# CHAPTER 2

# Early warning: a people-centred approach and the 'last mile'

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Before Cyclone Sidr hit the southern coast of Bangladesh on 15 November 2007, people knew that disaster was approaching. Many of them had experienced intense wind and rain before. Older people had told younger family members what to expect.

In Bangladesh, the cyclone preparedness programme, developed by the Bangladesh Red Crescent Society, with support from the International Federation of Red Cross and Red Crescent Societies, and the government of Bangladesh after a cyclone in 1970 had killed an estimated 500,000 people (International Federation, 1995), had worked with people on survival techniques. Around 5,000 trained volunteers worked through the night of 14 November to alert residents of the approaching cyclone. Megaphones and hand sirens were used to warn communities and encourage people to evacuate their homes and move to cyclone shelters and other safe places. As a result, no lives were lost in the area of Kuakata (British Red Cross and Bangladesh Red Crescent, 2008). Although more than 3,000 lives were lost and three coastal towns and 1.5 million homes destroyed throughout the whole country, this disaster was a fraction of the size it would have been had no warning been available.

The people-centred approach to early warning focuses on how individuals and communities can understand the threats to their own survival and well-being, share that awareness with others and take actions to avoid or reduce disaster. The risk of disaster is partly caused by external hazards (such as an earthquake, cyclone, surprise disease epidemic, war or economic crisis) that are difficult or impossible to stop. However, communities know that disasters are also about people being vulnerable, not being in the right place at the right time with adequate forms of protection.

People-centred early warning suggests that rather than being vulnerable, people can be capable, resilient and able to protect themselves. Three basic requirements are that individuals and institutions have the knowledge about what is a threat, that people are able to communicate a change in threat, and that they are in a position to respond. People-centred approaches to early warning, therefore, require the right support from scientific and political institutions to provide the context within which they can become strong.

A key point on which many scholars and practitioners of disaster reduction agree is that "strategies must extend beyond information provision to engage community members in ways that facilitate their adoption of protective actions" (Paton, 2006).

Photo opposite page: A woman walks through flood waters in Tewkesbury, England, in July 2007. That year, flood waters in parts of England rose to 60-year highs, submerging huge swathes of land and leaving thousands of people without running water or electricity.

This is reflected in the Hyogo Framework for Action (UNISDR, 2005). People are usually very active in looking after themselves. Specifically, depending on their circumstances, they work hard to interact with and adapt to hazards, manage risks, demand rights, develop resilience and secure livelihoods. What can be observed from Bangladesh, Cambodia, Mozambique, Nepal and other examples (see Box 2.1) presented in this chapter are that the key processes of identifying a threat, communicating about it and taking action often start at the localized and personalized level; they are people centred.

## Box 2.1 Early warning for floods in Cambodia

The vast flood plains and riverbanks of South-East Asia's sprawling Mekong River are home to millions of people. In Cambodia alone, nearly 84 per cent of the population lives near the river, with few options for relocation given the country's terrain. The lives of these people are inextricably connected to the Mekong, which provides water for drinking, cleaning, transportation and other universal aspects of daily life. Even traditional flooding provides benefits; the flood waters replenish soil nutrients essential for crop production.

The communities in this zone, while quite accustomed to traditional flood patterns, are now grappling with more unpredictable and frequent flooding. Climate change, environmental degradation, migration and other detrimental trends have exacerbated the communities' level of vulnerability, rendering traditional coping strategies inadequate and depriving communities of the same degree of protection or disaster recovery options that they enjoyed in the past. In order to get ahead of the curve and bolster community safety and disaster resilience, an effective, people-centred way to convey early warnings, which allows for prompt action in anticipation of an impending hazard, is an absolute necessity.

So the Cambodian Red Cross Society (CRCS) and the American Red Cross (ARC) have joined forces to build early warning communication channels and to simplify messaging among vulnerable communities and government authorities, enabling the transmission of life and livelihood-saving information.

### Community-based early warning through Red Cross volunteers

The Mekong River Commission (MRC) is a long-established, joint-government entity responsible for brokering responsible resource management of the countries that share the Mekong River. Between 2002 and 2007, and as part of a much larger MRC initiative, the CRCS and ARC played a major role in a multi-year, early warning programme funded by the United States Agency for International Development's Office of Foreign Disaster Assistance.

The programme addressed widespread needs for strengthened early warning communication channels, community ownership of the programme, training in data use and more effective participatory dialogue between the disaster response authorities and at-risk communities. This led to a programme known as the 'provision of early warning systems to flood-vulnerable communities in the lower Mekong River basin', which enabled key stakeholders in the region collectively to reduce flood risk among local populations.

In short, the primary aims of the programme were to develop simple, easy-to-use flood warnings for transmission among at-risk communities, government authorities and the MRC, and to build tools and communication techniques for rapid information flow among official decision-makers, emergency first responders and flood-susceptible communities.

Some 38 at-risk villages were selected, using pre-established criteria that included historical vulnerability to annual and flash floods, proximity to MRC water-level gauging stations, the presence of trained Red Cross volunteers and the level of interest in participating among communities and local authorities. The main aims for programme outputs included:

- flood referencing tools, materials and methods
- early warning system guidebooks and village manuals
- community feedback to integrate into decision-making

Apart from the CRCS and ARC, principal stakeholders included the Cambodian National Committee for Disaster Management (NCDM) and Department of Hydrology and River Works, the MRC and Action contre la Faim.

In August 2007, an independent evaluation team conducted a review of the programme to ascertain its effectiveness and impact, applying standardized methodology. The following five points highlight some of the more pertinent findings:

*Community ownership for shared responsibility.* The evaluation team found the early warning system to be very labour-intensive, and as such, it was crucial that responsibility for its development and maintenance was shared. For example, monitoring billboard data and flood markers and transmitting daily records entailed more work than anticipated. So project support committees were established in each village, comprising two Red Cross volunteers, NCDM members, the village chief and one additional community leader. The key purpose of each committee was to ensure community buy-in and mobilization.

*Broad stakeholder partnership for institutionalization.* The previous point directly relates to the importance of how to ensure institutionalization of early warning systems. In an end-to-end approach, where hazard information emanates from either the community level or central locations with response mandates, early warnings are conveyed through a whole chain of stakeholders, with each entry point equally critical to data transmission.

In this case, commitment towards the programme's success came from the highest levels of government, including the Cambodian National Mekong Committee (CNMC), which emphasized the need to integrate early warning systems into government planning, such as commune development plans. Memorandums of understanding also played a large role in the success of this programme, such as the tripartite agreement signed by the CRCS, ARC and CNMC.

*A community-relevant, decentralized approach.* The CRCS and its volunteer networks offered the perfect means to establish a well-grounded programme that has great potential for expansion and opportunities for ongoing investment. Generally, communities immediately recognized the usefulness of the programme. Also, a decentralized approach allowed for widespread community input in decision-making and fostered critical buy-in where communities themselves benefited from a programme they deemed relevant to their needs.

*Simple tools prompted replication and sustainability.* The benefits of developing easily understandable and replicable tools were found to be widespread. Other villages beyond the

target area were found to be copying components of this early warning programme, such as adopting the practice of using flood markers. Additionally, local radio stations continued to broadcast flood forecasts and warnings after the programme ended.

*Appropriate two-way communication technology.* As with other early warning system studies, the importance of using appropriate technology to suit the programme's context cannot be overstated. In this case, back-and-forth communication was essential, as opposed to one-way transmissions. All the sophisticated equipment and data at the national level are useless to vulnerable communities if they cannot be easily transmitted and understood at the end-user level. This held true in the Cambodian programme.

While the overall programme was deemed to be a success, there were certainly challenges to overcome, for example, securing enough funds to maintain the programme and ensuring consistent, high-quality data flow. Also, the time required to negotiate stakeholder participation and community behaviour change should not be underestimated in the planning process. Nevertheless, the Cambodian Red Cross and the participating communities are to be commended for their achievements under this programme, and for their willingness to pursue programming of such importance for promoting safer communities through disaster risk reduction. ■

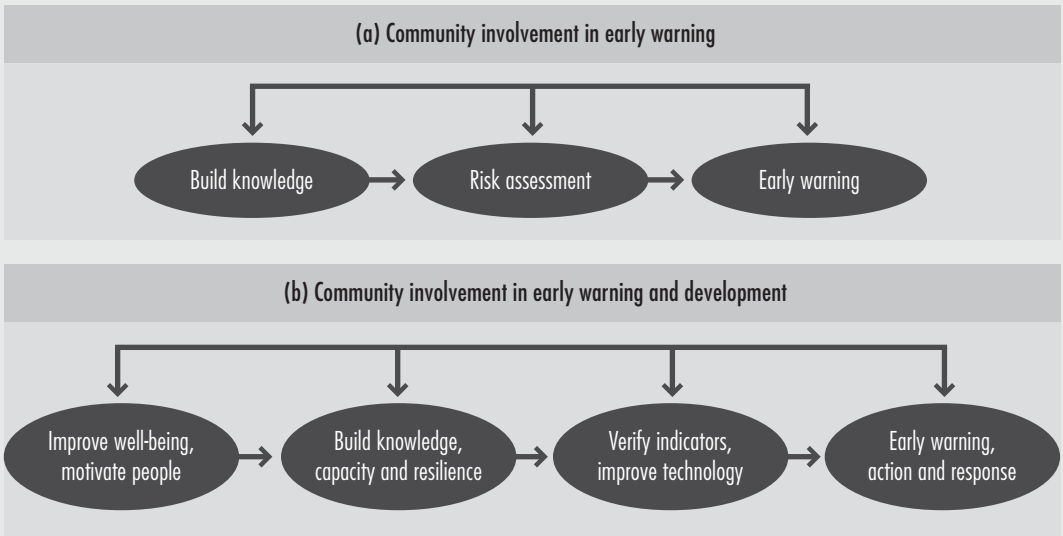
The components of this approach are illustrated in Figure 2.1. While the basic elements of the process for community involvement in early warning is demonstrated in part (a) as knowledge, assessment, the warning and communication links between these, the bigger picture of how this process is a part of development and improving well-being is demonstrated by part (b) of the diagram. It suggests that the more comprehensive linking of early warning and early action with people's development aspirations is what motivates people to engage in this activity.

Part (b) also shows how good indicators that inform people about changes in risk, plus the technologies to be able to identify risks, are an important stage in this process. Within this simplified model, it is suggested that building knowledge and awareness goes together with capacity and overall strengthening.

Early warning is accompanied by early action, which in turn improves well-being, motivates people and further strengthens their knowledge, capacity and resilience. Communities become stronger. In Bangladesh, for example, despite frequently being subject to the greatest of disaster threats in the world, development has continued to move forward and people remain resilient.

The ideal system presented by Figure 2.1 will succeed to the extent that people's reactions to threats are more or less what is expected. Hereby lies one of the great challenges to disaster reduction programmes. For example, in the cyclone belt of Bangladesh, prior to the arrival of a cyclone, not everyone seeks to protect themselves. Some move to the cyclone shelters, while others stay at home. Interviews by the

**Figure 2.1**
The basis of community-based early warning




author with survivors of the Mozambique floods of 2000 suggested that whether someone heeds the warning or not may depend on influences as diverse as knowledge, power, culture, environmental attachment, flexibility of lifestyle or simply personality (Collins and Lucas, 2002).

The challenge of engaging those people who remain outside the system of early warning and action, who are also often more marginalized and not part of the development process, is called the 'last mile'. Last mile is a term that has been adopted by some disaster managers because it expresses the sentiment that warnings and the means to respond to them often do not reach those who need it most – those within the last mile. They may be people who, for reasons of age, gender, culture or wealth, are not reached by disaster preparedness programmes.

In order to achieve the last mile, early warning systems need to engage all people at community level, to be locally owned and shown to be cost-effective. Incidentally, systems that are inclusive lead to improved well-being and development of communities at many levels (see Box 2.2).

## People-centred risk assessment

Pride and satisfaction were apparent in the smiles of the leader of Munhava's risk committee in the Mozambican town of Beira. During a community-based evaluation in his area, as part of the infectious disease risk management programme (Collins

## Box 2.2 The gender perspective on early warning and early action

When Rani Begam was growing up in Bangladesh, she used to listen to her father's sad tales of how he lost his four sisters and his first wife in a cyclone.

"This inspired me to volunteer," she said. Now she is one of many Bangladeshi women taking part in a project to disseminate information on what actions to take when a cyclone or flood is approaching. Funded by the European Commission, the project is supported by the British, German and Swedish Red Cross, together with the Bangladesh Red Crescent Society. They have been working in the coastal cyclone-prone areas of southern Bangladesh to raise awareness of disaster preparation options, especially among women (British Red Cross, 2007).

Forums with 12 women members have been created – one forum for each of the 85 cyclone shelters in the area. Female volunteers teach other women first aid and other personal lifesaving measures, and how to stockpile supplies. The women are advised to tie back their long hair and wear *salwar kameez* (loose trousers and a tunic) rather than a sari, which with its great length of loose material can get caught and cause drowning. Women are also told about the different types of flags that will be raised above the cyclone shelters to signal how long they have to prepare to leave their homes.

Women tend to suffer disproportionately when disasters strike. So work on averting and mitigating the effects of disasters is very much part of creating a more equal and sustainable society for everyone. In the 2004 Asian tsunami, up to four times as many women as men died (Oxfam International, 2005). Some of this disparity between the genders can be attributed to special factors, such as the wave striking when many of the men were fishing out at sea, while women waited for the catch on the seashore. In general, men were out and about on errands and could concentrate on saving themselves; women were at home looking after their children, and saving them was the priority.

People's reactions to disasters are conditioned by the social norms and relationships that guide their daily lives. Disasters tend to accentuate existing gender inequalities (Australian Red Cross, 2005). This applies to effective early warning systems and early action just as much as action at critical times and in the aftermath of disasters (Fordham, 2006).

Women do not have as much access to information as men, for example. Information tends to pass through male-dominated government agencies working on meteorology, managing water, agriculture, fisheries, health and disaster planning. This pattern of formal male networks is seen in the vast majority of the developed and developing world (Anderson, 2001 cited by Fordham, 2001).

Focusing on the life patterns and needs of women has become a central plank of gender-sensitive disaster preparation work. However, this can destabilize gender relationships and cause a male backlash. In a Redd Barna project in Uganda, women learned to speak out in public at meetings where there were separate discussion groups for older and married women, and for younger women and children. But some men felt threatened by the emboldened women and a number of women were beaten by their husbands for spending more time at these meetings than on domestic work (Bell, 2001).

This example highlights the need for gender sensitivity in early warning and early action, and the need to focus on relationships between men and women rather than the plight of women (or men) in isolation.

In southern Bangladesh, it used to be largely the men who knew about disaster preparedness. Now Rani's husband supports her voluntary work. "My husband worked in the army and realized that it was good for women to volunteer, but other people – particularly religious and family men – did not."

So gender sensitization workshops were held for 161 religious leaders and they have since endorsed the involvement of women. Some religious leaders asked for disaster preparedness material for their mosques and have delivered messages about the importance of women's participation during the gatherings for prayers.

"I had one bitter experience after I took part in volunteer training," said Rani. "When I returned home, some people said I had become a prostitute because I had stayed away from home for a month, being out of my house with men who were not my husband or brother. Luckily my husband supported me and helped deal with the situation."

She is pleased to see a change in people's attitudes: "Developing a good image for female volunteers has taken a long time. People now see that we are doing a good job helping others."

Many disaster preparedness initiatives have targeted women and girls in order to raise their participation while helping men and women to work together to create more effective disaster warnings and early responses.

On the southern flood plains of Nepal, CARE Nepal and three local NGO partners worked with 48 communities to target women through a door-to-door awareness campaign that reached out to women at home with their children. They also organized a skills fair in each of the communities. The women concentrated on demonstrations of improved cooking stoves, for example, while their children heard stories about past disasters and learnt about disaster preparedness at a children's stall. The most popular stall, run by Nepal Red Cross Society volunteers, taught first aid. Women said that they used to think first aid was a man's job but had now gained prestige by acquiring these skills. The increased women's participation was a significant success in a culture where women are often excluded from household and community decision-making.

When the July–August 2007 seasonal flooding occurred, some Nepali communities sat and waited for relief, while the 48 *samadhan* (meaning 'problem solving') communities who had benefited from the awareness campaign put the evacuation drills into action. Lives and possessions, which would probably otherwise have been lost, were saved. As well as improved disaster-related skills, the successful promotion of gender equality was a lasting legacy (United Nations, 2008).

An ActionAid International tsunami response project in India's Andaman and Nicobar Islands brought women together to share their experiences. These women had very limited experience of meeting people outside their homes and were constrained by strong social expectations of acceptable behaviour for women. This meant that when some women had their clothes ripped off by tsunami debris, they died in their homes rather than escape and suffer the shame of running outside naked.

During the two-year project, the surviving women learnt to swim and to fish. Only by working collectively could the women learn these skills. Being able to fish not only equips them with survival skills after a disaster, but also gives them a way to earn money and gain economic independence. Thus the women's active engagement in the disaster reduction programme on the islands began to address their wider marginalization in society (United Nations, 2008).

In earthquake-prone Lima, Peru, a scheme to involve poor women in the manufacture of robust building components to withstand tremors also demonstrated that practical disaster resilience programmes empower women in poor communities. Now, the women not only make the building materials, such as roofing panels, but also build low-cost housing, train others and earn an income. The project was started in 1996 by an NGO, *Estrategia* (Strategy), and a community-based organization, *Mujeres Unidas para un Pueblo Mejor* (Women united for a better community). It has benefited 55,000 families and is now being rolled out to neighbouring countries (United Nations, 2008).

Approaching disaster work through 'a gender-sensitive lens' (Fordham, 2006) means being alert for ways that gender stereotypes and gendered power relations interfere with equal rights for women and men, girls and boys, and how to remedy this. ■

et al., 2006; Collins and Williams, 2006; Williams et al., 2007), he, along with other members of the community, had identified the unhygienic environment as the cause of life-threatening diarrhoea. This 'local hero', working on a voluntary basis, then persuaded his community to clear and monitor the drains and clean up the public places, including removing human faeces.

His community's cooperation in these actions seemed to be motivated not only by the desire to respond to the warning of cholera in the region, but also from a pride in building their own strategy. During the cholera season that followed, the area was not affected. Local people were rightly proud of their achievement in reducing the risk of fatal disease. The often-untold stories of successful individuals who go the last mile for disaster prevention are found around the world. What inspires them and what ensures success?

Key components include community ownership of risk assessment. When risk assessment and management are governed locally and localized or indigenous knowledge is incorporated, then capacity is strengthened.

However, locally oriented and motivated people do not operate in a vacuum. They gain knowledge from what they hear via the programmes of the state, non-governmental organizations (NGOs), religious bodies and other communities, from friends, relatives and neighbours, and via the radio or other communication technologies, such as TVs and mobile phone updates (see Box 2.3).

## Community knowledge of vulnerability, risk and resilience

Progress in people-centred approaches depends on supportive research and politics to help release a readily available resource within groups of local people. Communi-

## Box 2.3 How to provide effective early warning messages

What is – and is not – said in an early warning has a profound effect on what people think and then do (Lindell and Perry, 1987). Research evidence on this topic has accumulated and been replicated over decades (Turner, 1976). It is ready for application and can be summarized as follows: it is vital to include appropriately three topics – source, content and style – in an early warning to maximize the odds that the public takes timely and effective actions.

*Source*. Emergency planners around the world embark on quests for a 'credible' early warning spokesperson because they think source credibility will generate public warning belief. There is actually no single credible spokesperson to be found. First, different people have different ideas about who is and is not credible. Second, people's ideas about credibility change over time. Third, spokesperson credibility and belief in the warning message are different and the former does not guarantee the latter. In fact, if one relies on spokesperson credibility to foster warning belief, the entire enterprise is destined to fail. For example, fire fighters are the single most credible source of warning information in the United States. They have the highest sole-source credibility with 35 per cent of the population. But even they leave 65 per cent of the population behind. The most credible early warning source is not a single spokesperson at all. It is a group of different people and organizations. For example, a group that includes the mayor, a national scientific organization, the Red Cross or Red Crescent because so many associate them with disasters, a familiar local media announcer and more. Creating a mixed panel to source early warnings requires that many agree to be a source through emergency planning long before events occur.

*Content*. First, and most important, is to give people guidance about exactly what they should do, using words that paint a picture of what their response should look like. For example, in reference to evacuation, it is less effective to say, "Get to high ground" than to say: "By 'evacuate to high ground', we mean climb the slopes around town until you are higher than the tallest buildings." Second, warning messages should tell people about the timing of their actions. Tell people when they should start and by when they should complete their protective action. For example, "Begin evacuating now, do not delay, evacuate now and be on ground higher than the tallest buildings in town no later than 16:15 this afternoon." Third, tell people who should take the protective action and who does not need to do so, and let them know why. People in harm's way need to hear clearly that you are talking to them. And people who are safe also need to be told so. For example, "If you are in the city limits and south of the Red River, evacuate now. If you are not in this area there is no reason for you to do anything because other areas will not flood." Lastly, people are more apt to take protective actions if the warning informs them about the pending hazard's consequences and how the protective action will cut their losses. For example, "The area of town south of Red River will be hit by a wall of water higher than all the rooftops that will be moving at 65 kilometres per hour; relocating to areas that will not flood will keep you safe."

*Style*. The style of warning messages is about how the warning is worded and spoken, and it too influences public response. Research documents five style elements to use (Mileti and Sorensen, 1990). The first is clarity. Messages must be simply worded. Jargon should never be

used. For example, a warning for an accident at a nuclear power plant should not say, "A breach in containment may result in a transient excursion of core materials." Instead, it should say: "Radiation may leak out of the building and into the air."

The second important style element is to be specific. Warning information that is precise and non-ambiguous works best. For example, it could cost lives if you advise people to evacuate and do not explain what you mean because the word 'evacuate' will mean different things to different people. For example, "Go north away from the coastline until you are 3 kilometres inland and at least past the intercontinental highway."

A third style element to include is certainty. Provide authoritative and confident language about what you tell people. People may wonder how they can be certain about the uncertain disaster forecasts that so often come from scientists. Here is how you do it. Tell people, "We cannot know if the tsunami will actually reach our coastline or exactly how high it may be if it does, but all the experts agree that it is likely enough that everyone should evacuate now."

Accuracy is the fourth warning style element to affect public response. The people you warn need to think that they are being given accurate information. Inaccurate information or errors in information confuse people and their response. An example occurred during the 1979 Three Mile Island nuclear power plant accident in the United States. A spokesperson for the US Nuclear Regulatory Commission stated that there would be an explosion at the power plant. He was referring to a gas bubble exploding inside a pipe in the reactor building but did not say so. Many people around the plant thought he meant that the plant would explode like a nuclear bomb. Information accuracy means telling people the truth, but it also means thinking about how people will interpret what you say.

The final warning style element is consistency. Consistent information works best. Inconsistent information can leave people with too much choice about the risk and protective action-taking. And given the choice, most people prefer to select information that says they are safe and not at risk. Consistency is applicable to a single message itself, and also applies across messages. Changes from past messages should be explained in subsequent messages. Why what you are saying is different from what others have said also needs to be explained. Inconsistencies inside a message should be removed. For example, it is inconsistent to say: "A tornado is headed for downtown, don't worry." People should be worried about that tornado. Telling them to not worry – because someone hopes to avoid starting a panic – gives them inconsistent information that erodes the effectiveness of the warning.

### Interpreting nature's warnings and responding to them

Public education is especially important in the case of hazards for which only nature provides warnings. An example is a tsunami triggered by a local earthquake or mudslides triggered by heavy rain on slopes that are not monitored by technology. In cases like these, public education should teach people how to interpret natural signs that foretell disaster and how to respond to those signs. Three things have been learnt about this sort of public education. First, public education to teach residents about natural warnings and how to respond to them works best if that knowledge becomes engrained into local culture and folklore. For example, the lesson to 'duck, cover and hold' when an earthquake is first sensed. Second, special outreach to tourists

and other transient populations is essential through, for example, posting information in hotel rooms and on beaches. Third, it is important to post visual information in potentially hazardous environments for people to see when events occur. For example, signs along beaches that state: "Tsunami hazard: leave the beach and head to high ground if you feel an earthquake." Sometimes local officials are reluctant to post such signs fearing that they will cause economic downturn. However, research evidence is clear that such postings actually have no negative economic impacts at all.

**Issue public warnings based on human science findings**

Local government officials have the responsibility in most societies to issue warnings to people in their jurisdictions. Even if national or international warning centres 'detect' danger, local officials typically word the actual warning messages that reach the people in harm's way. But there are too many local officials – and turnover among them is too high – to train them all about how to word early warnings based on psychological and sociological research. One solution might be to create a handbook of 'draft' public warning messages based on research. The handbook could be distributed to local officials worldwide to turn to when they must issue public warnings. A similar document might also be prepared for warning centres which sometimes directly issue warnings to the public. 'Evidence-based' draft messages could serve as a starting place for writing early warnings that are actually disseminated. ■

cation between societies at risk and the custodians of expert knowledge, finance and technologies is not just about narrowing the gap in knowledge, but integrating these resources into a genuinely people-centred system.

Knowledge and education are empowering, giving people the means to develop their own solutions. However, the language of vulnerability, risk and resilience, common in the world of disaster management and some parts of academia, is not easily understood by anyone outside a rather small 'disaster community', let alone people who may have received little education. Rather than use this language with communities, some programmes have used innovative techniques to bring additional scientifically verified information to people. For example, by way of preparedness and avoidance of diarrhoeal disease epidemics in Bangladesh, the International Centre for Diarrhoeal Disease Research (ICDDR,B) displays images on posters in high-risk communities to inform them about the harmful bacteria that can be found in the water, which must therefore be boiled or filtered before being drunk. Few words are needed. The ugly-looking pathogens accompany pictures of people suffering from cholera and are quite enough to communicate the desired warning message.

A further example of community capacity to govern early warning and action is the health security for disaster resilience project (Disaster and Development Centre, 2008; Ray-Bennett et al., 2008), which is supported by the United Kingdom's Economic and Social Research Council and Department for International Develop-

ment, and run by the Disaster and Development Centre (DDC) and ICDDR,B. This explores how secured health can have an impact on disaster mitigation, including through localized and community-based risk assessments. One of its findings in Bangladesh is that, when asking cyclone- and flood-affected communities about the greatest disaster threats they confront, they frequently refer to economic and social factors. This finding guided the programme into considering health security as an issue of social strengthening, rather than just in terms of resistance to environmental hazards. A further aspect of this approach is to examine how health enables early action in the face of prevalent and forthcoming risks. By implication, early warnings in these contexts are also about identifying the presence of a defence that is a strategy for health and for dealing with threats to everyday life.

A boy washes dishes in the flooded waters of Chokwe, Mozambique, in 2000. Since then, the flood-prone country has made excellent progress in taking early action before a flood becomes a major disaster.



Addressing vulnerability for disaster reduction is often similar to promoting development. We know from many years of analysis about development that to be sustainable, there are environmental, social and economic aspects of life that must be addressed. For example, health threats are environmental, social and economic in origin, both in situations of extreme underdevelopment and in times of disaster. Poverty reduction programmes have consequently opted for integrated strategies that try to address the causes of ill-health on several fronts. Furthermore, health means complete well-being, including the psychosocial aspect. Recognition of the impor-

tance of psychosocial support in disaster resilience requires acknowledgement of pre-built individual and community strengths that reinforce ability for preparedness and early action (see Box 2.4).

## Box 2.4 Pre-built psychosocial capacity allows early action

"Every night images of war, death and destruction keep running in my head," said 16-year-old Zarina Ikaeva from Tskhenvali. She is one of more than 30,000 South Ossetians who fled to North Ossetia in the Russian Federation during the August 2008 conflict between Georgia and the Russian Federation. "I do not know if I will ever be able to forget this."

As Ikaeva and her compatriots arrived in North Ossetia, they received support from the local Russian Red Cross branch. Not only were their basic physical needs covered, but trained staff and volunteers were also ready to provide much-needed psychosocial support. This early response was possible because the Russian Red Cross, especially its North Ossetia branch, has worked to build psychosocial capacity in the past years, following the Beslan school siege in 2004.

After the school tragedy, where more than 1,000 children, relatives and teachers were taken hostage in a school gym and 338 lives were lost, the Russian Red Cross provided essential psychosocial support to those who were affected. The programme continued for three years and, although it ended in 2007, there remained an awareness of the need for psychosocial support to people affected by crisis. In 2008, for example, the Russian Red Cross organized several psychosocial training courses. This meant that the local staff and volunteers were ready to respond immediately to those affected by the conflict, aiming to minimize the psychological effects of the war among displaced children and their families, and to be able to provide continued support. "To be with people and help them come to terms with their emotions is important in the first days after the tragedy," explained Viktoria Tibilova, a Russian Red Cross psychologist from Beslan. "But now more work is required to restore people's faith in the future and in other people, and to help them find basic resources to live on."

### Health means complete well-being

Traditionally, humanitarian and development aid addressed only physical needs, but in recent years more attention has been paid to people's mental and psychosocial needs. Over the past few years, an increasing number of Red Cross Red Crescent Societies has started community-based psychosocial support programmes to help affected people cope with their situation, seeking to restore their hope, dignity, mental and social well-being, and sense of normality.

Often, psychosocial support is provided in response to a crisis situation, such as a conflict or natural disaster, but then such programmes often continue and are expanded. These programmes often become a part of the general programme portfolio, and add value to the preparedness of a National Society. Since 1993, the International Federation Reference Centre for Psychosocial Support has supported this capacity-building and advocated for community-based psychosocial support as an integral part of humanitarian work.

### Tsunami response gave valuable lessons to earthquake operation

When National Societies have pre-built psychosocial capacity, they can quickly organize vital support in times of crisis. This was clearly

proven in the early response of the Indonesian Red Cross Society to the 2006 Yogyakarta earthquake, which killed thousands of people and left at least 200,000 homeless. Only three days after the event, a group of trained psychosocial specialists from the American and Indonesian Red Cross arrived in Yogyakarta from Aceh, where the team had already helped more than 60,000 survivors of the 2004 tsunami through community-based and culturally relevant activities.

When deployed to the areas hardest hit by the earthquake, they began by offering psychological first aid and community-based interventions to help ease people's suffering. The capacity built in the tsunami response was invaluable to facilitate early response in 2006. The Indonesian Red Cross had carried out some psychosocial projects before the tsunami, but the focus and organization of the approach was greatly improved through the tsunami experience. "The training and guidance we received from other National Societies with experience in this field, like the Turkish Red Crescent Society and the American and Danish Red Cross, was invaluable and made us even more effective," said Intan Keumala, an Indonesian Red Cross psychosocial support coordinator.

**The community-based advantage**

Although the first team to respond psychosocially in Yogyakarta arrived from another province of Indonesia, the community-based nature of the work often allows an even quicker response. A member of the first team was Sujata Bordoloi, manager of the American Red Cross psychosocial support programme for tsunami recovery efforts in Aceh province. The team provided psychological first aid and assessed the situation, and found that there was a good foundation to build on. "Even though the earthquake had destroyed almost everything in the villages we visited, we found that most people were staying in their communities," said Bordoloi. "There was a sense of cohesiveness and resilience among villagers, and that even though structures were gone, the communities still remained intact."

Involving village leaders, teachers and others, the team set up a variety of activities to help the communities cope. At the same time, they continued to build their capacity and increase their preparedness, thus ensuring that crucial, early response for the next disaster. ■

The benefits of locally based knowledge for early warning for urban or rural development programmes are experienced across the globe. One example would be the farmer field schools in Mozambique, run by World Vision, where local producers are taught how to predict the likelihood of a successful harvest. The proven worth of participatory community-based strategies can be shown in preventing crises associated with food, livelihood, health, environmental and economic development, to name a few. However, some of the limiting versions of participation are when there is only superficial 'involvement' rather than ownership.

The presence of community members at a meeting to discuss the threat of an incoming crop disease might be largely irrelevant, if local perceptions are merely that someone is trying to sell a different variety of crops. Similarly, vaccine uptakes can be compromised and safety routines for fire, flood and storm partly ignored, if the needs

assessment is poor and imported from outside the community. When a community itself calls for assistance for identified risks that threaten their food and water supply, livelihood, health or basic rights, they attract the active support of their members.

It is important for community-based assessments to have access to what more specialist science has to offer, though there are clearly limits to how accessible this may be to lay people. For example, in the assessment of infectious disease risk, a combination of ecological, socio-economic and behavioural assessments may be needed, involving microbiological, societal and economic analysis. The study of the complex origins of cholera risk in Mozambique identified that comprehensive early warning of the disease would require risk assessment engaging the disease, people, the places they live, the politics of the area and varying perceptions about what might be a threat or not. All these potential 'causes' needed to be looked at together rather than separately by different types of experts who might not even work together (Collins et al., 2006).

Despite 150 years of research on this more visible of pathogens, after the great outbreaks of cholera in 19th-century London, we are still unable to predict accurately when, where and with whom it will strike. Many infectious disease pathogens, such as viruses and prions, are much less well understood than cholera, raising questions about how we should best negotiate uncertainty in that field. In these circumstances, community early warning tends to provide solutions where early reaction is based on permanent readiness in the face of varied threats. However, areas and people at higher risk can be monitored more rigorously during more obviously risky times. For cholera, this includes during flooding, infrastructural collapse and where there is malnutrition. Local radio and public health activists can transmit notice of its arrival within moments. In the same way, Radio Mozambique used radio broadcasts of locally performed plays containing warning messages to warn communities in the province of Zambezia about HIV and AIDS. Flood warnings are also being transmitted through that medium.

## Techniques of community risk assessment and early warning

There are many participatory techniques that can be applied to disaster prevention (Haghebaert, 2007; Pelling, 2007). Perhaps the most well-known of the community risk assessment approaches in recent years is the vulnerability and capacity assessment (VCA) (International Federation, 2002 and 2006; Davis, 2004). There are many different versions of this, and some prefer versions that put more emphasis on resilience. It is perhaps surprising that greater emphasis has not yet emerged on combinations of capacity, resilience, strategic preparedness and well-being in these assessments, as the more likely characteristics of everyday life upon which early warning might be built. However, some excellent examples of VCA have been carried out through the work of

Red Cross Red Crescent Societies, who are largely attributed with developing and implementing the approach (International Federation, 2002 and 2006).

Techniques that communities and facilitators can use to gather information for early warning include all of the tools that exist in the rich repertoire of participatory appraisal. They include risk ranking and mapping, timelines, Venn diagrams, free listing and scenario building, together with the key ingredient of handing over the controls to the participants (Chambers, 1997 and 2005). Examples of data for detecting change include rainfall through rain gauges, river levels, a change in the number of people arriving at a health clinic, rising food prices and earth tremors. Local communities have been known also to be aware of a number of indicative early observations, such as changes in animal behaviour in advance of major environmental events. This has led to a growing appreciation of the role of indigenous knowledge in early warning and action, though a debate is often present as to whether the knowledge is better described as local (i.e., has developed in a specific location due to multiple factors from multiple sources) or indigenous (attributable historically to that setting and uniquely handed down over generations).

Beyond what lay people can measure for themselves, lies a mass of other information in the hands of those with access to the necessary technologies to sense it. However, such information is also becoming increasingly more within reach of lay people (see Box 2.5). For example, remotely sensed images in the Bay of Bengal off Bangladesh, or in the Mozambique Channel off the south-east coast of Africa, can track incoming meteorological events, such as cyclones, effectively on a minute-by-minute basis. The images can then be downloaded from personal computers around the world. This is now also the case in many thousands of settlements in previously technologically marginalized parts of the world. Lay people with an interest in early warnings need not wait for experts to provide information. For example, members of communities can engage in testing the quality of water and soil using adapted kits, in measuring the nutritional status of their families and all forms of neighbourhood watch.

## Box 2.5 Early warning and early action in Orissa

On 27 October 1999, at 18:50, the All India Radio station announced that the meteorology department had issued an early warning of a deep depression in the Bay of Bengal "that may turn to severe cyclone and may hit the Orissa coast with a wind speed of more than 200 kilometres per hour".

Natha Sethi, who lives in Padampur, Orissa, recalled that day. "We became alert for the forthcoming cyclone and organized an emergency meeting of the disaster preparedness committee along with task force members. Following the community contingency plan that we had prepared earlier, we checked all the disaster preparedness equipment that the Indian Red Cross Society's Orissa branch had provided for our shelter. [Various people] took the lead role in disseminating the warning message

to each household using megaphones, *kunch* [conch shells], bells and sirens, and we also started to collect dry food, drinking water (that we lifted manually to the overhead tanks), kerosene, candles, match boxes, etc., and stocked them in the shelter. Self-help group leaders prepared the community by supplying household emergency packs."

The Indian state of Orissa is flanked by the Bay of Bengal in the east; its 480-kilometre coastline is described as a 'very high damage risk zone' in the *Vulnerability Atlas of India*. In addition, the rapid degradation of the region's ecology in recent years has made it even more vulnerable to cyclones of minor intensity. In 91 of the last 102 years, Orissa has experienced natural hazards – flood events in 50 of those years, drought in 20, cyclones in 11, and other phenomena, including whirlwinds and hailstorms, in 14 years. Of the floods and cyclones, 13 and 11 respectively were particularly severe and devastated the state.

In the early 1990s, following many devastating cyclones, the Indian Red Cross, through its Orissa branch, worked with the state government to produce the Orissa Disaster Mitigation Programme (ODMP). This involved constructing multi-purpose cyclone shelters and organizing disaster preparedness activities so as to avoid the worst effects of such natural hazards. By 1995 the plan was in operation, supported by KfW, a German bank, and the German Red Cross.

Recognizing the importance of strengthening the local communities' capacity and resilience, the Indian Red Cross worked with community-based organizations and trained volunteers, making them the basis of the disaster response team at state level and similar teams at district and block levels. Shelter and disaster management committees and task forces were set up at shelter level. This was done with the support of the International Federation and German, Spanish, American and British Red Cross. To build up resilient, well-prepared and safer communities as well as a well-functioning state branch, various training courses were held, including community-based disaster risk management, search and rescue, first aid, psychological first aid, leadership training, and the use and maintenance of lifesaving equipment. Community awareness programmes on disaster preparedness and response were organized through mass rallies. Posters and manuals were prepared and mock drills carried out on special days.

The ODMP stood the test when the 'super cyclone' hit Orissa on 29 October 1999 with a wind speed of 280 kilometres per hour. The government declared a death toll of around 10,000 people but, according to unofficial sources, the number of people killed was estimated to be in the tens of thousands.

The 23 shelters constructed during the programme saved 42,000 lives. The government took immediate action, a noticeable paradigm shift from post-disaster activity to pre-disaster preparedness and mitigation. However, the concept of community-based disaster preparedness in the state of Orissa had been introduced by the Indian Red Cross, which was the pioneering institution in preparing the community for early action after warnings of a sudden-onset event such as a cyclone.

Natha Sethi recalled that, unlike other villages where no shelters existed, his community was safe from the cyclone. "The people from the nearby villages that had not reached our shelter were swept away like straw… The training imparted by the Red Cross was used at the proper time and proper place so that we could save [all the lives] in our village compared to more than 900 reported dead in the surrounding villages." ■

## Closely sensed information

Communication, alert and response systems for a wide variety of disaster events can be embedded within communities, engaging the people who are the last-mile users, so that the distance between a perceived risk, real risk, warnings and early action is reduced. This is demonstrated by several of the systems described in this chapter (Box 2.1 on Cambodia and Box 2.6 on Mozambique and risk and resilience committees (RRC) in Nepal). Local knowledge is based on a community's history and grows within a community, providing information about local people, including indication of their capacity and well-being in the face of an imminent crisis. Specialist knowledge made more accessible to the community, such as access to data on water, climate, the economy, hill slope stability, disease risks and so forth, can be integrated with a people-centred early warning system.

As disaster risk is often comprised of a complex array of social, economic, environmental, political and perceptual factors, the challenge is how to integrate this knowledge comprehensively to identify when, where and with whom early action must be taken. This requires local people to be engaged with the awareness of an appropriate set of indicators of change and the means to monitor them. It requires identifying which indicators of change need to be monitored by specialists, such as arsenic contamination in tube wells in Bangladesh and many other parts of the world, and how such information can be part of community-based information streams.

### Box 2.6 Risk committees in Mozambique and Nepal

In 2005, the local health department in Beira, Mozambique and the infectious disease risk management programme (IDRMP) initiated a pilot project of cholera risk committees. The main aim was to reduce diarrhoeal disease risk through community-based risk management. This was achieved through establishing a coordinated network of risk committees in key disease risk areas. These would be effective in the reduction of diarrhoeal disease risk, through a 'system-supported community-based risk management' approach. This was a practical, low-cost strategy to enable management of diarrhoeal disease risk at the local level and to become the first stage of a community-based early warning system.

The approach places emphasis on avoiding disease epidemics through effective risk management, rather than expensive emergency aid interventions once epidemics occur. The risk committees resulted from findings during initial IDRMP work that highlighted weaknesses in community-based responses to risk reduction and failings in communication between the community and authorities. The specific objectives were therefore to:

- improve community-based risk management through the establishment of area-specific risk committees
- improve communication channels between community risk committees and stakeholders in order to facilitate appropriate and timely risk reduction
- improve cholera risk management at the 'central' level through monitoring of risk information produced by risk committees and through responding appropriately

The committees consist of a core membership, which identifies and monitors the risk areas and, most importantly, encourages community members to manage and reduce diarrhoeal disease risk. The committees disseminate risk information to key service providers and health institutions such as city health authorities and the city council. These groups in turn provide committees with technical information and support where appropriate and possible.

The work of the committees is flexible, as it must adapt according to changing hazards and vulnerabilities in the population and environment. Participatory community-based assessments encouraged community responses, with the committees being run and managed as unique entities by the community. This approach builds organizational capacity to respond to disease risk by increasing civic knowledge of disease risks and risk reduction measures. It develops advocacy skills at the local level to enable the community to mobilize interventions and lobby the authorities and other stakeholders to address identified disease risks. Some of the disease risks are also, at the request of the community, confirmed through laboratory analysis provided by the local health authority. Although the government of Mozambique ended this programme in 2006, several of these committees continued to operate, thus demonstrating their capacity to become self-sufficient. However, others dissolved as attempts to generate their own funding failed. Evidence of the success of the approach has led to further initiatives of this type.

Infectious disease risk management was a DDC programme, supported by the UK's Department for International Development (DFID), the World Health Organization and the United Nations Children's Fund (2002–2005) and partnered with the Mozambican government and the International Centre for Diarrhoeal Disease Research, Bangladesh. DFID/British Council, Catholic University of Mozambique and ICDDR,B currently support its sequel, the infectious disease risk reduction programme.

Examples such as this from Mozambique illustrate how risk management, early warning and resilience can be locally governed. Along these lines, a related long-term case study has been developed since 2006 for a number of communities in Nepal, one of the world's most hazardous and low-income environments. This project is to trial, on behalf of the government of Nepal, a series of risk and resilience committees (RRC) to identify the circumstances within which they can effectively enhance community-owned hazard and vulnerability mitigation, risk reduction and resilience. The RRC achieved to date are situated at a confluence of local traditions and changing government structures in two different areas of Nepal. The experience shows that establishing RRC in the community, with participatory initiatives and a wide range of stakeholders, can produce high-level acceptance, involvement and local knowledge-building. Despite the relative success of this approach, variation between the way different community groups develop their risk and resilience strategies and potential weaknesses in conceptualization of core themes and processes, means there is much still to be learnt.

Community-based approaches claim to build on existing local knowledge and experience as well as the resources, coping and adaptive strategies of local people. Pre-existing local capacities and institutions provide a foundation for community-based disaster preparedness – the overall aims of which is to empower local people by supporting them to become increasingly self-reliant (Allen, 2006). The RRC institutional framework embraces government structures, traditions and customs, political practices and public awareness to identify best ways

of enhancing local disaster resilience. They currently sit within a wider strategy for 'people-centred hazard and vulnerability mitigation for disaster risk reduction' in Nepal and Bangladesh. The initiative, based on low-level funding, also includes higher educational links. It may bring to the fore some of the circumstances within which increasing hazards can be offset by the community and be one of the strategies contributing information to the wider approach to build disaster-resilient communities.

The RRC aim to enhance disaster resilience by the communities' self-directed establishment of activities involving local knowledge-sharing and capacity-building to assess and manage risk. Two RRC were established in 2007 at Pachkhal Valley, Kavre District in central Nepal and Dhankuta Municipality in eastern Nepal. Individuals from local government, NGOs, political parties, academic institutions and other bodies were introduced to the fundamentals of disaster reduction through participatory training workshops. Localized risk records in which localized hazards, risks and vulnerabilities are detailed were designed by the RRC. At Dhankuta, participants worked in four heterogeneous groups, each ultimately drafting a risk record based on their previous experiences and needs. Risk ranking exercises, related techniques and wider community surveys were also implemented at both sites. Comparisons are made between the RRC to compare how different community decision-making, contexts and notions of risk and resilience impinge on the sustainability of the approach. The project has also provided opportunity for training at varied levels including through the exposure of community representatives to higher political levels. One executive officer of Dhankuta Municipality has disseminated the positive experiences of this approach at national, regional and international levels. Concerns about disaster vulnerability and risks that have been identified by the RRC have been incorporated into the municipal development process with suggestion that this methodology could be used more widely, while strengthening early warning and response in the area. Ongoing questions concern the wider governance circumstances within which a people-centred approach in Nepal and elsewhere can successfully build resilience.

Findings from Mozambique and Nepal to date have demonstrated that the risks highlighted by varied institutions and authorities are often not at the fore of local community concerns. For example, cholera, earthquakes, hunger, fire and storms can rank lower than issues of governance and poverty.

In Nepal, people ranked agrochemicals high amongst their concerns, although this had not been an apparent threat to the wider team prior to this process. Some languages in Mozambique or Nepal do not have words to differentiate between hazard, vulnerability and disaster in the same way as in English. In the context of Beira, a disease risk was part defined in terms of fear. In both Mozambique and Nepal, vulnerability, not surprisingly, was found to be expressed often in social and economic terms and invokes a state of sympathy for others. Well-being has multiple dimensions with factors such as health and education facilities, water and forests featuring as some indicators.

Beyond questions of language and interpretations, communities have demonstrated they are very aware of the nature of vulnerable groups and indicated that, first and foremost, they felt responsible for disaster management themselves, rather than expecting it to lie entirely with central government. At Beira, a key risk reduction identified by the community was to create voluntary cleaning brigades. At Panchkhal, Nepal, a key strategy was to enhance agricultural productivity. Motivation to develop the RRC approach to date

appears to have varied between communities within the same country. Small details in the interpretation of the purpose of RRC may lie at the core of explaining some of these differences. However, there is a willingness to engage risk reduction issues whether real or perceived, and these can be used by the RRC to inform newcomers to the community. In Nepal, the RRC approach has led to the community using a baseline survey approach to risk data, putting up hoardings (13 at Dhankuta) to make people aware about risk, vulnerability and possible disaster, and providing support to a bereaved member of the community. In Beira, the Munhava risk committee created an assistance fund for families with members in hospital. In both cases, it is clear that community groups want to link risk reduction and early warning functions with matters of everyday life. This is a clue to the sustainability of this approach for the future.

DFID and the British Council partner with Kathmandu University, B.P Koirala Institute of Health Sciences and the government of Nepal to support the DDC's people-centred hazard and vulnerability mitigation in Nepal and Bangladesh programme. ■

## Risk management and governance of people's early warning and early action

Few societies have experienced institutionalized systems of early warning and action that answer the needs of all. From Hurricane Katrina and Cyclone Nargis to the persistent famines of Africa, reliance on external agents, expertise and national-level governance has not been sufficient to prevent a disaster. Systems of governance founder, leaving people unsupported and at risk. Hall (2007) points out that while community-based strategies are important, the place of early warning within the context of effective emergency management essentially includes the roles and responsibilities of a further four 'primary participants': emergency managers, scientists, the media, and public officials. The time to develop early warning for early action locally, from within as well as from without, has been a priority for decades.

The people-centred risk and resilience approach suggested in Figure 2.1 starts with the motivation of the individual and their desire to achieve better well-being. Community risk and resilience strategies can help stimulate that process for local groups. The infectious disease risk reduction programme in Mozambique (see Box 2.6) found that area-specific risk committees were able to assess and intervene in health hazards and vulnerability in relation to varied types of health threats. An established community group or committee feels empowered to communicate, on behalf of the people it represents, with other institutions such as local government or NGOs that can then help facilitate targeted risk reduction. Possible actions, such as cleaning a suburb, putting up road warnings for traffic, fire or flood warnings, require that risk reduction be backed up by verification of risk perceptions. Where necessary, links to skilled services such as laboratory analysis may be needed, but also basic advice on managing risks through improvements in local authority services, such as rubbish collection.

Community associations, groups or committees engaging with risk reduction issues might be more effective where warnings are directly combined with environmental interventions, income generation or neighbourhood security activities that motivate the participants. In the Mozambique health risk committees, for example, some groups managed to link the committees to making blocks for latrines and another with marketing of fish. The rights and security aspect of risk committee work also involved the broader early warning agenda in trying to uphold rights to neighbourhood hazard reduction, including through hygiene policing.

The application of community-based disaster management has gained much interest around the world. Beyond the pioneering work of the Red Cross Red Crescent in disaster preparedness that underpins many of the initiatives, good examples have been provided by La Red in South America (La Red, 2008) and a number of international and local NGOs around the world. Disaster management authority is delegated institutionally in varied ways in different countries; in those approaches that are more people-centred, the common feature is the decentralization of access to knowledge and decision-making.

In the United Kingdom, the government established local and regional resilience forums around the country in the wake of the Civil Contingencies Act of 2004 (UK Government, 2004). For the moment, these still give an impression of being separate from local communities, and there remains little public knowledge of their existence, let alone early warnings for which they might be responsible. They consist primarily of representative strategic service providers, such as the fire and rescue services, police, ambulance service and so forth. In India, community-based strategies have been attempted on a wide scale, through village-level governance mechanisms called *panchayats* (Wikipedia, 2009), to incorporate disaster risk reduction. One key lesson from this approach is that separate local committees for individual threats are less useful than strengthening the key local governance mechanism and mainstreaming the disaster risk reduction agenda to deal with multiple threats.

For people-centred approaches, a number of key questions remains. First, is there evidence of the need for new forms of local risk and resilience governance, such as through risk and resilience committees (Box 2.6) or similar, or are we really looking at small adjustments to existing societies using existing community routines? It remains to be more fully considered within which types of current world political systems do communities engage more with strategies to reduce risks. However, the experience of risk committees in both Mozambique and Nepal supports the findings that establishment of these groups provides a mechanism that serves to stimulate early warning and action. RRC can be low cost and linked to a sustainable monitoring system, adaptable to local knowledge and perception, and perceived as effective within the community. They become a stimulus for risk reduction coordination and can be converted to first response groups if necessary. The added benefits of commu-

nity-based warning and action strategies are disaster risk reduction, health risk reduction, community strengthening, good governance, cost effectiveness, sustainable development and preparedness.

## Reaction to risk and the imposition of risk

People's reactions to risks, as explained earlier, depend on multiple past and present influences and any knowledge that might be available via a risk assessment process and early warnings. There is, however, an overall uncertainty as to the balance of individually driven motivation to manage risk versus that which is motivated by institutions and external intervention. Influences on individual and group reactions to health risk that were gauged in terms of actions taken during displacement from the Mozambique floods of 2000 and in the contexts of urban epidemics more recently, found that:

- Basic knowledge of risks in the community was generally good, but that the material ability to intervene was limited.
- Perception of risks varied, though the view that illness could be avoided by addressing issues of dirt, stagnant water, flies, food, storage and lack of treatment of water, hygiene and living conditions was widespread.
- Motivating factors included fear, the desire to be respected, first-hand experience of disease and any proven successes of a strategy.
- Constraining factors included the infrastructure, lack of finance and the basic means to intervene (i.e., with chlorine, a latrine, or just being heard).
- There was varied risk avoidance associated with attitudes and a sense of responsibility towards peer groups, local community and civic authorities (Collins and Lucas, 2002; Collins et al., 2006; Williams et al., 2007).

In Bangladesh, vulnerability was found to increase as a result of late responses to warnings and complex processes of decision-making. People's reactions to risk when confronted by cyclones, including Sidr in 2007, could make them more vulnerable to disaster (Alam and Collins, 2009). As people are used to facing multiple hazards each year, their responses to warning depend upon the intensity of wind speed they feel, previous hazard experiences, local beliefs about cyclone occurrences and/or a cyclone signal hoisted by the Bangladesh Meteorological Department (BMD). If the symptoms of previous hazards coincide with a BMD warning of about 6–7 on average, people start to prepare to save belongings or decide to leave their homes to go to a cyclone shelter or other stronger buildings nearby. Before that, they adopt a 'wait and see' technique, to observe whether the cyclone intensity is moving upwards. The women indicated that, in most cases, the decision to take early action to leave home depends upon the male head of the household, and if he is not at home, they and the rest of the family wait for his return before taking action. Due to conservative religious beliefs, some male heads of households prefer not to move to cyclone shelters, thinking the process of relocation unsuitable for female members of household (see Box 2.2). Households also consider the problems that can arise in cyclone shelters, such as limited space, lack of privacy and poor sanitation.

Other reasons for not heeding the warnings can be reluctance to leave domestic animals, concern about belongings in general and the potential loss of their only means to a livelihood should they not stay to protect it. A family may decide to move only when the visible severity of the cyclone increases and warning signals go up. However, by then it may be too late because rainfall and the severity of the wind have increased. Roads to the cyclone shelters may be blocked, damaged or destroyed by combined rain and wind. Fear of injuries by flying debris is another factor deterring people from moving to cyclone shelters once the winds increase in force.

Many of the principles mentioned in this chapter have been in the context of African and Asian examples. However, the issues are often applicable to higher-income countries. For example, in 2008, one year after widespread floods in the United Kingdom, a seminar was held in London attended by members of parliament and key stakeholders involved in flood management policy. At the meeting, the author of this chapter posited that the time may have arrived for the UK public to be given greater opportunity to engage in locally owned prevention and response activities.

This would include the greater involvement in identification of risks, vulnerabilities and hazards, counteracting social downturns in society. It would link to strategies for potential economic and environmental benefits in difficult economic times and would enhance environmental sustainability. This would advance together with developing preparedness and prior response in addressing multiple hazards and risks, identifiable by the communities of the UK.

## Rights and responsibilities

The people-centred approach reinforces the important truth that it is people, not institutions, who should have rights. Institutions should be established in the interests of people. Early warning systems are, therefore, systems or institutions that must serve people's needs.

Setting minimum standards in early warning might be a reasonable target for the people-centred approach and those responsible for assisting the well-being of communities. Responsibilities, on the other hand, lie in part with individuals, so that taking effective early action relates also to personal decision-making, the quality of community cohesion, values and ethics.

More comprehensive evaluation might suggest the weighting of personal responsibilities against those of local civic institutions. It is unlikely that large-scale standardization of ideas in this respect would be possible across cultures, varying political systems and contrasting economic and environmental circumstances. However, common threads around the question of 'what are communities entitled to expect' are likely to be recurrent in most contexts.

## Conclusion

Community-based risk and resilience assessment is the beginning of a process whereby local people take the lead in building their capacity to manage their own disaster risk reduction and early warning processes. Participatory initiatives in communities with a wide range of stakeholders can produce high-level acceptance, involvement and local knowledge-building. While community-based development or disaster reduction groups are not new, concerted examples of people-centred risk and resilience building in the interests of well-being and early warning remains largely underutilized. This is evident in the 'developed' world, where strongly institutionalized and top-down approaches to risk assessment and early warning still dominate.

Integrated (community) risk reduction is a people-centred approach to address uncertainty through comprehensive disaster risk assessments. It involves people's participation, appropriate frameworks, monitoring and evaluation, so that citizens take some ownership of risk assessment and management. It requires knowing the who, when and where of risk, and the circumstances of changes in hazards, vulnerabilities and capacity, and well-being. It is expected that risk assessments, records and other techniques will form the basis of producing municipality-level disaster risk reduction policies and plans, and these should be made to function as an early warning mechanism.

Investment in development might offset many of the impacts that environmental and other crisis events produce. Critical service support in an early warning framework can provide the additional mix of information that communities need to offset incoming hazards and vulnerabilities. Empowering people, sensitizing institutions, delineating the responsibilities of the state, and legislating the rights and responsibility of individuals and other stakeholders are included in the role of an early warning system.

A requirement is that early warnings and early response systems protect less able people who cannot engage effectively in risk reduction. Local resilience forums (such as in the UK) might have much to offer, but could learn from the experiences of regions engaging initiatives along the lines of local risk and resilience committees, in which there may be greater opportunity for community ownership of the process, rather than being governed by expert knowledge and service institutions alone. However, questions remain about the efficacy and sustainability of different variants of RRC operating in contrasting contexts and with more and less community control. The approaches outlined above need to be calculated in terms of the lives and vast amount of money that might be saved through investing in people-centred early warning and action.

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