environmental degradation, the breakdown of public services and disruption of infrastructure, household assets and livelihoods. Conflict, or the fear of conflict, undermines the rational use of resources, which may be over-exploited to meet immediate needs. People displaced by conflict often have no choice but to resettle in hazardous locations, such as unstable hillsides or flood plains. Social crises and conflict also create or accentuate social inequalities, where those who wield physical power exert greater influence and control: women and children are particularly marginalised in such situations. Although every situation or event is different, the interaction between disasters and conflict increases the risk of future crises by undermining individual and collective coping capacities. Case Study 15.1 (Conflict, displacement and food security) is an example of the impact that environmental pressures and conflict can have on poor people.

Case Study 15.1 Conflict, displacement and food security

In Northern Mali, years of drought have had a significant impact on families that depend on farming and livestock for their livelihoods and food security. There were poor harvests in 2011, followed in 2012 by separatist campaigns involving a number of armed groups which displaced over 300,000 people. Food and seed stocks intended for consumption and sale were looted and the price of basic foodstuffs rose steeply. Livestock breeders were unable to move their animals in search of pasture and water, and were forced to sell them at very low prices in those local markets that were still accessible. In the towns, workers were no longer paid and banks ceased operating. Electricity and water supplies stopped functioning in some towns. Most community health care centres in rural areas also stopped working, having been looted or abandoned by their staff. Medicines were hard to obtain and vaccination programmes were suspended. The insecurity also hindered efforts to control locust swarms that were feeding on newly planted crops.

J.-N. Marti, 'Addressing the Critical Humanitarian Situation in Northern Mali', *Humanitarian Exchange*, 55, 2012, <http://www.odihpn.org/humanitarian-exchange-magazine>.

15.2 Implementing disaster risk reduction in insecure contexts

Governments and other organisations working in 'fragile' or conflict-affected states are often unable to plan and implement DRR or development programmes. Political instability, power struggles and challenges to government authority from political or armed factions undermine the normal processes of decision-making and long-term planning. Hazard-prone regions affected by insecurity or conflict are often neglected. National governments may choose to overlook them because they are too marginal economically, politically or ethnically. Lack of basic services and functioning local infrastructure, such as roads, water and power supplies, makes project implementation more difficult and expensive. Official institutions may be weak, with limited human capacity, technical expertise and material or financial resources, and corruption may be a major challenge. Civil society organisations may lack capacities or be affected by wider divisions in society.

DRR and other sustainable development agendas are likely to be marginalised by what are perceived to be more urgent needs: even in countries and communities affected by both conflict and natural hazards, and where it is acknowledged that conflict and other forms of disaster are linked, it is still common to find conflict management and DRR pursued as

independent initiatives, with a lack of coordination between organisations in the field and strategies, programming and assessment carried out independently. Humanitarian assistance agencies can often obtain donor funding in crisis-affected regions, but donors are wary of committing funds to longer-term development or DRR initiatives where the risks are high and the outcomes are perceived to be uncertain. Alternative financing mechanisms for DRR, such as those discussed in Chapter 12, are unlikely to be available, and livelihoods projects may be hampered by difficulties in accessing markets. Security may be a major concern: organisations are often deterred from working in dangerous places because they fear that aid materials and equipment will be destroyed or stolen, and because staff may be put at risk. Security planning and training, together with good risk assessments, are essential to minimise risks, although safety can never be guaranteed. Relationships may have to be built with a number of national, local, official and non-governmental organisations to ensure acceptance and safe access; delicate and protracted negotiations are often required to achieve this. At the same time, external organisations must be perceived as neutral and non-threatening by local groups and factions.¹

DRR practitioners have to adapt their normal programming and ways of working to insecure contexts. They may need to operate on a different scale, for example, or use different entry points where it is impossible to work through government structures, and should be flexible in their approach to programming. As instability or crisis worsens, some types of DRR intervention may no longer be possible, particularly if they require long-term or multi-stakeholder engagement. In extreme situations, the emphasis may have to shift to short-term coping or response mechanisms, with a greater focus on external assistance to individual households in need rather than community-based approaches. Nevertheless, the overall aim should always be to build local capacities for DRR and adaptation. Humanitarian agencies may also need to adjust by implementing longer-term programmes (i.e. lasting years rather than months) in places suffering from protracted crisis.

15.3 Conflict sensitivity

Aid interventions in disaster-prone areas or post-disaster periods can exacerbate conflict. Badly planned programmes may increase social tensions if interventions appear to favour some sections of society over others. DRR needs to be conflict sensitive and must not cause unintended harm. All assistance programmes involve transferring resources of some kind: these might include seeds, tools, housing, water and sanitation, financial services, food,

¹ Detailed guidance on aid worker security is provided in another Good Practice Review, *Operational Security Management in Violent Environments* (revised edition) (London: ODI, 2010), <http://www.odihpn.org/hpn-resources/good-practice-reviews/operational-security-management-in-violent-environments-revised-edition>. There are a number of training courses for field staff, include those offered by RedR (<http://redr.org.uk/en/Training-and-more/find-a-training-course.cfm>).

health care and technical skills. In areas suffering from instability and conflict such resources may be scarce, those who control them gain power and wealth as a result, and the resources themselves become part of the conflict.

Over the past 15 years or so, many agencies have adopted the ‘Do No Harm’ approach and frameworks in emergency and development programming (see also Section 15.4: Situation analysis).² Organisations working in DRR may not possess specialist conflict resolution or peace-building skills, but they should be conflict-sensitive, seeking to avoid contributing to social tensions and conflict through their interventions. There may be instances where natural hazard management interventions can stimulate dialogue and collaboration between social groups (see Case Study 15.2: Overcoming social tensions through DRR).

Case Study 15.2 **Overcoming social tensions through DRR**

For some years, farmers in coastal villages in Central Java, Indonesia, experienced destructive floods, while local fishermen found their access to the sea at low tide hindered by the deposition of river sediments. Both farmers and fishermen laid the blame on deforestation by the inhabitants of villages upstream, and for some time relations between the two groups of villages were unfriendly.

A local NGO, Society for Health, Education, Environment and Peace (SHEEP), began a community-based DRR project in the area in 2009. It decided to work in both upstream and downstream villages, seeking to encourage dialogue between communities and to create a community DRR network. Community organisers worked in each village with farmers’ and fishermen’s groups and other community organisations. During 2010 the groups, organisers and community leaders collected information on changes in land use, water management and environmental conditions to produce community risk maps that were presented, discussed (and corrected) in the villages. Meetings between upstream and downstream villagers were organised, at which community representatives explained their conditions. This greatly improved awareness of all the causes of the flood and landslide problem in the different locations. The whole process took about a year. As a result, relations improved and a flood early warning system was set up linking upstream and downstream villages.

²‘Reducing Flood Risk by Overcoming Prejudices Between Upstream and Downstream Villagers, Central Java’, in ICCO and Kerk in Actie, *CBDRM and Its Transformative Potential: Reworking Power Relations To Reduce Disaster Risks at Community Level* (Utrecht: ICCO and Kerk in Actie, 2012).

² See www.cdacollaborative.org/programs/do-no-harm and M. B. Anderson, *Do No Harm: How Aid Can Support Peace – or War* (Boulder, CO: Lynne Rienner, 1999).

There is some potential for linking DRR and conflict management work, even though they may require different skills and a range of different organisations may have to be involved: for example, agencies working in human rights and protection or conflict resolution, together with those specialising in technical and organisational aspects of disaster management. A recent review of disaster risk management in insecure contexts suggests that DRR programming should become ‘conflict-sensitive’ and peace-building should be ‘hazard-proof’.³ In other words, DRR should be implemented in ways that do not provoke further disputes or conflict, and community cohesion must be protected against the disruption that hazards and the unsustainable use of natural resources can cause. Environmental management, conflict management and DRR should not be seen as separate activities but as linked to each other, as well as to poverty reduction and livelihoods programmes. Clearly this works better for some types of conflict (e.g. environmental conflict or conflict over contested natural resources) than others (e.g. power struggles or ethnic conflict).

If carried out sensitively, DRR programming can be a form of conflict management, especially where the conflict is linked to scarcity of resources. Disputes over natural resources can be reduced by introducing techniques that use those resources more efficiently (for instance improved irrigation schemes or water-efficient agricultural practices in drought-prone areas), by replacing lost resources in times of crisis (food aid or restocking livestock) and by establishing more participatory and transparent systems for resource sharing and management. The Kenya Red Cross installs boreholes in drought-prone communities as part of its DRR programming and, because this is often in areas of conflict over scarce water, collaborates with local peacebuilding organisations to get communities to work together to manage the boreholes.⁴ However, it is also important to remember that the legacy of conflict – physical, economic and social – is long-lasting. Recovery from natural disaster events may also take much longer in unstable contexts.

15.4 Situation analysis

The key to good practice is good context or risk analysis that enables organisations and groups to plan for and manage different types of disaster, ensuring that they are aware of how conflict or instability may affect their projects, as well as the potential impact of those projects on conflict and instability. However, development and DRR agencies often lack good situational knowledge of this kind, leading to interventions that are not sufficiently conflict-sensitive.

3 A. Mitchell and E. M. Smith, *Disaster Risk Management for Insecure Contexts* (Paris: Action Contre la Faim (ACF), 2011), http://www.actioncontrelafaim.org/sites/default/files/publications/fichiers/drm_for_insecure_contexts_0.pdf.

4 A. Ahmed et al., *Conflict Management and Disaster Risk Reduction: A Case Study of Kenya*, Feinstein International Center, Kenya Red Cross Society, Nairobi Peace Institute-Africa, 2013, <http://www.preventionweb.net/english/professional/publications/v.php?id=34827>.

When carrying out an analysis of context and risk, it is important to break down the distinction between conflict and natural hazards. Agencies need to know about the nature of threats of *all* kinds faced by individuals, households and communities, and understand how conflict affects these threats. They also need to be clear about how insecurity will affect their own ability to carry out DRR initiatives, and its impact on project outcomes. In considering factors that cause or worsen insecurity, they may need to define risk thresholds and adapt their project objectives and ways of working if those thresholds are exceeded.

There are a number of tools for assessing conflict and its implications for development programming at national and local levels.⁵ These are used to analyse the conflict itself (the background situation, causes, actors, dynamics, etc.), develop scenarios of how the conflict will develop in future, map and analyse existing responses (including development and peace-building interventions) and develop new initiatives. Repeated assessments during the project cycle will be required in most cases, since situations rarely remain stable for long: crises may flare up and die down repeatedly, and under conditions of severe stress additional pressures can generate crises rapidly – see, for example, the outbreaks of rioting in several low-income countries triggered by global fuel and food price increases in 2007–2008.

Vulnerability and capacity assessments (VCAs) can be extended or adapted to include conflict sensitivity: for example, ActionAid’s Participatory Vulnerability Assessment tool (see Box 3.3) has been adapted in this way.⁶ VCAs ought anyway to identify the full range of threats facing societies and the root causes of vulnerability, including underlying patterns of discrimination and unequal power relations (see Chapter 5). Analysis of governance issues, political dimensions, power dynamics and the immediate causes of a crisis can be added to this.

Existing data-gathering, analysis and presentation tools may be sufficient, provided that those who use them have sufficient awareness of all the relevant issues and questions. Assessment approaches for vulnerability and DRR, climate change adaptation and conflict often employ similar or even identical participatory methods and tools, offering the possibility of more coherent analysis to cover these different issues. Participatory approaches can give insights into how and why conflict arises, as well as promoting dialogue and collaboration between different groups, which can contribute towards peace-building; if carried out correctly, they can give a voice to people who are normally powerless. A more formal political economy analysis might sometimes be appropriate: this type of analysis

⁵ See Saferworld et al., *Conflict-sensitive Approaches to Development, Humanitarian Assistance and Peace-building: A Resource Pack* (London: APFO, CECORE, CHA, FEWER, International Alert and Saferworld, 2004), <http://www.saferworld.org.uk/resources/view-resource/148-conflict-sensitive-approaches-to-development-humanitarian-assistance-and-peacebuilding>; Conflict Sensitivity Consortium, *How To Guide to Conflict Sensitivity*, 2012, http://www.conflictsensitivity.org/sites/default/files/1/6602_HowToGuide_CSF_WEB_3.pdf.

⁶ *How To Guide to Conflict Sensitivity*.

focuses on power relationships, the distribution of power and contests over power between individuals, communities and organised groups, and how these affect the outcomes of development initiatives.⁷

Early warning systems for natural hazard and conflict threats are usually quite separate, although some conflict early warning systems include environmental and food security indicators that are recognised as potential causes of social tension.⁸ Community-based systems have proved effective,⁹ and there is scope for combining environmental, hazard and conflict indicators in local-level forecasting and warning systems.

15.5 Communities, local institutions and livelihoods

15.5.1 Communities

Community-based DRR has the potential to contribute to peace-building by engaging people to work together to address hazard threats that affect everyone. This is particularly valuable where trust between citizens, or between citizens and the state, has broken down. In some situations, DRR programming that focuses on politically neutral natural hazards, rather than encompassing all kinds of potential risk, may be the most pragmatic approach and entry point into a community. Nevertheless, agencies should not lose sight of fundamental issues of human rights, equality and social justice.

Where there are different communities, social, religious and ethnic groups in a particular location, with associated inter-group tensions, agencies should try to locate themselves and their interventions so that they can give support across group divides, without losing sight of the need to help the most vulnerable. Careful siting of local infrastructure and mitigation measures, such as tube wells, flood defences, rehabilitation of roads and strengthening bridges is one way of achieving this. Another approach is to hire local staff from the various communities: this ensures that their perspectives feed into the agency's context awareness and also helps in securing acceptance of the project. However, such steps take time and require careful planning, which can be challenging when an agency is under pressure to produce results quickly.

⁷ For more information, see C. McLoughlin, *Topic Guide on Political Economy Analysis* (Birmingham: University of Birmingham, 2012), <http://www.gsdrc.org/docs/open/PEA.pdf>.

⁸ Examples include the Economic Community of West African States (ECOWAS) Early Warning and Response Network and the Inter-Governmental Authority on Development (IGAD) Conflict, Early Warning and Response Network (CEWARN) for the Horn of Africa.

⁹ J. Leaning and P. Meier, *Community-based Conflict Early Warning and Response*, Harvard Humanitarian Initiative, 2008, <http://irevolution.files.wordpress.com/2011/07/hhi-deliverable-3.pdf>.

The ability to programme effectively for DRR and conflict reduction is highly dependent on local communities and institutions. People are not passive in conflicts, just as they are not passive in other disasters. They are active in seeking their own physical and economic survival, and in peace-making. Community-based initiatives are an important part of DRR practice (see Chapter 6) and building community organisations and associations is valuable in DRR and conflict resolution alike. (This approach becomes very challenging where communities are themselves divided into factions and where neighbouring communities are hostile to one another.) An emphasis on inclusiveness and equality in discussion and planning is needed. The basic principles of making DRR approaches community-based and participatory apply here too. Getting this right can contribute to community cohesion. DRR interventions may be able to create a neutral space for rebuilding relations between communities and other institutions, stimulating joint work on a single issue.

Community-based methods are more likely to work well in places with a strong civil society, and where local organisational structures and capacity are in place. This is often not the case in places affected by displacement, insecurity, violence and high levels of dependence on external assistance. In some circumstances, agencies may have to focus on households until factions can be brought together, even though this is more costly in terms of time and resources. To avoid deepening community divisions, such household-focused interventions need to appear even-handed, benefiting families in different parts of the community.

15.5.2 Local institutions

Working with different levels of government is an important part of scaling up and sustaining risk and vulnerability reduction initiatives. It is also much more complicated where there is political tension or conflict because governments are not neutral actors in these situations. It may be necessary to find alternative partners for DRR activities, among NGOs and other local or even regional organisations.

Weak capacity in formal government means that customary and informal local institutions become more prominent and are often key partners in local-level DRR. Their roles in facilitating dialogue, resolving local issues and solving problems may often endure in periods of instability where more formal institutions are no longer functioning. Local institutions define and regulate many of the rules, traditions and values that govern people's behaviour. It is important to understand how such institutions maintain social order, address local problems and conflicts, manage common resources such as water and control access to resources. Note that local patronage systems, in which elite groups favour their clients in resource allocation, increase inequality and vulnerability (see Case Study 15.3: Power relations, vulnerability and conflict).

Case Study 15.3 Power relations, vulnerability and conflict

An Afghan NGO, Co-operation for Humanitarian Assistance (CHA), worked with eight villages in Balkh Province, which is prone to drought and floods. All the villages used a 10km irrigation canal. In spring, floods damaged houses in upstream villages, but downstream villages depended on floodwater for irrigation. The upstream villages lobbied CHA for flood protection measures, but this was opposed by those downstream because it would deprive them of water.

CHA discovered that there were long-running tensions between the upstream and downstream villages over water. Under the Taliban, water had been allocated according to the amount of land held, but after the fall of the Taliban regime in 2001 local government was taken over by groups connected with the upstream villages, who changed the water distribution rules in their favour. This led to water gates along the canal being closed for several months each year. A prolonged drought in 2006–2007 put great pressure on the downstream villages and their livelihoods: as a result, some young men left the district and joined armed groups.

A. Heijmans et al., 'A Grassroots Perspective on Risks Stemming from Disasters and Conflict', *Humanitarian Exchange*, 44, 2009, <http://www.odihpn.org/humanitarian-exchange-magazine>.

Where national and local government is weak, NGOs and other external actors sometimes have to bypass official institutions, but there is a risk that this will undermine them even further. Local institutional and capacity development should be a core part of DRR activities, in order to secure long-term and sustainable risk and conflict reduction.

15.5.3 Livelihoods

Livelihood support is likely to form an important part of DRR programmes in unstable settings. This may be to replace lost resources, such as tools, seeds and livestock, which have been destroyed or stolen. It could also create income and employment opportunities and thereby reduce economic and social stress, disputes over resources and the risk of violence. Such support should be broad-based, to match the wide range of livelihood strategies on which people rely. As insecurity increases, the focus of programming may shift from supporting systems and basic services to protecting household livelihoods, with an emphasis on physical assets. Conventional livelihoods frameworks have been adapted for use in conflict settings, to explain the range of factors and forces at work (see Figure 15.1).

Building or rebuilding local infrastructure such as roads, bridges, electricity supplies and water and sanitation services is likely to be a critical task in areas emerging from conflict. Local contractors should be hired for such work wherever possible. Inclusion of those who are or have been engaged in conflict in the repair and construction of infrastructure and other types of DRR intervention, such as early warning systems, encourages communities to work together to address common needs. In some cases it can encourage individuals away from violence by providing them with income-earning opportunities. Such approaches often target young men to prevent them from being drawn into criminality or violence because they cannot find work.

Projects that support the acquisition and strengthening of households' livelihood assets to increase resilience to disasters – an effective approach in peaceful and stable settings –

Case Study 15.4 DRR, livelihoods and peace-building

In parts of East Africa, persistent cattle raiding has caused acute tension and conflict between pastoralist groups. Herders have found it increasingly difficult to obtain access to grazing land and water sources, which often requires negotiations between different communities.

In 2006 Practical Action launched an initiative to mitigate the impacts of drought and animal disease amongst pastoralist groups living on either side of the Kenya–Uganda and Kenya–South Sudan borders. Twenty wells and four boreholes were sunk or rehabilitated, serving more than 30,000 pastoralists and their livestock. Because traditional institutions regulating land access were weak or no longer existed, two committees were formed and given training in conflict resolution and managing grazing land. In addition, 50 community animal health workers were trained to treat and prevent diseases. The training, which involved animal health workers from three countries, led to an improvement in communal relations, with members of one tribe able to treat others' animals.

Relations between pastoralist groups improved as a result of these interventions. Cross-border peace meetings were held and trade across borders and between groups increased. There were also examples of stolen livestock being returned to their rightful owners. Herders from groups previously in dispute shared grazing areas and water for the first time in over a decade.

Building Resilience to Drought in the Karamoja Cluster of Eastern Africa (Nairobi: Practical Action, undated), https://practicalaction.org/docs/region_east_africa/karamoja_project_profile.pdf.

can sometimes have the opposite effect where there is conflict. Here, assets may become liabilities, increasing families' vulnerability because other groups may target them: livestock and food crops are often stolen in conflicts, for example. In some circumstances it may make sense to provide less visible assets to support or rebuild disaster-affected livelihoods and stimulate local markets, such as cash or vouchers. This has been done effectively in emergencies including the long-running crisis in southern Somalia.

Chapter 16

Preparing for disasters and emergencies

16.1 Introduction

Disaster preparedness has two main aims: to help people avoid impending disaster threats, and to put plans, resources and mechanisms in place to provide adequate assistance. The main elements of disaster preparedness are forecasting events and issuing warnings; taking precautionary measures; and improving response through timely and effective rescue, relief and assistance. Table 16.1 sets out the main components of disaster preparedness.

The categories in the table should not be seen as a fixed sequence. Activities in different categories will often be carried out at the same time. Nevertheless, there is a logical sequence of sorts: planning must be preceded by understanding of risk, hazards and vulnerability, and it leads to the establishment of an institutional framework; the framework is a foundation for setting up information and warning systems, assembling resources, putting preparedness mechanisms in place and testing them and providing public education and training. In reality, one never starts with no elements of the disaster preparedness system in place, so that the task is to make improvements in all areas.

16.2 Plans and planning

Disaster preparedness plans can take several forms, ranging from a broad mitigation and preparedness strategy to detailed contingency plans for responding to a particular threat. In most plans, the operational priorities are to save lives, meet people's emergency needs (principally medical care, food and shelter) and restore essential facilities (hospitals, water and sanitation, power and transport). The focus should be on the planning process rather than the production of specific written plans. A written disaster preparedness plan is not an end in itself, and a plan is much more than a document. Emergency response cannot be effective without well-functioning managerial and operational systems, structures and procedures. Planning and plans develop the capacities, tools, understanding and collaborations to stimulate warning and response action and to make that action effective. Constant practice, review and dialogue between partners are required for this. Case Study 16.1 (Building up preparedness capacities) illustrates the benefits of strategic disaster preparedness planning and coordination.

Table 16.1 Disaster preparedness framework

<p>1. Vulnerability, hazard and risk assessment Starting point for planning and preparation, linked to longer-term mitigation and development interventions as well as disaster preparedness</p>	<p>2. Planning Disaster preparedness plans agreed and in place, which are achievable and for which commitment and resources are assured</p>	<p>3. Institutional framework Well-coordinated disaster preparedness and response system at all levels, with commitment from relevant stakeholders. Roles and responsibilities clearly defined</p>
<p>4. Information systems Efficient and reliable systems for gathering and sharing information between stakeholders (e.g. forecasts and warnings, information on relevant capacities, role allocation and resources)</p>	<p>5. Resource base Goods (e.g. stockpiles of food, emergency shelter and other materials), services (e.g. search and rescue, medical, engineering, nutrition specialists) and disaster relief funding (e.g. for items not easily stockpiled or not anticipated) available and accessible</p>	<p>6. Warning systems Robust communications systems (technologies, infrastructure, people) capable of transmitting warnings effectively to people at risk</p>
<p>7. Response mechanisms Established and familiar to disaster response agencies and disaster victims (may include evacuation procedures and shelters, search and rescue teams, needs assessment teams, activation of emergency lifeline facilities, reception centres and shelters)</p>	<p>8. Education and training Training courses, workshops and extension programmes for at-risk groups and disaster responders. Knowledge of risk and appropriate response shared through public information and education systems</p>	<p>9. Rehearsals Evacuation and response procedures practised, evaluated and improved</p>
<p>Adapted from R. Kent, <i>Disaster Preparedness</i> (New York/Geneva: UNDP/DHA, 1994), http://www.pacificdisaster.net/pdnadmin/data/original/dmtp_07_disaster_preparedness_8.pdf.</p>		

Case Study 16.1 Building up preparedness capacities

Mozambique suffers frequent floods and cyclones. Floods in 2000 and 2001 affected over four million people; the 2000 floods also cost the country a fifth of that year's gross national product. The government subsequently strengthened its preparedness and response capacity, setting up a structure to coordinate disaster management at all levels, from central government to local administrations and communities. A new national disaster management agency (INGC) was created in 2000, followed by a national emergency operations centre and three regional centres. International donors gave support to train staff and equip the national headquarters and regional centres. The new structure was based on Latin American models, and specialists from that region were brought in to give advice. In 2006 the government published a comprehensive strategy for disaster management and vulnerability reduction.

In February 2007 there was severe flooding in the Zambezi river basin and the southern coast was hit by a cyclone. The two events forced over 300,000 people from their homes and tens of thousands lost their crops; essential infrastructure was badly damaged. Actions coordinated by the INGC and regional emergency operations centres prevented many deaths and evacuated more than 200,000 people to temporary camps and resettlement sites established after the 2000–2001 floods. Whereas in 2000–2001 Mozambique had depended heavily on foreign aid and international agencies had led the response, in 2007 the government coordinated response efforts and did not appeal for international assistance.

The improved emergency preparedness structure enabled informed and rapid decision-making during the crisis. Simulation exercises in October and November 2006 also contributed to the effectiveness of the response. The government stockpiled relief supplies against the threat of floods, key staff were moved to the regional operating centres well before the waters arrived and communities monitored water levels. Because disaster preparedness had been made part of the school curriculum there was better awareness of flood risk and the appropriate actions to take.

C. Foley, *Mozambique: A Study in the Role of the Affected State in Humanitarian Action* (London: ODI, 2007), <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/3423.pdf>.

Box 16.1 Contingency planning

Contingency planning involves planning for specific situations by developing scenarios, deciding appropriate objectives for response and working out how to achieve them. In practice, the term is used interchangeably with other, similar terms, such as emergency or disaster preparedness planning. The simplest way of differentiating is to see contingency planning as focusing on specific problems, within the broader scope of emergency planning, whereas the latter consists of a much wider range of activities designed to ensure effective disaster response, including defining organisational relationships and chains of command, developing standard operational procedures, establishing and maintaining facilities and capacities, stockpiling and training staff and partners.

R. Choularton, *Contingency Planning and Humanitarian Action: A Review of Practice* (London: ODI, 2007), <http://www.odihpn.org>.

Plans by formal emergency management institutions can be complex and detailed. In low-income or remote communities a more pragmatic approach to planning may be required, based on an understanding of local priorities, resources and capacities within the community and its ways of working.¹ Whatever the contents of the plan (or plans, or planning), it should have the following characteristics:

1. The objectives and activities must be set out logically and systematically. Plans should be presented clearly and written in language that is easily understood.
2. Planning should be realistic, based on existing organisational structures, operating systems, human resources and funding mechanisms, acknowledging their capacities and recognising their weaknesses as well as their strengths. A high level of adaptability will be required during disasters. Plan for likely problems within response organisations as well as on the ground. Creating a preparedness/response system that can deal with the full range of disasters a society is likely to face will take a long time. Planning should reflect this.
3. Roles and responsibilities must be defined clearly. This is often done through legislative provisions and government administrative orders, but official mandates may be too generalised, so there is often a need for separate agreements and protocols

¹ For example, Practical Action Latin America, *Technical Brief: Emergency Preparedness Plans*, 2005, <http://answers.practicalaction.org/our-resources/item/emergency-preparedness-plans>.

between agencies. Existing arrangements can rapidly become outdated, so partners must monitor them regularly and adapt them if required. For organisations working at local level, it is particularly important to establish the extent of decentralisation in the plan and the corresponding extent to which they are allowed to make their own operational decisions.

4. Governments usually take the lead in disaster preparedness planning, but plans should integrate the skills and capacities of a wide variety of agencies – official and non-governmental, including community groups and groups and organisations not normally involved in disaster management (see also Chapter 4). This institutional ‘architecture’ should be set out clearly. The plan should be flexible enough to incorporate emergent groups that spring into action after disasters (see Chapter 6). Local people are the main responders in the immediate post-disaster period, and disaster workers should support their efforts, not duplicate or undermine them.
5. Good coordination is vital – vertical (between local and higher authorities) and horizontal (between different agencies operating at the same level). National and local emergency operations centres play a key role in facilitating this. Disaster preparedness planning does not have to be centralised. There needs to be some centre to coordinate operations, but disasters cannot easily be controlled from a single point, and decision-making should be delegated where possible.
6. Decentralisation of responsibilities allows for disaster responses that are more rapid, better informed about local needs and able to adapt or improvise where necessary. Organisations operating locally may need to develop their own preparedness plans, especially where there is little likelihood of support from government or external agencies, perhaps because the government is ineffective or the area is very remote. But in most cases, some degree of coordination with official agencies is vital to make the most of available capacities and avoid duplication of effort. Plans may also have to be translated into local languages in order to engage local people and their organisations.
7. Plans should be ‘owned’ by everyone involved. For a plan to work, people must believe in it and be committed to it. At government level, enabling legislation and adequate resources (especially funding) are key indicators of commitment, as is support from a senior figure such as a president or prime minister. Some of the indicators set out in Chapter 2 may be helpful in assessing the commitment of other agencies.
8. Where there are institutional weaknesses, strengthen existing structures rather than creating new ones. The latter approach adds to the bureaucracy and creates confusion between organisations with similar mandates. The arrival of international relief teams after major disasters often creates ad hoc, parallel structures that confuse the situation even further and overwhelm local agencies and systems.

9. Plans must be based on reliable and comprehensive information covering all relevant aspects of hazards, risks, vulnerabilities and capacities. Analysis of past events and how they were managed is a central part of this information base, but it is also important to anticipate events that are likely to happen in the future, which may be very different from those in the past.
10. Planning must prepare for extreme events and chaotic situations. These will require a different scale and type of response than routine emergencies. Although smaller events can be disastrous at local level, major disasters are quite different in their scale and often in the nature of their impact.
11. Planning must reflect the needs of the community, especially the most vulnerable. This means that vulnerability and capacity analysis is essential in advance. Preparedness plans are usually much more aware of the vulnerability of critical facilities and infrastructure (e.g. emergency command centres, hospitals, power and water supplies, roads and bridges) than that of the human beings who live within their remit. When a disaster strikes, needs assessments need to be as quick and accurate as possible, and take the most vulnerable into account.
12. The aim should be *effective* and *timely* response: providing what is most needed, when it is needed. In the aftermath of a disaster, people's needs and priorities may change rapidly. Disaster managers must be able to identify and react to this.
13. Planning should include plans for early recovery. Emergency response and humanitarian relief focus on reducing suffering and loss of life, but do not necessarily stimulate sustainable post-disaster recovery or prevent a return to previous conditions of vulnerability and risk (see Chapter 17). Many preparedness plans include mitigation and recovery, but this may be only for form's sake. In practice, emergency systems usually do not have the capacity to undertake these complex, long-term tasks.
14. Regular review and updating of plans, systems and procedures is essential. It is a good idea to do this soon after an event or, where hazards are seasonal, such as floods and cyclones, at the end of the season. It is also important to test plans in normal times, through emergency exercises, simulations, practice drills and public awareness days.

16.3 Resources

When a disaster strikes, a variety of goods and services are needed to deal with the crisis. Good preparedness includes having these resources in place or having established mechanisms to provide them rapidly when needed. The material resources required include search and rescue equipment, boats and vehicles (and fuel to run them), stockpiles of relief goods such as food, medicines, water purification and oral rehydration tablets, emergency shelter materials, blankets and cooking utensils. The range of potentially useful materials is very wide, and careful thought must be given to likely needs and how to supply them. Adequate funding must be available to pay for emergency response operations.

Delivery of essential relief supplies after major disasters causes major logistical and management problems. There are often delays and duplication, and aid does not always get to those who need it quickly enough. Inappropriate materials continue to be delivered to relief victims, including items that are not needed, are unsuited to local cultures and practices or are simply inferior (e.g. foodstuffs that people do not use or like, out-of-date or inessential medicines, equipment that is old, faulty or not adaptable), and items that are brought in from far away when they are readily available locally (such as blankets, tents, cooking utensils and foodstuffs). Off-the-shelf and often expensive prefabricated emergency shelters, designed with little or no understanding of the diversity of local cultures, practices and needs, have been heavily criticised since the 1970s, but still appear in many disasters.

All of these problems can be overcome, but this needs careful logistical planning and management, for which systems should be set up well in advance. New information technology has helped considerably here, and a great deal of work has gone into developing robust supply management systems. However, the capacity to use such systems needs to be built up through acquisition of technical resources and training.

Wherever possible, supplies and stockpiles of relief materials should be bought locally. They will be relatively cheap and appropriate. Local purchases also stimulate the local economy, although large-scale purchases of foodstuffs or other items in local markets for stockpiling are likely to push up prices, which may harm poor households.

The necessary human resources include trained emergency management staff and volunteers able to disseminate warnings, assist with evacuation, carry out emergency response activities, make needs assessments and manage the distribution of relief goods. The skills of medical personnel, the police, fire-fighters, engineers, architects, scientists, media professionals and many others will also be needed. Training courses should go beyond emergency managers, staff and volunteers to include all professional groups that are likely to be involved in responding to disasters.

Good disaster preparedness makes full use of the capacities of local authorities and communities. This requires delegating responsibilities to local leadership as appropriate, together with community mobilisation and participation in developing and testing emergency plans. Chapter 6 looks at community-managed DRR in general, and the principles and issues discussed there apply to disaster preparedness too.

A standard component of many community-level preparedness and response programmes is the establishment and training of disaster preparedness groups or committees, consisting of a cadre of volunteers who can be mobilised for emergencies. The groups' tasks vary according to context, but typically include risk mapping, preparing contingency plans, planning evacuation routes and setting up safe places, construction or repair of local mitigation structures and infrastructure (e.g. embankments, bridges), raising community awareness of risks and preparedness measures, establishing local-level monitoring and warning systems, first aid, search and rescue and distribution of emergency relief. External agencies play an important role in establishing and training these groups, and providing them with emergency equipment such as spades, first aid kits, stretchers, radios, flashlights, boats and tents.

The effectiveness of these teams depends on the number and distribution of volunteers, their level of skills and commitment and the equipment and material resources at their disposal. Volunteer numbers will have to be built up over time, and developing their skills will also be a long-term process; short-term perspectives and over-ambitious targets should be avoided. This implies some level of continuing involvement and support by external organisations. However, the task of setting up a single volunteer group, giving basic training and providing equipment can be carried out within a relatively short period.

DRR agencies often create new structures for disaster preparedness and response, but unless the agency concerned is prepared to remain in the area and offer long-term support these may not be sustainable. In many cases it may be better to use established community structures as the foundation for disaster preparedness activities, because they will have a solid base of organisational skills, motivation and group solidarity. Many kinds of community structure can form a foundation for disaster preparedness work, including village development committees, peasants' federations, savings and credit groups, slum dwellers' associations and youth clubs. Working with such groups also helps to connect preparedness initiatives to other work on DRR and development.

The capacities of the community structure and its members, including their enthusiasm for the task, are the key criteria in identifying their suitability for disaster preparedness. Many volunteers and organisers are likely to be involved in community work already. Selection of team members should always involve consultation with the community, and in many instances it can be left to local groups. However, it is important not to overload groups and individuals with new responsibilities, and in most cases additional volunteers and organisers will have to be found.

Case Study 16.2 Sustaining community preparedness

Between 1996 and 2002 the Bangladesh Red Crescent Society, with technical and financial support from the German Red Cross, supported a community-based disaster preparedness programme in the coastal district of Cox's Bazar. The programme worked with communities in the vicinity of 30 cyclone shelters built as part of the Bangladesh Cyclone Preparedness Programme. Volunteer village disaster preparedness committees and squads were created, responsible for disseminating warnings, assisting evacuation, first aid, search and rescue, and shelter management. A disaster preparedness fund was established in each community to collect contributions from households for shelter maintenance and relief goods, accompanied by extensive public education and awareness raising.

An evaluation of the programme in 2009 found that it had been effective at household level, where there was good understanding of how to interpret early warning signals, what to do during a cyclone and how to protect livelihood assets. At a collective level achievements were less consistent. The village preparedness committees retained responsibility for shelter management and played a role in managing evacuations, but the disaster preparedness squads were less effective and many members had moved away. The condition of the shelters varied and some equipment had gone missing. People were unclear about the arrangements for shelter repair and maintenance, and whose responsibility this was. Most communities had stopped contributing to the disaster preparedness fund after the programme ended, and most of the groups set up to manage the fund and support household-level DRR and income-generating activities were inactive. On the other hand, the individuals who had been involved in the various groups continued to assume their former roles in an emergency. Many had formed links with other group members, and people continued to draw on these individual connections for support and advice. The shelters were valued by communities and women were more willing to go to shelters than previously.

The main lesson from the evaluation was that there should be more careful planning for phasing out and project handover in community preparedness projects if they are to be sustainable. Local organisations and groups should receive ongoing monitoring, guidance and refresher training to maintain their capacities and enthusiasm. Phasing out should be planned from the start, in a participatory way and with the involvement of all local stakeholders.

IFRC, *Empowering Communities To Prepare for Cyclones* (Geneva: International Federation of Red Cross and Red Crescent Societies, undated), https://www.ifrc.org/Global/Publications/disasters/reducing_risks/194300-Empowering-communities-to-prepare-for-cyclones.pdf.

Training of professionals and volunteers is essential. Refresher courses are also essential, although under-resourcing means that these happen less frequently than they ought to. Training should be given in a range of skills: not just specific technical skills such as first aid, search and rescue or warning dissemination and evacuation, but also more generic skills, such as management, communication, coordination and social mobilisation. Disaster preparedness manuals emphasise the importance of emergency rehearsals or simulations. No simulation can fully prepare teams for a real disaster, but rehearsals enable them to practice procedures and test their effectiveness. They often reveal weaknesses in the system that can be corrected.

Community-level training and preparedness can bring almost instant benefits where threats are imminent, although normally a longer period of training, organisation and mobilisation is needed. Agencies need to pay attention to the long-term sustainability of community preparedness organisations once external support comes to an end (see Case Study 16.2: Sustaining community preparedness) and, in the case of local-level programmes, to replication.

16.4 Protecting assets

Short-term measures to protect household assets are needed in sudden-onset disasters. The most obvious step is to move them out of harm's way. Communities vulnerable to frequent hazards such as seasonal floods tend to have well-established systems for moving livestock, food, household utensils and other items. Where this is not possible, possessions can be secured within the home by putting them on high shelves and platforms, hanging them from the ceiling or even placing them on the roof. If the house itself is vulnerable – for example to the high winds and sea surge of a cyclone – some goods can be made safe by burying them in the ground in tins or pots. This is common practice in parts of Bangladesh, where it is also increasingly common to build mounds of earth rising above floodwater levels that give shelter to animals.

Protecting household assets is largely a matter for individual households: disaster preparedness and response agencies are primarily concerned with saving lives and relieving human suffering, although preparedness planning is beginning to take livelihoods issues into account. Some shelters and safe places are designed to take animals and people will often take their most precious possessions to shelters (the need to protect livelihood assets has an influence on poor people's readiness to respond to warnings of disasters). Community stores have been built to protect grain and seeds against flooding. The idea of providing secure buildings for storing other items is occasionally discussed but has not been tested on any scale. 'Safe' or 'hardened' rooms within homes and public buildings can provide protection, particularly against high winds and debris from windstorms, cyclones and tornadoes. After Hurricane Gustav in 2008, scientists in Cuba designed and promoted a low-cost approach

Table 16.2 Flood preparedness measures at different levels

Individual and household level

- Build awareness about the risks: drowning, waterborne diseases, electrocution, poisonous animals.
- Install protective railings around houses, to protect children from falling into the water and to provide support for the elderly.
- Identify potential safe areas and potential routes to get there.
- Know what to do when a warning is received.
- Know whom to contact in case of emergency.
- Keep life jackets or buoys or tyres.
- Keep first aid kits.
- Store clean water and food in a safe place.
- Listen to flood forecasts.
- Move valuable items to higher ground.
- Be prepared for evacuation.
- Protect livestock and other important assets.

Community level

- Identify and maintain safe havens, safe areas and temporary shelters.
- Put up signs on routes leading to temporary shelters.
- Inform the public of the evacuation plan, and the location of safe areas and the shortest routes leading to them.
- Keep a list with important contacts such as district or provincial and national emergency lines, and identify a focal point in the community.
- Make arrangements for setting up teams in charge of health issues, damage and needs assessment.
- Set up community volunteer teams for a 24-hour flood watch.
- Improve or keep open communication channels to disseminate warnings.
- Distribute information throughout the community.

Table 16.2 (cont'd)

Municipality, district, provincial or regional and national levels

- Determine roles and responsibilities of each agency during response, relief and recovery.
- Prepare maps (flood risk, extent and depth; vulnerability and resource maps) to provide essential information and data on current situation, and to plan assistance.
- Make sure that critical roads are built up to a level above expected flood height, to create safe areas and to ensure continuous transportation for flood relief.
- Identify safe areas and maintain existing shelters, making sure they have sanitary and other basic necessities.
- Implement public education and awareness activities.
- Prepare resource inventories, identifying how much is available locally and how much is needed from outside.
- Plan resource mobilisation.
- Set up emergency teams (e.g. health, search and rescue teams).
- Conduct drills (exercises) for search and rescue teams.
- Make sure that communication channels to the community are functioning well.
- Check flood mitigation infrastructure (e.g. dykes, levees and floodwalls) as well as other key infrastructure (e.g. roads, dams).
- Disseminate public safety information through early warning systems.
- Specify the source and actions to be taken immediately after receiving warnings.

Adapted from A. K. Jha, R. Bloch and J. Lamond, *Cities and Flooding: A Guide to Integrated Urban Flood Risk Management for the 21st Century* (Washington DC: World Bank, 2012), <https://openknowledge.worldbank.org>.

consisting of a single room within a house, constructed with resistant material, in which families can seek protection for themselves and their valuables during a storm.²

The assets of the disaster preparedness system itself also need protecting. Control centres, communications systems, warehouses, search and rescue equipment and relief goods may

² See <https://www.youtube.com/watch?v=uYK3VUaTbVs>.

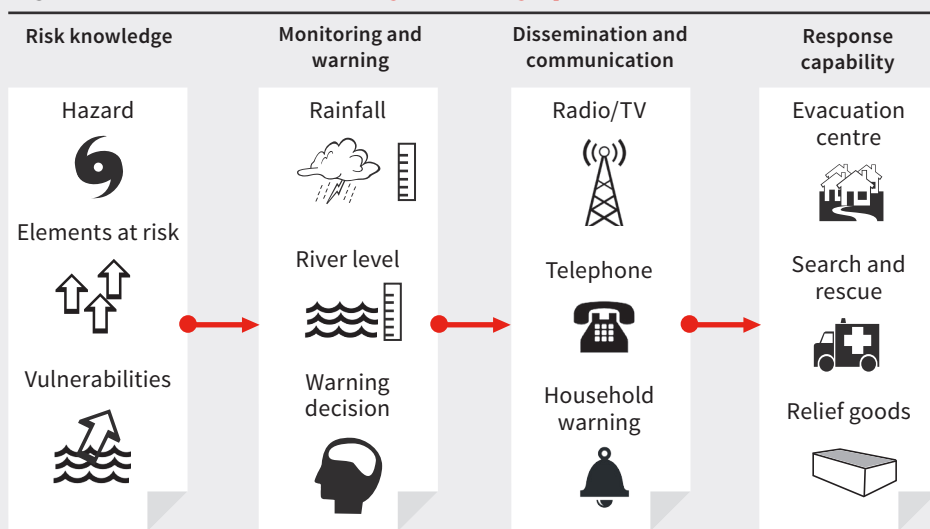
all be at risk. Agencies need to protect their own buildings, equipment – and files: preserving records of beneficiary groups, resources, methods and experiences is important (just as it is for local government agencies to preserve land, legal and medical records). Protection of community infrastructure and lifelines is discussed in Chapter 9.

16.5 Forecasting and warning

The literature on forecasting and early warning systems is extensive. This section sets out a few general principles of good practice and discusses some of the most important issues in making warnings effective. The aim of early warning systems (EWS) is to enable individuals and communities threatened by hazards to act effectively and in sufficient time to reduce the likelihood of death, injury and damage to property and the environment. EWS vary greatly in size, structure, management and technological sophistication, according to the extent of their coverage, the nature of the hazard(s) and the human and material resources available. But they have many features and issues in common.

Early warning systems must be understood as working systems with inter-connected components (see Figure 16.1: Flood forecasting/warning system and Figure 16.2: Key components of an early warning system). A weakness or failure in any one component of the system (technical or human/organisational) can potentially undermine the whole.

Figure 16.1 Flood forecasting/warning system



(Olaf Neussner, GIZ)

Figure 16.2 Key components of an early warning system

<p>Risk knowledge</p> <p>Systematically collect data and undertake risk assessments.</p> <p>Key questions/issues:</p> <ul style="list-style-type: none"> • Are the hazards and the vulnerabilities well known? • What are the patterns and trends in these factors? • Are risk maps and data widely available? 	<p>Monitoring and warning service</p> <p>Develop hazard monitoring and early warning services.</p> <p>Key questions/issues:</p> <ul style="list-style-type: none"> • Are the right parameters being monitored? • Is there a sound scientific basis for making forecasts? • Can accurate and timely warnings be generated?
<p>Dissemination and communication</p> <p>Communicate risk information and early warnings.</p> <p>Key questions/issues:</p> <ul style="list-style-type: none"> • Do warnings reach all of those at risk? • Are the risks and the warnings understood? • Is the warning information clear and usable? 	<p>Response capability</p> <p>Build national and community response capacities.</p> <p>Key questions/issues:</p> <ul style="list-style-type: none"> • Are response plans up to date and tested? • Are local capacities and knowledge being used? • Are people prepared and ready to react to warnings?

UNISDR, *Developing Early Warning Systems: A Key Checklist* (Geneva: UN Office for Disaster Reduction, 2006), <http://www.unisdr.org>.

16.5.1 Management and resources

Large-scale early warning systems require considerable resources: people, infrastructure, technology, data and funding. They have to operate continuously. They are complex to manage, needing to integrate multiple actors (scientists, civil authorities, the media and the public) and different levels (international, regional, national, local). They must also be linked to disaster preparedness and DRR programmes. There must be strong links throughout the system and between its stakeholders: warning system failures often occur when these

links are weak or break down (see Case Study 16.4: Early warning failure).³ Institutional arrangements for coordination and communication have to be worked out carefully and agreed, and responsibilities defined. Setting up a system can take a long time, therefore, according to its scale and degree of complexity. Systems should always be undergoing testing, practice, review and refinement (warning systems for frequent events tend to be more effective than those for infrequent ones because they are used more regularly). Facilities and equipment have to be maintained and where necessary repaired; staffing and volunteer levels also have to be maintained. However, it is certainly not the case that only rich societies can have effective forecasting and warning systems.

16.5.2 The 'last mile'

Large-scale, centralised systems tend to achieve broad geographical coverage but can fade out as they get closer to vulnerable communities and more marginalised groups. Information can be transmitted accurately and effectively through different levels in the system, but may not reach communities at risk (what is often called the 'last mile'). This problem has been highlighted on a number of occasions. In most systems, the bulk of effort and expense goes into transmitting detailed, clearly presented information to decision-makers and emergency management services. Less effort and funding go into disseminating this information right down to individual communities or households through accessible messages that will warn them and help them to make decisions about how to respond.

Warning systems need to be end-to-end, therefore, connecting those who need to hear messages to those who prepare and deliver them. Here it is particularly important that they reach the most vulnerable and marginalised (the 'last mile' is as much social as spatial), and trigger local evacuation and protection mechanisms. The vulnerabilities, needs, roles and capacities of different groups in society must be taken into account. Messages reach people in different ways, they may interpret them differently and they have different responsibilities in response.

16.5.3 Local and community-based systems

There is an important role for small-scale, local and people-centred early warning systems that rely on the participation of those exposed to hazards. These can utilise local capacities and technologies to a greater extent than larger systems, reducing the need for sophisticated, expensive equipment and external technical experts. They can deal with the local incidence of hazards, which larger systems cannot usually manage, and are better aligned to local needs and capacities. Communities are more involved in running them and more likely to respond to their warnings.

³ C. Garcia and C. Fearnley, 'Evaluating Critical Links in Early Warning Systems for Natural Hazards', *Environmental Hazards*, 11 (2), 2012.

Case Study 16.3 A community-managed flood warning system

A flood and cyclone warning system in the Búzi River basin in Mozambique is a typical example of design for the needs and capacities of local communities. Work on setting up the system began in 2002 with the help of experts from Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and Honduras, and with co-financing from the Munich Re Foundation. Appointed village officials take rain and river gauge readings along the river, passing on messages by radio to a control centre if there is heavy rain or river levels rise. If a crisis threatens, blue, yellow and red flags are raised to indicate different alert levels and volunteers issue warnings using drums, megaphones, SMS and local radio. The volunteers receive training and there are regular system tests and practice drills.

In February 2007 Cyclone Flavio struck the area. Strong winds and heavy rainfall caused considerable damage and river levels rose rapidly. Villages at risk had been warned two days beforehand, and when the order to evacuate came from the district government some 2,300 inhabitants were moved to designated safe areas. The floods caused extensive damage to property and infrastructure, but only four people were killed.

Flood-warning System in Mozambique: Completion of the Búzi Project (Munich: Munich Re Foundation, 2007), <http://www.preventionweb.net/english/professional/publications/v.php?id=2919>; *Mozambique: Disaster Risk Reduction as the Basis for Climate Change Adaptation* (Eschborn: GIZ, 2011), http://www.preventionweb.net/files/32970_32970giz20110501enmozambiquedisaste.pdf.

The effectiveness of such systems is particularly evident in community-based monitoring of drought/famine (see Chapter 14) and flood warnings (see Case Study 16.3: A community-managed flood warning system). Local warning systems can sometimes be free-standing, but for comprehensive, integrated outreach it is better if they form 'sub-systems' of larger-scale programmes. It can be a challenge to establish and maintain sufficient local capacity (particularly of local government organisations) to connect local EWS to larger-scale, end-to-end systems and the institutions that manage them.

For early warning systems to be sustainable, a wide range of stakeholders need to be involved in their design, set-up and management. This includes producing and verifying information, agreeing operational protocols and selecting appropriate communication strategies.

16.5.4 Official response

When a hazard threat develops, a designated institution or team has to make decisions about when and how to react, taking into account the nature, extent and timing of the threat, the

location and vulnerability of people at risk and the local resources and capacities for emergency response. This places considerable responsibility on the decision-makers concerned. Underestimating the danger or reacting too late causes avoidable damage or casualties, but over-reacting can lead to false warnings and undermine the warning system's credibility.

Official warnings to the public are usually given in stages, using defined warning or alert levels. The alert levels can be increased as the likelihood of disaster becomes more certain or imminent. This ensures that awareness is raised and emergency preparations can be made in good time, although in some cases (e.g. flash floods or landslides) the warning time may be very short, even just a few minutes.

Institutional response to forecasts and warnings of impending disasters is influenced by external factors – political, attitudinal, legal, economic, logistical, ideological and institutional – that are unrelated to the purely scientific data. Where events are seasonal or frequent, such as cyclones or monsoon floods, institutions are familiar with them and it is easier to develop and run effective warning systems. But in the case of infrequent events, officials may not understand the hazard and establishing a warning system is less likely to be a political priority. Volcanic eruptions are a prime example: many potentially dangerous volcanoes have not erupted in living memory, the exact timing of eruptions cannot always be predicted with certainty and volcanoes are complex natural phenomena that are not easily explained to non-scientists. Successful evacuations, such as that of 60,000 people ahead of the eruption of Mount Pinatubo in 1991, owe their success to the effort and ingenuity that went into communicating with non-specialists, including decision-makers, the media and the public.⁴ Case Study 16.4 outlines a famous, tragic example of political-institutional weaknesses contributing to a volcanic disaster that could have been avoided.

⁴ See *Communication during Volcanic Emergencies* (London: UCL Hazard Centre, 2003), <http://r4d.dfid.gov.uk/Output/5400>; R. S. Punongbayan et al., 'Eruption Hazard Assessments and Warnings', in C. G. Newhall and R. S. Punongbayan (eds), *Fire and Mud: Eruptions and Lahars of Mount Pinatubo, Philippines* (Quezon City/Seattle: Philippine Institute of Volcanology and Seismology/University of Washington Press, 1996), <http://pubs.usgs.gov/pinatubo>.

Case Study 16.4 Early warning failure

Shortly after 21.00 on the evening of 13 November 1985 the Nevado del Ruiz volcano in Colombia erupted, throwing out clouds of hot ash that scoured and melted part of the summit's snow and ice cap, sending torrents of meltwater, slush, ice and volcanic debris down the slopes, where they picked up water, vegetation and other debris to form lahars that raced along the valleys of streams and rivers normally fed by the volcano's melting snow and ice. Shortly before midnight, the lahars reached the town of Armero: more than 21,000 people were killed.

Yet the eruption was not a surprise. The volcano had been noticeably active for about a year. Early in 1985, government scientists and civil defence authorities were alerted. Civil Defence prepared a disaster plan, but this was done without an up-to-date hazard/risk map. This was the responsibility of the government geology and mines bureau, INGEOMINAS, but it showed little sense of urgency when it came to mapping or monitoring the volcano, and in any case did not have sufficient volcanic expertise. Equipment and experts had to be brought in from other countries to help monitor seismic activity (a key indicator of volcanic activity and likely eruption), but it was not until the end of August that the monitoring system was in place, and even then there were two parallel monitoring sets in operation, one run by INGEOMINAS and the other by an officially sanctioned local Volcanic Risk Committee that had been set up by the local government, universities and businesses to prepare against a possible eruption. Central government officials were offered more expert volcanologists, equipment, training and information by UNESCO, but did not act on the offer for nearly two months.

Nevado del Ruiz increased volcanic activity markedly in September, speeding up preparedness activity. The Volcanic Risk Committee issued a public warning of a serious risk of an eruption and avalanches of rock and ice. A national-level emergency committee was formed, Civil Defence developed its emergency management plan and the Colombian Red Cross assumed responsibility for emergency communication and disaster response. Civil Defence identified populations at most risk along the river systems fed by the volcano, initiated awareness programmes in schools, improved radio communications facilities and provided other emergency equipment and met national and local officials. Provincial emergency committees contacted villages to highlight the need for preparedness and encourage the development of local evacuation plans.

Yet disaster management arrangements remained incomplete. A preliminary hazard map was presented in early October, showing that extensive areas were threatened and some towns would need to evacuate rapidly, but only ten copies were made and distributed. The four provinces likely to be affected were developing separate plans,

with little coordination. The seismic monitoring programme was still inadequate and data were not being shared fully. It was felt that the national government was hesitant about action, and some government officials in the capital criticised the hazard map as being too alarming. In an attempt to calm the population, a national newspaper stated that the volcano was not dangerous, as did the Director of the Geophysical Institute of the Andes. The Chamber of Commerce in Manizales, a large town near the volcano, expressed concern that irresponsible reporting would cause economic losses, and an Archbishop criticised the media for spreading ‘volcanic terrorism’. The Mayor of Armero stated that many people there were confused by the information they received: they did not know whether to stay or leave.

Improvements to the scientific monitoring system and public presentation of a revised hazard map were delayed by a national political crisis early in November, when guerrillas took over the Palace of Justice in Bogota and the government sent in troops to recapture it. When Nevado del Ruiz began to erupt in mid-afternoon on 13 November, regional and local emergency structures were alerted but no immediate decision to evacuate was made, although it was known that the lahar flows might be rapid, leaving little time to escape: the people of Armero would have at most two hours’ warning to evacuate to higher ground. In Armero, residents were reassured by a local radio station and the church public address system that there was no immediate danger.

After a new and more serious phase of the eruption began at 21.00, the Governor of Caldas Province called local radio stations to issue red alerts to communities living along the rivers. Officials in the capital of Tolima Province attempted to order the evacuation of Armero from 21.45, but there were power and communication difficulties owing to a torrential rainstorm filled with volcanic ash. Shortly afterwards, the lahar broke through a natural dam created by a landslide 12km upstream. The dam had been holding back 250,000 cubic metres of water, which were now released in a 40-metre-high wave. The Mayor of Armero had stated his concern about the dam on 17 September and government geologists had recommended draining it, but the work had not begun.

Survivors’ accounts suggest that there was no official, systematic order to evacuate, although in some cases representatives of relevant agencies took action as individuals. Many people were reluctant to move having heard the earlier reassurances from the local priest and radio station. Even the Mayor and his family remained. In Armero, most people fled, on foot and in the darkness, only after hearing the first flood waves hit the town.

B. Voight, ‘The 1985 Nevado del Ruiz Volcano Catastrophe: Anatomy and Retrospection’, *Journal of Volcanology and Geothermal Research*, 44, 1990.

16.5.5 Community response

As previous chapters in this book have shown, people at risk make rational choices about protecting themselves from disaster. Within communities, there are many different perspectives of risk: these vary according to socio-economic differences in wealth, social standing, education, age, religion, ethnicity and gender. Personal and collective experience plays a significant part. Risk perceptions are likely to vary considerably between different communities, and even within the same community. This diversity presents a challenge to those who have to transmit early warning messages over wide areas.

One of the principal socio-economic factors affecting response to disaster warnings in many low-income countries is the vital need to protect assets and maintain livelihoods. The poorer and more marginalised a household is, the more important it becomes to hold on to its assets, property and income. A household may perceive the risk of evacuation, in terms of losing control of assets and resources, as more devastating than the risk of the hazard, especially where warnings are frequent but do not necessarily lead to disaster. There are many indications that poor people delay evacuation because of this.

Warning specialists often fail to understand how communities perceive and react to hazards and risks. There are several reasons for this. The first is that specialists and communities look at a potential disaster from different starting points. Early-warning systems tend to start centrally, at international and national levels, and then move outwards and downwards towards districts, sub-districts and villages or neighbourhoods. In this perspective, individual villages or neighbourhoods are on the periphery, but for the individual at risk, their home and immediate locality are at the centre of the picture. This means that factors that are of primary importance to the villager or householder at risk are likely to be invisible to the system managers, who work on a much larger scale. Conversely, the manager's national or regional perspective appears irrelevant to the individual at risk.

The second reason is that the two groups measure and describe risk in different ways. Technical specialists draw upon scientific and engineering methods of analysis to quantify risk, principally in mathematical terms of probability. This specialist technical knowledge is not understood outside the scientific community. It may not even be understood by officials and NGO staff responsible for disaster preparedness and response. It is not easy to translate such mathematical calculations into everyday language (such as 'high', 'medium' or 'low' risk) for operational use; indeed, this may only add to the confusion. Disaster victims and potential victims measure and describe risk in more varied, qualitative terms. Technical words and phrases which seem ordinary to scientists may not be understood by the public. For instance, official warnings of the arrival of Typhoon Haiyan in December 2013 referred to a 'storm surge' (the technical term for an abnormal rise in water levels caused by low-pressure weather systems). Yet many residents of the coastal areas affected, as well as local decision-

makers, admitted that they did not understand the term and as a result failed to evacuate.⁵ Seemingly simple alert level systems, using number or colour codes, are usually designed to be clear to affected communities, but even these can sometimes be misunderstood.

A third reason is the assumption among some disaster professionals that they alone understand and assess risk objectively (i.e. scientifically), whereas the disaster victims' understanding and assessment is merely subjective, even irrational, perception. There are a number of problems with this attitude. One is methodological: it is not possible to maintain a clear distinction between 'objective statistical' and 'subjective perceived' risk because 'objective' risk estimation itself involves value judgements, such as the definition of what constitutes a 'hazard event'. This attitude also undervalues the knowledge of those who actually experience hazards on the ground, and overlooks the social and economic forces that make some people more vulnerable than others. A better understanding of such matters requires different approaches to communicating with communities at risk, based on dialogue and community participation (see Chapters 6 and 10).

Many communities draw on their own indicators of impending hazard when deciding how to respond to warnings. These are often based on observation of weather patterns, the action of the sea and rivers and animal behaviour.⁶ Such indigenous knowledge has been shown to be quite reliable on occasion, particularly for frequently occurring events, but there has been little attempt at rigorous scientific validation. More work could be done to correct potentially dangerous errors in understanding and to enable warning systems to incorporate reliable indigenous indicators; famine early warning systems certainly benefit from community participation, as local people are sensitive to socio-economic as well as agricultural indicators of food insecurity.

16.5.6 Controlling information

Emergency planning manuals highlight the importance of officially validated forecasting and warning information issued from a central point. Whilst the use of multiple communication channels is necessary to ensure maximum outreach as well as reinforcing the warning

⁵ O. Neussner, *Assessment of Early Warning Efforts in Leyte for Typhoon Haiyan/Yolanda* (Tacloban: GIZ, 2014), Environment and Rural Development Programme, http://www.preventionweb.net/files/36860_36860gizassessmentofearlywarningyol.pdf.

⁶ See for example P. Howell, *Indigenous Early Warning Indicators of Cyclones: Potential Application in Coastal Bangladesh* (London: UCL Hazard Centre, 2003), <http://www.ucl.ac.uk/hazardcentre/resources/working-papers2>; G. Cerdena, 'Indigenous Know-How on Mayon Volcano's Lava-Spittle Mysticism', in R. Shaw et al., *Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learned from Experiences in the Asia-Pacific Region*, European Union/UNISDR Regional Office for Asia and Pacific, 2008, http://www.unisdr.org/files/3646_IndigenousKnowledgeDRR.pdf.

message, disaster managers are often concerned about unofficial sources of information, especially radio, satellite and cable television stations, the internet and social media. Information from multiple unofficial sources, with varying degrees of reliability, is generally reckoned to be dangerous, leading to unjustified alarm and incorrect responses.

There is some justification for this view, but in the modern age command and control of information is unrealistic. The public are increasingly consumers of information from different sources, choosing what information to use and where to obtain it (see Chapter 10). In practice, community members often draw on a variety of information sources, types and messages to decide when to take action and what form of action to take in response to warnings. Social capital, social networks and inter-personal communications are key factors in sharing hazard warning information and motivating people to take responsive action, whatever formal channels or technologies are used for communicating warnings.

It is difficult to strike a balance between the need for authoritative warning information and people's desire to make their own choices. Disaster managers will have to acquire extensive skills in media management, but the central issue is probably one of public trust in the competence and integrity of disaster professionals. Trust is intrinsic to the success of warning communications. Where the authorities, officials or scientific experts who direct forecasting and warning systems are not trusted, people are more likely to disbelieve forecasts and warnings, or seek out other, informal sources of information.

16.5.7 Science and technology

Recent decades have seen rapid advances in scientific understanding of natural hazards and ways to monitor them. This has greatly enhanced scientists' ability to forecast the location, timing and severity of events. All forecasting and warning systems rely on scientific knowledge of one kind or another, but scientists' capacity to predict varies with the hazard studied. For example, in the case of geological hazards (earthquakes, volcanic eruptions, landslides, tsunamis), it is possible to identify where events may take place, but it can be very difficult to indicate when. Short-term predictions or forecasts (over days or hours) are generally much more successful in the case of landslides, volcanoes and tsunamis than they are for earthquakes. Meteorologists have become very skilled at making short-term forecasts of tropical cyclones, predicting their timing and movement, and their seasonal forecasting is also becoming more reliable.

The scientific-technical resource base is the result of many years of investment globally. Knowledge is widely shared among scientific communities. Data from technical devices such as remote-sensing satellites and buoys monitoring sea-surface temperatures are routinely transmitted to forecasters and disaster planners through established global networks. The World Meteorological Organization, for example, has played a significant role in coordinating monitoring and forecasting of hydro-meteorological hazards.

Technological sophistication is not necessarily a barrier to small-scale warning systems or community involvement. A wide range of technologies may be appropriate for particular hazards, localities and needs. Those appropriate at regional or national levels include satellite imagery, GIS maps, computerised networks for receiving and transmitting data, automated gauges and other monitoring devices and radio and television broadcasts. At community level, one might find participatory mapping of hazards and vulnerable households, manual river level or rainfall gauges, signs marking evacuation routes and the use of megaphones, bells and drums to issue warnings. In many cases, vulnerable communities will monitor impending events themselves; for example, communities living close to flood-prone rivers often have people watching water levels at times of severe or prolonged rainfall.

16.6 Evacuation and emergency shelter

In many cases evacuation is the primary response to warnings. Official evacuation plans should be based on an understanding of people's existing capacities and opportunities to evacuate (lack of attention to this was one of the many factors that contributed to the Hurricane Katrina disaster in New Orleans in 2005). Particular attention should be given to helping vulnerable people escape: older people, the disabled and pregnant women or women with young children may not be able to move quickly and easily, and may need assistance. Evacuations are often voluntary, in response to warnings and advice from the authorities, but in some circumstances may be mandatory: forced removal of inhabitants tends to be seen as a last resort, but it can save many lives.

Establishing escape routes and emergency public shelters is essential. People at risk need to know which routes are safe to use and where to go in case of a hazard event. Escape routes and emergency shelters have to be designed for specific hazards, as a certain place or route may provide safety against one type of hazard but not against another. Many lives are lost in disasters because people remain in their homes for too long, until they cannot escape, or because places they believed to be safe were not.

Escape routes can take many forms, such as paths, roads, open land and fields. They should not be cut off by the hazard itself (e.g. by flood waters) or blocked by those fleeing the disaster; alternative routes should be made available wherever possible. Emergency plans often include safe pick-up areas where people can gather before being transported to designated public shelters. These pick-up areas can be open spaces, public buildings or landmarks, or any other places that are safe and accessible to vehicles.

Public shelters are often purpose-built but they do not always need to be specially constructed, since existing community buildings such as schools, community centres, churches, temples and mosques may be adequate or can be upgraded. Conversely, many disaster shelters are used during normal times as community buildings, such as meeting

halls, schools and stores. Shelters should be designed or adapted to the specific hazard threat(s), the local geography and the needs of those who use them, as well as the length of time they are likely to be occupied. Planning should include compiling inventories of such facilities and strengthening or protecting them where necessary. Shelters often have to take in more people than they were designed for, and for longer periods than they have supplies for. Arrangements have to be in place for provisioning and maintenance between crises. There is concern that people in positions of power may use such facilities for their own purposes and deny access to others at times of crisis, or may influence the siting of shelters to suit their own purposes, though it is unclear how widespread this is or how best to prevent it. Evidence from the 2013 Typhoon Haiyan disaster in the Philippines has drawn attention to the importance of the correct siting of evacuation shelters: many of the shelters that people moved to in response to warnings were in danger areas and were not built to withstand the force of the storm surge, and as a result many people in those shelters died.⁷

Safety within shelters is also important. Women may be reluctant to go to shelters because of the lack of privacy or fear of abuse there. Disabled people experience considerable difficulties with regard to access, facilities, food, medication, communication and other support. Most of these problems are due to poor shelter planning and management and can be overcome through better organisation and awareness-raising among staff.

More systematic study of how shelters are managed during and between disasters would be helpful. Maintenance of shelters and their equipment appears to be a common issue, once the external agencies that built and established them have left. Community organisations need training, resources and a clear mandate to ensure that shelters are fit for purpose; they must also be trusted by community members to carry out their responsibilities honestly and efficiently.

⁷ Neussner, *Assessment of Early Warning Efforts in Leyte for Typhoon Haiyan/Yolanda*.

Case Study 16.5 Impact of cyclone preparedness measures in Orissa (Odisha)

Actions	Super Cyclone (Paradeep/05B), 28–30 October 1999	Cyclone Phailin, 12 October 2013
Mitigation and DRR	<p>Just 23 cyclone shelters existed in Orissa, all built by the Red Cross</p> <p>Communities reported not knowing how high above sea level they were, and consequently did not have any idea of how far the storm surge would reach and thought they would be safe</p>	<p>Orissa State Disaster Management Authority (OSDMA) reported it had constructed 43 cyclone shelters by July 2003 and half a million cyclone-resistant houses; 10,000 primary schools and 900 secondary schools strengthened</p> <p>By 2013 an estimated 200 shelters were completed, each able to hold around 500 people</p> <p>People were trained by NGOs and OSDMA to understand risk and warnings, how and when to use shelters and what other preparations they should make, including dissemination of warnings</p>
Preparedness: early warning	<p>First official advisory from Indian Meteorological Department (IMD) 48 hours before landfall. Most people hear of warning between 24 and 12 hours beforehand through TV, newspaper or radio</p> <p>IMD underestimated the cyclone’s intensity and only issued a revised warning two hours before communications were cut, leaving insufficient time to relay to communities. Warnings also gave no advice on appropriate responses, and terminology was too technical</p>	<p>IMD issued Red Message on 8 October (96 hours before landfall) to relevant authorities and district officials. Improved accuracy of forecasting meant that it was able to estimate potential damage. OSDMA issued detailed guidance for preparedness on 9 October (72 hours before landfall)</p> <p>Early warning messages disseminated on TV and online media and 10,000 text messages sent to mobile phones</p> <p>Loudspeakers used to reach those without access to TV/ media/internet</p>

Case Study 16.5 (cont'd)

Actions	Super Cyclone (Paradeep/05B), 28–30 October 1999	Cyclone Phailin, 12 October 2013
Preparedness: early action	<p>Most people did not evacuate (approximate maximum 69,000), and those that sought shelter took inadequate supplies</p> <p>Red Cross supplies proved inadequate for the number of people that did go to shelters</p>	<p>Communities took active steps to protect themselves, moving to cyclone shelters with provisions and livestock (nearly 1.2m took refuge or were moved inland)</p> <p>OSDMA ensured that all mobile phone numbers were updated and verified, cancelled leave and placed stocks of food and relief items on stand-by</p> <p>Control rooms were established in ten coastal districts</p> <p>Water levels in reservoirs were lowered to mitigate anticipated flooding</p> <p>Precautions were taken to protect cattle</p>
Preparedness: response readiness	<p>There was no clear mechanism for coordinating response and communications</p>	<p>National Disaster Management Authority (NDMA) deployed 2,000 personnel to the three affected states ahead of landfall; 29 teams of National Disaster Response Force (NDRF) were deployed with rescue equipment in Odisha and 15 in Andhra Pradesh, assisted by four teams from Tamil Nadu, and seven teams deployed in West Bengal. All teams were equipped with sat-phones and wireless sets</p>

Case Study 16.5 (cont'd)

Actions	Super Cyclone (Paradeep/05B), 28–30 October 1999	Cyclone Phailin, 12 October 2013
Cyclone statistics		
Wind speeds	Up to 260kph	Up to 220kph
Storm surge height	7 metres	3.5 metres
Flooding extent	15–30km inland	
People affected	19m	13.2m
People evacuated (including moving to community shelters)	Approx. 69,000	1m
Fatalities	Approx. 10,000	30–50
Economic losses:		
Livestock killed	450,000	
Houses damaged	1.6m	
Agricultural losses	1.9m hectares or 19,000km ² land flooded	5,000km ² land flooded, approx. \$320m

Prepared by Laura Howlett from F. Thomalla and H. Schmuck, “‘We All Knew That a Cyclone Was Coming’: Disaster Preparedness and the Cyclone of 1999 in Orissa, India”, *Disasters*, 2004, 28(4); V. K. Sharma and A. A. Khan, ‘Orissa (India) Super-cyclone: Impact and Emergency Management’, in S. M. Seraj et al. (eds), *Village Infrastructure To Cope with the Environment: Proceedings of the International Millennium Conference on Housing and Hazards and the Rural Community* (Dhaka/Exeter: Bangladesh University of Engineering and Technology and Housing and Hazards Group, 2000), <http://salekseraj.com/TP15.pdf>; southasiadisasters.net, special issue 99, October 2013; ‘When Preparedness Works: Case of Cyclone Phailin’, <http://www.aidmi.org/publications.aspx>, November 2013; ‘Cyclone Phailin in India: Early Warning and Timely Actions Saved Lives’, *Global Environmental Alert Service*, November 2013, www.unep.org/GEAS.

Chapter 17

Risk reduction after disaster

17.1 Introduction

Relief, rehabilitation and recovery initiatives should contribute to long-term development and the reduction of vulnerability – they should not simply reconstruct the existing risk. Ideas about how to do this have been discussed widely for a number of years, in various forms (the ‘relief-development continuum’ or ‘developmental relief’ in the 1990s; ‘recovery plus’ or ‘build back better’ in more recent times). There is plenty of debate about the meaning of the different terms and concepts, and their merits and drawbacks. Operationally, it may be simpler to look for similarities in their basic principles, which can be summed up as follows:

- intervene at the earliest possible stage in the disaster cycle to reduce future vulnerability;
- incorporate development principles into relief operations (e.g. build up local capacities, adopt participatory approaches);
- use relief not just to meet immediate needs but also to restore livelihood assets and rebuild livelihoods;
- use disaster relief to develop infrastructure that will be of value after the emergency is over; and
- take the opportunity to induce positive socio-economic change, not merely a return to the status quo.

The main opportunities for introducing DRR are through recovery. Originally seen as a distinct linking phase between emergency response/relief and development, recovery is now seen more as a continuing process that may take place alongside relief and development, and ideally is integrated with them. Recovery interventions should aim to restore and improve disaster victims’ physical, socio-economic and environmental conditions. However, recovery is a complex, long-term process, with many different dimensions relating to society, the economy, infrastructure, the built environment, ecosystems and institutions. These are all connected and interact. Recovery processes are not necessarily linear or uniform; they can be interrupted or come to a halt; they operate at a range of scales; social groups may reach recovery milestones through varied pathways and at different times; and the nature and speed of recovery depends on what people are recovering from and the conditions under which the recovery takes place.

The initial steps towards recovery (often called the ‘early recovery’ phase) are key moments for incorporating DRR. Early recovery starts in the humanitarian response period but works on more developmental lines. It seeks to ensure that humanitarian inputs contribute to longer-term self-reliance and resilience, building on humanitarian lifesaving assistance by supporting community actions and laying the foundations for recovery and development. It includes restoration of basic services, livelihoods support, provision of transitional shelter, establishing or re-establishing appropriate governance, ensuring security and the rule of law, environmental management or remediation and addressing other socio-economic issues, including land tenure and security and the reintegration of displaced people (in a conflict setting it also includes political processes).

There are fundamental challenges and tensions in early recovery. The immediate priorities of humanitarian response must be balanced against the opportunity to work towards longer-term needs. Developmental approaches may be unsuited to some crisis contexts, while humanitarian interventions often fail to lay foundations for enduring recovery. In any case, integrated recovery planning requires time, skilled personnel and widespread engagement. Institutional programming and donor funding schedules often set dates for completion of relief, early recovery and long-term recovery phases, but in reality humanitarian and recovery efforts overlap. It is unrealistic to expect communities to return to some kind of normality soon: human and material losses generally leave them more vulnerable than before. Post-disaster adjustment and adaptation last for years – often for decades – and disaster impacts can alter the environment, societies and economies irreversibly. Relief, recovery and development programmes need to take account of this ‘new normal’.

17.2 Opportunities, issues and challenges

17.2.1 Windows of opportunity

Disasters can be opportunities for change and renewal. They are sometimes said to present a ‘window of opportunity’ for promoting and implementing risk reduction measures, because the consequences of failing to act are strongly implanted in the minds of those who are affected by disasters, the operational agencies that have to respond to them and the public policymakers who have to manage their effects. This is demonstrated by the number and variety of initiatives introduced at all levels after major disasters. Disasters are an opportunity to change socio-economic relationships that affect vulnerability; they promote the formation of pressure groups; they prompt public debates about vulnerability and how to reduce it (Central America after Hurricane Mitch in 1998 being a notable example);¹ and they stimulate policy changes, new laws and regulations for disaster reduction. Relief and

¹ M. Mowforth, *Storm Warnings: Hurricanes Georges and Mitch and the Lessons for Development* (London: Catholic Institute for International Relations, 2001).

rehabilitation initiatives sometimes lead to longer-term risk reduction projects, especially where the same agencies are involved in both relief and development work in the area concerned.

Characteristics of the ‘window of opportunity’ at a more local level may include: residents and local officials are made to think about the problem of risk, when they do not normally do so; the disaster may already have forced some changes (for example by destroying unsafe buildings and infrastructure); the community has to make decisions about recovery; and technical and expert advice and resources become available from government and non-government sources.² It is hard to tell how long the window will remain open, what types of change might take place (and whether their outcomes will be positive or negative), or what conditions must be met to take advantage of the opportunity. Momentum can easily be lost and lessons are soon forgotten. Chances of success at community level may be improved by acting quickly before fear or the enthusiasm for change created by the disaster have lessened; basing interventions on familiar technologies and local resources as far as possible; concentrating on a small number of important actions, rather than introducing a whole portfolio of changes that dissipate efforts; focusing on what is achievable – communities already hit by a disaster have many urgent problems to attend to, and they will not respond if they believe the proposed mitigation measures are beyond their reach; and encouraging, supporting and involving communities as participants in change.

Post-disaster needs assessments (PDNAs), a key tool in post-disaster response, also have a key role to play in recovery and DRR planning. They collect information on damage losses and recovery priorities, including human development needs, and can be designed or adjusted to determine a range of recovery requirements and priorities, linked to DRR and development objectives. There are formal procedures for conducting PDNAs, particularly at government level, but any assessment of disaster impacts and needs can provide some kind of baseline and inform recovery policies.

Above all, it makes sense to agree on recovery goals and draw up plans before disasters happen, when there is time to think out strategies carefully and engage relevant stakeholders. Even if recovery needs after a disaster cannot be predicted reliably, credible scenarios can be created and the structures and systems to enable recovery can be established well in advance (as in preparedness planning).³

2 Natural Hazard Center, *Holistic Disaster Recovery: Ideas for Building Local Sustainability after a Natural Disaster* (Boulder, CO: University of Colorado, 2001), <http://www.colorado.edu>.

3 International Recovery Platform, *Guidance Note on Recovery: Pre-disaster Recovery Planning* (Kobe: International Recovery Platform, undated), http://www.recoveryplatform.org/resources/guidance_notes_on_recovery.

Case Study 17.1 A window of opportunity for DRR

Cyclone Nargis, which struck the Ayeyarwady Delta in Myanmar in May 2008, was a devastating disaster: there were more than 140,000 fatalities, 700,000 homes and critical infrastructure were damaged or destroyed, 2.4m people were affected, and the loss of crops and livestock was immense. However, the experience also stimulated improvements in disaster management and a new emphasis on DRR. Nargis made the government of Myanmar realise the limitations of its disaster management capacity, in particular the need to invest more in DRR. Soon afterwards, the Myanmar Action Plan for Disaster Risk Reduction, Preparedness, Relief and Rehabilitation was developed by a task force from government ministries, the Myanmar Red Cross, UN agencies, the Association of Southeast Asian Nations (ASEAN) and the Asian Disaster Preparedness Center. The action plan was considered a landmark in cooperation between the government, civil society and international agencies in Myanmar. A new national disaster management law and building codes were also drafted and programmes were initiated to mainstream DRR into the health and education sectors. In 2009 international donors set up a trust fund to improve food and livelihood security for the rural poor, who had been the main victims of the disaster, and the government designed a development plan for the Ayeyarwady Delta that sought to use recovery programmes as a platform for longer-term economic regeneration.

Local groups, businesses and religious networks had been active in the emergency response to Nargis: new alliances and partnerships were formed, which bridged ethnic, religious and class divisions. This led to government agencies, communities, local authorities and international aid agencies making new connections between each other, and working together to plan and carry out recovery programmes. A variety of DRR interventions were undertaken, including public education programmes on preparedness and risk reduction, the establishment of village disaster management committees, training in first aid, search and rescue and early warning, and the construction of cyclone shelters. Businesses also began to take risk reduction more seriously. Large construction companies educated smaller counterparts on building codes and seismic resistance, and the construction of schools and hospitals which could also be used as cyclone shelters.

L. Fan, *Disaster as Opportunity? Building Back Better in Aceh, Myanmar and Haiti* (London: ODI, 2013), <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8693.pdf>.

17.2.2 Coordination

Coordination of activities and interventions relies on collaboration between agencies working in relief, development and DRR. Such collaboration can be hard to achieve in the aftermath of major crises, when there may be a massive influx of national and international agencies of all kinds. The UN's cluster system (which includes early recovery as one of its key themes) is attempting to streamline coordination between agencies. Relief and post-relief initiatives tend to operate on different scales, with mass coverage being more easily achieved in relief operations, and humanitarian agencies must weigh the imperative to assist as many people as possible during an emergency against the need to support them against future emergencies.

Relief funding is likely to cover only short-term, often fixed periods (typically of a few months, except in chronic crises), and the artificial distinction between relief, recovery and development in typical donor budget lines may lead to effort and resources going into activities that are not sustained, and to strict limitations on activities deemed too 'developmental' by relief donors. Agencies are often under pressure to spend money quickly in order to meet donor deadlines. Seeking funding from development budget lines may not be a realistic alternative given the length of time donors can take to reach decisions. Another issue is that some agencies divide their humanitarian, development and DRR work institutionally into separate teams that do not necessarily collaborate or share knowledge effectively. Finally, large-scale interventions by international agencies can bypass or marginalise national governments and NGOs, reducing local ownership of post-disaster initiatives, making it harder to achieve coherent and planned recovery and risk reduction and reducing long-term impact. Conversely, the withdrawal of international organisations and support may lead to further fragmentation, especially if it is sudden.

17.2.3 Phasing out

Relief and rehabilitation agencies bear some of the responsibility for ensuring that the underlying causes of vulnerability are addressed and longer-term DRR activities are sustained. Many post-disaster assistance projects come to an end abruptly, with little or no provision for follow-up or ongoing funds, materials and other resources for consolidation and replication. Response organisations talk a great deal about 'exit strategies', but what an external agency describes as a phase-out may be seen locally as the agency walking away instead of seeing the job through.

Organisations that work in the short to medium term in a disaster-affected area should plan their withdrawal carefully, recognising that there will be plenty of unfinished work and that community expectations may not have been fulfilled. Phased withdrawal is preferable to sudden departure. There must be a coherent handover to locally based organisations and communities that have been involved in planning the exit strategy and have the appropriate

capacity and resources. The process should be planned early; it should be transparent, and agreed and coordinated with partners. The goal of an exit strategy is to ensure the sustainability of impacts after a project or programme ends.

17.2.4 Participation

Community participation (see Chapter 6) is just as important after a disaster as before it. Communities should drive the recovery process: they should as far as possible determine their own needs, making decisions about priorities for recovery and designing, implementing and monitoring interventions. The need for urgent response in a disaster often overrides participatory principles and mechanisms. To some extent this is understandable, but it can easily lead to agencies making too many hasty assumptions about what people need and want. This results in inefficient relief distribution and closes off opportunities for other areas of intervention to increase resilience. Inadequate participation can also reinforce existing local power structures that marginalise certain groups and keep them vulnerable.

17.3 Recovery interventions and DRR

17.3.1 Restoring livelihoods

Preserving livelihoods is vitally important to poor and vulnerable people, and vulnerability is closely linked to livelihood security (see Chapter 9). After a disaster, earning a living will very soon be a priority for the victims. Disaster response agencies sometimes fail to appreciate how important this is. For example, in the case of drought, interventions are often launched only after communities have begun to dispose of essential livelihood assets as the last resort in their coping strategy. Relief efforts also risk undermining local markets and incomes by flooding them with goods (e.g. food aid, shelter materials) or outside labour (e.g. in housing reconstruction programmes). Without adequate beneficiary participation in assessment and planning, there is a danger that livelihood support activities will be inappropriate. It is often difficult for outside agencies to identify key livelihood issues in the chaotic and stressful conditions after a disaster, but there are tools to help with this, such as the Emergency Market Mapping and Analysis (EMMA) Toolkit, a manual designed to assist front-line staff doing rapid assessments of market systems in the first few weeks following a crisis.⁵ Even rapid participatory approaches can give valuable insights.

Disaster response programmes usually recognise the need for livelihood support. Relief/rehabilitation aid commonly includes food- or cash-for-work schemes (see Section 17.3.2), and it is common to provide seeds and tools, livestock, household utensils and shelter

⁵ M. Albu, *The Emergency Market Mapping and Analysis Toolkit* (Rugby: Practical Action Publishing, 2010), <http://policy-practice.oxfam.org.uk>.

materials. The appropriateness of such goods (e.g. are the seeds suitable for local conditions and farmers?) is much debated, and national governments and other aid agencies are increasingly using financial assistance such as emergency loan funds and cash transfers (see Chapter 12) to help disaster-affected households replace or repair assets, transferring decision-making to beneficiaries and allowing them to decide for themselves what they need most. There may also be opportunities to introduce livelihood activities that are more resilient to natural hazard events. It is also worth noting that disasters can make existing livelihoods unviable: for example, land flooded by salt water in a cyclone may no longer be fit to farm. In such situations, recovery initiatives may need to support alternative livelihoods or adapt existing livelihood strategies.

Interventions to support livelihoods in post-disaster conditions must be able to adapt to rapidly changing circumstances. Overcoming indebtedness, which increases after disasters, is a significant challenge. Moreover, as livelihood strategies vary greatly between and within communities, support programmes need to be equally varied and based on thorough knowledge of local conditions. Local NGOs and CBOs are best placed to undertake such work – and, because they are locally based, to follow up. Participatory approaches are clearly

Case Study 17.2 Rebuilding livelihoods after disaster

After the October 1999 cyclone in the Indian state of Orissa, two Indian NGOs – Voluntary Health Association of India (VHAI) and Orissa Voluntary Health Association (OVHA) – established a wide-ranging community-based disaster management initiative in which livelihood support played a central part. It supported a wide range of income-generating groups: women's groups involved in dry fish processing, mat-weaving and broom-making, artisans, small traders and women-headed households (through poultry and animal husbandry). It also supplied fertilisers and seeds, renovated wells, ponds, latrines and salt pans and built water-harvesting structures. Village volunteers were trained in disaster preparedness and health care. The type of support varied according to the activity. For example, fishermen's cooperative groups were offered equipment under a long-term repayment scheme. Two women's groups were trained in literacy and small enterprise management, enabling them each to secure a loan of Rs20,000 (\$440) to fund fruit processing: in their first three months of operation, each enterprise earned a profit of over Rs7,000 (\$155).

J. Keve and P. K. Mohanty, 'From Disaster to Development: How People Can Help Themselves', in T. Palakudiyil and M. Todd (eds), *Facing Up to the Storm: How Local Communities Can Cope with Disaster* (New Delhi/London: Christian Aid, 2003).

valuable for identifying needs, setting priorities and targeting beneficiaries. Relief agencies that are unfamiliar with a disaster-affected area are likely to find it particularly challenging to implement effective livelihoods initiatives.

17.3.2 Work programmes

Cash- and food-for-work programmes are a standard device in an emergency, intended to give temporary help to disaster victims and provide more permanent community facilities for the longer term. One of the most famous examples is the 1972–73 drought in Maharashtra, India, where at one point nearly five million labourers were employed on public works by the state. The income they received under the programme enabled them to buy food, helping to prevent famine.⁶ Public works activities tend to focus on the construction or repair of physical structures such as roads and schools, or short-term activities like clearing rubble. They are also often used to build mitigation infrastructure, including irrigation channels, dams and other water harvesting structures, embankments, flood shelters and measures to stabilise hillsides (terraces, gabions and afforestation).

Although food- and cash-for-work initiatives can protect livelihoods and reduce risk, success depends on good planning and management.⁷ Projects should be based on a good understanding of local labour markets and wage rates, to avoid distorting local economies. Objectives should be clear: some schemes aim to provide income and public facilities, but in practice these two aims can be difficult to reconcile. The need to create work quickly may lead to projects of limited value, whereas it takes a long time to set up more substantial, complex initiatives because of the level of technical, managerial and other inputs required. Inadequate planning and consultation can lead to effort being wasted on mitigation structures that are not a priority for the community, or are inadequate. Decisions about such projects should be made through consultation with communities and local authorities, to ensure that they are relevant to people's needs and will be maintained afterwards. If beneficiaries feel they are not participants in the project, but treated merely as cheap labour, this can result in poor-quality construction. Timing may be important, especially in areas where demand for labour is seasonal. Poor targeting may fail to support those most in need or create divisions within communities by selecting some individuals and not others; here it is important to ensure that marginalised social groups are not excluded. Case Study 17.3 (Cash for work and food insecurity), although not a recent example, illustrates well the typical complexity of cash-for-work projects.

⁶ J. Drèze and A. Sen, *Hunger and Public Action* (Oxford: Clarendon Press, 1989).

⁷ See P. Harvey and S. Bailey, *Cash Transfer Programming in Emergencies* (London: ODI, 2011), <http://www.odihpn.org/hpn-resources/good-practice-reviews/cash-transfer-programming-in-emergencies>

Case Study 17.3 Cash-for-work and food insecurity

Koisha is a *woreda* (administrative unit) covering 700 square kilometres in southern Ethiopia, with a population of over 150,000. The region was badly affected by the 1984 famine. The development NGO SOS Sahel began working in Koisha in 1991 on an agricultural development programme, but soon realised that chronic seasonal food insecurity made it necessary to develop an integrated strategy of relief and development. This included a cash-for-work project to rehabilitate the main road through Koisha, to improve marketing opportunities for local farmers.

A review of the initiative two years after it had begun identified a number of benefits. Nearly 700 households took part in the first year of the project (a good year agriculturally) and over 1,300 in the second year (a bad year). Even so, the project could not provide for many in need. Nor did it make provision for those unable to work (an estimated 15% of families could not participate because they did not have the necessary labour).

The targeting method used, which involved community participation in selecting beneficiaries, was effective, but support and training are required to make such processes sustainable. Most work was carried out during the slack period in the farming season, and in the mornings, allowing labourers to attend to their farms and other activities. Cash-for-work improved food security: nearly half the money earned from the road repair in the first year was spent on food, and it appeared that the increase in money supply did not affect grain prices in local markets. Most labourers would however have preferred food for several reasons, including fear of losing out when cash was converted into food and the likelihood of creditors becoming more insistent when cash was available. Over 40km of road through the *woreda* were rehabilitated, leading to increased commercial and relief traffic, a fall of 50% in transport costs and improved access to markets and services.

The review also found that, if such employment schemes were to make a real difference to local food security, they must be longer-term investments, managed as far as possible by communities and directed towards public works identified as a priority by the communities. Government and non-government institutions would have to be involved, and shared responsibilities negotiated. A range of projects would be required, together with a high degree of flexibility that would allow initiatives to close down during peak periods of demand for agricultural labour, and to scale up or down during good and bad years.

P. Jenden, *Cash-for-Work and Food Insecurity in Koisha, Southern Ethiopia* (London: ODI, 1995), <http://www.odihpn.org/hpn-resources/network-papers/cash-for-work-and-food-insecurity-in-koisha-southern-ethiopia>.

17.3.3 Psychological and psychosocial support

Recovery from the psychological shock of disasters is central to restoring well-being. Post-traumatic stress can be a significant influence on the way survivors, the bereaved and responders deal with disasters and their consequences, although we still have much to learn about this.⁸ Post-traumatic stress disorder (PTSD), depression, anxiety and substance abuse are often documented after disasters, but psychological and psychosocial recovery are still neglected in relief and recovery work, particularly where disasters triggered by natural hazards are concerned (there has been more engagement in post-conflict settings). This may be because these matters are assumed to be personal and private to the individuals and communities concerned, and hence not a task for outside agencies; or they may simply be overlooked. For instance, in large-scale disasters, emergency response agencies often bury bodies as quickly as possible under the (often mistaken) assumption that they present a major public health risk, but this denies families the chance to follow cultural burial practices that may assist grieving. Clinical psychologists, psychotherapists and counsellors are needed to provide specialist support for individuals with post-traumatic stress disorders, and there is a growing number of people and organisations with skills in psychosocial support.

The term ‘psychosocial’ refers to the relationship between a person’s individual psychological dimensions (such as internal feelings and thought processes) and their social dimensions (such as relationships, family, social capital and cultural values and practices). Psychosocial support takes many forms, including listening to and communicating with people in distress (‘psychological first aid’), lay counselling, peer support and facilitating peer and self-help groups. Traditional community organisations can play an important role (see Case Study 17.4: Community-based psychosocial recovery), as can trained volunteers. Psychosocial support can benefit anyone affected by a disaster, although some may need support from clinical psychologists and other mental health professionals. Ideally, it should be integrated with other aspects of recovery, such as livelihoods or skills development, or it can be an entry point for these. It is important to remember that those involved in supporting disaster victims may themselves need support to cope with the psychological pressures of working with people affected by trauma.

Over-emphasis on negative responses such as PTSD and unresolved grief can lead to the assumption that people affected by disasters are passive victims, when in fact disaster-affected communities are the main actors in the response, and the experience of disasters can even stimulate survivors and the bereaved to work vigorously for better risk reduction efforts in the long term (see Case Study 11.1: A voice for disaster-affected people).

⁸ See for example K. J. Tierney, *Controversy and Consensus in Disaster Mental Health Research* (Newark, DE: University of Delaware, 2000), <http://udspace.udel.edu>.

Case Study 17.4 Community-based psychosocial recovery

Between 2002 and 2004 the NGO Richmond Fellowship Peru (RFP) carried out a psychological support project for displaced women who had fled from long-running conflict in the highlands to live on the outskirts of the capital, Lima, with little or no access to official services and care. Many of the women were widows or wives of missing persons. The project provided therapeutic activities to help participants share their experiences and grief through the creation of mutual assistance groups, which were partly derived from the highland traditions and culture of collective meeting and decision-making. Sessions were held in familiar places such as community centres built by local people, where the participants felt safe and confident, and in their indigenous language. Sessions were held fortnightly for 16 months. Ninety per cent of the participants were women (more than 940 women took part); 70% had suffered directly from political violence, and 65% from domestic violence. As a result of the treatment, many people were able to speak openly about their experiences and feelings for the first time. Psychological tests showed a distinct decline in symptoms of post-traumatic stress disorder. RFP incorporated lessons from the project into training courses for health and emergency services professionals.

Universidad Científica del Sur, *Project Evaluation: Psychosocial Treatment for Displaced Andean Women Designed and Carried out by Richmond Fellowship Peru*, 2005, <http://www.baringfoundation.org.uk/IntevalReason.pdf>.

17.3.4 Reconstruction and safer housing

Post-disaster reconstruction offers good opportunities for DRR in the built environment: rebuilding homes and infrastructure so that they are ‘safe’ or ‘disaster-resistant’, retrofitting or strengthening existing structures and rethinking land use planning and regulations. Shelter relief and reconstruction programmes absorb large amounts of international aid, yet we still have much to learn about their long-term impact in making vulnerable people more secure. In the past, the impact of many programmes has been limited, for the following reasons:⁹

- An emphasis on technically ‘safe’ housing, without certainty that such housing is affordable or culturally acceptable. Large-scale programmes are particularly likely to be technology-driven and introduce new or expensive construction technologies.

⁹ J. Twigg, *Technology, Post-Disaster Housing Reconstruction and Livelihood Security* (London: UCL Hazard Centre, 2006), <http://www.ucl.ac.uk/hazardcentre/resources/working-papers2>.

- Although reconstruction programmes can and do provide jobs for local builders, in many cases the builders and their traditional skills are displaced by imported technologies and labour. Communities do not acquire the skills needed to extend, modify and repair the new houses.
- Where reconstruction does create local jobs, it is not clear how sustainable these new livelihood opportunities are once the programmes funded by aid agencies come to an end.
- The focus is on *houses* (physical structures) rather than *housing* (the arena of social and economic life). Homes are not seen as places of work, learning, communication and relationship-building. Houses are built without regard for how – or if – this will improve social and economic status or reduce vulnerability in its widest sense.
- Lack of community participation. Most reconstruction projects claim that they are participatory, but there can be an element of agency propaganda in this, and the extent and nature of such participation are sometimes hotly disputed.

In general, participatory approaches, based on local skills and appropriate technologies (see Chapters 7 and 8), offer the best chance of long-lasting success in post- and pre-disaster situations alike. External agencies have increasingly chosen to give material, financial and technical support to disaster-affected households to rebuild their homes themselves (generally known as ‘owner-driven’ reconstruction), rather than implementing their own housing projects (‘donor-driven’ reconstruction). This shift is an acknowledgement of the major role played by households in building, extending and repairing their homes in normal times.

The owner-driven approach is generally quicker, cheaper and more effective, but it is not necessarily very participatory. In some projects, donors and technical support agencies still make the key decisions about design, technology and quality: the owners are given a limited range of choices, or merely provide labour for house building, rebuilding and retrofitting. Moreover, by focusing on people who own their land and homes, it marginalises the many others who do not. This is a particular problem in urban settings, where a large proportion of the population may be renters or squatters. There have been calls for reconstruction to become more ‘people-centred’ and better linked to other areas of recovery intervention and vulnerability reduction. Building local technical capacity and skills is essential if safer building practices are to become widespread and sustainable; raw materials and skilled and unskilled labour must also be affordable.

Transitional shelters (i.e. basic houses designed for temporary occupation) are often provided by humanitarian agencies to bridge the gap between emergency shelter, such as tents, and permanent housing. They are an attractive option in major disasters that leave many people homeless because large numbers can be built rapidly. They are not designed with long-term resilience in mind and may be located in hazardous areas, but in some cases they become semi-permanent dwellings because there is insufficient funding available to

Table 17.1 Key considerations in reconstruction programmes

Planning	Design	Construction
<ul style="list-style-type: none"> • Understanding the context and impact of the disaster • Understanding the local governance structures, regulatory framework and establishing methods of coordination • Understanding funding streams and timescales • Identifying beneficiaries • Determining which method of assistance is most appropriate • Establishing partnerships with other stakeholders in order to provide assistance • Recognising natural hazards which pose a future risk • Capturing the objectives, timescales, resources and risks in the programme plan. 	<ul style="list-style-type: none"> • Selection of appropriate sites for reconstruction • Resolving issues of land tenure • Physical planning of settlements • Definition of appropriate quality for reconstruction • Identifying appropriate types of construction • Minimising the environmental impact of reconstruction • Incorporating disaster risk reduction strategies • Design of houses, schools and health centres • Capturing the scope of works, programme, human resources, cost and risk management plans into a detailed project plan to inform construction 	<ul style="list-style-type: none"> • Different methods of implementation • Management of construction projects • Specification, procurement and transportation of materials • Management of labour and workmanship • Handover, maintenance and post-occupancy evaluation of completed projects

J. da Silva, *Lessons from Aceh: Key Considerations in Post-disaster Reconstruction* (Rugby: Practical Action Publishing, 2010).

meet the demand for permanent housing. Lower-income groups, who cannot afford other housing options, are more likely than better-off people to remain in transitional shelters.

Good land use and planning play a vital role in early recovery and DRR. Land is a critical issue in housing reconstruction, food security and economic recovery, and land issues, such as security of tenure, access to land and land administration, can assume great importance after disasters. Disaster-affected communities need access to land for emergency, transitional and in many cases permanent shelter. The loss of land ownership records in a disaster can result

in people losing their land or in ‘land grabs’ by more powerful individuals and groups. People who have lost identity cards or other forms of documentation find it difficult to establish their ownership of land and property.

Infrastructure plays a vital role in providing for basic needs, delivering essential services and supporting national economic development. Functioning infrastructure systems are also essential for delivering humanitarian aid quickly and efficiently. For these reasons, the repair and replacement of damaged infrastructure is seen as a priority after disasters (which also offer an opportunity for upgrading and modernisation). Governments and international financial institutions are the main agencies involved in this, because of the high costs and technical complexity associated with such projects, but there are good opportunities for community involvement in rehabilitating local infrastructure such as public buildings, roads, paths, footbridges, market places and water reservoirs and pipes. However, local infrastructure of this kind may also be more vulnerable because it is less likely to be built to high specifications or with higher-quality, more resilient materials.

17.3.5 Relocation and resettlement

Disasters can displace large numbers of people, some for long periods or even permanently, because the places where they lived are made uninhabitable (e.g. covered by a landslide or volcanic eruption) or closed off, they lack the resources to rebuild wrecked homes and infrastructure or the general destruction of local markets and economies cripples their livelihoods.

A common response by official agencies to the destruction of housing in disasters is to resettle their occupants in safer locations (see also Chapter 13.5). In some cases, many thousands may be moved in this way. Governments usually plan and manage large-scale resettlement because of its high costs and major practical challenges, but international agencies and NGOs are also often involved. From a purely hazards point of view, relocation makes sense. Some locations – floodplains, exposed coastlines, unstable hillsides, soils likely to liquefy as a result of seismic tremors – are inherently unsafe, and it is extremely costly, sometimes even impossible, to make communities that live in such places more secure. After a major disaster, survivors may be so traumatised and afraid of future hazard events that they are very keen to move. Provision of land can also improve livelihoods where it is used to grow crops or products used in building or craft work.

Relocation is a viable option in some circumstances, but it presents considerable practical challenges, including the cost of purchasing land and providing infrastructure and the difficulty of securing legal title and land rights. There are examples of planned relocation projects failing because the community could not obtain public land or buy private land. Organisations that become involved in such projects need to work very closely with local authorities and beneficiaries to resolve these problems, but this requires considerable time, adequate financing, detailed planning and careful negotiation with a range of stakeholders.

More fundamentally, the policy of resettlement overlooks the economic and other reasons that make people settle in unsafe areas in the first place. Even after disasters, many people are reluctant to move if their livelihoods depend on their existing location. For example, farmers living in fertile floodplains or fishing communities living on coastlines and riverbanks may be willing to live with the risk of storm surges or floods because they have no alternative source of livelihood. There are many examples of resettled households losing their livelihood assets, social networks and cultural identity and becoming unemployed, landless, poor or marginalised; they may also lose access to educational opportunities and other social services. Host populations may resent the arrival of large numbers of newcomers, which can cause social tensions and even conflict. Because of these potential problems, incentive

Case Study 17.5 Communities and post-disaster relocation planning

Four million people in the Philippines were displaced or made homeless by Typhoon Haiyan in November 2013. As part of its post-disaster recovery programme, the government proposed relocating 200,000 survivors away from the coast to safer inland locations and establishing no-build zones along shorelines. In February–March 2014, Oxfam surveyed people targeted for relocation in three provinces about their needs, priorities and concerns if they were moved. Maintaining livelihoods was their top priority: most people living near the sea were fishermen or worked in the fishing industry. Other concerns were security of tenure, availability of basic services and maintaining social support networks, although protection against future typhoons was a significant incentive. Some affected communities were afraid that relocation was being used as a means of evicting informal settlers to make way for commercial activities. The study also identified weaknesses regarding consultation, even though Philippines law requires that affected groups be informed and consulted. Little information had been provided; hardly anyone had been consulted by government officials; most were unaware of their rights regarding relocation; and many did not know where they would be moved to.

Due to the Philippines' decentralised government structure, responsibility for implementing the relocation programme fell on municipalities and Local Government Units. However, these lacked the financial resources, technical capacities and staff to tackle the many challenges associated with the task, which included limited availability of land, long and expensive land acquisition procedures and a range of other housing and property issues. A lack of official guidance on key issues such as selection criteria, arrangements for secure tenure and ensuring equity led to inconsistent local planning.

Oxfam, *The Right Move? Ensuring Durable Relocation after Typhoon Haiyan* (Oxford: Oxfam, 2014), <http://policy-practice.oxfam.org.uk/publications/the-right-move-ensuring-durable-relocation-after-typhoon-haiyan-316093>

schemes are often needed to persuade people to move. Sometimes, however, resettlement programmes are forced upon communities.

17.3.6 Environmental management

Disasters generate a number of environmental problems that can reduce communities' resilience to future events. They damage ecosystems' capacity to buffer the impact of future natural hazard events (e.g. by taking away topsoil and trees). They create large volumes of debris and waste, some of which may itself be hazardous (e.g. toxic materials). The pressing need for the reconstruction and restoration of livelihoods following a disaster may lead to over-exploitation of natural resources.

Recovery strategies need to address such problems and find ways to improve sustainability and resilience. There are plenty of possibilities here. Some waste can be recycled or re-used: materials from destroyed buildings, such as concrete, masonry and brick rubble, are often used in reconstruction, for example. There are opportunities for environmentally sound reconstruction through the adoption of alternative designs and building materials, and local procurement of materials. Alternative farming practices and diversification of livelihoods can help to reduce pressure on the environment; waste land and ecosystems can be rehabilitated.

In development projects providing housing, infrastructure and other services it is usual, and generally a legal requirement, to carry out an environmental impact assessment. Such assessments are rarer in recovery planning because environmental issues have low priority against other competing pressures. Where they are carried out they tend to be limited in scope and only apply to formal projects, not the extensive self-recovery efforts of disaster survivors. Nevertheless, it is possible to carry out environmental assessments in various forms during the post-disaster period, including rapid assessments in emergencies.¹⁰ Other tools and resources have been developed to help organisations incorporate sustainability into recovery and reconstruction, although little is known about how widely they have been applied and what the results have been.¹¹

10 C. Kelly, *Strategic Environmental Impact Assessments: Building Back Smarter* (London: UCL Hazard Centre, 2013), <http://www.ucl.ac.uk>; C. Kelly, *Guidelines for Rapid Environmental Impact Assessment in Disasters* (Atlanta, GA and London: CARE International and UCL Hazard Centre, 2005), <http://www.gdrc.org>.

11 For example, the Green Recovery and Reconstruction Toolkit (<http://green-recovery.org>) and the QSAND (Quantifying Sustainability in the Aftermath of Natural Disasters) tool (<http://www.qsand.org>).

Chapter 18

Monitoring and evaluation

18.1 Introduction

Monitoring and evaluation (M&E) are important because they:

1. Make operational agencies more accountable to those they seek to help, as well as those who support them.
2. Demonstrate to donors, policymakers and practitioners that risk reduction works, thereby making a case for greater effort in this area.
3. Improve understanding of how DRR works in practice – including identifying problems and mistakes.

This chapter contains a short account of approaches to M&E of DRR projects and programmes, focusing on evaluation. Project monitoring in general is covered in standard manuals and should be part of all agencies' systems and training. Evaluation is one of the principal methods by which agencies seek to learn lessons and incorporate them into their work to improve future policy and programming. It also provides accountability to partners, beneficiaries and donors.

The range of M&E approaches and methods in development and relief has grown considerably over the years, as has the level of interest in the subject. This has partly been driven by criticism and donor pressure, but also by the desire to demonstrate success and improve performance. A growing body of work is providing agencies with better-informed guidance on M&E methods for development, DRR and emergencies. This is supported by initiatives such as the Active Learning Network on Accountability and Performance in Humanitarian Assistance (ALNAP) (www.alnap.org) and the electronic MandE information forum for development workers (www.mande.co.uk).

Assessment of a project or programme can focus on several different aspects:

- Inputs. These are the human, financial and technical resources deployed. Their effectiveness, cost-effectiveness and appropriateness can be assessed.
- Activities and processes. This covers the performance of tasks and factors affecting this.

- **Outputs.** These are the immediate results the project achieves (sometimes called ‘deliverables’).
- **Impact (or outcomes).** This is significant or lasting changes, brought about by a specific action or series of actions.¹

Similarly, the main distinctions between monitoring and evaluation can be identified:

- 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 progress reports to donors. Evaluations focus on outputs and especially impact, and are intended for a wider audience within and outside the organisation.
- Monitoring is mainly descriptive. Evaluation is more analytical. Impact assessment is mainly analytical and concerned with longer-term outcomes.
- Monitoring should be regular and frequent, throughout the project. Evaluation is infrequent and can take place at any point in the project cycle (and after the project has ended).

Other terms used in this context are:

- **Review.** Reviews come somewhere between monitoring and evaluation. They supplement regular monitoring, taking place less frequently and providing an opportunity to identify key issues in programming. They usually form part of internal management systems, but reviews involving external stakeholders are not uncommon.
- **Audit.** Audits assess project and programme compliance with established regulations, procedures or mandates.

18.2 Planning and operation

M&E must be planned carefully, bearing in mind that no two projects are the same. Many agencies have developed generic evaluation criteria, which can be helpful. For example, the evaluation criteria set out by the Organisation for Economic Cooperation and Development’s Development Assistance Committee (OECD-DAC) are widely used in development projects, and often in humanitarian actions and DRR as well (see Box 18.1: OECD-DAC evaluation criteria). However, such frameworks and approaches should not be adopted thoughtlessly: they cannot be applied to every situation. They can be used to start discussions about what to evaluate and how to go about it, but the evaluation should be designed with the specific project in mind.

¹ C. Roche, *Impact Assessment for Development Agencies: Learning To Value Change* (Oxford: Oxfam/Novib, 1999).

Box 18.1 OECD-DAC evaluation criteria

Development

Relevance: The extent to which the aid activity is suited to the priorities and policies of the target group, recipient and donor.

- To what extent are the objectives of the programme still valid?
- Are the activities and outputs of the programme consistent with the overall goal and the attainment of its objectives?
- Are the activities and outputs of the programme consistent with the intended impacts and effects?

Effectiveness: A measure of the extent to which an aid activity attains its objectives.

- To what extent were the objectives achieved/are likely to be achieved?
- What were the major factors influencing the achievement or non-achievement of the objectives?

Efficiency: Measuring the outputs in relation to the inputs.

- Were activities cost-efficient?
- Were objectives achieved on time?
- Was the programme or project implemented in the most efficient way compared to alternatives?

Impact: The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended.

- What has happened as a result of the programme or project?
- What real difference has the activity made to the beneficiaries?
- How many people have been affected?

Sustainability: Measuring whether the benefits of an activity are likely to continue after donor funding has been withdrawn.

- To what extent did the benefits of a programme or project continue after donor funding ceased?
- What were the major factors which influenced the achievement or non-achievement of sustainability of the programme or project?

Box 18.1 (cont'd)

Humanitarian action

Relevance/appropriateness:

- Relevance: Assessing whether the project is in line with local needs and priorities (as well as donor policy).
- Appropriateness: Tailoring humanitarian activities to local needs, increasing ownership, accountability and cost-effectiveness accordingly.

Connectedness: The need to ensure that activities of a short-term emergency nature are carried out in a context that takes longer-term and interconnected problems into account.

Coherence: The need to assess security, developmental, trade and military policies as well as humanitarian policies, to ensure that there is consistency and, in particular, that all policies take into account humanitarian and human rights considerations.

Coverage: The need to reach major population groups facing life-threatening suffering wherever they are.

Efficiency: Measuring the outputs – qualitative and quantitative – achieved as a result of inputs. This generally requires comparing alternative approaches to achieving an output, to see whether the most efficient approach has been used.

Effectiveness: The extent to which an activity achieves its purpose, or whether this can be expected to happen on the basis of the outputs. Implicit within the criterion of effectiveness is timeliness.

Impact: the wider effects of the project (social, economic, technical, environmental) on individuals, gender and age groups, communities and institutions. Impacts can be intended and unintended, positive and negative, macro (sector) and micro (household).

OECD-DAC, *DAC Criteria for Evaluating Development Assistance* (Paris: OECD-DAC, 2000), <http://www.oecd.org/development/evaluation/49756382.pdf>; ALNAP, *Evaluating Humanitarian Action Using the OECD-DAC Criteria: An ALNAP Guide for Humanitarian Agencies* (London: ALNAP, 2006), <http://www.alnap.org/material/78.aspx>.

Evaluations can take many forms, including real-time evaluations, after-action reviews with communities, internal or self-evaluations by project staff and partners, and formal, externally-led evaluations. Evaluation guidelines sometimes divide them into three main kinds: summative (judging the merits and achievements of a project or programme), formative (to enhance project/programme learning, by understanding what worked and why), and developmental (to introduce new learning and ideas to organisations or the sector as a whole).² Mid-term evaluations are usually undertaken in longer projects. Impact evaluations long after the conclusion of the project are also valuable, but are rare.

The evaluation process should begin at the project design stage, when goals and objectives are set and logical or other results-based frameworks developed. Ideally, there should be a series of evaluations during and after the project, to permit longitudinal analysis, although this rarely happens. Evaluations should be scheduled at those points in the project where they can be most useful, principally at key moments for decision-making.

The purpose and methods of any monitoring exercise, review or evaluation should be clearly defined and agreed. Since it is almost never possible to assess everything, there must be some focus to the assessment, and its objectives must be realistic in relation to the resources that go into it. Thought should be given to such issues as:

- Indicators (see Section 18.7) – this is very important.
- Units of assessment. M&E can take place at individual, household, group, community, institutional, district and national levels. Even in a large project, it is important to get as close to the grassroots as possible: data can be collated subsequently.
- Sampling: sample size and sampling methods.
- Scope. This is conditioned by the project's coverage in terms of geographical area, hazards and risks addressed, and the number and types of vulnerable people assisted, as well as by factors such as remoteness, difficulty of access and security.
- Existing information sources. Most evaluations draw on external sources (e.g. government and other agencies' data sets and surveys) and internal sources (e.g. project documents) as well as field surveys. The quality and accessibility of external data is likely to vary. Agencies need to have knowledge management systems in place to identify and obtain relevant internal documents.
- Who should be involved in collecting, providing and discussing evidence (see also Section 18.4: Accountability and participation). The size, composition and skills of evaluation teams are important considerations.

2 M. Buchanan-Smith and J. Cosgrave, *Evaluation of Humanitarian Action: Pilot Guide* (London: ALNAP, 2013), pp. 33–34.

- **Scheduling.** Reviews and evaluations should be scheduled at an appropriate point in the project's lifetime, or after it has ended, and at suitable times of year (i.e. not at periods when communities are very busy, such as harvest time, or when weather conditions are difficult). When in the field, researchers must find appropriate times of the week or day for talking to the different beneficiaries.
- **Tools and methods.** In the field, these may comprise formal surveys, structured or semi-structured individual and group interviews, group discussions such as focus groups and workshops, direct observation, community mapping, seasonal calendars, timelines, problem/solution trees, other participatory learning and action methods and case studies. Each method brings its own advantages and drawbacks. Project evaluations generally use several methods. The methods adopted must be appropriate to what is being assessed and the resources available to carry out the assessment.
- **Matching inputs and outputs.** The evaluators must have enough time and resources to carry out the proposed activities and achieve the outputs required. Effective M&E also requires organisational capacity to support it: systems, financial resources and specialists in data management, analysis, reporting and M&E training.
- **How the findings will be reported back to all the stakeholders concerned, and how they will be acted upon.** This is often neglected.

Clear terms of reference are vital. Many problems with evaluations stem from a failure to achieve this clarity and reach agreement on it. Sufficient time should be set aside for this. Even the best plans can break down when confronted with reality in the field, so flexibility is essential. Good planning should allow for this.

Often, evaluation teams are not given the time or resources to do their work thoroughly. Overcrowded schedules are common. This limits time for preparation and in the field, forcing evaluators to place too much reliance on what may be very selective field evidence, on agency documents that may be incomplete or unavailable and on interviews in head offices. In consequence, many evaluations are little better than snapshots of an initiative, coloured by chance encounters and personal views. Experienced evaluators can compensate for this to some extent by drawing on their skills in identifying and gathering key data and their knowledge of similar initiatives elsewhere, but if they rely too much on their general knowledge they may miss features that are distinctive to the programme or project in question. However, snapshots can be useful. Small-scale or rapid assessments do provide valuable insights in some cases, especially when focused on a distinct aspect of risk reduction (as in Case Study 18.1: Reporting on disaster response).

Case Study 18.1 Reporting on disaster response

On 11–12 November 2002 a cyclone warning was issued along the coast of the Bay of Bengal. A relatively weak cyclone struck, with high winds and heavy rain in several places. The Orissa State Branch of the Indian Red Cross used the event to assess the effectiveness of its disaster preparedness work. The initial assessment was based on telephone calls from local voluntary coordinators and emergency team members in eight locations. These conversations focused on the following:

- When the cyclone warning was received, and from which source(s).
- Actions taken by local disaster preparedness teams.
- Actions taken by villagers.
- Details of the event (wind speed, condition of the sea, rainfall) and its impact.

The phone calls provided plenty of local detail. Using this, it was possible to build up a picture of the situation on the ground and actions taken almost as they happened, the effectiveness of warning and response mechanisms and factors affecting them, and variations between the locations. The phone call method was not seen as a substitute for field surveys, but it would not have been possible to carry out such surveys immediately after the event.

Orissa State Branch, Indian Red Cross Society, 'Actions by 8 Red Cross Cyclone Shelter Communities in Orissa during Cyclone Warning (Nov. 11 to 12, 2002)', mimeo, 2002.

18.3 Sustainability and theory of change

It can be difficult to judge a project's long-term sustainability and replication, but this can often be inferred from other evidence. For example, DRR initiatives are more likely to be sustainable where extensive time and effort have gone into preparatory work with communities, partners and other local and national actors. Another indicator is the level of stakeholder contributions of financial and other material and human resources to the project (on the assumption that sustainability is linked to the degree of local ownership).

In community-based projects, the strength of community organisation is central to sustainability. Evaluations often place great emphasis on the creation or revival of local groups such as disaster management committees. The mere existence of such groups is a

weak indicator of their capacity, whilst attitudinal analysis may only demonstrate short-term enthusiasm. Evidence of group activity should be collected (e.g. risk assessments, preparation of emergency plans, building of mitigation structures). The frequency, nature and quality of such activities and the degree of community involvement can be monitored and evaluated. Evaluators should also consider external factors that may affect sustainability, such as changes in official policy, staff turnover and economic changes.

Whatever their focus, evaluations – and projects – should be based on a ‘theory of change’. Theory of change is understood and approached in different ways, but the key idea is that individual initiatives should be underpinned by broader thinking about how change happens generally, as well as the overall, longer-term changes the initiative itself seeks to achieve (or to contribute to, where the desired changes are very long-term). These ideas need to be acknowledged, debated and made explicit by project participants, and projects should be clear about how they contribute to change. This generates a shared vision or rationale at the start, provides clarity about roles and ways of working during the project and makes it easier to assess and communicate findings at the end.³

Formal planning, monitoring and evaluation tools, such as logical and results-based frameworks (see Section 18.9: Identifying cause–effect links) can capture some of this, but they tend to be linear and compartmentalised, and may be less effective in complex programmes or in explaining how individual projects relate to the larger, more complex socio-ecological and socio-political systems in which they are located. Uncertainty, which is an important element in risk assessment and long-range planning for sustainable development, DRR and climate change adaptation, is another issue that conventional M&E approaches may not be able to capture adequately.

18.4 Accountability and participation

It is best to approach M&E as a mutual learning process for all involved, not merely as an information-gathering exercise. This encourages flexibility, openness and debate. The principles of accountability to vulnerable people outlined in Chapter 11 are very important here. Communities’ views should be central to evaluation, and communities (or beneficiaries) should be able to take an active part in the evaluation process. Participatory evaluation enables the voices of project stakeholders, particularly beneficiary communities and vulnerable groups, to be heard, draws on their local knowledge, stimulates dialogue and

³ C. James, *Theory of Change Review: A Report Commissioned by Comic Relief* (London: Comic Relief, 2011), http://www.theoryofchange.org/pdf/James_ToC.pdf; I. Vogel, *Review of the Use of ‘Theory of Change’ in International Development* (London: DFID, 2012), <https://www.gov.uk/government/news/dfid-research-review-of-the-use-of-theory-of-change-in-international-development>.

Box 18.2 Differences between theory of change and logical frameworks

Theory of change:

- Captures the complexity of change much better – it is less linear and can take into account relationships and the interdependence between different programme elements.
- Acknowledges an initiative's starting point (captures existing change processes).
- Is broader than just a project: it takes into account programme and non-programme factors affecting change.
- Focuses on change and how to get there, rather than programme components.
- Is simpler and more flexible – more 'organic' and less 'mechanistic'.
- Is not rigid in its terminology and so is more free-flowing.
- Is an exercise or process, rather than a tool.
- Enables organisations to think about their work and their organisation more deeply.
- Is more interactive and fun.

C. James, *Theory of Change Review: A Report Commissioned by Comic Relief* (London: Comic Relief, 2011), http://www.theoryofchange.org/pdf/James_ToC.pdf.

mutual learning and creates wider 'ownership' of the evaluation's findings. However, many M&E systems are still top-down, designed to extract information from the field to give to headquarters staff and donors. Collecting data solely for external use can undermine the participatory process.

Beneficiary participation in M&E can take various forms. In some projects, it may be no more than providing information to review or evaluation teams, but this is too limiting. Beneficiaries should be involved in planning the assessment (including selecting indicators), providing information on what was and was not achieved, analysing and verifying the results and making decisions about future activities. Findings should always be fed back to communities. The needs of communities in this regard may differ from those of outside agencies, and the targets, indicators and priorities developed by communities may differ

considerably from those of agency staff. Adopting participatory approaches does not prevent the use of more formal data collection methods: these can complement or validate information gathered in a participatory way. Methods should be selected according to their usefulness in helping to understand impact.

Participatory methods such as those described in Chapter 6 are valuable in allowing beneficiaries to express their views. Standard participatory learning and action exercises can yield valuable information. Since it is never possible to involve everyone, careful thought must be given to ensuring that those who are consulted are representative of the range of groups concerned, paying particular attention to the most marginalised as well as people who may have dropped out of the project. Some evaluations pick up the views of similar people who were not involved in the project as a kind of ‘control group’.

Participatory impact assessment focuses on a project’s impact on beneficiaries’ lives rather than measuring project performance. The importance of identifying who benefits from a DRR initiative, and who does not, cannot be overemphasised. Evaluators should never assume that benefits are spread evenly across a community. They should assess beneficiary communities’ socio-economic characteristics carefully, considering gender issues and people who are vulnerable due to other factors, such as poverty, ethnicity, age and disability, as well as the influence of local power relationships.

Beneficiaries are one group of stakeholders. Project staff are another. NGOs and other local institutions, local and national government officials, and, where appropriate, international donor agencies and other kinds of organisation (e.g. the private sector) should be consulted if they have been involved in the project, are affected by it or have some influence on its outcome. It can be difficult to reconcile the views of such diverse groups. This makes it all the more important to be clear from the start about what M&E is designed to look at. Meetings should be held to discuss and explain this. Where stakeholders have different priorities and perspectives, this should be made explicit at the start to avoid misunderstandings later.

Evaluations are often funded by donors or in some way linked to ensuring continued donor support. In such circumstances the ideal of M&E as mutual learning may be hard to sustain. Many of those involved will be tempted to overstate the positive features of their project and downplay the negative ones. They may be defensive about their work, fearing that evaluation teams are searching for faults and problems. Community members may only tell evaluators what they think they want to hear.

18.5 Assessment teams

Participation and accountability are significant factors to bear in mind when forming assessment teams. The balance between internal and external assessors is an important consideration. Evaluations may be carried out by external specialists, local staff or local people, working separately or in mixed teams. Both internal and external evaluations aim to learn lessons, but external evaluations, which provide a more detached, objective perspective, also make an important contribution to accountability. There are no fixed rules: the appropriate size and mix of evaluation team depends on the specific project. However, all teams should have the appropriate technical skills, gender balance and local participation.

Involvement of a range of people makes it more likely that an evaluation's lessons will be shared and its findings acted upon. Unfortunately, external specialists – mostly men – often dominate teams evaluating DRR and humanitarian aid initiatives, and it is still common to have projects evaluated by a single external consultant. Whilst it is useful to have the added objectivity of an outsider's view and the experience of a well-travelled evaluator, there is a danger that somebody new to the project will not understand all its complexities. This danger is accentuated by the limited time usually allocated to evaluators.

The purpose of the evaluation offers some guidance on the balance of the evaluation team. If the main purpose is lesson learning, it makes sense to involve more internal staff; if it is accountability, the independence of external evaluators becomes more important. In practice, however, most evaluations aim at lesson learning and accountability. There is a lot of discussion in the literature about the appropriate skills mix in evaluation teams. Again, there are no fixed rules about this. Some people feel that a wide range of technical skills is essential; others maintain that experience in evaluation methods is more important. In some kinds of DRR project technical expertise may be valuable, be it in science, engineering, architecture, nutrition, economics or the social sciences. Evaluators need to be able to use relevant data types (e.g. quantitative or qualitative) and collection methods. Knowledge of local geography, society, cultures and institutions is also important.

18.6 Baseline data

A baseline is the measurement of conditions at the start of a project, against which subsequent progress can be assessed. Ideally all projects should have baseline studies to help them set their objectives and indicators of achievement. In practice, this happens far less than it should, leaving many evaluators struggling to find adequate measures of success.

In DRR programmes, a risk or vulnerability/capacity analysis (VCA) should provide good baseline data to guide planning and interventions. However, considerable resources are required for a comprehensive analysis, and time, resource and capacity constraints in

Case Study 18.2 **Establishing baselines**

Project assessments of its community-based DRR programmes by the Myanmar Red Cross include initial baseline surveys intended to provide community profiles and an understanding of local perceptions of risk and disasters, and to identify the coping and preparedness strategies used by households and communities. Baseline surveys are carried out by community M&E teams comprising between 12 and 15 local Red Cross volunteers. Team members are given a two-day basic training course in M&E concepts and survey methods, and are supported in the field by a specialist M&E officer. A sample of 10–20% of households is interviewed using a semi-structured questionnaire, and the data collected is entered onto a computer for analysis using specialist software: all of this work is done by the volunteers. The M&E officer then writes a report based on the data and analysis. End-of-project surveys are carried out by the same teams, using the same sets of questions as the baselines, in order to compare and measure change. Key respondents are also interviewed to add a further perspective on the project's impact.

Baseline and End-line Studies as Means To Analyze the Effectiveness of Community-based Disaster Risk Reduction Activities (Nay Pyi Taw: Myanmar Red Cross Society, undated).

evaluations make it difficult to collect and analyse the range of data required. VCA is also a relatively new approach for many project staff. Until they acquire greater confidence in the techniques required, they may be reluctant to use it in evaluations, especially where the findings will go before senior staff or funding agencies.

18.7 Indicators

Evaluators normally look for a range of indicators that will give a balanced view of a project's achievements and contribution towards its objectives: these should be easy to understand, by communities as well as implementing organisations. Indicators can be qualitative, quantitative or a mixture of the two, but in general they should try to be both SMART (specific, measurable, attainable, relevant and time bound) and SPICED (subjective, participatory, interpreted, cross-checked, empowering and diverse): see Table 18.1. Remember that the indicators that are easiest to measure are not necessarily the most useful for analysis.

This sounds simple on paper, but in practice it is more complicated. Questions to be asked regarding the practicality of indicators include:

Table 18.1 SMART and SPICED indicators

Smart	Spiced
<p>Specific: Indicators should reflect those things the project intends to change, avoiding measures that are largely subject to external influences.</p> <p>Measurable: Indicators must be defined precisely so that their measurement and interpretation are unambiguous. They should give objective data, independent of who is collecting the data. They should be comparable across groups and projects, allowing change to be compared and aggregated.</p> <p>Attainable: Indicators should be achievable by the project and therefore sensitive to the changes the project wishes to make.</p> <p>Relevant: It must be feasible to collect data on the chosen indicators within a reasonable time and at a reasonable cost. Indicators should be relevant to the project in question.</p> <p>Time-bound: Indicators should describe by when a certain change is expected.</p>	<p>Subjective: Informants have a special position or experience that gives them unique insights which may yield a very high return on the investigators' time. In this sense, what may be seen by others as anecdotal becomes critical data because of the source's value.</p> <p>Participatory: Indicators should be developed together with those best placed to assess them. This means involving a project's ultimate beneficiaries, but it can also mean involving local staff and other stakeholders.</p> <p>Interpreted and communicable: Locally defined indicators may not mean much to other stakeholders, so they often need to be explained.</p> <p>Cross-checked and compared: The validity of assessment needs to be cross-checked, by comparing different indicators and progress, and by using different informants, methods and researchers.</p> <p>Empowering: The process of setting and assessing indicators should be empowering in itself and allow groups and individuals to reflect critically on their changing situation.</p> <p>Diverse and aggregated: There should be a deliberate effort to seek out different indicators from a range of groups, especially men and women. This information needs to be recorded in such a way that these differences can be assessed over time.</p>

C.Roche, *Impact Assessment for Development Agencies: Learning to Value Change* (Oxford: Oxfam/Novib, 1999), pp. 48–49.

- Measurability. Is the indicator measurable? Is it sufficiently sensitive to an improvement or deterioration in conditions?
- Ease and cost of collection. How easy is it to obtain the information required? How costly will this be? Can the community participate? Are relevant data already collected?
- Credibility and validity. Are the indicators easy to understand, or will people argue over what they mean? Do they measure something that is important to communities as well as implementing organisations?
- Balance. Do the selected indicators provide a comprehensive view of the key issues?
- Potential for influencing change. Will the evidence collected be useful for communities, implementers and decision-makers?⁴

Even with this guidance in mind, it is very rare to find all the evidence one wants. Indicators are *indicators*: they are not necessarily final proof. In some cases it will not be possible to measure change directly, with clear and unambiguous indicators. It is often necessary to identify relative or approximate changes instead, using indirect or ‘proxy’ indicators.

Part of the process of collecting baseline information should be to identify those indicators that will be most valid for M&E. However, experience as the work progresses may highlight other issues and require changes to the project. Some indicators may have to be modified or new ones will emerge, which makes it important to be flexible. Monitoring methods should be designed to pick up these issues so that decisions can be made. Where baseline data are lacking (which is often the case), or previously identified indicators are difficult to assess or simply irrelevant, the baselines may have to be reconstructed (e.g. from project documents, interviews with key informants and data from other organisations) or new indicators must be developed. In practice this happens quite often, but the process must be managed carefully to avoid confusing or misleading stakeholders; an open, participatory approach is needed, and the aim should be to achieve the highest possible level of consensus.

Evaluations usually combine qualitative and quantitative data. Both types are valuable, in different ways. Quantitative indicators are often used to assess progress towards stated targets (e.g. the number of hazard-resistant structures built or community disaster preparedness committees established). Numbers alone cannot measure quality or effectiveness, although they can be proxy indicators for this. Qualitative data are often used in DRR evaluations. Typically they are collected from stakeholders through workshops, focus

⁴ L. Nosen, ‘Hazard Mapping and Risk Assessment’, in ADPC (ed.), *Proceedings, Regional Workshop on Best Practices in Disaster Mitigation, 24–26 September 2002, Bali, Indonesia* (Bangkok: Asian Disaster Preparedness Center, 2002), pp. 83–84 <http://www.adpc.net/audmp/rllw/default.html>.

Table 18.2 Examples of data collection methods and their application

Method	Examples of application
Formal surveys of beneficiaries and other stakeholders (can also be generated by interviews and group discussions)	<ul style="list-style-type: none"> • Survey of builders and occupants of hazard-resistant housing to ascertain application of skills and increased security • Household survey on food production, availability, consumption and marketing to identify patterns and shifts in vulnerability
Structured and semi-structured interviews with staff, partners, beneficiaries and others	<ul style="list-style-type: none"> • Individual interviews building up a picture of the level of understanding of the project, agency–community working relationships, effectiveness of coordination mechanisms and outcomes of DRR interventions
Group discussions, especially with beneficiary communities (e.g. participatory workshops, focus groups)	<ul style="list-style-type: none"> • Beneficiary workshop to identify and assess benefits of particular DRR interventions and unforeseen impacts • Expert workshop to assess potential effectiveness of new DRR methods or approaches • Feedback workshop with beneficiaries and other stakeholders to test/confirm evaluation findings
Rapid assessments	<ul style="list-style-type: none"> • Post-disaster telephone or field survey to indicate effectiveness of warning and response mechanisms and factors affecting them
Direct observation and visual surveys	<ul style="list-style-type: none"> • Visual surveying of structural mitigation measures to determine quality of design and workmanship, take-up of technologies or techniques (disaster resilience inferred from this or assessed through post-disaster surveys) • Observation of coping strategies and other risk-reducing behaviour – before, during and after disasters

Table 18.2 (cont'd)

Method	Examples of application
Case studies	<ul style="list-style-type: none">• Personal or group accounts of use of skills, materials and organisational capacity acquired from disaster management training courses, during subsequent events
Simulations	<ul style="list-style-type: none">• Group simulation or exercises (table-top or field) of disaster management activities or responses to disaster events, to test plans, skills, equipment, etc.
Documentary evidence	<ul style="list-style-type: none">• Content analysis of educational material on risk reduction and management produced by project• Quantitative and qualitative data about project delivery, effectiveness, impact and costs, from project documentation• Secondary data collection to complement or validate information collected by the evaluators in the field

C. Benson and J. Twigg with T. Rossetto, *Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations* (Geneva: ProVention Consortium, 2007), http://www.preventionweb.net/files/1066_toolsformainstreamingDRR.pdf.

groups or semi-structured interviews. They can provide good measures of achievement and impact, and reveal insights into processes and attitudes. Participatory approaches tend to produce a good deal of qualitative information. Some examples of data collection methods and their application are shown in Table 18.2.

18.8 Outputs or impact?

M&E manuals often speak of ‘impact’ and ‘process’ indicators. Impact indicators, which can be both quantitative and qualitative, measure changes that occur as the result of project activities. Conventional M&E methods usually focus on positive impacts. Few initiatives are without some negative impacts, although in most projects there is a reluctance to review these. All partners in a project should be open about the importance of identifying negative impacts and groups

that have been overlooked or excluded. This requires a high degree of trust between those involved in the project, which may be difficult to achieve owing to the unequal relationship between poor communities and external organisations bringing in resources.

Process indicators measure the implementation of project activities, and are usually quantitative. They often act as proxy indicators of impact for DRR interventions, especially where the hazards concerned are infrequent. Actions during a project can be used as indicators of potential effectiveness. In a community disaster preparedness project, for example, process indicators might include recruiting, training and establishing a community disaster management team, organising public meetings to identify threats and the most vulnerable households, building relevant structures and holding regular evacuation drills.

In practice agencies are more comfortable with indicators of output rather than impact (especially quantitative indicators), and it is common for evaluations to come up with the kinds of output indicators that merely quantify the measures taken by a project (e.g. the number of volunteers trained or public education leaflets distributed). Evaluations tend to be short-term studies, usually carried out at the end of a project, when it is too soon to assess its longer-term consequences. Post-project impact assessments are rarer and there is a shortage of genuinely long-term studies. Published case studies of well-regarded initiatives usually appear at a relatively early stage in the project or are based on short-term evidence. The exceptions tend to be drought/food security initiatives: these demonstrate that projects' impact can be judged only over a period of several years; they also reveal the extent of rethinking and modification that takes place even in successful projects.

DRR sometimes presents problems of evaluation because of what can be called its 'reverse logic': i.e. the success of an initiative is that something – the disaster or loss associated with it – does *not* happen. Nevertheless, evidence from subsequent hazard events and the response to them is a good indicator of the impact of some types of DRR intervention, such as the effectiveness of early warning and response systems, and the resilience of houses and infrastructure.

Structural/physical mitigation measures are relatively easy to assess. The quantity and quality of, for example, embankments, flood shelters, earthquake-resistant houses and soil and water conservation structures can be assessed visually, as can the extent to which alternative technologies or techniques are adopted. Judgement about the quality of such technical innovations serves as a proxy indicator for their impact – i.e. their resilience to actual hazard events. Non-structural measures involving changes in attitudes, skills, organisation or awareness are much more challenging. Proxy indicators of impact can be picked out, but they are less certain than those for physical change. For example, interviews or discussion groups can reveal how interventions have changed a community's attitudes towards risk, but only allow us to estimate how that community will actually behave when confronted with a disaster.

Case Study 18.3 Evaluating the impact of rainwater harvesting

In 1997 the NGO Intermediate Technology (now Practical Action) commissioned an independent evaluation of a rainwater harvesting initiative in Kenya that had begun more than ten years before. The evaluation was based on project documentation (including local partners' monitoring records), interviews with project and partner staff, five group discussions with beneficiaries (104 people in total), individual interviews and field observation. The discussion groups and individual interviews were based on PRA techniques. The evaluation covered a range of issues, including impacts on sorghum production, diets and household wealth, gender, land tenure and the environment.

Much of the evidence was qualitative. To obtain relative data on sorghum yields and constraints on sorghum production, the evaluators used ranking and proportional piling, in which individuals were asked to place stones in separate piles to indicate amounts. Data on crop yields was gathered from various sources, including project records, discussions with project staff and the assessments of interviewees. This was compared with data from previous project reviews and workshops.

C. Watson and B. Ndung'u, 'Rainwater Harvesting in Turkana: An Evaluation of Impact and Sustainability', mimeo (Nairobi: ITDG, 1997).

Given these challenges, the need for triangulation and cross-checking of different types of evidence is clear. This is particularly important for qualitative data, where evidence may be more subjective. Triangulation of interview or focus group data can also identify differences in partners' aims and expectations. Good impact evaluations should be wide-ranging in their search for relevant signs of increased resilience to risk, as well as objective about the quality of the evidence collected. Case Study 18.3 (Evaluating the impact of rainwater harvesting) is an example of this. In the field, direct observation is a useful way of identifying discrepancies between what people say and what they do, although evaluators do not always have enough time to do this.

18.9 Identifying cause–effect links

Analysis of the relationship between process (activity and output) indicators and outcome or impact indicators helps to understand cause–effect links, often referred to as ‘attribution’ in M&E guidance.

Many factors combine to make people vulnerable and create situations of risk. No project intervention can address all of these factors, and all projects will be influenced by them. This influence must be understood in order to assess a project’s achievements. To what extent are particular changes due to the project itself, or to local actors, external agencies and other factors? It can be difficult to make a judgement here, particularly when evaluating long-term impact.

Good risk reduction work should comprise a range of activities: organisational, educational, structural and socio-economic. Activities are meant to be mutually reinforcing. For example, training in safe building techniques should be complemented by regulation of land use and the setting and enforcement of building standards, as well as by measures to address the economic and social pressures that force poor people to live in flimsy housing in hazardous locations. Where risk reduction adopts such a broad approach, with numerous interlocking elements, how can one assess the results arising from one particular type of intervention against another? It may be impossible to identify specific links between cause and effect. Consequently, how can one set priorities for intervention?

Some project evaluations or assessments have used control groups for comparative purposes, although DRR and particularly humanitarian response agencies are sometimes uneasy about studying at-risk groups that the organisation is not attempting to protect. There are also methodological challenges with this approach: no two communities are exactly the same, which makes comparison difficult. The method is better at demonstrating the basic point that DRR interventions can bring benefits (by comparing communities that have been assisted against those that have not) than at assessing the most effective types of intervention to adopt. However, it can be useful. Some evaluations seek the views of community members not involved in projects, usually to identify reasons for non-participation. Talking to groups that have dropped out of a project can also provide valuable information about the way the project was implemented.

Some agencies specifically investigate external influences when assessing projects: this at least puts evaluation findings into context, even if it often cannot demonstrate specific cause-and-effect links. Triangulation of different data sets and sources is also helpful in isolating particular factors affecting success or failure. In most cases the sources and types of information will vary. In particular, there will be a mixture of quantitative and qualitative information. Using different stakeholders or assessors to review the same issue can reveal similarities and differences; here it is very important to consider the views of differently vulnerable groups.

The problem is reduced wherever evaluators can focus on specifics. Assessment of disaster preparedness and response measures tends to be simpler: for example, warning and evacuation procedures can be tested through practice drills as well as by events (there are examples of evaluation teams observing such drills). It is also relatively easy to isolate for analysis different elements in the preparedness-response system. Responses to early warnings have been studied on many occasions, throwing light on community attitudes and the effectiveness of early warning systems. Such knowledge has supported the development of sophisticated methods for evaluating the condition of early warning systems.

Projects that have clear objectives and targets can develop a hierarchy of indicators that link process to impact and thereby make M&E more coherent. Results-based frameworks, such as logical frameworks, which are used in project design, should already provide a hierarchy, helping evaluators to form judgements at all levels (activity, output, outcome, impact). However, M&E systems also need to be sensitive to changes and impacts that are due to a project, directly or indirectly, but which are unexpected and unplanned for. This means looking beyond formal, linear planning frameworks.

The Outcome Mapping and Most Significant Change methods move away from a focus on project results to explore how interventions contribute to change in wider, more complex and uncertain contexts. Outcome Mapping looks at changes in the behaviour, relationships and actions of the groups and individuals that a project works with (which may or may not be direct consequences of the project) and considers how the project and other factors contribute to that change process. Most Significant Change is a form of participatory M&E that works without predefined indicators, in which community members and field staff collect, discuss and analyse changes.⁵ These methods are good at capturing unforeseen changes and building up a more complete picture of change overall.

18.10 Cost–benefit analysis

Disasters cause huge economic losses through the damage and destruction of infrastructure, housing, crops, natural resources and other livelihood assets, and through lost production and employment. Relief and reconstruction are also costly. The case for DRR is often made in economic terms, by using cost–benefit analysis (CBA) to justify investment in protection generally, or in particular types of risk-reducing interventions. In addition, agencies and donors want evidence that their projects and programmes are delivering good value for

⁵ S. Earl, F. Carden and T. Smutylo, *Outcome Mapping: Building Learning and Reflection into Development Projects* (Ottawa: International Development Research Centre, 2001), <http://www.outcomemapping.ca/resource/om-manual>; Outcome Mapping website: <http://www.outcomemapping.ca/resource>; R. Davies and J. Dart, *The 'Most Significant Change' (MSC) Technique: A Guide To Its Use*, 2005, <http://www.mande.co.uk/docs/MSCGuide.pdf>; Most Significant Change web page: <http://mande.co.uk/special-issues/most-significant-change-msc>.

money. Evidence produced for the costs and benefits of DRR frequently shows that investment brings greater benefits than costs. However, every case is different, specific to location, hazard and type of intervention, and hence cost–benefit ratios may vary considerably (and may even be unfavourable).⁶

CBA has long been used as an economic assessment tool in large-scale mitigation projects, especially involving the protection of infrastructure and other physical structures. It is now being used increasingly in planning and, in particular, evaluating local-level DRR initiatives.⁷ As yet there is no common or standard methodology for this, and a variety of approaches have been used.

At the start of a project, CBA can be used alongside VCA to identify which interventions will obtain the best benefits with the resources available. However, it is not a routine part of project appraisal or evaluation in small-scale projects. This is partly because the principal

Case Study 18.4 Cost–benefit assessment of a DRR project

The NGO Tearfund commissioned a cost–benefit analysis of a DRR and food security programme in Malawi, which had been running for four years and covered 53 villages. The programme’s key components were crop diversification, soil and water conservation and provision of livestock (goats) that could withstand drought. The analysis was based on quantitative estimates of the programme’s benefits, in terms of increased crop and livestock production, continued education (by preventing drop-out due to hunger and inability to pay school fees) and a reduction in hunger-related malnutrition and mortality. It was calculated that the programme had delivered \$24-worth of benefits for every \$1 invested.

C. Cabot Venton and J. Siedenburg, *Investing in Communities: The Benefits and Costs of Building Resilience for Food Security in Malawi* (Teddington: Tearfund, 2010), <http://tilz.tearfund.org/~media/files/tilz/research/investing%20in%20communities%20web.pdf>.

⁶ C. Shreve and I. Kelman, ‘Does Mitigation Save? Reviewing Cost–Benefit Analyses of Disaster Risk Reduction’, *International Journal of Disaster Risk Reduction*, vol. 10, part A, 2014, <http://www.sciencedirect.com/science/article/pii/S2212420914000661>.

⁷ For examples, see C. Cabot Venton and P. Venton, *Disaster Preparedness Programmes in India: A Cost–Benefit Analysis*, Network Paper 49 (London: ODI, 2004), <http://www.odihpn.org/hpn-resources/network-papers/disaster-preparedness-programmes-in-india-a-cost-benefit-analysis>; T. H. Tuan and B. D. Tinh, *Cost–Benefit Analysis of Mangrove Restoration in Thi Nai Lagoon, Quy Nhon City, Vietnam* (London: International Institute for Environment and Development, 2013), <http://pubs.iied.org/10644IIED.html>; D. Willenbockel, *A Cost–Benefit Analysis of Practical Action’s Livelihood-Centred Disaster Risk Reduction Project in Nepal* (Brighton: Institute of Development Studies, 2011), <http://www.ids.ac.uk/idsproject/cost-benefit-analysis-livelihoods-centred-disaster-risk-reduction>.

local actors, NGOs and CBOs, are unwilling to give too much weight to purely quantitative features of complex socio-economic processes, partly because of their lack of familiarity with the methods, and partly because of the perceived difficulty of carrying out this kind of analysis. CBAs are generally quantitative, using data from primary and secondary sources, but they can also incorporate qualitative aspects, especially when carried out at community level as part of a participatory process, or to explore quantitative findings more extensively. For instance, ISET-Nepal has facilitated ‘shared learning dialogues’ with local stakeholders to identify and discuss their perceptions of the costs and benefits of different flood mitigation interventions and develop appropriate risk reduction strategies.⁸ Data gathering does not necessarily require considerable extra resources or technical capacity, depending on the data available or the level of analysis. Where data are limited quantitative assessment may not be possible, or would provide misleading results.

There are several challenges and issues regarding the use of CBA in risk reduction. It is difficult to assess the human and economic impact or cost of disasters. Data and methods have improved over the years but remain unreliable, especially in low-income countries. Estimates of economic impact generally focus on direct costs, and it is more difficult to assess indirect and secondary costs (see Box 18.3: Economic costs of disasters). Assessment

Box 18.3 Economic costs of disasters

The economic costs of disasters are usually divided into three kinds: direct, indirect and secondary.

- Direct costs relate to the capital cost of assets (e.g. buildings and other physical infrastructure, raw materials, crops) destroyed or damaged.
- Indirect costs are the damage to the flow of goods and services (e.g. lower output from factories destroyed or damaged, loss of sales income due to damaged infrastructure, costs of having to buy materials or services from elsewhere, medical expenses, lost productivity).
- Secondary effects are the short- and long-term impacts on overall economic performance (e.g. deterioration in external trade and government budget balances, reallocation of planned government spending, increased indebtedness, changes in income distribution patterns, changes in the scale and incidence of poverty).

⁸ A. Dixit, A. Pokhrel and M. Moench, *Costs and Benefits of Flood Mitigation in the Lower Bagmati Basin: Case of Nepal Terai and North Bihar* (Kathmandu: ISET-Nepal and ProVention Consortium, 2008), http://www.preventionweb.net/files/81116_WP206highres1.pdf.

of direct losses is harder where a large proportion of losses are uninsured, and it is difficult to calculate less direct costs such as loss of income when a significant proportion of economic activity takes place in the informal sector.

A focus on economic costs and benefits addresses only one aspect of people's vulnerability to disasters. One of the main criticisms of CBA in DRR is that it values costs and benefits in purely monetary terms. In the case of physical structures (e.g. homes, infrastructure, public buildings) and economic aspects (e.g. employment, crops and livestock, savings) these calculations are relatively straightforward. It is much more difficult to quantify less tangible aspects (e.g. the natural environment, social and psychological issues) and many CBAs do not pay enough attention to them. Projects with clear monetary benefits may be selected over those which may be equally beneficial, but whose results are not so easily quantified: this is problematic for community DRR, which typically includes a mixture of 'hard' and 'soft' measures. Other challenges include incorporating uncertainty and trends into assessments. Calculating the probability and extent of a hazard's occurrence and impacts can be difficult, especially at local level and where there are data gaps and deficiencies. CBA is better at assessing shorter-term outcomes than longer-term trends, where there is a much higher level of uncertainty. Climate change adds another level of complexity.

There are also ethical concerns, the main one being that many people object in principle to assigning a monetary value to human life. Another is that conventional CBA does not consider the distribution of costs and benefits within communities (in other words who gains from DRR measures, and who loses out). Additional qualitative assessment may be needed to identify the impacts on different households, social groups, businesses and institutions.

18.11 Using M&E findings

M&E is of little value if it does not lead to improvements in agencies' work to reduce risk. M&E reports are potentially very useful documents. They enable practical lessons to be learned and applied within and across programmes and regions. They feed into strategic planning by providing a basis for discussion about better practice and policy change. They also contribute to institutional memory, which is important in organisations that suffer from rapid staff turnover. Good-quality presentation is essential here: no matter how good the evidence and analysis they contain, reports will not inform and influence if they are not well written and presented.

Evaluation should be embedded within an organisation's systems and regular practice to ensure that learning takes place. In reality, many agencies are poor at absorbing the lessons from evaluations, with the result that the same problems recur. Too often, the review or evaluation report is filed away to be acted upon later, but then forgotten amidst the pressure of work. Many organisations have poor information storage and retrieval systems, making

it very difficult to find documents, and feedback mechanisms are weak. Few staff have sufficient time to reflect on the lessons from individual projects, and fewer still are able to consider what can be learnt from several projects and countries. Overwork and pressures of work, which are common among staff in DRR agencies, prevent clear thinking and innovation. Knowledge management and learning systems need to be given higher priority and more resources in most organisations. Plans for sharing and using results and findings, in the field and across the organisation, should be built into the evaluation process from the start. These should be based on consultations with potential users of the evaluations.

Transparency in M&E is a key element in making operational agencies more accountable. Evaluation processes should be as open as possible, and their results should be made widely available, particularly to project stakeholders (who should also be consulted before reports are submitted, for clarification and confirmation). However, there is still much to be done here. The widespread failure to share and publish DRR evaluations means that practitioners are unable to learn lessons from each other and so are frequently reinventing the wheel. It also runs counter to the principle of accountability that agencies claim to follow. There is a particular reluctance to document mistakes and share their lessons. In some cases, joint reviews by agencies could be carried out to encourage mutual learning, knowledge sharing and transparency. Participatory M&E creates a sense of 'ownership' of the final product among stakeholders, which greatly increases the likelihood that lessons will be noted and acted upon.

Humanitarian Practice Network

Disasters are a major problem worldwide and a serious threat to sustainable development. As well as loss of life, injury and disease and the destruction of property and other assets, disasters can also cause social and economic disruption, loss of infrastructure and other services and damage to the environment.

This revised edition of Good Practice Review 9 on disaster risk reduction (DRR), first published in 2004, identifies and discusses the principles and practice of DRR. Drawing on experiences from around the world, it gives guidance on the main issues to consider when carrying

out projects and programmes, and ways of addressing these issues in practice. The book is targeted at practitioners, principally project planners and managers who are already working in the DRR field or planning to undertake DRR initiatives. It is above all a practical document: its emphasis is on the process of planning and implementing risk reduction initiatives, looking at key issues and decision points. The descriptions and discussions are supported by case studies, which aim to give a sense of the range and diversity of the practical approaches that can be used.

