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# **Migration and Global Environmental Change**

**SR5: What mechanisms are there for reacting to  
environmental shocks?**

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## Abstract

**This paper analyses mechanisms for reacting to migration associated with environmental shocks. It responds primarily to recent calls for mainstreaming migration into environmental disaster risk reduction and climate change adaptation. The principles suggested here are applicable to those who move, host or stay behind. Based on a multiple sector and interdisciplinary perspective, the human impact of environmental shocks can be mitigated through appropriate technologies and awareness, civil societal engagement and political commitment. Operational mechanisms include contingency planning, early warning, risk management, improved communication and the application of appropriate response standards. These are guided by on-going evaluation of human vulnerability and capacity, particularly amongst marginalised groups, also being applicable irrespective of limitations in ‘environmental migrant’ categorisation and quantification. Relocation in relation to environmental shocks is variably characterised by risk increase or reduction, adaptation and potential betterment or decline in well-being and security. However, complexity between type, location and timing of environmental shock, individual behaviour, cultural and political influences renders migration mainstreaming in disaster reduction an uncertain science and policy domain. It is noted in this respect that relocating or remaining *in situ* requires adaptation, depends on variable survival mechanisms and is subject to the power and control wielded over people’s lives by others. Findings from disaster reduction studies suggest that understanding decisions to migrate, stay behind, host supportively, engage migration policy and so forth, will involve understanding and respecting people’s varied aspirations for well-being. For the complex terrain of international and internal migration this will demand an approach beyond standard vulnerability or resilience assessments. The framework attempted suggests that simplification of human mechanisms of adaptation and reacting to environmental change remains largely unresolved, but some approaches flagged here can contribute much, being sensitised by principles of human rights, responsibilities and sustainable development more widely.**

## Introduction: emergency management reactions in relation to migration

Mechanisms for reacting to migration associated with environmental shocks depend on the nature of the hazards and vulnerabilities experienced over the immediate or long term. In this paper emphasis is put on ‘reactive involuntary non-administered displacement’ (Oliver-Smith, 2006). The paper is largely a discussion extrapolated from a mix of involuntary migration and disaster reduction literatures. In this instance predominant themes in disaster risk reduction

work are considered in the context of those who relocate from environmental crisis as internally displaced people or across national boundaries, those who chose to stay behind and those who host displaced people.

The mechanisms in reacting to environmental shock include the activities of self-help that individuals, households or communities use to protect themselves in the face of adversity. In Bangladesh, rural communities in the exposed coastal zone apply techniques of mutual assistance before, during and after the onslaught of cyclones, including that which requires temporally altering local religious and cultural norms (Alam and Collins, 2010). It had also been noted by Zaman (1993) that 88% of people displaced from river deltas in Bangladesh migrated within 2 miles of displacement location, therefore emphasising localised adaptation.

Reactions to environmental shock constitute what people do prior to the 'shock', during the event itself and post event. Migration over a short or long distance, or not at all, is one of the fundamental choices to be made. With adequate early warning, when people believe the message (Erwin-Atwood and Major, 1998), many will take action to protect themselves and their assets, though not necessarily complete removal from danger. As experienced in recent cyclones in both Bangladesh and the USA, the choice of reaction to remove from home may be mediated by the relative risk of loss of possessions, incapacity, or lack of a sense of need to detach. In other instances, warnings are not heeded on the basis that they were incorrect on previous occasions. In Bangladesh, not all people move to cyclone shelters on hearing of incoming cyclones because the shelter might be considered inadequate in terms of serving basic needs. People question how they can leave behind a much-loved cow, or ask themselves what would God's will be regarding this oncoming threat. Meanwhile, in pastoralist area of Africa (Angola, Kenya, Tanzania and others) pastoralist communities have carried out their migrations in response to environmental change across seasons as part of normal living throughout the millennia.

The propensity to adapt, be resilient and to preserve or pursue well-being lies at the heart of understanding mechanisms for reacting to environmental shocks. But what can this mean for migration as a mechanism at the global level? Much work of the development and relief agencies has been concentrated on reacting through international relief, often delivered to those who are refugees or internally displaced. However, the last two to three decades have also witnessed growth in awareness and attempted application of more preventative, risk- and development-orientated perspectives in disaster reduction, and this also implicates the type of mechanisms that can be explored in respect of reacting to disaster related migration issues. The conceptual and to some extent practical links here are now currently integrated by the International Organisation of Migration (IOM 2009; 2010). This integration of ideas and approaches is characteristic of many international organisations (particularly the UN) wishing to bring together awareness of sectoral issues (i.e. health, energy, gender, climate etc.) and concern about increases in environmental shocks and trends.

However, from the perspective of many disaster-orientated scholars, this new level of engagement in theory and policy will need to include the view of disaster as both a calculated impact and the notion of 'disaster' as a relatively derived concept or construction (Quarentelli, 1998). In the context of this paper I simplify, considering environmental shock, the migration that may result and the potential for either disaster or betterment of life as the experience of millions we may consider at direct risk of current environmental change. They are those living in low-lying areas of the world frequently subject to flooding, drought-stricken regions, seismic zones, and locations so impoverished by unsustainable development excesses that people survive conditions worse than not having a couple of dollars a day. However, there are currently no sound figures available to quantify how many of these migrate, stay behind or help

host others, and there remains some speculation as to whether environmental change is currently a key driver of migration at all.

By migrant, therefore, in the first instance I simply refer to those who relocate as a result of an environmental event, be it climate, other hazard-induced or inappropriate development. These will in many instances also include those forced to flee due to conflict. In each instance adaptation to new environments is a matter of survival, with the intention of betterment. It is acknowledged that not all forms of migration can be addressed in this one short paper. However, with respect to recent calls for mainstreaming migration into environmental disaster risk reduction and climate change adaptation (IOM 2009, 2010), it is proposed here that the influences on migration reactions resulting from environmental shocks can be suitably analysed through the more people-centred emergency management principles. These involve those aspects of resilience building and adaptation that are emergent (in some cases resurgent) principles of disaster risk reduction more generally, being also applicable to, if not also sourced from, forced migration contexts where there can be an environmental driver.

Environmental shocks, whether unfolding over short or long timeframes, activate reactions from individuals, communities and designated emergency response institutions. The outcomes are influenced by the nature of environmental events, the socioeconomic contexts within which they occur and the effectiveness of emergency management available. Slow-onset events, such as drought leading to famine, require the crossing of a critical threshold of observable human suffering and public communication before international reactions occur. Formalised response cultures vary, from 'blue light' services operational in developed regions, to international humanitarian relief that may get applied to the larger-scale emergency migrations anywhere. The military can be a prevalent component of emergency responses to environmental shocks. The media rallied to this point in 2010 in relation to military engagement of the USA following the Haitian earthquake and of the Pakistan army for the Indus mega-flood. Official relief reactions, whether formalised or not, are influenced by the representation of events as they unfold, as warranting the designation 'disaster' or not. Images of migrants from environmental shock stimulate relief reactions through the media for most major environmental events involving displacement of people or their assets.

Systems of command and control are a common characteristic of official emergency response. For example, local- or national-level floods, veterinary disease epidemics or bombing campaigns trigger the UK's 'gold, silver and bronze' system operational through a hierarchy of emergency decision making. Though contextually less relevant to the focus of this paper, the approach represented by such a system has resonance with global emergency reaction cultures. Larger droughts, earthquakes, tsunamis, floods, volcanoes, cyclones, hurricanes and other environmental disasters that produce population displacement usually stimulate both national- and international-level humanitarian reactions. Accompanying emergency management roles can involve evacuation of at risk people from hydrological, climatic and tectonic hazards, either short or long term, to areas where there is safety from an environmental event becoming a full-scale disaster. However, first migration responses from environmental shocks are usually a spontaneous self-preservation action of individuals, families and communities in the absence of official assistance or alternative options to stay. This is very apparent in response to rapid-onset events such as earthquakes, tidal waves, landslides and flash floods that occur over minutes. Slower-moving environmental events, such as a failing harvest, encroaching violence or economic destitution, also put people on the move, though the differentiation between being forced or there being a more voluntary decision to relocate is potentially a subjective classification. Cases of direct displacement through conflict are considered forced. The way in which a disaster designation can be appropriately applied has also been frequently contested (Quarantelli, 1998). In analysing environmental

shock-induced displacement and migration, the designation of a crisis or no crisis can therefore similarly be a matter of judgement. The discussion here is not solely of an academic milieu, but influences the nature of humanitarian reactions to environmental events. Misrepresentations of displacement crises equate to inappropriate reactions.

There are no limits in terms of a timeframe for environmental events that cause relocation. ‘Very slow-onset’ environmental crises or shocks, such as deforestation, or simply unsustainable development, also become accepted as a part of everyday life for those having to adapt to them. Whilst decisions to migrate are more obvious with the onset of an immediate shock, they may also result from several seasons of accumulated incidents (multiple shocks) or gradual deterioration of assets. Moreover, the definition of an environmental migrant with many potential variants of physical, economic and social environmental pressures, including through open conflict, indicates the categorisation difficulty. Consequently, mechanisms for reacting are subject to interpretation of the nature of the issue for which a reaction might occur. To explore much of the above further this paper now turns to some of the principles that can be applied to situations of real and perceived environmental pressure, and which can help address this conundrum.

Migration and any related disaster information and awareness requires integrated analyses of multiple causes and reactions to environmental shocks, should these be the cause of displacement. Integrated models of displacement, such as Cernea’s (1997) ‘impoverishment, risk and livelihood reconstruction’ (IRLR) model, provide an explanation of vulnerability regards migrants in the resettlement process. However, approaches that apply from disaster management have also often been underpinned by vulnerability assessment including integrated emergency management (IEM) (McLoughlin, 1985; Tufekci, 1995; CCA, 2004), integrated disaster risk management (IDRiM) (Ammann, 2006; Amendola *et al.*, 2008; Ikeda *et al.*, 2008) and disaster and development approaches (Cuny, 1983; Collins, 2009a). These increasingly include (i) multi-sectored and interdisciplinary perspectives; (ii) recognition of civil societal mechanisms of engagement that take place beyond formalised emergency management; (iii) longer-term reactions beyond the immediate relief phase; and (iv) options of improved investment in prevention through risk reduction. They are considered alongside related operational mechanisms such as early warning, vulnerability and risk assessment (including resilience and capacity assessment), communication processes and response standards as likely principles for addressing migration reactions to environmental shock and reactions to migration resulting from environmental crises. The following sections review what these suggested aspects of environmental migration assessment and management mean in their operational management, rather than a panacea for this field of inquiry.

## **Migration implications for environmental risk reduction and response**

### **Multi-sectored and interdisciplinary perspectives**

Multi-sectored reactions to environmental shocks involve varied strands of governance in aiming to coordinate and communicate outcomes of an event. For integrated emergency plans government departments with responsibilities in planning, infrastructure, finance, health, welfare, education, environment and trade are amongst those included alongside or within a disaster management coordinating body. However, emergency management planning intentions often struggle to deliver coordination prior to or during an environmental shock and



do not differentiate between potential internal migrants or refugees until after a major event (such as a flash flood or earthquake) has taken place. This can be observed for almost all recent disaster events involving mass displacement of people, from Haiti to Pakistan to Japan. A salient question here is therefore 'how more integrated emergency management can better respond to contexts of multiple displacements and migrations from environmental shocks?'

Limitations in cross-sector emergency reactions where there is migration may be due to lines of communication not being well integrated between departments in advance, being under-resourced or due to damage from the event itself. Beyond political infrastructure, multi-sectoralism also implies technical and theoretical developments through interdisciplinary research, learning and capacity building. The academic sector recognises this demand (Alexander, 1997) since multi-causal environmental shocks and disasters draw from different knowledge environments. This is reflected across paradigms of disaster studies, from a focus on natural hazards (Smith, 2001; Smith and Petley, 2009), to the construction of disaster causality (Lupton, 1999; Bankhoff, 2001). It extends also from an emphasis on the production of human vulnerability (Bankoff *et al.*, 2004; Wisner *et al.*, 2004; Birkmann, 2006) to the current emphasis on resilience (Manyena, 2006; Paton and Johnston, 2006; King and Cottrell, 2007). Through these aspects, the study of disaster, development and associated displacement studies combine multiple streams of inquiry through integrated environmental, social and economic analyses, amongst others (Collins, 2009a). This includes notions of those enduring an environmental shock as survivors rather than victims, resilient rather than vulnerable, and desiring of well-being rather than just to cope. Beyond its immediate dimensions of people moving from one location to the other, migration becomes a mechanism or adaptive strategy through which these characteristics and aspirations get expressed.

That people flee, travel, resettle and attempt to be accommodated in new settings under a wide range of circumstances demands a multi-sectored and interdisciplinary approach at field level should interventions be taking place. A process of on-going assessment of those displaced by an environmental shock, whether remaining *in situ* or relocating to another context and potentially being hosted by others, would form part of an integrated reaction to the adaptive migration effects of environmental shocks.

## Reactions beyond formalised emergency management

Migration reactions to environmental shocks are almost never accompanied by formalised emergency management systems whilst people are in the act of initial flight from the event. Furthermore, civil societal reactions towards mutual assistance in disasters are under-represented or overlooked in analyses of response mechanisms (Oliver-Smith, 1996). The gap here is widened further in that emergency management responses get evaluated through analysis of participating sectors based on their own learning cycles as official responders. This is characterised by closed-door 'lessons learnt' sessions that may take place post event to improve formalised reactions to the next event, usually without the participation of displaced survivors.

Rapid response without knowledge of the situations confronted will be less effective than response involving prior experience and assessment of the situation (Price, 2006). However, by definition, a major disaster and the resultant population displacement it causes will have pushed the boundary of human capacity beyond regular limits. These present limitations in the reactions of formalised emergency response teams, but many more people engage in first response. First responders are those first on the scene of a crisis who set off a call for assistance, remove people from rubble and wreckage, enter dangerous environments to save

people and possessions, apply medical first aid and variously engage in other actions required during and immediately after major incidents. In the case of migrations from environmental change, first response can be measured in terms of those who help others relocate, those who stay behind and those who facilitate resettlement in hosting areas. In this sense both migrant and host may be a first responder. Citizen or otherwise identified independent first responders (Palen *et al.*, 2007) represented the main reaction force when there were no emergency units available during the early stages of the earthquake at Sichuan, China, in 2009, the Haiti earthquake of 2010, flooding of Pakistan in 2010 and the Japan earthquake, tsunami and nuclear meltdown of 2011. Initial migration decisions in these events were without any, or little other, option based on a rapidly considered assessment of the situation by the displaced. However, questions arise as to why, when faced with significantly similar threats (i.e. villagers within the same area at risk), some chose to flee whilst others do not? Beyond physical ability, information availability and the presence of official emergency agents, socioeconomic, cultural and psychological reasons are relevant to addressing this.

Early response, though not necessarily a first reaction, may include the setting up of reception areas for displaced people close to the point of environmental shock, as witnessed in Japan in 2011 and previously in New Orleans, though in Japan a 20-km exclusion zone was set up around the Fukushima nuclear plant. Wider coordinated response then includes people migrating or being formally evacuated further afield, such as the relocation of a significant percentage of New Orleans residents to other parts of the United States.

In rapid-onset emergencies, those in charge may call upon official citizen groups, for example the Citizen Corps in the USA, whilst unofficial citizen responders can be considered a hindrance to rescue services. The combination of moral and ethical demands to participate in disaster response weighed against value in community action is a potentially complex question. Meanwhile, for external responses, difficulties have been associated with unwanted forms of relief that crop up post disaster, exemplified by the case of relief to pastoralists (Kilby, 1993), and of food and medicine during the great flood of Mozambique (Christie and Hanlon, 2001). Impacts of inappropriate medical aid in emergency relief included the treatment of thousands of refugees from Rwanda residing at Goma displacement area, resulting in mass death (Goma Epidemiology Group, 1995). Inappropriate external intervention may contrast at times with often unrecognised, though appropriate, indigenous reactions to environmental shocks. The merits of indigenous practices have been realised (Mercer *et al.*, 2010), in relation to cyclones (Alam and Collins, 2010), droughts (Richards, 1985), disease epidemic and so forth. There is also a call for increased recognition of the role of self-help approaches for disaster reduction more widely, referred to as self-care in the context of health disasters (Edgeworth and Collins, 2006; Edgeworth, 2010).

In that those migrating from environmental shocks may mean loss of livelihoods, reactions can be towards seeking ways of compensating a loss of income and other assets through emergency assistance, with the intention to recreate former livelihoods elsewhere post displacement. However, the reasons some people do not migrate away from an environmental impact can include the desire to hang on to the potential to rebuild a livelihood within the impact zone and to protect assets held there despite on-going risk. The act of staying behind to protect livelihood and capital assets is exemplified by those sitting it out with weapons in the upper rooms of their houses in New Orleans, people perched with their livestock in river islands of Pakistan and farmers continuing to produce unwanted food in zones evacuated through radiation risk in Japan.



## Longer-term reactions

Longer-term reactions and preparedness include potential migrants and people in hosting areas being aware of forthcoming crises in advance. This can then assist early preventative actions, the investment offsetting the impact of environmental shocks for future generations. Though seemingly idealistic when considering immediate reactions to crises, the theme of intergenerational justice, core to sustainable development, is particularly relevant to future protection, the precautionary principle (Harremoës, 2002) and the right not to have to flee the scene of former crimes. Longer periods are also necessary in addressing those directly injured or traumatised by environmental events, people not seen to visibly react in the short term. This requires understanding of complex human recovery and rehabilitation processes including what are considered psychosocial reactions to shocks manifest over a long period (NCPTSD, 2005; NICE, 2005). However, many of the assumptions concerning these impacts have been criticised because of a failure to understand human coping beyond medical diagnoses (often Western) of mental health (Ingleby, 2005; Jayawickrama, 2010).

Mass slow-onset environmental events such as drought leading to displacement and forced migration, famine, infectious disease epidemics, economic collapse, societal breakdown or conflict require reactions that are long-term commitments to change. Emergency services generally remain inadequate in providing sufficiently long-term responses where mass casualties are less concentrated or less predictable. This is one of the driving aspects of a long-established call to link disaster relief with longer-term development actions (UNDP, 2004), and disaster risk reduction, climate change adaptation and environmental migration (IOM, 2009; 2010). The two-way linkage between disaster and development is also behind the drive to mainstream disaster reduction into development (DFID, 2005; 2006), get development out of disaster, address development-induced disaster, and other variants of this equation (Collins, 2009a). Though an oversimplification in operational terms, it has become conceptually reasonable in a world of global and local environmental change to equate disaster reduction directly to sustainable development, as two sides of the same coin. Migration is often at the core of this equation as removal of people, either self-instigated or externally managed, from the place, time or lack of protection to environmental threats can defuse immediate risks. However, where resettlement is constrained in terms of regaining a livelihood and security, perpetuated conditions of displacement extends the effects of environmental shocks much further. The role of impoverishment through displacement is analysed in some detail by Cernea (2000, 2005) and others with reference to the impoverishment, risks and reconstruction module (IRR).

## Disaster risk governance and environmental migration

This paper continues to build upon a current interest in disaster risk reduction at the global level (UNISDR and most large NGOs) and the role of migration from environmental shocks in this dynamic. Of note here is a shift to inclusion of local-level capacity formalised at the World Conference on Disaster Reduction in Japan (UNISDR, 2005), which launched the Hyogo Framework for Action around a risk management and resilience-building agenda. A quick reminder of how this has been articulated shows that each of the aims of Hyogo also promotes the way we can consider institutional reactions to migration resulting from environmental shocks. The action calls for:

- the integration of disaster risk reduction into sustainable development policies and planning;

- development and strengthening of institutions, mechanisms and capacities to build resilience to hazards;
- the systematic incorporation of risk reduction approaches into the implementation of emergency preparedness, response and recovery.

World Conference of Disaster Reduction (WCDR, 2005)

Achieving this throughout the migration sector may be a long way off, although it is pertinent to recognise that guidance notes promoted by UNISDR surface clearly not only in the IOM but also with UNHCR. Good examples of the application of some of the thinking behind the current UN stance iterated through WCDR (2005), though often still limited in global reach, include the work of organisations such as the Cyclone Preparedness Committees in Bangladesh (IFRC, 2009; 2010), Practical Action (2010), La Red, Plan, Action Aid, Oxfam and others. These recognise population displacement aspects of disaster outcomes, but less obviously tackle questions of differential migration and hosting of the displaced from environmental crisis. The action research approaches for risk and resilience committees facilitated by the Disaster and Development Centre (DDC) initiatives in Mozambique, Zimbabwe and Nepal reflect a community disaster reduction approach (Collins, 2009b). Whilst these have not specifically targeted forced migrants, the communities within which they have been active lie in post-conflict areas where population displacement has been commonplace. What the more progressive examples of these approaches provide is a dialogue and actions at the local level that to varying degrees are devised and owned by those who will implement them, namely everyday occupants of the area at risk. Using this approach, a reaction to flee, migrate, stay, return and rebuild would remain a local matter but based on closely sensed and locally governed information and strategies. For example, the Cyclone Preparedness Committees in Bangladesh engage local citizens in disseminating alerts regarding cyclone risk levels and coordinate the opening of cyclone shelters to which people flee for shelter before the cyclone arrives. They hold meetings and report back to a network of committees, generating sensitisation for other state or NGO institutions that may be required. The cost is minimal, being that of mobilising a large number of volunteers. In interviews I carried out with members of the teams engaged in the warning exercises I found that they were not paid any money and received only very basic provisions, such as a loud-hailer. Those with prominent roles in the warning and informing process indicated they did so in part for the prestige it brought them in the community, or simply because they cared about it.

The DDC-related work with urban risk committees in Mozambique experimented in the use of a further version of the approach to build community resilience to pervasive infectious disease risk, particularly diarrhoeal diseases. Community committee activities included the use of visual representation of what local people considered to be a risk in their neighbourhood, working on the basis that both a perceived or real risk was relevant to confronting the threats to community health (Williams *et al.*, 2010). Risk committees then engage local authorities once their own assessment of a disease risk has been confirmed by environmental health scientists who are on hand to the community. Committees then own the process of implementing their solution to the risks confirmed (Collins, 2009b). In some instances this resulted in the improved and willing cleaning up of an entire area by the community and consequent reduction in health risks. However, not all risk and resilience committees are successful. The need for a financial resource rather than relying entirely on volunteerism and the presence of one or more highly motivated individuals at the core of a community committee are two of the features that have been reported to make a critical difference in this process.

The committees of this type in Nepal uncovered a further range of factors in group organisation that influence the local risk governance process, with higher success rates being found, but causes unproven, for committees more embedded in state government than functioning entirely independently (Jones *et al.*, 2011, forthcoming). A core feature of the risk and resilience committee approach relevant to evacuation and migration preparedness is that they can be applied with common procedures in preparation for multiple types of oncoming environmental risk. A second key ingredient is that they can be active during times of relative normality with on-going community-strengthening activities, whilst also being ready to transform into response units when environmental shocks occur. It is suggested that they represent an approach that can address issues of migration in response to environmental shocks, either in warning and coordinating for those who will flee, or in preparing local communities to receive the displaced from other areas. Sensitisation to the needs of knowing risks, rights and responsibilities are central to this function, and best developed within the local ownership that a risk and resilience type social organisation can facilitate.

In the case of Nepal, the Red Cross has begun to develop many of the functions of local committees in terms of emergency response. However, in the case of Mozambique, some difficulties in longer-term development of the approach for disease surveillance and control ran into difficulties through ministerial-level interference regarding the relevance of community based health actions of this type. Fortunately, the National Emergency Management Institute (INGC) moved on without reservations regarding community-based risk reduction approaches for environmental risks, and Mozambique currently has a system to this effect across rural areas most prone to flood. The experience of the risk and resilience community approach is that it can work without external funding, existing on the basis of locally motivating environmental issues. However, the expectation of local groups that engage in this type of action has often been that funds would be generated from somewhere. The precise formula that can ensure their sustainability and viability, including for adaptation to address environmental migrations, is hitherto untested.

Managing displacement risks in advance of major shocks, rather than through emergency response post disaster, put simply is to follow the principle that prevention is better than cure. This section has suggested this is possible to realise should systems of risk governance be sensitised to the rights and needs of those who are at risk through their displacement. As risks of impoverishment reduce, disasters are avoided or their impacts mitigated through the migration process. However, reducing risks accumulation through environmental migration requires participation in avoiding the increase of vulnerable groups being, or ending up, in the wrong place at the wrong time without adequate forms of protection. Community-based approaches already appreciated in some civic forms of disaster relief and recovery are therefore now gaining more recognition as risk management strategies. International organisations keenly report community resilience principles, such as the IFRC (2002–2010), but this knowledge and experience appears to be remain separate from mechanisms for reacting to migrations from environmental shocks and trends, other than conceptual visibility in the IOM briefings. The community-based disaster risk reduction approach extends naturally, through its engagement of people first and people's local governance of a process, to adaptation, planning, stabilisation and environmental protection processes. As implied by the IOM in its review of activities, these may be aspects of what it means to engage the migration management cycle. This would acknowledge the improvement in capacity and motivation of the citizen responder referred to earlier in this paper. It is balanced by recent re-emphasising of demand for greater community-based preparedness and risk reduction not only for its benefits as a cost-saving exercise (Linnerooth-Bayer *et al.*, 2005), but also as a morally and practically better way of engaging disaster mitigation. This is important to assessing institutional and governance needs related to environmental change and migration (Warner, 2010).

# Selected operational mechanisms for reacting to environmental shocks in global migration

The summary analysis in Table 1 outlines selected operational mechanisms for reacting to environmental shocks when putting migration into a disaster reduction frame as influenced by the principles derived so far in this paper. The selection of these mechanisms is not intended as comprehensive but is indicative of a field undergoing on-going development. As indicated in Table 1, they are the more specific mechanisms that emerge if developing detail from the IOM schema which uses themes of preventing, preparing, managing, mitigating impact and addressing migration as the components of a migration management cycle (IOM, 2010). The subsections that follow explore the consequences further.

## Early warning and engagement

Early-warning actions in preventing and preparing for migration are those that seek to avoid or reduce potential negative impacts, modified to the extent that knowledge built from earlier events contributes to understanding how to prepare for those forthcoming. In the case of migration as an adaptive strategy to cope with environmental change, this could also function as early warning for optimal opportunities to migrate elsewhere during non-emergency. Early-warning mechanisms have been encapsulated in what disaster managers refer to as a disaster management cycle moving between preparedness, relief and rehabilitation. Though cycles of this variant have been contested as limited in their resemblance of actual process (Frerks *et al.*, 1995), as a conceptual and descriptive management aid the cycle is still perpetually referred to. The need to prepare for decision making before, during and after a disaster event is not in question. Prevention involves a contingency plan and this has been developed for mass migration emergencies (IOM, 2008).

**Table 1: Selected operational mechanisms in reacting to environmental shocks for migration contexts**

Operational mechanisms in reacting to environmental shocks			
Preventing and preparing for migration	Managing and mitigating migration		Addressing the effects of migration from shocks
Early -warning engagement	Reactions to risks	Disaster communication	Response standards
<p>i.e. Awareness to strengthen motivation and capacity to negotiate migration from environmental shocks</p> <p>Participation in early action through potential migrant and host capacity to address uncertainty in environmental systems</p> <p>Knowing when and how best to evacuate or stay put relative to changes in environmental risk, where necessary with improved risk assessment and early warning technologies</p>	<p>i.e. Advanced interpretation and representation of migrant, non-migrant and host community reactions to risks and consequent implications</p> <p>Resourcefulness of potential migrants and understanding of culturally derived reactions under varying social economic and environmental contexts</p> <p>Inputs of ongoing risk assessment into sustainable risk management. Making global assistance pledges accountable</p> <p>Evaluation of risk governance contexts of environmental migrants, non-migrants and hosting communities</p>	<p>i.e. Integrated communication to mediate reactions to environmental shocks for those who migrate, those who stay and those in hosting areas</p> <p>Locally, grounded information between those experiencing, those observing and those reporting reactions to environmental migrations</p> <p>Appropriate access to and use of communication technology</p> <p>Communicating past lessons to current circumstances for modified policy development</p> <p>Appropriate use of the media and other communication channels in environmental migration education</p>	<p>i.e. Minimum and extended standards for contexts of environmental migration.</p> <p>Civil societal, and locally grounded management of emergency relief and recovery for the most vulnerable in areas of fleeing, migration routes and destinations</p> <p>Longer-term recovery and rehabilitation</p> <p>Migration as development oriented adaptation and disaster risk reduction through upholding of migrant and host rights.</p> <p>Honouring pledges for reconstruction in areas of environmental shock</p>

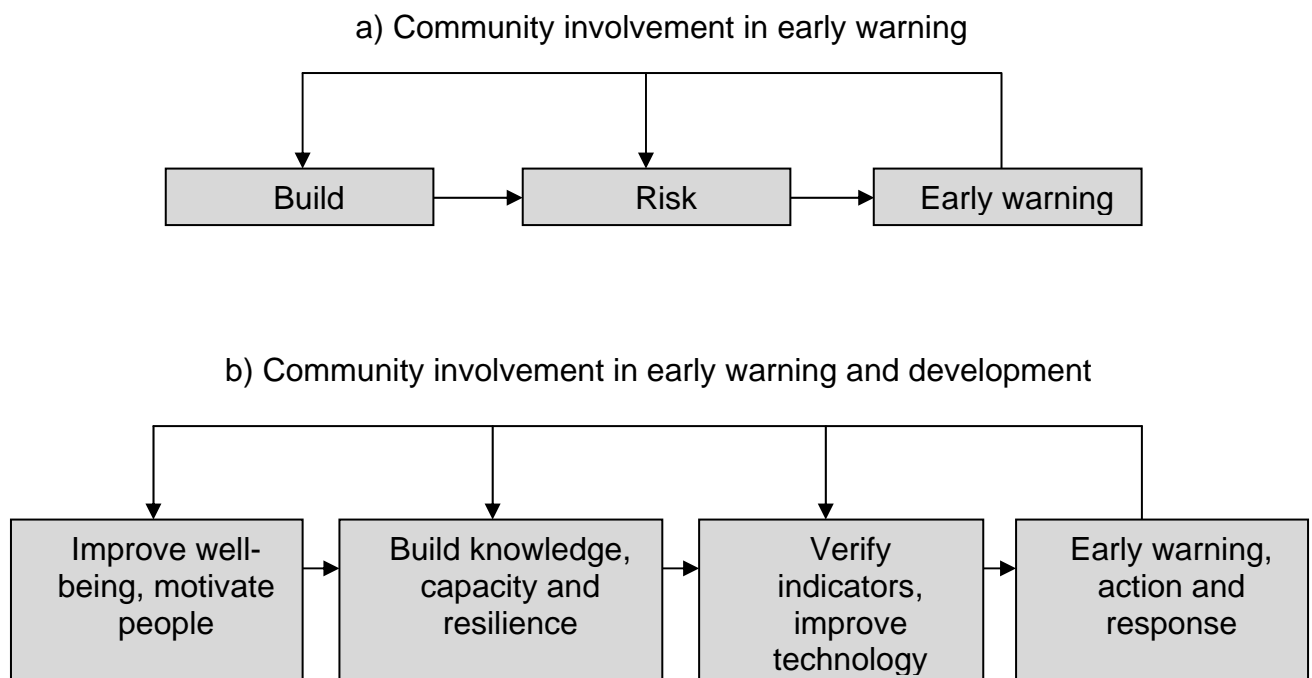
Early warning does not guarantee early action due to complex interpretational and communicational limitations addressed in the following subsections of this paper. Ultimately, preparedness challenges human organisation, vision and commitment as it involves working in preparation for ‘uncertain’ or unproven events. Resources to invest in preparedness are often difficult to source as the evidence base is incomplete, leading to potential loss of motivation for action amongst at risk groups. Politically it is difficult to invest in unseen risks rather than the more obvious and well-reported scenes that follow an environmental shock. The unpredictability of migration decisions adds to this ‘crisis of uncertainty’, complicating prediction capacity still further. The implication has been that the field of prevention and risk reduction remains distinctive for receiving wide interest and pledges of ideas or monetary support (such as through the Hyogo Accord of 2005), but remains to date with few to-scale financial investments, and many gaps in finding adequate technical solutions.

Whilst the world rallied behind the Hyogo Accord following the reactions to the 2004 Indian Ocean Tsunami and other environmental disasters, and whilst there is increasing attention to potential environmental migrations, real investment in longer-term environmental disaster risk reduction remains elusive. Putting preparedness and its attendant early-warning and disaster



mitigation measures not only requires further examination in terms of mainstreaming migration, but also awaits combinations of knowledge and technology development, political will and behaviour more widely. Each factor can be driven by the other, so one way forward is to facilitate education and awareness of disaster and development migration linkages for a more informed early-warning approach.

With regard to community preparedness in environmental hazard mitigation, one of the questions raised through the work referred to earlier in Mozambique and Nepal is whether the most at-risk members of a group have sufficient motivation, or can be adequately empowered, for protective actions in advance. This is because where poverty is a daily pressure, people focus on the immediate needs they experience, rather than on longer-term speculative ones they do not currently experience. We know from this that migrant and host group engagement with risk reduction will require linking activities that make preparedness worthwhile in the short term. This is the rationale behind Figure 1, which shows that community engagement in effective early warning requires inclusion of community development and well-being aspirations. For example, the groups engaged in the risk and resilience work in Mozambique and Nepal and to some extent the Cyclone Preparedness Programme in Bangladesh were active in seeking small-scale asset gains in carrying out their work for their committees, either economic or social, though these could be environmental or political gains in other contexts. However, the variability in propensity of different types of migrant, non-migrant or hosting group to engage in early preparedness is not known, even if the motivational well-being opportunities may be a likely way of achieving it. Furthermore, it is important to consider that the simplified representation of community involvement in early warning and development through a well-being driver takes place within culturally and politically specific contexts that vary from place to place and over time. The model is suggested as resonant with successful migrant adaptation processes. The well-being driver within refugee groups is a potential vast arena to consider,



**Figure 1: The basis of community-based early warning.**

**Source: Author, in IFRC *World Disasters Report* (2009, p. 43).**

involving economic, social, environmental and psychological domains (Jayawickrama, 2010). For simplification it can be considered here to reflect well-known aspirations of internally displaced persons (IDPs) and refugee groups internationally to engage in regular life skills and livelihoods even in the most extreme cases of physical and mental deprivation. Alternatively, in developmental terms it can also be considered as the investment in poverty reduction that offsets the impact of adverse environmental change, rather than removing environmental change.

## Reactions to risk

Reactions to environmental risks vary from situation to situation dependent on experiences of previous events, perceptions of risks, personality, levels of dependency on resources, communication and interpretational issues. The way risks have been conceptualised is notoriously influential on the way interventions may develop. However, there is also a longstanding cultural controversy concerning environmental disasters as either 'acts of God or acts of man' (O'Keefe *et al.*, 1976). An associated fundamental viewpoint is that no disaster is in effect a natural disaster (Cannon, 1994). They are unnatural in that mass fatality is never inevitable should there be the capability of being in the right place, at the right time with adequate forms of protection (Collins, 2009a). In this respect capacity is an overriding theme that tends to determine ultimately much of the progress in disaster reduction (Wisner *et al.*, 2004). Of interest here for the case of migrants is that 'displaced' groups have frequently been associated with resourcefulness (Haines, 2010), a phenomenon that extends to not only regulating their own livelihoods but also contributing to the opportunities of host communities (Jacobsen, 2002).

At the institutional level, further challenges are in the moral, political and scientifically guided decisions in relation to level of impact of an environmental shock and certainty about its occurrence (Table 2). Terms of engagement in these reactions and policy rationales will vary across different contexts and institutional links to the event. It is important to note that Table 2 represents only a very basic conceptualisation of the decision-making domain where there are trade-offs between higher and lower impacts under varying conditions of certainty. The point here is to demonstrate a range of potential reaction positions alongside implied and contrasting policy rationales. Analysts will recognise examples of disasters and displacement events they have accompanied as variously fitting parts of this representation. There is no intention here to brand any particular event within this; it is accepted that categorisation in this respect could be hugely subjective. It is also acknowledged that environmental crises involving migration may at different stages of the unfolding event be represented by varying parts of the matrix.

Financial investment as a reaction to global risk has additional dimensions to those implied in Table 1. For example, there is much greater investment in the more politically active arena of climate change adaptation than other forms of disaster risk reduction despite uncertainty about climate. Driving this is the fear of migration of some governments, particularly that high numbers of Africans might be pushed by climate change into Europe, and Mexicans to the United States. However, few sound data exist to show how many people really might move in this way as a consequence of overall climate change. For example, whilst the Intergovernmental Panel on Climate Change (IPCC, 2007) has indicated that, by 2080, 1.1–3.2 billion people will be experiencing water scarcity, 200–600 million hunger and 2–7 million coastal flooding, estimations of an additional 250 million people being permanently displaced by climate change phenomena alone by 2050 are speculative and admitted to assume continued current trends. Most agencies avoid providing current figures but quote likely future figures, further demonstrating limitations in the current definition of environmental migrant. For now, evidence is more specifically available with regard to those people who are displaced

either temporarily or longer term by rapid-onset events, some of which may be becoming more frequent as a result of climate change, such as flash floods and cyclones. The indirect impacts over the longer term, such as worsening food security in arid areas, though a genuine pressure of climate change, remain difficult to assess because of the mitigating effects of adaptation and the drive to remain *in situ* not being fully known.

**Table 2: Characteristic migration related reactions and policy rationales under varying conditions of certainty and environmental impact**

	Higher potential impact	Lower potential impact
Higher certainty	<p><b>Characteristic reaction:</b> Focus on short-term and more visible migration impacts with limited investment in underlying vulnerability and development issues</p> <p><b>Characteristic policy rationale:</b> Mitigate likely impacts on known vulnerable migrant groups. Resilience building, well-being, poverty reduction and development progress as additional actions where feasible</p>	<p><b>Characteristic reaction:</b> Moral and political awareness of migrant and other issues submerged. Low intervention investment accompanied by non-action for 'acceptable' risks of 'minority' concern</p> <p><b>Characteristic policy rationale:</b> Use evidence base to reduce environmental threat, and negotiate longer-term adaptations, well-being or poverty reduction</p>
Lower certainty	<p><b>Characteristic reaction:</b> Lack of motivation and precautionary investment to crucial areas of migration. Occasional misdirected reactions due to uncertainty</p> <p><b>Characteristic policy rationale:</b> Develop knowledge and understanding of complex impact on and consequences of migration. Opportunity for diplomacy, rights and moralistic persuasion with potential of political opportunism</p>	<p><b>Characteristic reaction:</b> Slower-onset and 'lower impact' crisis is considered status quo with acceptable levels of unknown migration risk</p> <p><b>Characteristic policy rationale:</b> Concord with available knowledge and development broadly mindful of underlying condition of resilience and well-being, including potential of poverty reduction and development. Migration only partially considered</p>

Whilst the science of climate and related environmental hazards remains at times patchy, albeit it is clear that change is occurring, some level of certainty is readily available with regard to the effects of local environmental changes on varying conditions of human vulnerability. It is important to consider here that displaced people who may be economically impoverished often gather, or are gathered, in areas of higher environmental risk (Black, 1998; Collins, 1998). The poorest are more exposed to environmental hazards, and hence vulnerability and poverty reduction mitigates disaster impact (Pelling, 2003; Bankhoff *et al.*, 2004; Wisner *et al.*, 2004; Collins, 2009a). The relationship between poverty and impact of an environmental shock led to increasing convergence of disaster risk reduction as emphasised by the Hyogo Accord of 2005, poverty reduction as emphasised by the Millennium Development Goals, and climate change adaptation (Collins, 2009a; Pelling, 2010). Multiple international organisations increasingly recognise the interconnections including the UN, World Bank and national-level strategies. In contexts of poverty, disaster risk reduction, sustainable development and climate change adaptation are largely aspects of the same agenda of survival and a struggle for more even development, intergenerational equity and aspirations of well-being for current and future generations. The ability to view this in terms of a human migration context potentially revitalises global reactions to these global policy drivers regardless of the levels of certainty that may be possible.

## Disaster communication

Communication also mediates reactions to environmental shocks. State-of-the-art communications are those that preserve the integrity of the message being communicated. From the ground-level site of a displacement, those engaged in the research process increasingly have learned to apply participatory technologies to be able to gather and communicate information (multiple sources describe this, but see Pelling, 2007; IFRC, 2010;). What can be communicated is only as good as the interpretation of the situation through assessments at the scene of the events. A further advance in the techniques of crisis communication lies in the ability to transmit information in real time and the accessibility of multiple actors, including emergency migrants themselves, to engage in communication at a global level. However, hazards, risks, vulnerabilities, adaptation processes and the capacity to deal with environmental shocks and associated migration are subject to how all of these are represented in the wider chain of communication. Questions in disaster communication can be reduced to who informs and who is informed, and what techniques are available to transmit sensible and interpretable information. This is particularly important with regard to the role of the media and the reactions they are capable of inducing (Vasterman *et al.*, 2005). Since the way information is portrayed and received determines the reaction that may result, risk perception studies play an important role in understanding how people reduce or ignore risk (Adams, 1995; Slovic, 2000) and the distancing of risk through modernisation (after Beck, 1992). Further in-depth work is currently being compiled on disaster communication questions by an international research group coordinated by the Centre for Interdisciplinary Studies at Bielefeld University, Germany (ZiF, 2011). The question of communicating trust is central to many of the issues being exposed (Stephenson, 2005; Longstaff and Young, 2008).

Communication underpins the capacity for early-warning engagement as outlined earlier. Information communication technology (ICT) now allows environmental shocks to be known about instantly throughout the world, providing access to a higher percentage of people. It is also a tool for those surviving the environmental shocks, to trace each other across dispersal landscapes. Some recent environmental emergencies, such as our cited cases of New Orleans, Haiti, Pakistan and Japan, have all witnessed the adoption of mobile communication technology as a reaction mechanism. It was used to make contact with families and in some instances to warn of further risks to come. The mobile phone and social media more widely have ushered in a communication environment in which both those displaced by environmental shock and observers can interact with each other and with the media in a manner that was not possible until recent times. Some relief NGOs now engage in providing communications services for survivors and refugee groups. Communication capacity changes the dynamic in the dialogue among those experiencing, those observing and those reporting more formally on environmental events. For longer-term displacements and migrations, once the main media interest has subsided, communication technology remains the tool by which migrants can network their reactions and decision making.

## Humanitarian standards in disaster response

Inevitably, despite the ideal of prevention and risk reduction, reactions to larger environmental shocks need to engage emergency relief. In the analysis of operational mechanisms included here migrants are often already taken more into the frame for relief than they are for prevention strategies. To avoid a haphazard approach to relief that leads to criticisms of the limitations in the industry, measures have been taken to produce guidelines and minimum standards (Oxfam, 1995; MSF, 1997; Sphere, 2004; and others). These include standards for immediate needs people have when an environmental shock has caused major destitution. They include

the primary subsistence ingredients of nutrition, water, sanitation, shelter and fuel. The case of Haiti revealed that security from theft and abuse must also be added to this list together with further criteria, such as wider health requirements and communications facilities. Reference to the rights of refugees is apparent in the Humanitarian Charter, reiterated through Sphere in terms of the right to non-refoulement (i.e. not to be sent back). The MSF humanitarian text is specifically orientated to refugee situations, and similarly the Oxfam approach to emergency relief. However, minimum standards often remain unattainable in many humanitarian crises involving mass displacements both rapid and slow onset, albeit with distinct differences between the two. This is because for more rapid-onset events displaced people may be out of reach of immediate relief or not represented as sufficiently a high priority to attract attention, and for slow-onset events they may become seen as an inevitable and 'acceptable' level of outcome. In these contexts, receipt of regular assistance can rarely be assumed.

Minimum standards as portrayed by the agencies might be less appropriate to some contexts or in more extreme circumstances if the standards are not locally derived. What therefore might be the basis of a minimum standard for contexts as contrasting as Somalia and populations displaced to the UK? A further problem is that when migrations are also associated with contexts of political violence rather than environmental shocks alone, there may be deliberate worsening of standards if a migrant group ends up on the wrong side of a political divide. Minimum standards in these contexts become more fundamentally about protecting rights through humanitarian action (IASC, 2002). There is evidence that local players can manage standards and delivery of humanitarian aid effectively where suitable emergency management governance is in place. This also helps address the problems of dependency and declining international interest once supporting agencies go home (Crisp, 2005), and in viewing the right level of recognition of displaced people's own adaptation strategies.

In summary, minimum standards for displaced people are now well realised by aid agencies, but are not necessarily adhered to when logistics do not allow or resources are not sufficiently abundant. Through involving the idea of a humanitarian charter, standards ultimately need to extend to a rights-based approach for disaster risk reduction and development opportunities, not just in terms of relief. However, limitations are that both preventative risk reduction and long-term recovery are likely to remain less well supported than short-term emergency relief, and the latter can be confined to those who migrate. A growing problem is that pledges for long-term reconstruction assistance following some disasters events are not being honoured. In the case of the 2004 Indian Ocean Tsunami, from which there were at least 160,000 deaths and 2 million people in need of assistance, many of them temporary or longer-term migrants, the Council of Europe Parliamentary Assembly estimated the world to have pledged over US\$8 billion of relief and longer-term assistance during the short-term aftermath. However, 1 year later only 2% of this response had actually been delivered (Council of Europe, 2005). Many (it is not known how many) in the regions affected remain displaced from their original rebuild aspirations. Reactions to environmental shocks where there is only immediate relief does little to reintegrate sustainable development and bring security in contexts of future displacement risks. The 2010 earthquake in Haiti and floods of Pakistan, amongst other events, have already demonstrated this.

## Conclusions

This paper has analysed mechanisms for reacting to migration associated with environmental shocks drawing from people-centred principles of disaster risk reduction and response. A basic framework suggested as central to the analysis of appropriate reactions was supplemented with a number of operational mechanisms that form a part of this approach. The consequences



of not applying a framework of principles along these lines are that understanding of environmental migration and its associated reactions, means to mitigation and options for addressing the outcomes would lack appropriate orientation. Further, there would be a lack of attention to extensive conceptualisation informed by the direct experiences of dealing with extreme events. Application of these principles should help avoid misrepresentation of environmental migration priorities.

Reactions to environmental shocks depend on the nature of the event, and the circumstances and profiles of those displaced or otherwise affected. Key concerns are exposure to higher-risk places by more economically vulnerable groups and the resultant dynamics that develop through displacement. Transitions in health security, capacity, rights, resilience and adaptability mediate changes in risk, and are fields that can be effectively engaged. This demands inter-sectoral and interdisciplinary work, although combinations of governmental departments and external agencies would naturally need to vary from crisis to crisis and country to country. No reaction is appropriate if it is not grounded in the local reality of citizen first responders. This was evidenced by an apparent policy lacuna in this aspect regarding reactions dealing with recent emergencies involving mass displacements in China, Haiti, Pakistan and other environmental disaster-struck locations. Short-term reactions are rarely balanced by long-term investments in recovery. With respect to displaced people's adaptation to change, whether assisted or not, there is further doubt as to whether returning a situation to a previous 'norm' is helpful. Forcibly displaced migrant adaptation strategies, as observable for voluntary migrant strategies, can be considered in terms of their role as the potential longer-term recovery strategy. Any assistance or relief in this sense becomes support to a migrant's own aspirations towards strategic improvement of well-being. Adjustments in relation to these challenges to existing norms of prevention and response cultures in relation to environmental shocks requires on-going reviews of disaster risk governance in migration contexts.

There are multiple definitions and classifications that can be ascribed to migration in relation to environmental shock. Though this paper has chosen not to labour already well-worn debates regarding classification of different types of migrant and displaced person, it has been important to reflect migration that occurs variously with both 'slow'-onset and rapid-onset events. Slow-onset environmental change can also produce characteristics of shock unfolding slowly, albeit realisation of a crisis can happen rapidly. Uncertainty about the full impact of many environmental events and consequent human migratory reactions exposes a need for a lot more in-depth research. For example, knowing more about why the same environment shock can produce variable individual relocation and emergency response reactions for groups of otherwise relatively similar people could assist future disaster mitigation efforts. Further, there are gender, age, experiential and educational influences in crisis decision making but little clarity as to the role of these differentials with respect to migration and hosting effects of migrations.

The paper has presented principles and adapted operating mechanisms learned from practice, though in part interpreted theoretically. The principles are reflections of what has become known as relevant to people operating from local communities, the lay practice, and does not necessarily always fit with formalised emergency management. Whilst migration contexts already constitute complexity, it is suggested that much of what is presented here, rather than merely adding disaster reduction ideas to the mix, are more so the latent issues stemming from within the issue of reacting to environmental migrations. This may mean the meta-narratives offered currently by the IOM in this field are to some extent now reflecting well-realised links and connections from scholarly work. However, little in-depth literature to date appears to fully analyse the summative observations offered here.

Beyond community-based initiatives, such as the risk and resilience committees referred to in this paper, progress also needs to extend to adjustments in state and international policies. For example, this needs to address the designated status of future environmentally displaced people in order that human security in these contexts is a nationally and internationally governed right. Variable responses occur across cultures of formal and informal emergency management subject to contrasting development needs. Preparedness, early warning, civic or national policy, and accountable humanitarian response merely guide mechanisms in reacting to environmental shocks. Whilst people react to risk variably, timing and nuances of communication influence the nature of risk reaction, response and longer-term resilience building. Technological development enabling the rise of real-time and socially orientated media is altering the terrain of access, understanding and reacting to major crisis events, these being constructed and deconstructed by those who must interpret the messages conveyed. Migration is well recognised as a sensitive social, economic and political phenomenon for the media so that its representation in relation to environmental crisis can be presumed also open to good and bad representations as in other contexts.

Both research and systemic capacity in this field would appear to be in its infancy, in effect amounting to global-level indictments of being to some extent forewarned of the general, but on the whole unprepared for the specific. For example, early warning in countries of environmentally induced migration would require the capacity to know people's predisposition to migrate under different levels of environmental pressure. Once the effect of environmental shocks set in, humanitarian mechanisms that follow may continue to be needed short-term or for protracted periods, requiring on-going guidelines for disaster response. However, common standards rights and responsibilities in relation to environmental shocks are likely to remain contested in an uneven world.

We have ample evidence throughout history that sustainable development reduces the impact of environmental shocks, and that disaster risk reduction can improve the likelihood of sustainable futures. This also suggests there is much to be gained from the adage 'getting development out of disaster'. Principles presented here should assist the aspirations of those effected by environmental shocks to 'build back better' (Monday, 2002; UNICEF, 2005) and this is applicable for those who move, those in host areas and those who stay behind. It requires a vision for future actions beyond merely reacting to vulnerability and displacement, to realising aspirations for well-being and sustainability.

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