

# The Nature of Emergencies and Disasters

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Disasters, even if not large, are treated to intense media coverage with the consequent need for political involvement and public sympathy. But the disaster is almost always treated as an ‘event’, with media interest moving quickly to the next issue. Those affected, however, may find that the impacts are long lasting and extend well beyond the apparently affected area. Our aim in this book is to provide a framework to help shift the focus away from the event and towards longer-term thinking about the disaster process, including issues such as vulnerability, resilience, preparedness and recovery. This chapter sets out the basis for our approach in terms of contemporary thinking about disasters, their definition, trends and underlying causes, drawing on a broad characterization of the field and on some brief ‘vignette’ case studies.

We might argue with the statistics suggesting that the worldwide toll from disasters is escalating; but there is no argument that the impact of disasters on people’s thinking and on the political agenda is much higher now than a few years ago. The Asian tsunami, Hurricane Katrina, heat waves in Europe, infrastructure failures in Australia and the US, transportation failures in Sweden and Indonesia, earthquakes in Pakistan, among many other events of every kind – and far more less or known ones – remind us of the limits of prevention, and the political and human costs of inadequate disaster response and recovery planning. Most of all, we are becoming aware of a shortage of longer-term strategic thinking and policy.

There are 90 million more human beings every year, and our societies and economies grow ever more complex and interdependent. The co-location of dense human settlements with potentially devastating natural and technological hazards suggests that we should expect more disasters, or at least more events that have the potential for disaster if not properly handled. The number of humans who exist in day-to-day survival mode, if not the proportion of the total population, appears to be increasing and is probably about half of all humanity – defined as those surviving on less than US\$2 a day (UNDP, 2005) or who live in the 60 or so countries currently directly affected by warfare or violence. Such people have very limited capacity for disaster preparedness or recovery – their resources are inadequate for even their daily needs. This does not mean that people and their communities are not highly resourceful, but certainly their vulnerability to disruption is exacerbated.

Trends underlying increasing exposure and vulnerability may be exacerbated by the now near-universal use of risk analysis and management in decision-making across all areas of society as part of regulatory, commercial and management processes. Risk now occupies a central place in thinking about contemporary society, as illustrated by the work of the social theorists Beck (1992) and Giddens (2000), who argue that modern society is better understood in terms of risk rather than, for example, class. Risk occupies a key position in policy debates. Among other things, this acknowledges explicitly that most aspects of our lives are filled with uncertainty. However, almost every aspect of the risk concept is hotly contested. Potential problems for risk-based disaster management are that much attention can go to the trivial but easily measured or conceptualized, while, paradoxically, the process may also show that the risk of exotic animal disease, import of food produced with particular chemicals or escape of contaminants is low – and therefore acceptable. Acceptable risk is the ‘residual’ or remaining risk. In our context, ‘acceptable’ means that emergency managers, usually without consultation, will be responsible for dealing with the residual risk, effectively removing it from public debate. The implication is that acceptance of a risk, and the benefits that this may bring, is traded off (usually implicitly) against sound emergency management.

What are the essential components of a ‘disaster’ or ‘emergency’, and what constitutes ‘vulnerability’? The field, like all others, has its own jargon. The question ‘What is a disaster?’ is the subject of three recent books, which examine the topic primarily from a research perspective (Quarantelli, 1998; Stallings, 2002; Rodriguez et al, 2006). Agencies and statutes also set out their definitions; but often it is the media who seem to have the power to declare an event or situation a ‘disaster’. Charles Fritz (1961, p655) was possibly the first to articulate a definition in the research and policy literature. Disasters are:

... uncontrollable events that are concentrated in time or space, in which a society ... undergoes severe danger and incurs such losses ... that the social structure is disrupted and the fulfilment of all or some of the essential functions ... is prevented.

Today, we may have to accept that disasters are not capable of precise definition, especially given that we increasingly recognize that disasters may be complex in their genesis and create unexpected additional disasters as they proceed. No matter what the arguments of intellectuals or policy-makers are, the global media, epitomized by CNN, is likely to be the ultimate definer of ‘disaster’.

Disasters are subject to numerous definitions: to an investment bank, they mark an investment opportunity in the same genre as investing in shares; they are research opportunities; and the livelihoods of many non-governmental organizations (NGOs) and professionals are built on them. To governments, disasters offer the opportunity to legitimize themselves, to parade their power by mobilizing resources, and to empathize with the victims by offering sympathy and assistance. Seen like this, disasters are social, political or economic phenomena, not visitations by some force external to human control or as a result of calculated engineering risk.

## Overview of disaster trends

The global re-insurer Munich Re (2006, p48) observes that, since the 1950s, there has been a threefold increase in major natural disasters, an eightfold increase in losses from such events and a 15-fold increase in the losses carried by insurers. The peak year was 1995, at US\$190 billion, or 0.7 per cent of global gross domestic product (GDP). This trend probably reflects the social trends set out below, as well as the global spread of insurance, rather than changes in the global environment (although climate change is certainly implicated). During the 1990s, disasters resulted in a global average each year of 75,250 deaths and 211 million people affected (Walter, 2001). These figures apply to all disasters other than warfare. These figures refer overwhelmingly to climatic hazards, with 90 per cent of the deaths from climatic agents.

Most of the human impact of natural disasters is in the developing world, as shown by the following figures illustrating the dramatic difference between rich and poor countries (IFRC, 2001 – from the IFRC database of 2557 disasters from 1991 to 2000):

- highly developed countries (HDCs): 22.5 deaths per disaster;
- countries with a medium level of development (MDCs): 145 deaths per disaster;
- least developed countries (LDCs): 1052 deaths per disaster.

It has been conventional wisdom that while developing countries bear the brunt of human losses from natural disasters, developed countries suffer more economically. While this may be the case in terms of gross total dollar cost, the poorer the country, the greater the proportional impact on national economies and development progress. Some well-known examples show this clearly:

- Hurricane Mitch (Honduras), 1998: 75 per cent of GDP;
- earthquake in Turkey, 1999: 7 to 9 per cent of GDP;
- Hurricane Andrew (US), 1992: <1 per cent of GDP.

Hazards are clearly a vitally important issue for poor countries, even if they are not reflected in budgetary or public-sector arrangements. It is to be expected that small countries would be more affected by a single hazard event than a large country since a single event could affect much of their territory and, thus, their infrastructure, productive capacity and human population. However, this explains only part of the variation in impact set out above. Many developing countries find that their hopes for development are severely constrained by natural hazards since survival and urgent daily priorities effectively undermine strategic disaster reduction policy. Some countries' abilities may also be constrained by internal conflict, weak institutions or other social or economic problems. Similar issues can arise for poorer regions of otherwise wealthy countries.

## Emergency and disaster institutions

Emergency and disaster-related institutions and policy processes were not developed for the broader challenge of longer-term strategic policy development, but for effective *response*, and occasionally for *prevention*, emphasizing events well defined in space and time. For planning and response purposes, disasters are seen to affect a specified area for a specified time. These boundaries are generally defined in administrative terms as required by jurisdictional boundaries and budgets. Yet, many types of disasters have very long-lasting impacts, at least on some sections of society, and may have a near global reach. As critically important as the dominant bounded approach to disasters is (saving lives and protecting assets), ignoring broader policy and institutional settings creates a problem frame and response approach to the threat of disasters that can easily become reactive and less strategic.

Nevertheless, there have been attempts to broaden the scope of emergency management and to develop more strategic approaches and capacities. One attempt to broaden the approach to emergency management has been through the introduction of a risk-based framework and approach, known in Australia and New Zealand as Emergency Risk Management (ERM), based on the generic Australian–New Zealand Risk Management Standard (Standards Australia, 2004), which has become a model framework in the field. ERM is not a substitute for the policy process, although on paper (if less in actual practice) it contains some of the essential attributes of policy development and implementation. It sets out a process for guiding implementation of societal goals that are established elsewhere. An extended version of this framework is developed and connected to longer-term policy challenges in Chapter 3. The ERM approach offers a broad view of risk and the required response by spreading attention away from simply the event itself to include more explicit consideration of what is at risk, the context of emergencies and disasters, and consultation and communication.

This book proposes that such a broader view is required – but is too often missing – due to the underlying nature of disasters and emergencies, where phenomena with highly complex causes and effects exist well before and after specific events.

Our focus is primarily on levels 1 to 4a, as illustrated in Table 1.1, albeit with recurring reference to levels 4b and 5. This does not in any way discount the critical importance of the latter, but rather that we see a needed contribution in the policy and institutional dimensions of emergencies and disasters so that the more immediate ways in which we conceive of and respond to disasters can be enabled, and not constrained, by the policy processes and institutional settings within which emergency management operates. If levels 1 to 3, in particular (the negotiation of social goals, the policy and institutional environment, and the directions to emergency managers and communities issued from them), are imperfect, then emergency management is constrained. At best, responses to disasters will be inefficient, resources will be squandered, and cycles of blame will occur. At worst, lives will be lost and communities devastated, when the outcome could have been better.

**Table 1.1** Hierarchy of activities in emergencies and disasters

<b>Level</b>	<b>What (is done)? Who (does it)? How (do they do it)?</b>
1 Social goals	<ul style="list-style-type: none"> <li>• Negotiation of what is valued; expression (at least partially) of the goals of society.</li> <li>• Political system, executive, voting population, policy communities, epistemic communities, media.</li> <li>• Highly variable within political and institutional traditions, rules and styles.</li> </ul>
2 Institutional systems and policy processes	<ul style="list-style-type: none"> <li>• The ‘rules of the game’ and processes through which social goals are translated into action (or not).</li> <li>• Political system, governments, policy communities, epistemic communities.</li> <li>• Highly variable over time, jurisdictions and issues, but within political and institutional traditions, rules and styles.</li> </ul>
3 Policy objectives	<ul style="list-style-type: none"> <li>• The more precise targets and goals expressed in formal policy statements.</li> <li>• Largely the role of governments in various kinds of partnerships with non-government interests.</li> </ul>
4a Policy implementation in the public sphere	<ul style="list-style-type: none"> <li>• Design and implementation of policy programmes and instruments; monitoring and evaluation of these.</li> <li>• Government organizations/agencies and their partners (industry and community).</li> <li>• Through various strategies involving resources, statutory authority, information provision, etc., depending on context, instruments used, etc.</li> </ul>
4b Policy implementation in the private sphere	<ul style="list-style-type: none"> <li>• Provide infrastructure, services, insurance, etc. within regulatory and market settings relevant to preparedness, response and recovery.</li> <li>• Private firms, consultants, sole operators (e.g. trades people). Independently, in industry associations or contracted by governments.</li> <li>• In all the above, and also as individuals, households, and informal or formal community groupings.</li> </ul>
5 Emergency management	<ul style="list-style-type: none"> <li>• Preparedness for and response to events.</li> <li>• Emergency management sector and industry; key partners and related sectors (health, security, local communities, etc.).</li> <li>• Professionalized; highly responsive and rapidly changing in the face of events, policy shifts, community preferences, the media, etc.</li> </ul>

Note: for definitions of policy-related terms, see Chapter 2.

## **The nature of disasters and emergencies: Cause and effect**

The causes of impacts in, say, a flood can be explored by examining much more than the hydrological event itself. Vulnerability in this case might be defined by land-use planning or its absence, which allows settlement in hazardous areas; poverty that leaves little choice but to settle in flood-prone areas and in unsafe structures; inadequate transport and other infrastructure; poor educational and communication provision; and other factors. This connects with the long history of social vulnerability – the ‘root causes’ discussed in some disaster literature – and the complex social, economic and political interactions within communities, and between communities and the natural environment and other sources of hazards. Vulnerability may be much more a socially and politically constructed phenomenon than one determined by proximity to a source of natural hazard. If policy is to be strategic, and if institutional settings are to increase resilience and avoidance of impacts, then a focus on the ‘event’ alone may save lives and property, but will always be reactive and is unlikely to improve resilience. The *underlying causes of vulnerability* should be a target for disaster policy.

Disaster events themselves are not always clear and recognizable. The agent of disaster may be invisible, and there may be contamination rather than, or in addition to, more tangible and instant damage, as in New Orleans following Hurricane Katrina. Where there is contamination, it may be difficult to measure or identify until much later: the problem may be unbounded in time and space, with impacts persisting for decades. Often there is a clear beginning (but often not), and the problem may continue for generations (as in the Chelyabinsk area in Russia, following the nuclear accidents of the late 1950s), with contaminated soil and water, or irreversible change to economies, communities or ecosystems. Climate change, ozone depletion and biodiversity loss are universally seen as global environmental change issues; but many lower profile issues have international dimensions. This situation may occur, for example, through the pursuit of compensation in different jurisdictions than that of the event (e.g. the chemical accident at Bhopal), through expansion of regulations or best practice globally (e.g. transport, nuclear energy, dam safety and industrial accidents), through government and non-government aid, or by relocating activities banned in one jurisdiction to another.

Compensation is another key issue. Not all events may be compensated for or insured against. The global insurance industry talks of ‘mega-perils’, which may be unbounded. Insurers have never insured against radiation and are increasingly concerned about natural hazards and global environmental change. The industry is also concerned with more traditional events that are clearly bounded, but very expensive. These include major earthquakes in wealthy areas or large-scale natural events, with the US insurance industry, for example, gradually restricting cover for wildfire and hurricanes. With the exception of the UK, commercially available flood insurance is very limited. The insurance industry refers to – as does Beck (1992) – an uninsured future.

There is a widely held perception that there are now more disasters because of the increasing number of climate extremes or severe climatic events, resulting from shifts in global climate and other processes (Steffen et al, 2004). This appears to be the perception in Europe following a series of severe storms, floods and heat waves through the late 1980s, 1990s and into the 21st century. Yet, this is only part of the story. The

evidence set out above concerning the global distribution of disaster losses suggests that even if there were fewer climatic extremes, we would, nevertheless, be seeing increasing losses. This is because social, economic and political factors, as well as our use of technology, are crucial to vulnerability and our ability to adapt. Climate and its manifestation through weather is an important contributor; but it is only one factor. The factors that appear to be important explanations of why climatic disasters are increasing are now identified – it is these factors that are most amenable to policy responses.

## **Knowledge and attitudes**

Increasingly complete and sophisticated data may contribute to the size of the list of disasters and emergencies. Certainly, this is likely to be the case for smaller emergencies where data have, in the past, been at best erratic. However, major disasters have long attracted global media coverage, so the difference in the number of major events simply because we have become better at recording them is likely to be small. How we record and note them may have more influence. As insurance coverage spreads, for example, economic estimates of the cost of disasters can change our views on their impacts. Live media coverage and increasing international networks heighten awareness of distant events, and if the global media declares an event a ‘disaster’, it is difficult for politicians and civil society not to concur.

The impact of knowledge and attitudes is far greater in terms of our understanding of disaster potential. As our knowledge of the physical and social processes underlying disasters grows, so, it seems, does the potential for disaster. It is likely that the greatest influence is our changing attitudes to risk and danger – best seen through the proliferation of health and safety-related regulations, especially in more litigious societies, and our appreciation of vulnerability. It can seem that many people would like zero risk and seek compensation when this is not achieved. Perhaps more importantly, there may be intense interest – paranoia even – about the possibility of disaster. This could turn into an advantage if the attitude can be harnessed by emergency and disaster managers for long-term policy objectives, but is far less constructive if harnessed for other political reasons.

More usually, though, knowledge, awareness and sensitivity to disaster are heightened and widely sought only briefly following a major event. An inability to maintain attention over longer periods is anathema to the strategic development of policy and institutional responses.

## **Increasing frequency of climatic extremes**

The evidence for increasing frequency of climatic extremes is mixed. That said, the Intergovernmental Panel on Climate Change (IPCC) represents the largest concentration of sustained scientific effort in history. Their recent report stated that ‘evidence of global warming is now unequivocal’ (IPCC, 2007). The impacts of warming are clearly visible in polar regions, and many research groups argue that some impacts are visible globally through an increase in extreme hot weather. Heat waves tend not to have major obvious economic impacts, but may result in massive loss of life. Warmer winters, fewer frosts and changed rainfall patterns have impacts on biodiversity and agriculture that may not be as media friendly, but may undermine

local economies. Climatic extremes and climate change do not by themselves result in disaster: it is the interaction of climate through weather with human activity or assets that can produce disaster. The impacts are likely to be greatest in areas dependent on farming, especially subsistence agriculture. Studies of future flood loss in south-east England show that climate change would account for about 20 per cent of the increase in expected economic loss by 2020: the main factors were increased wealth and exposure (Foresight, 2004). Human exposure and vulnerability to disasters also increase with rising population.

### **Increase in world population, with most increase in poorer areas**

All other things being equal, with higher populations any given event affects more people. Most population increase is in poor countries that are disproportionately affected by climatic hazards. In addition, many newly occupied areas were previously left vacant precisely because they are hazardous, especially on the fringes of (or in) poorly built infill in ever growing urban areas. This is best seen in areas prone to flooding, landslides and industrial pollution, now occupied by squatters or informal settlements, and – at the other end of the wealth spectrum – by those seeking environmental amenity through coastal canal estates, and riverside and bush locations, areas that are often at greater risk from floods and fires.

### **The growth of urbanization**

Much of the hazards literature argues that large contemporary cities – ‘megacities’ – are incubators for disasters because of the concentration of people and activities in a confined space and the generation of new hazards (Mitchell, 1999; Pelling, 2003). However, although less so in poorer countries, this situation can be balanced by the fact that cities contain massive resources to cope with hazards. In addition, the growth of cities may also be an adaptation against other forms of hazard, including lawlessness and climatic hazards such as drought. The overall situation is unclear; but cities are growing very rapidly and now contain about half of humanity. Unfortunately, this is often closely associated with environmental degradation, such as the removal of the natural protection against storms and flooding provided by mangroves, wetlands and sand dunes.

### **Economic and social factors, and rapid change**

In wealthy areas, increasing wealth and exposure of wealth in existing hazardous locations is a primary driver of escalating disaster losses. The UK’s study of future flood losses (Foresight, 2004) highlights this issue. In these circumstances, high losses largely offset by insurance are not by themselves indicators of low resilience.

In contrast, economic globalization, chronic corruption, aspects of economic ‘structural adjustment programmes’ and the changes accompanying the collapse of communism and other forms of highly centralized government (such as in Eastern Europe) are examples of social factors that often undermine people’s capacity to cope with hazards. Many countries have serious problems of corruption and weak institutions. These factors inhibit development and people’s ability to improve their lives and prospects, undermining and even reversing progress on key contributors to

resilience, such as healthcare, political representation, mobility and livelihood security, and the capacity of government to plan for, and respond to, crises.

Economic globalization is seen as an unqualified good by almost all political leaders in the industrialized world. The essence of the argument is that through free trade, the whole world will become more prosperous. However, many poorer countries and those working with poorer sections of society worldwide might disagree. Focusing on distributional issues, they cite as evidence the growing gulf between nations, and between rich and poorer people within countries (e.g. Stiglitz, 2002), with the accompanying implication that their vulnerability is increasing and their ability to cope with emergencies is declining.

### **Dispossession by war or civil strife**

Refugees and those driven into marginal areas are often the most dramatic examples of people vulnerable to the negative effects of natural events, cut off from coping mechanisms and support networks. About half of the world's countries are directly linked to uprooted populations, with people being forced to flee in some 60 countries (US Committee for Refugees, 2000). Where warfare is involved, these areas are also characterized by an exodus of trained people and an absence of inward investment. Reasons for the increase in vulnerability associated with warfare include destruction or abandonment of infrastructure (transport, communications, health and education) and shelter; redirection of resources from social to military purposes; collapse of trade and commerce; abandonment of subsistence farmlands; and lawlessness and disruption of social networks (Levy and Sidel, 2000). The proliferation of weapons and minefields, the absence of basic health and education, and the collapse of livelihoods can ensure that the effects of war on vulnerability to disasters are long lasting.

## **Evolution of emergency management: From 'acts of God' to socially constructed disasters**

The above list of causal factors shows the overriding importance of human factors – social, economic and political – in generating vulnerability to disaster and exacerbating the impacts of natural phenomena. By comparison, natural phenomena, over which we have little or no control, often make relatively modest contributions to disaster vulnerability. This statement must be qualified for those whose livelihoods depend entirely on climate, and for exceptionally severe events such as the Asian tsunami, which may have very serious impacts at the local level, especially in poor countries and poor regions of otherwise wealthy countries.

Overall, though, thinking has shifted in emergency management from being dominated by a passive, accepting approach – disasters as 'acts of God' – with the resulting attitude that little can be done, to a more proactive approach that accepts the role of humans in creating the conditions for disasters. This opens the way for the development of institutions, policy and practice aimed at reducing vulnerability and enhancing resilience. Recognizing the importance of human agency, however, may also encourage attribution of blame, whether deservedly or not, so the shift is by no means entirely positive.

Modern emergency management involves many players with distinctive backgrounds and reasons for involvement. In some countries, these organizations have their origins in the ‘civil defence’ or ‘home guard’ units developed during World War II. Working with the career uniformed services and established welfare groups, such as the Red Cross and the Salvation Army, they supported the home front. After the war, it was not long before there was another threat that had a military aspect – the Cold War and the possibility of nuclear attack – creating the imperative for maintaining civil defence capacities. Although the precise evolution varied by jurisdiction, such war-related organizations found themselves increasingly busy with more ‘everyday’ emergencies and crises arising from natural agents and from transport and technological failures: events that affected and concerned far more people than hypothetical risks of war. During the 1970s, most civil defence organizations in Western countries formally shifted focus in terms of their corporate image to an emergency management, rather than war-related, emphasis. Civil defence was not about risk management as such – it did not attempt to reduce threat of war, but rather sought to protect the state and, to a lesser extent, the people.

In thinking about emergency management organizations, we need to be aware that the key groups include many dedicated more to recovery and support than the actual task of immediate response. This is especially the case in the non-governmental and government welfare sector. The culture, interest and background of these groups are quite different from emergency management organizations and are largely complementary to them.

We are not critical of a strong response focus – that is what society, media and politicians want when a crisis erupts. It saves lives and property and is indispensable and utterly admirable. Rather, we advocate a greater *additional* emphasis on strategic thinking and policy, while maintaining a high level of response capability. Recent shifts in thinking in emergency management are in keeping with our position, and are summarized in Table 1.2. We argue for an intensification of these trends.

Recent trends in disaster and emergency research and management reflect a range of interests, some of them common to other public policy areas, such as sustainable development:

- seeking to put emergency management into the policy mainstream and away from a marginal activity by reframing problems;
- seeking to deal with causes rather than symptoms, emphasizing the need for learning and greater efforts in strategic policy development;
- the need for appropriate institutional structures to deliver long-term solutions;
- sharing ownership of the problem with those at risk and working to reduce vulnerability.

Generally, we can say that among many in the social and policy sciences, adaptation to hazards and sustainable development are now seen as interlocking aims (Mileti, 1999). The World Summit on Sustainable Development (WSSD), the ten year follow-on to the first United Nations Conference on Environment and Development (UNCED) of 1992, was held in 2002 in Johannesburg. The summit made disaster reduction one of its central themes. To be very vulnerable is not sustainable – economically, environmentally or socially.

In summary, today emergency management is largely about being resilient in the

**Table 1.2** Trends in emergency management

<b>From</b>	<b>To</b>
<p><b>Framing the fundamental issue:</b>  Hazards as ‘other’ – acts of God  Event driven</p>	<p>Hazards are generated by humans  Situational and less visible creeping hazards included</p>
<p><b>Policy context:</b>  Lack of visibility and profile</p>	<p>Legal liability  Rising expectations and critical scrutiny  Impacts of counter-terrorism and security</p>
<p><b>Problem ownership and framing:</b>  Acceptance/individual decision-making  Local  Choice</p>	<p>Community vulnerability and sustainability  Local–global  Institutional constraints</p>
<p><b>Style:</b>  Secret  Paramilitary  Uncertainty ignored or quantified</p>	<p>Open  Dominantly civilian  Uncertainty is acknowledged</p>
<p><b>Policy emphasis:</b>  Accept or reduce loss  Focus on the hazard and event  Solutions as separate</p>	<p>Manage vulnerability or increase resilience  Focus on community safety and consequences  Solutions found in organization of society and the development process</p>

Source: Drawing on Handmer (2003b)

face of uncertainty. This involves a shift – easier in concept than in practice – from treating symptoms to dealing with causes. In turn, this is closely linked with the emphasis on addressing vulnerability through building capacity and resilience in communities at risk. In some cases, a fundamental shift in thinking has occurred so that causes are redefined or reframed, particularly to recognize human agency and structures rather than fate, and to clarify what we are trying to achieve. Once human agency is recognized, the problem becomes more amenable to policy intervention.

Redefining the problem and objectives can be a powerful mechanism of change (explored further in Chapter 5). For example, Merseyside fire service in the UK examined the pattern of urban fires, including arson, and identified poverty as the critical underlying factor (McGurk, 2005). The fire service cannot do much about poverty directly, but has changed its approach radically by incorporating this information. At a general level, for commercial enterprises, the first need is usually to minimize disruption so that trade can continue, rather than simply preventing physi-

cal damage; and for many communities, protection of the livelihood base is usually the first priority, rather than reconstructing buildings. The institutional setting needs to be amenable to this type of strategic and creative thinking, where underlying causes are targeted.

Examples can inform better ways of constructing disasters as problems, and identifying what comes before and after a disaster event, thus informing strategic approaches. We now turn to a series of vignettes to expose and illustrate the themes that the rest of the book will pursue.

## Illustrative vignettes

The following brief case studies illustrate both success and failure in terms of the broad policy and institutional response of vertical or horizontal coordination, accountability, participation, evaluation and information on risks, and short-term decision imperatives, among other issues. Boxes 1.1 to 1.9 identify themes and challenges that are addressed in later chapters. Table 1.3 matches the 'vignette' cases studies and the themes that the book focuses on and is organized around. The vignettes deliberately describe disasters of a massive scale, well known to the world, as well as others of smaller extent and impact, but which nonetheless illustrate generic issues. We can learn from experiences both large and small, and certainly must respond to both.

**Table 1.3** *The book's themes and illustrative case studies*

<b>Book themes</b>				
Long, complex antecedents	Hurricane Katrina	London	The Netherlands	Goma
Disasters and development impacts	Asian tsunami	Mozambique	Goma	
Owning the problem/ accountability	Hurricane Katrina	Longford	London	
Problem framing	Asian tsunami	Goma	Nyngan	The Netherlands
Responding and implementing: policy choice	Asian tsunami	Goma	The Netherlands	
Learning from experience	Nyngan	The Netherlands	Australian wildfire	
Institutional settings	Hurricane Katrina	Longford	Mozambique	

**Box 1.1** *Hurricane Katrina, New Orleans, US*

Much of the city of New Orleans – a city of over 1 million inhabitants – lies below sea level, and much of the surrounding land of the Mississippi delta has been eroding away for decades. Within days of warning, Hurricane Katrina headed towards New Orleans in August 2005, creating a storm surge that forced itself into the lakes and canals surrounding and bisecting the city, and breached and/or overtopped levees protecting the city. The majority of those at risk evacuated in some chaos as a normally short drive took most of the day. However, over 100,000 people (including many tourists) did not evacuate, either lacking the means to do so or deciding to stay.

Neither the hurricane striking the city, nor the inability of over 100,000 people to evacuate should have been a surprise. The whole event, generally and in detail, was well predicted and thoroughly rehearsed. A report in *Nature* soon after the event observed that ‘The similarities between Katrina and the Hurricane Pam simulation (used for training by emergency management agencies at the various levels of government) are eerie’ (Reichhardt et al, 2005).

However, while the event was expected, the outcomes were surprising. The predictions, scenarios and rehearsals did not deal with the paralysis of local and state government that occurred; the collapse of essential services (which appears to have continued to worsen as organizations ran into financial problems); the sense that law and order had broken down; the abandonment of many of the more vulnerable people; the thousands of children separated from their parents; and the seeming inability of the federal government to come to terms with the scope and nature of the disaster.

It was assumed, and in many cases asserted, that planning and preparations were thorough and would be effective. It was well known from the various disaster planning scenarios that a car-based evacuation would leave some 100,000 stranded. This occurred and those stranded were also those who had played the most limited role in previous emergency planning – marginalized or poor residents and tourists. The stranded were eventually evacuated to points scattered throughout the US. The media and state and local officials gave full ownership of the resulting problems to the US federal government and particularly to the Federal Emergency Management Agency (FEMA) and its parent agency, the Department of Homeland Security (DHS). Local and state officials avoided responsibility, and no one seemed interested in owning the problem or even in gaining political capital from dealing with it (Handmer, 2006):

Katrina exposed serious problems in our response capability at all levels of government, and to the extent that the federal government didn’t fully do its job, I take responsibility. (President Bush, BBC, 13 September 2005)

The planning had been thorough in many respects, but failed to include many key players, and this was reflected in the response that was slow to take advantage of private-sector and major NGO capacity. This form of exclusion from emergency

policy and planning is by no means confined to Hurricane Katrina. This exposes the challenge of intergovernmental and cross-sectoral coordination (see Chapters 2 and 8).

The government reports into the Katrina and New Orleans disaster are clear: there was a failure of leadership at all levels. This may seem rather harsh. Why should one or two people carry the blame for the failure of very large organizations in a major crisis? There was a failure to clarify ownership of the almost infinite number of issues and problems by all those involved, and there were institutional failures not only within the key organizations responsible for disaster response and recovery, but also with inter-organizational coordination. Strategic failures in planning and thinking are linked to these issues and are also seen in the inability to deal with an event that is large in space and time – and with an apparent failure to take account of the local political and socio-economic context, even though it was very well known and documented. The biggest failure may be emerging in the apparent lack of direction about the future of New Orleans and the regional economy.

There is now argument over the ‘real’ extent of the crisis. However, there is little argument over the absence of clear decisions and recovery direction, even two years on. Much of the aid and livelihood support had conditions attached that made its utility limited or were strictly time limited. The evidence is mounting that there was limited strategic planning before the event, and that officials have struggled to find any since. Another view is that there was substantial strategic and response planning, but that it was poorly connected to the vulnerabilities of people at risk, as well as to the institutional and geophysical realities.

### **Box 1.2** *Longford gas explosion, Victoria, Australia*

An explosion and fire on 25 September 1998 halted gas production at Esso’s Longford plant in the Australian state of Victoria. Two employees were killed and eight others injured. Supplies of natural gas to domestic and industrial users were halted for over two weeks. The Longford plant was the primary source of Victoria’s gas, and only very small amounts of gas were available to Victorians during the crisis through an emergency supply from a pipeline link with the neighbouring state of New South Wales and a small gas field in Victoria. Victorians had also experienced a cut in their supplies from Longford following an incident at the plant earlier the same year.

Much industry depends on gas supplies, as do hospitals and schools, and there were some 200 individuals who used gas-powered life-support systems. The state faced an energy crisis that could easily become a political and economic crisis, in addition to the human impact (Hopkins, 2000).

The State Premier, emergency services and industry worked to make the

problem everyone's problem. The Premier made it clear that everyone in the state would be sharing the burden, and that working together to overcome the difficulties posed was the only way of ensuring that the state's industries, employment and essential services would be maintained and that no group would prosper at the expense of others. The small amount of gas available went to essential services and some industries. The emergency services, including the Department of Human Services, which has charge of disaster recovery coordination, worked to identify and support the most vulnerable and worst affected. It had been assumed that the elderly would be in this group; but that was not the case.

To prevent a complete run-down of reserves, supplies of gas were prioritized to essential services only, such as hospitals. About 1.3 million households and 89,000 businesses were affected by the disaster and export earnings alone were cut by over AU\$200 million. Stand downs and production losses for affected Victorian and interstate businesses and factories were initially estimated by the Victorian Employer's Chamber of Commerce and Industry to cost billions of dollars, a figure later revised to AU\$1.3 billion, as reported by the *Financial Review* on 27 April 1999.

On 2 October 1998, a AU\$100 million federal government assistance package was announced for Victorians affected by gas shortages. The government lost about AU\$300 million in tax revenue. The disaster triggered the largest class action in the country's history with 10,000 claimants. However, this and other similar legal actions were later dismissed by the courts. The final restoration of gas supply to all consumers took place by 14 October 1998.

The Premier of Victoria re-commissioned the Longford Gas Plant on 13 March 2002. The plant was rebuilt at a cost of AU\$500 million and incorporated new safety measures and staffing increases. Esso also announced that it would invest a further AU\$100 million in the development and expansion of the Longford plant over the next two years (Premier of Victoria, Australia, News Archive, 13 March 2002).

The Victorian government has established gas supply redundancies, in part by including other suppliers, and has acted on the recommendations of the Longford Royal Commission, including the implementation of a rigorous safety regime for hazardous sites. Emergency management agencies, especially the Department of Human Services, which shouldered much of the work, has altered its procedures and established mechanisms to manage large disasters of this kind (Hopkins, 2000).

This is not to suggest that the crisis was handled perfectly, but that the various levels of government and sectors in Victoria worked well together to handle a major infrastructure failure, and later to increase the resiliency of the system. Information for Longford came primarily from the EMATrack database, maintained by Emergency Management Australia.

**Box 1.3** *The South Asian tsunami*

The 26 December 2004 tsunami swept 8000km across the Indian Ocean in a matter of hours, inundating coastal areas of Indonesia, Thailand, India, Sri Lanka, the Maldives, Somalia and Malaysia, among others, resulting in some 300,000 deaths and enormous physical damage in various locations. The tsunami was generated by a very powerful undersea earthquake just offshore from the Indonesian province of Aceh. There were no warnings, although some people were saved by informal alerts.

The resilience of many coastal areas – in terms of local livelihoods – depends upon income through tourism. Should the area suffer some major shock, the longer-term effect will be related to the ability of the area to recover from this impact. The tsunami of 2004 devastated many tourism areas, including some in southern Thailand. Resorts were destroyed, many local people and international tourists were killed, and the areas suffered something approaching the worst possible publicity as countless people searched for their missing friends and relatives against a backdrop of devastation.

Recovery and the longer-term survival and prosperity of the affected areas depend, as they frequently do following disaster, upon the vitality of the local economy. This means that the flows of money into and within an area affected by disaster needs to reach those affected. However, increasingly this is framed within the context of a globalized economy, and the restoration of high-profile assets – referred to as ‘thing theory’ in the *2001 World Disasters Report* – may not be well connected to the livelihoods of local people (IFRC, 2001).

Most of the local survivors lost their employment and normal livelihoods. Some governments, such as Australia, urged their citizens to leave the area immediately after the tsunami and to return home – thereby depriving the areas of desperately needed foreign exchange and employment. In one sense, this highlights that disaster planning and thinking may need to be concerned with economies and livelihoods in other countries.

Although the approach of supporting local commerce, where possible, may seem obvious, it is not universally accepted among economists (IFRC, 2001). The Red Cross uses the analogy of a leaking bucket, where ‘plugging the leaks ensures that post-disaster resources re-circulate within the local economy, rather than leaking out of it’ (IFRC, 2001). Although this idea is based more on recovery in poorer economies, the approach can also be applied in developed nations, especially in rural communities where aid funds are less likely to re-circulate.

For most of the world and some sectors within rich countries, understanding the informal economy is the key to understanding people’s livelihoods and the necessary emphasis on survival, rather than wealth or profit accumulation. It is often celebrated by sociologists as showing people’s resilience in the face of economic systems that do not offer anything to them. Others, such as the World Bank, see the informal sector (known less favourably as the ‘black economy’) as something to be eliminated, arguing that it is primarily a tax dodge and connected with over-regulation (see Handmer and Choong, 2006).

**Box 1.4** *Wildfire evacuation in Australia*

Learning from experience, with a major impact on policy, can occur incrementally as a result of a number of events and subsequent analysis, rather than simply arising from a single event or as a result of research and a bureaucratic process of adoption and change. The adoption of the wildfire evacuation policy in Australia provides an example.

In parts of Australia, there has been an emphasis on avoiding last minute evacuations, now formalized in a position on community safety and evacuation during bushfires summed up by the catch phrase: 'Houses protect people and people protect houses.' The basic message of the Australasian Fire Authorities Council (AFAC) is that where adequate fire protection measures have been implemented, able-bodied people should be encouraged to stay with their homes in the event of wildfire. This position moves away from the evacuation doctrine that has prevailed among emergency services during recent decades towards greater community self-reliance. It is referred to as the 'Prepare, stay and defend or leave early' policy, and it is now widely endorsed by Australian wildfire-fighting agencies.

In the Stay or Go approach, 'staying' means preparing, staying and actively defending the property as the fire front passes, and from ember attack before and after the front. 'Going' means making a decision not to defend the property and leaving well before the fire front arrives. Findings on how houses burn down and what happens to people when they adopt different behaviour in the face of a fire, demonstrating significantly higher survival of houses when defended, were used to develop the approach.

The first post-war iconic Australian urban interface fire occurred in Hobart, Tasmania, on 7 February 1967. It resulted in 62 deaths and the loss of 1300 homes, and led to investigations of house and personal survivals. Findings by Alan McArthur and Phil Cheney of the Commonwealth Scientific and Industrial Research Organization's (CSIRO's) Forest Research Institute found that:

Most of the people who died in their homes or within a short distance thereof were either very old and infirm, or suffered from some physical disability. In the case of about half of the people who died whilst escaping from their homes, such homes did not catch fire. In a few cases it may be said that if they had stayed inside they would have had a reasonable chance of survival. (McArthur and Cheney, 1967)

The Ash Wednesday fires of February 1983 destroyed about 2300 buildings and resulted in 83 deaths in the states of Victoria and South Australia. The clearest lesson in the studies following the fires was that late evacuation is dangerous: twice as many deaths occurred in vehicles or in the open than inside houses. Research also showed that the single major determinant of house survival was the presence of able-bodied people. People would extinguish the small ember fires that normally grow to destroy houses, an insight gained during the 1940s.

Analysis of the Australian evidence in support of the policy and its gradual adoption shows a somewhat hesitant process, affected by various institutional and political priorities, such as legal liability, or the desire for clear empirical evidence. Nevertheless, a series of major wildfire disasters, empirical investigation combined with legal inquiries, a desire by senior fire managers to ensure that wildfire policy and practice are based on defensible evidence, and the recent creation of national forums where strategic policy issues can be discussed have seen the approach become national policy. While implementation challenges remain, shared understanding of a fundamental principle has emerged.

This approach also highlights a possible weakness with the international research literature on evacuation. The published material almost invariably frames the evacuation research question in terms of how to get people to leave. There is very little on alternatives and few attempts to frame the problem differently in terms of minimizing risk or loss.

Source: adapted from Handmer and Tibbits (2005)

### **Box 1.5** *Floods at Nyngan, New South Wales, Australia*

Flood warning systems seem to be characterized by failure; yet, increasingly, our acceptance of risk relies on effective warnings to protect us from the inevitable remaining or residual risk.

In April 1990, the three mainland states of eastern Australia experienced severe flooding. Two country towns (Charleville, with 3200 people, and Nyngan, with 2500 people, in the states of Queensland and New South Wales, respectively) had to be completely evacuated and there were substantial evacuations from small urban centres in the Gippsland area of the state of Victoria, as well. Nyngan, in particular, was a major media and political event, and an exemplary case study of a community repeatedly affected by floods and reliant on ever higher levees as protection (Newell and Wasson, 2002). In 1990, virtually the whole community was involved in placing over 200,000 sandbags to heighten the existing levee that created a dry 'island' on the vast flooded western plains. This environment comprises a very low relief, with meandering, braided streams and the slow exit of floodwaters. Eventually, the augmented levee was overpowered, the town was flooded and the population was evacuated by helicopter – the problem had shifted from protection to escape. The extensive and damaging flooding in the three states put warnings and emergency management under intense public scrutiny.

As a result of the inadequacies in warning system performance, a national workshop on flood warnings was convened by the national coordination agency, Emergency Management Australia, in late 1991, with 50 participants from government (the state and territory Flood Warning Consultative Committees) and non-governmental (media and research) organizations involved in various aspects of the warning task, from flood detection and prediction through to the

delivery of warning messages. This workshop ended with a consensus calling for the production of a national guide to good practice in the field of flood warning (EMA, 1999). The guide was published in 1995 and revised in 1999. Great efforts were made to include as many agencies and key individuals as possible in the process of development, and the guide was endorsed by most Australian flood warning-related agencies. However, actual implementation on the ground has been slow in most jurisdictions.

### **Box 1.6** *Mozambique floods of 2000*

Heavy continuous rainfall across Southern Africa induced flooding on 9 February 2000, and southern Mozambique bore the brunt of the deluge. People started fleeing the capital Maputo as main roads and electricity were cut between the capital and Beira, the second most-populated city. Over 70 people were reported to have died by 11 February as the Limpopo River burst its banks, causing severe flood damage to the Limpopo Valley to the north of Maputo.

Tropical Cyclone Eline hit the coast near Beira, with winds measuring up to 260 kilometres per hour on 22 February 2000. Considered one of the worst floods in living memory, getting relief supplies to affected areas, particularly clean drinking water, was a priority, with relief dependency an ongoing concern during the initial reconnaissance efforts. There was confusion over which aid agency would do what as relief supplies hit the ground. The United Nations and Mozambique government oversaw the entire operation, conducting daily meetings with all aid agencies involved. The cost of rebuilding would add to an already burgeoning external debt that is close to US\$8.3 billion, bearing interest of up to US\$1.4 million per week. With little ability to return to pre-disaster economic growth levels, the question of debt always surfaces after disaster in developing countries.

The media became a circus, with what was described on the BBC as a 'clash between the face of modern media and global communications and the people of a very remote, very poor, rural lifestyle'. However, the truth is that without the media presence, few in the world would have known about the enormity of this disaster. Like most disasters, there are stories of triumph of the human spirit: in this case, of the communities and their ability to cope despite the damage.

The flood directly and indirectly killed approximately 800 people and affected about 1.5 million more, approximately 12 per cent of the nation's population. Many small farm households lost their livelihoods to damage and many livestock were lost. Nine-tenths of the country's irrigation infrastructure was destroyed, along with industrial urban areas and communications and road infrastructure. The economic cost of relief in itself was very modest at: US\$5.9 million for health, US\$3.6 million for relief kits, US\$3 million for fuel and running costs, and US\$6.4 million to rebuild some infrastructure to move relief goods into the country. It is estimated that it will take around ten years to fully recover and rebuild.

**Box 1.7** *Flooding in The Netherlands, 1993 and 1995*

Living under the threat of catastrophic flooding is part of the Dutch national ethos, and flood risk is a policy field with a high profile. About half of The Netherlands is protected from flooding by dikes, with about half the population at risk. The risk is mostly from the sea; but a significant risk comes from the Rhine and Meuse (Maas) rivers that flow into The Netherlands, bringing water from other countries. Since 1978, the level of flood protection has been set in legislation at the 1:1250 flood (or 1250-year flood) for riverine flooding. In the upstream area of the Meuse, the population at risk is in the floodplain, parts of which are protected by levees; but downstream and along the Rhine, the people live in polders (areas protected by ring dikes) that can be flooded rapidly with potential for heavy loss of life (van der Grijp and Olsthoorn, 2000).

Responsibilities for disaster planning, management and response are set out in 1985 legislation. Disaster planning is required. At the local level, 572 mayors are in charge of the disaster response organizations, while local fire chiefs have the primary local operational responsibility. Sixty-five water boards are responsible for water-related issues, including dike security. Although warnings are the responsibility of the national water ministry, failure to respect local decision-making authorities can lead to conflict and to mayors overturning provincial decisions to evacuate.

Warnings have traditionally given highest priority to those responsible for dyke protection. This is complicated by the fact that some dikes are centuries old, and lack of knowledge about their construction means that predicting failure is problematic. Post-flood compensation has been provided by government on a generous, if *ad hoc*, basis. Since 1998, this has been formalized by legislation. Flood insurance is not available.

The 1993 flood on the Meuse in the south of The Netherlands occurred just before Christmas as a result of heavy rain in northern France and Belgium. Its ferocity caught emergency services and residents by surprise, and some 10,000 were evacuated. The situation was exacerbated by the absence of communication between the Dutch, Belgian and French authorities, at first, and by the relatively weak state of emergency preparedness.

In 1995, rain in the same areas, in addition to snowmelt were responsible for more serious floods, with over 13,000 houses inundated along the Meuse. Once the authorities responsible for the safety of the dikes protecting the polders along the Rhine announced that they could no longer guarantee their safety, mass evacuation was inevitable. The Mayor of Nijmegen took the lead. There had been considerable learning following the flooding in 1993, and the area had prepared a detailed flood emergency plan, which greatly improved communication and coordination between the various official players, where before there had been little or none. Generally, the authorities were much more proactive in their response. One problem concerned conflict over appropriate warning lead time; but this was settled through 'unofficial' forecasts to emergency managers.

In all, some 250,000 were evacuated in The Netherlands, along with very large numbers of farm animals. It proved to be a largely precautionary measure as the dykes held and the areas flooded along the Meuse were those without full protection. Nevertheless, post-emergency surveys show that nearly all (88 per cent) thought that the evacuation was appropriate (van Duin et al, 1995). To help ensure compliance, the government promised to compensate evacuees for any losses incurred. Investigators suggest that as the initial evacuations (of 60,000 people) in high-risk areas around Nijmegen were successful, it became easier to evacuate other areas. People were very cooperative and those without transportation were largely helped by individuals whom they knew; very few (3 per cent) needed the special buses provided. Local media supported the emergency services, providing information to their audiences.

**Box 1.8** *Refugees and a volcano in Goma, Democratic Republic of Congo*

The case of Goma in the Democratic Republic of Congo, and eruption of Mount Nyirangongo, throws light on the complex implications of natural hazards in a society marred by three-and-a-half years of civil war and grappling with serious development issues. The rich volcanic soils and tropical highlands give life to livestock and farming, despite growing migration to urban centres. In January 2002, the city of Goma, on the border with Rwanda, was divided by a wall of black lava that spewed from the volcano into the heart of the city.

Demographically, there is a disproportionately large percentage of young people, many of whom are migrating into regional centres such as Kivu on the Rwanda border. The cross-border Congo–Nile Ridge has become a melting pot for regional instability since 1994, when tens of thousands of Hutu refugees crossed the border. Goma quickly became a rebel city, where Rwandan refugees began re-banding, planning and carrying out cross-border attacks. With the ethnic conflict initiated by the influx of refugees from conflict-ridden Rwanda, the Congo – with the feared regime of Mobuto Sese Seko – caught between warring Hutu and Tutsi rebels and a new leader, Laurent Kibila, experienced developing conflict as Rwanda and Uganda rose up against Kibila, and Zimbabwe, Angola and Namibia backed him as a leader. The situation is far from being a simple volcanic eruption.

On the contrary, this risk context envelops the dimensions of a complex humanitarian conflict; a stagnating formal economy; an unstable political situation both in the country and bordering areas; approximately 95 per cent human displacement from the volcano alone; a refugee crisis; food and water shortage; risk of disease spread through poor sanitation; and damaged infrastructure and transportation routes. Further complicating the matter, there is no clear knowledge of the refugee population that has moved across

the border to Rwanda, which makes reaching the survivors for short-term survival needs and long-term resettlement even more difficult. It is said that the numbers reported to have crossed the border are grossly overestimated, and people have been reported as saying: 'They would rather die in their homesteads than in a foreign land where they are not welcome' (Oxfam, 2002).

Standard relief problems are being played out, such as the need to distribute water, shelter and food; but one problem is to avoid creating ongoing dependency among the refugee population, who are now entangled with the residents of many areas, such as Sake, where people have been experiencing severe malnutrition even before the hazard struck.

The case of the Congo reflects the complexities that a natural hazard can place on a country or region when there are existing and/or brewing conflicts. This seems to be a human-induced insecurity and risk situation, catalysed by a natural phenomenon, uncovering a host of layers that add to peoples' livelihood insecurity.

Source: adapted from OECD (2003) and BBC (<http://news.bbc.co.uk/1/hi/world/africa/1767789.stm>)

### **Box 1.9** *London smog: Long antecedent, slow response*

The great London smog of 1952 lasted for five days from 5 to 9 December. It resulted in at least 4000 deaths, although retrospective estimates put the death toll as high as 12,000 (Bell and Davis, 2001; Davis, 2002). There were some 100,000 cases of illness directly attributable to the smog, and the city came to a near standstill. It is an example of a disaster slowly building over centuries. The response too was slow and, in a negative sense, strategic as health was traded against money and other priorities.

As long ago as the 13th century, air pollution was recognized as a public health problem in British cities, and the burning of coal was identified as the principal source. Elevated death tolls were attributed to air pollution throughout the 19th century. Although the fog was natural, it trapped sulphur dioxide from coal fires and other industrial toxins. A study by Sir Napier Shaw in 1900 confirmed this phenomenon. A number of studies identified that smoke-laden fogs resulted in many deaths; for example, there was little argument that smog killed 1000 Glaswegians in 1909. The worst affected part of London was usually the working class East End, where the density of factories and domestic dwellings was very high and the low-lying topography trapped the smog (Brimblecombe, 1987).

In 1952, it was unusually cold and the fires were burning more coal than usual; the resulting gases, along with industrial effluent, were trapped by an inversion. Visibility in parts of London dropped to near zero, and nurses report

having had trouble seeing to the end of hospital wards. People were dying outside as there was no room for them in hospitals. The first indicator of mass deaths was a shortage of coffins and flowers.

The disaster was well documented, and the post-war political and social context was quite different from before the war. For example, Victorian-era governments had been careful not to interfere with what people could do in their own homes. Clean air legislation was passed in the form of the 1954 City of London (Various Powers) Act and the 1956 and 1968 Clean Air Acts. These acts restricted emissions of black smoke and decreed that residents of urban areas and operators of factories must convert to smokeless fuels.

As a result, the episode is often used as an example of an event triggering appropriate response. However, it may be a better example of the opposite. Governments suspected that smog caused mass deaths for centuries (there was a short-lived attempt to ban coal fires in 1273), and for at least one century the cause–effect link was known. Following the 1952 smog, the government of the day resisted passing legislation for as long as it could, blaming an influenza epidemic for many of the deaths (now discredited; see Bell and Davis, 2001) and trying to link later episodes to smoking. When the legislation was passed, there was a period of many years given for conversions, and it emphasized ‘best practicable means’, rather than specifying ambient conditions. For industry, the result was tall chimneys. It was only gradually enforced following other mass death episodes – for example, in 1957 and in 1962, when about 800 Londoners died as a result of smog. Further improvements have come gradually, in part as a result of the decline of polluting industry within London, and in part driven by the European Commission. The episode and its associated public and professional debates and government action make it a landmark in the environmental health movement.

Source: adapted from Brimblecombe (1987); Bell and Davis (2001); Davis (2002); further information was gleaned from the BBC and UK Met Office websites (<http://news.bbc.co.uk/2/hi/health/2545747.stm>; [www.metoffice.com/education/secondary/students/smog.html](http://www.metoffice.com/education/secondary/students/smog.html))

## Key challenges

These vignettes of disasters and the discussion of how they were understood and handled illustrate important themes, including those proposed in Table 1.3. We can iterate these themes now, all of which will be explored further in later chapters, and which are located largely in the second column of Table 1.2: the future of disaster and emergency management, rather than its past and present.

The report by the US National Science and Technology Council (2005), *Grand Challenges for Disaster Reduction*, argues that ‘Communities must break the cycle of destruction and recovery by enhancing their disaster resilience.’ It advocates

information, behaviour change and the application of new technologies. The mission of the UN's International Strategy for Disaster Reduction (ISDR) promotes a similar mission, although without a technology emphasis: 'The ISDR aims to build disaster-resilient communities by promoting increased awareness of the importance of disaster reduction as an integral part of sustainable development' (UN-ISDR, 1999).

These and many other statements by political and scientific leaders – often made in the immediate aftermath of a catastrophe – highlight that, for many, disaster reduction will result from the application of technology, as well as the need for increased community awareness as a prelude for improvement. These are important parts of a disaster reduction programme but, like other aspects of resilience, are frequently hindered by the absence of a strategic policy framework to support improved prevention, preparedness, response and recovery. We attempt to address the latter need. In doing so, important themes or challenges are as follows:

- Disasters and emergencies are a *whole-of-society problem*, and thus also a whole-of-government problem, and are especially a joint concern of responsible government and potentially affected communities. Thus, the ownership of the problem, and participation in response, are wider than often assumed in a traditional preparedness-response approach. Wider ownership of the problem necessitates different policy processes and policy responses, based on different relationships, information and sources of authority. Ownership of, and participation in managing, the problem requires recognition of community vulnerability and resilience, including non-tangible aspects such as spiritual values, non-economic attachment to place, cultural assets and continuity, and the informal economy.
- The importance of initial *problem framing*, including clear identification of proximate versus underlying causes. Put simply, the problem can be construed as: people are at risk of flooding, and levees and evacuation assistance are needed; or disadvantaged groups (or rich individuals with political influence) are living in flood-prone areas, and while levees and assistance should be provided, livelihoods issues, lack of alternative housing and planning laws should be considered. Community *vulnerability and resilience* become primary concerns, in local economic and asset terms, as well as aspects such as cultural identity, lay knowledge, health, local institutions, etc.
- The inevitability of *residual risk and uncertainty*. No matter what the quantity and quality of knowledge or the sophistication of policy and management, unexpected events, human behaviours and complex phenomena will place people and places at risk and confound our presumed understanding. Explicit admission of residual uncertainty in the natural and built environment, government institutions and local vulnerabilities reinforces the need for contingency planning, positive redundancies and safety margins, a flexible and adaptive response capacity, and better shared understanding of the circumstances of vulnerability.
- *Redundancy*. In the past, including some redundancy in our systems may be sound practice not simply for emergency management, but also for enterprises operating in the face of uncertainty and with much at stake. Nevertheless, this is seen as inefficient and suboptimal in a commercial world dedicated to being productive. The issue for emergency managers is that a small failure in

any part of such 'optimized' systems is likely to amplify through the rest of the system. Charles Perrow (1984) calls these highly sensitive arrangements tightly coupled systems. In rich countries, this is well demonstrated by just-in-time food and energy distribution systems that may be highly vulnerable to disruption. Conversely, advancing technology means that telecommunication systems may now have built-in redundancy through the parallel use of landlines and mobile phones. Our argument is not for built-in *inefficiency*, but for consideration of the impacts of failure and the use of 'fail-safe' design where appropriate – some of this may come from harnessing informal or community capacity. In this book we apply these ideas to policy and institutions, rather than to the more usual focus on back-up technology and operational capacity.

- *Strategic policy development.* Emergency management has, understandably, been mainly concerned with dealing with the immediacy of crises: it has been good at management, but not at strategy. Efforts at strategic thinking have often been constrained by long-established standard models and approaches. An issue is that many of the constituents of vulnerability and resilience are found in the organization of daily life, and in the culture and priorities of government and corporations – and are not easily addressed by emergency managers. This sets up the challenge of how strategic policy capacity can be created and implemented.
- The art and craft of *policy instrument choice* for disaster management requires development in terms of the range of options considered, the basis for their selection and the inclusiveness of the policy formulation process. In addition, *policy implementation* is often under-attended, particularly in the lull between disaster events, when political and public attention wanders and strategies are starved of resources.
- Long-term *learning and purposeful adaptation* of response strategies could be greatly improved, again particularly across the attention peaks associated with irregular disaster events. This and the other imperatives above emphasize the importance of the *institutional settings* defining the ongoing capacities and strategies in the disasters and emergency field.
- *Multiple aims and values* – reducing the impacts and consequences of disaster is a core aim of emergency management agencies; but this aim is usually interpreted in multiple ways and pursued through locally specific political, administrative and legal institutions, consistent with the priorities of these institutions. Priorities may include commercialization of services; development rather than hazard management; aid intended to buy political influence rather than to assist victims; privileging 'national security' over other needs; avoiding controversy; detailed auditing and real-time record-keeping; and so on. Some aims and values will not be stated explicitly, but are embedded in organizational culture and include priorities that undermine disaster programmes. Legal frameworks may inhibit decision-making as those responsible consider potential legal liabilities. They may also have budget constraints, although the post-disaster impact surge in expenditure may lead to a local economic boom in some circumstances. The administrative aim may be to reduce expenditure, transferring the risk to the individuals involved or to the private sector. Whether these constraints are real or not, they can limit the space for decisions. Some senior emergency managers argue that *perception is reality*. Political

and media priorities for the dramatic and immediate, or an individual's agenda for hero status, can also turn perceptions into reality as far as the emergency manager is concerned and make long-term learning difficult. Explicitly including multiple aims and values in emergency policy and planning is one approach to managing these issues.

Some of these themes and their associated dimensions are addressed within the structure of the book, such as policy instrument choice in Chapter 6. Others, such as community resilience, emerge in a number of chapters. Following the argument that thinking about disasters and emergencies has focused more on management than on policy, Chapter 2 surveys key ideas in policy and institutional studies in terms of their relevance to disasters.