KNOWLEDGE FOR DISASTER PREPAREDNESS: A LITERATURE REVIEW

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Abstract

This paper is based on a review of literature pertaining to the knowledge and practices. It attempts to give an overview and framework of local knowledge in disaster preparedness, an understanding of its usefulness in disaster management, and the benefits and problems involved. Evidences show that knowledge and practices can help implementing organizations to improve disaster preparedness activities. Notwithstanding this evidence, the marginalization of knowledge and practices by mainstream literature and institutions involved with disaster management continues. A knowledge system is composed of different knowledge types, practices and beliefs, values, and worldviews. Such systems change constantly under the influence of power relations and cross-scale linkages both within and outside the community. As such, knowledge and practices need to be understood as adaptive responses to internal and external changes which result in disaster preparedness at local level. In order to identify knowledge on disaster preparedness, one should focus on four key aspects: people's ability to observe their local surroundings, people's anticipation of environmental indicators, people's adaptation strategies, and people's ability to communicate about natural hazards within the community and between generations. In totality, the ability a community has to prepare itself for disaster preparedness needs to be understood within the broader context of livelihood security and sustainability and building up community resilience in the long term.

Keywords: *knowledge, disaster preparedness, practices & beliefs, literature review*

Introduction

A growing body of literature (Adapted from UN/ISDR) has highlighted the importance of integrating local knowledge and practices into programs and development. A less well-known but also growing body of literature comes to a similar conclusion in relation to natural hazards and disasters. Literature reviews on early research findings in Sociology (Dynes 1974; Fritz 1968; Quarantelli 1978), Geography (White1974; Burton et al. 1978); and Anthropology (Torry 1979) are available elsewhere. Most of the work on human response and adaptation to natural hazards and disasters advanced more in the developing world than in developed countries. Especially on drought, focused on indigenous peoples, peasant and farmers, and much of it directly challenged mainstream academia, the media, government, and aid agencies policies and practices. In spite of, the mainstream literature on natural hazards and disasters and the mainstream institutions charged with disaster management, local knowledge and practices rarely received attention. The emphasis of most academic work, both nationally and internationally, has been on the latest, advanced geophysical knowledge and technical systems as the most effective disaster response mechanisms. The considerable body of work on local knowledge remained marginal. This is partly due to the enormous technical-social

perspectives' divided and the privilege accorded the expertise approach which emphasizes formal education and degrees instead of life experience.

Nevertheless, in the 1980s, increasing numbers of institutions have recognized the importance of integrating local knowledge into development. The same applies to disaster management, with increasing research. Samples of early case studies on human responses to natural hazards and disasters can be found in Latin America (Oliver-Smith 1977; Dougherty 1971; Bode 1977 on the 70s Peruvian earthquake); in the Sahel and East Africa (Copans 1975; Watts 1983; Campbell 1984); and in New Guinea (Waddell 1975) contrasts disastrous official relief to damaging frosts with indigenous strategies. In the 1970s-80s, drought was the hazard studied most, especially among African pastoral people; (Jodha 1975) about community adaptation to drought in Rajasthan, India).Torry (1979) on personal communication initiatives, (Dr. Ken Hewitt) on national and UN agencies, and major international NGOs are beginning to take local knowledge and its stakeholders into account. Many NGOs have been established locally, regionally, and globally to address these issues or engage in activism on behalf of those at risk. The extent of the latest work on local knowledge and related participatory disaster management approaches are less vulnerable to marginalization by national and international disaster management strategies than earlier work. A comprehensive framework through which to understand local knowledge on disaster preparedness is found in mainstream literature.

The Framework

This framework is based on a literature review and highlights the over-riding processes surrounding local knowledge on disaster preparedness rather than listing good practices for data collection and storing. Knowledge is not static; it is being lost and gained all the time. Local knowledge is meaningful within its own spatial and temporal contexts. As such, understanding the causation and process of knowledge creation and transformation is more important than focusing on the knowledge outcomes (Clarke-Guarnizo 1992; Hall and Davis 1999).This section describes each step of the framework: the need to understand the nature of local knowledge, the transformation processes influencing local knowledge, the key dimensions of local knowledge on disaster preparedness, and the links between local knowledge, disaster preparedness, and poverty reduction. The peoples' knowledge is influenced by their beliefs, lifestyle, and behavior. To understand local knowledge one has to understand and account for people's ways of knowing (i.e., different knowledge types) as much as their practices and beliefs, perceptions, and values. Understanding all these are crucial because it can explain why people do things the way they do. Considerably, the interaction between conventional science and local knowledge is not new and the history of science demonstrates that the two knowledge systems have often been intertwined (Agrawal 1995). In the country, as elsewhere, trade routes; military and scientific expeditions; and political conquests have contributed to the exchange of knowledge (Linkenbach-Fuchs 2002). Local knowledge has never been isolated it has always been connected to other places and other types of knowledge. If, as Agrawal argues (1995), the division between indigenous and scientific knowledge is artificial, then it makes more sense to talk about multiple knowledge types (or dimensions) which can serve different interests and purposes.

Local Knowledge

A Local knowledge of appropriate building styles can contribute to disaster preparedness. Local knowledge on disaster management has often been associated with local, technical knowledge (Thrupp 1989), probably because it is the most visible and concrete aspect of local knowledge. Local, technical knowledge includes local methods of construction, use, and combination of specific materials for domestic and local buildings. Aside from local, technical knowledge, there are other types of knowledge such as environmental and agricultural knowledge, socio-cultural knowledge, and historical knowledge. This local, non-structural knowledge is not easily identified by outsiders, because it is closely embedded in people's livelihoods and regional views. Environmental and Agricultural knowledge or ecological knowledge is the most intensively studied (Antweiler 1998) that refers to local knowledge of natural resources (ICSU-UNESCO 2002). Studies have highlighted the richness of local environmental knowledge (e.g., soil classification, land-use categories, and weather patterns) and have shown how local methods, such as agro-forestry and polyculture, contribute to conservation of ecological diversity. However, they fail to make the link between the aspects of it (e.g., soil classification, land use, and weather patterns) and also the natural disaster management. Socio-cultural and historical knowledge is often ignored by studies of natural disasters, despite its importance (Ellis and West 2000). Socio-cultural knowledge includes knowledge related to the socio-cultural environment in its broadest sense, viz., social, political, economic, and spiritual aspects of life (Antweiler 1998; Langill 1999). According to Ellis and West (2000), it can be argued that local knowledge is embedded within both the historic understanding of natural hazards and disasters and current actions and events. This is important because local history about social relations can influence the way people perceive and respond to natural hazards. Consequently, the knowledge about development projects refers to people's beliefs about the outside world andare likely to intervene in disaster responses which affect their respond to interventions.

Approach

Disaster preparedness is a combination of short and long-term strategies that help minimize or reduce the negative effects of natural hazards, prevent their impacts on assets, and escape certain peak values (e.g., during periods of excessive rainfall, etc) or their consequences. As such disaster preparedness goes well beyond emergency preparedness which is used by nations to refer to crisis management based on command-and-control (civil defense) and short-term response strategies. It is difficult to isolate disaster preparedness from other components of disaster management (e.g., disaster relief) as they are inter-related.

Notably, most of the literature on local knowledge is dispersed in various fields, for example, geography, anthropology, natural resource management, climate change, development, rural sociology, urban planning, and engineering. Based on the assumption that much can be learned from other fields, this paper is based on across-disciplinary literature review. The resulting framework enables identification ofkey findings and trends in current literature on local knowledge related to disaster preparedness. The literature review mainly draws from English language reports available on the Internet

and from peer-reviewed research journals. The great diversity of languages in the region make it difficult to tap into there sources available on local knowledge, as most of it is not recorded or is embedded in old religious and cultural works. Although the aim was to focus on disaster preparedness in the Zamboanga Peninsula and Misamis Occidental, references and studies from a broader geographical area (i.e., other developing regions and countries) were included to take advantage of lessons learned in its sphere of influence.

This paper does not discuss participatory literature in detail, but the rediscovery of local knowledge is concomitant with calls for flexible and adaptable management systems and the new discourse in the development field on a participatory and bottom up approach. The catchwords of this approach are governance, empowerment, community-based management, self-reliance, and decentralization of decision-making, adaptive management. Hazard research has been relatively slow off the mark in engaging with these broad debates (Few 2003), but they are entering the humanitarian aid and disaster risk reduction fields (e.g., community-based risk reduction, community-based hazard identification and mitigation, and participatory hazard mapping) and an increase in community participation in disaster management is being called Linkenbach-Fuchs [2002], as well as on early warning research and systems. Parker and Handmer 1998 [England]; ILO 2002 [India]; Pratt 2002 [Kenya]; ISDR 2004). The success of these participatory approaches lies in their generality, which enables them to link disaster preparedness with the issue of development as a whole (Few 2003). Participatory approaches to disaster management and preparedness often pre-suppose a basis in local knowledge and practices because communities in disaster-prone areas have accumulated a lot of experience over time (Battista and Baas 2004). These approaches also recognize that local people are the primary actors by default when a disaster strikes. From a local knowledge perspective, according to Battista and Baas (2004), it is more interesting to examine recurrent shocks that gradually increase the vulnerability of communities. Exceptional disasters require external means, beyond normal coping strategies.

Local Knowledge as a Tool for Change

According to the participatory discourse, taking local knowledge into consideration in terms of practices and contexts can help implementing organizations improve their planning for and implementation of disaster preparedness activities and it can help improve project performance and project acceptance, ownership, and sustainability. This means that understanding, accounting for, and respecting local knowledge contribute to cost-effectiveness in the long-term, from both a financial and a social point of view especially in the context of complex, changing, and growing hazards.

Firstly, from a financial point of view, economies of scale are based on the assumption that people perform better on some scales than on others and that different resources are found on different scales (Berkes 2002). Solutions in resource management, development, and disaster management need to go beyond the dichotomy between local versus state management levels and integrate cross-scale institutional linkages. Understanding local knowledge and practices can help identify what is needed and acceptable locally and how people's participation can be solicited to ensure their support for external action. Building on local knowledge and practices (i.e., capitalizing on local

strengths), when it is relevant to do so, can decrease dependency on external aid. Local people provide continuity and can monitor the actions taken (Wisner and Luce 1995).

Secondly, from a social point of view, taking local knowledge and practices into account promotes mutual trust, acceptability, common understanding, and the community's sense of ownership and self-confidence. Understanding local knowledge, practices, and contexts helps development and research organizations to tailor their project activities and communication strategies to local partners' needs. It also enables development research organizations to act as intermediaries in translating messages from government level to communities in a way that is understandable and credible. For example, a meteorological agency might release the following message to communities: the river is going to rise by one to two meters in the next 24 hours. But is it enough? What does it mean to the locals? Government agencies often release information that is not understood at local level (Jaarsma et al. 2001; ILO 2002; Messer 2003; Cronin et al. 2004; ISDR 2004). Cronin et al. (2004) describe how depictions of volcanic hazard on a map could not be understood locally, because the community had a different perception of the landscape from that of the mapmakers. Hence, communication tools for disaster preparedness, such as official warning messages or hazard maps, need to incorporate local references. The inclusion of local people in disaster management and preparedness activities is challenging. In practice, participation and decentralization involve complex processes and the devolution of power to local levels does not always transfer into power being given to the most marginal groups, mainly because increased access to (political) resources does not always translate into increased benefits from those resources (Chambers and Richards (1995, cited in Ellis and West 2000). These aspects illustrate how the use of local knowledge raises complex issues.

The Rise in Vulnerability

Despite advances in knowledge and technology (e.g., satellite coverage or surveillance techniques), vulnerability to and the risks from natural hazards have been rising in developed and developing countries and this may be the case even with the frequency and magnitude of hazard events remaining constant (Gardner 2002; Van Aalst and Burton 2002). In other words, what has been increasing is not the number of disasters as a result of natural hazard events per se, but the impacts of these events on people and property. The increase in risks and vulnerability is the result of changes in people's social, economic, cultural, political, and environmental contexts. The incidence of and toll disasters have increased for decades both because of development processes and because of lack of development. For example, development processes (e.g., dams and road construction) have affected the allocation and distribution of resources between different groups of people and have created new natural hazard risks. When people are displaced, the poorest among them are forced to settle on marginal land and in risk-prone areas because of demographic and socioeconomic pressures.

Example: In the Philippines, costal shorelines often flood as a result of a storm surge preceding typhoons and other major windstorms. The storm surge flooding can be more dangerous than the windstorm itself. [Introduction to International Disaster Management]It is stated that National estimates show that 82.5% of the entire population of the Philippines are at risk to tropical cyclones, flooding and storm surge. As well as

identifying that homes are unlikely to withstand the impacts of stronger typhoons or storm surges. [Climate change assessment for Sorsogon, Philippines].

Local Practices

It is a fact, that what people know is influenced by what people do, that is their practices; in other words: local knowledge in addition to being in people's heads is embedded in individual and group action. According to Ellis and West (2000) Local practices are not static traditions; they are rather complex adaptive responses to external and internal changes that have evolved throughout the generations from trial and error (Berkes 1999). People's adaptive or coping practices can protect them from the impacts of natural hazards (i.e., preventative measures), and can help them to reduce the negative effects of natural hazards (i.e., protective measures, risk reduction mechanisms, impact-minimizing strategies, risk-spreading strategies that may help them to escape certain peak values or their consequences (i.e., 'avoidance strategies'). Local practices are mediated by local institutions and associated power relations.

Certain disaster preparedness practices may be found only at the household level while others may be found only at the community or village level. Practices may differ from one social group to another according to factors such as age, gender, profession, caste, or ethnicity. Sinclair and Ham (2000) documented adaptive strategies related to household livelihoods in the western Himalayas and found that practices varied within villages according to socio-economic, or caste status, among others, and that some strategies were interdependent upon others. Some practices may be directly designed for disaster preparedness; others may be designed for other purposes (e.g., making a living) but may contribute indirectly towards disaster preparedness. Some practices may help people to deal with natural hazards in the short term; while others may help them to be prepared and to adapt in the long term. Similarly, some effective short-term human adjustments might actually increase the long-run vulnerability. (White et al. 2001) Not all adjustments to natural hazards are environmentally sustainable. Batterbury (1999) found that successful adaptations did not always protect the environment in general and did not benefit the community as a whole. Local strategies could also be weakened by socio-economic changes. Similarly, not all adjustments to natural hazards are socially equitable. Example: In Tacloban City, Leyte (2013) Philippines, where flood warnings being not taken as an opportunity to impound floods to use on high-yielding paddy by many and it aggravated great damage downstream for many people.

Belief Systems

The most fundamental lesson of traditional ecological knowledge is that local, national and worldviews and beliefs do matter. (Berkes 1999) Local belief systems are understood here as the combination of people's beliefs (e.g., socio-cultural and religious belief systems), worldviews (i.e., ways of perceiving the world), values and moral principles (e.g., respect, reciprocity, sharing, and humility), and ethics. Belief systems shape people's understanding, perceptions, and responses to natural hazards. These perceptions are mediated by cultural interpretations, in combination with arrange of other factors proper to each community and household at a specific time and place which will influence how people are going to prepare themselves or not. These factors influence

people's perceptions and responses to natural hazard risks: for example, from the outside two similar households might face the same risks; however, they will have different perceptions of risk and address it differently (Heijmans 2001). These factors (or filters) influence local knowledge and practices on disaster preparedness in a complex way and can act simultaneously as amplifiers and/or attenuators of natural hazards. For example, the nature and behavior of hazard events may be perceived as chronic, part of normal life, rare, new and never experienced locally, and unavoidable climatic or seismic extreme or a just form of retribution meted out for a community's transgressions (Bankoff 2004). Cronin et al. (2004) in a case study in an island, which has the largest and most hazardous volcanoes, describe the failure by scientific experts (such as volcanologists) to understand and account for local beliefs and how this has contributed to the failure of volcanic hazard education brought from outside. They argue for the establishment of a common ground for communication about hazards in which the principles of considering local views can be used to adapt and communicate scientific, hazard information to non-scientists anywhere. Understanding local beliefs, perceptions, and values is crucial because it provides insight into why people do things the way they do. In that sense, with some groups, how people say things may be more important than what they say because the outcome can be interpreted in many ways unless you understand the context.

Attenuators and Amplifiers of Natural Hazards

Belief systems can help to create shared cultural attitudes and community spirit, which in turn can help the community to withstand natural hazards and risk disasters. Collective ceremonies may even simulate elements of natural disasters through symbolic actions and act as cathartic events for the whole community. For example, during a barrio fiesta, an important festival of the barangay, an ethnic minority in a District, men and boys run down the hills and shout. If they see a snake, it is believed to be a sign of a good luck. Ceremonies, such as the Subanen dances can be interpreted as symbolic methods of dealing with anxiety. This festival can be interpreted as a collective forecasting ceremony; a way of helping the community overcome the anxieties associated with future uncertainties (including uncertainties about the weather and natural hazards).The ceremony helps to reduce stress and the psychological distress associated with living with risks and uncertainties (Dekens 2007). It is a means of incorporating these times of great stress or loss into a community's collective memory in such a way that they are rendered manageable on an individual human scale. Such ceremonies permit the incorporation of hazards into daily life within the structure of people's everyday cultural construction of reality, and they can contribute to the normalization of natural hazards (Bankoff 2004). Religious activities, such as prayers and collective gatherings, can also be part of long term coping strategies to natural hazards by providing rules for wise natural resource management. Examples can be found in relation to water management: in Bali local priests used to monitor and manage the local irrigation system, the 'subaks', and this ensured the maintenance of biodiversity and helped avoid localized landslides (Lansing 1987); in the Newari communities of the Kathmandu valley, temples are found close to ponds and they are used to ensure and mediate the sustainable management of water for drinking and irrigation. The key point was the ethics or the codes promoted by socio-religious symbols in the use of natural resources (Berkes 1999); in other words, in practices. Just as all adjustments are not sustainable, not all beliefs are sustainable or

relevant. They can act in a negative or dysfunctional way. Some values have led to massive environmental degradation and the collapse of entire societies (Diamond 2005)

For example, the ritual of slaughtering goats in the communities to prevent floods confers ritual, symbolic values on goats. They are used for ceremonial purposes only and never sold (no economic value is attached to goats). Hence it might prevent the community from having sufficient food or cash income during or after hazard events.

Global Factors and Trends

In many cases, natural hazards, although they can represent an important stress, are not the major stress faced by communities. Aside from natural hazard risks, community ability to anticipate and respond to disaster is influenced by other stresses(e.g., poverty, state policies, and legislation) and factors and trends (e.g., climate change, globalization, and privatization). Studies focusing on multiple stresses and how they interact with one another to give a specific type of response (or no response) are still few in the field of natural hazard and disaster research. For the purpose of this report, we will focus on three major factors of change influencing people's coping strategies to natural hazard risks: the impact of state legislation; policies, especially those promoted through 'conservation' and 'development' projects; and economic and cultural globalization processes.

Many communities are at risk from natural hazards due to lack of development, but in this section we will investigate the other side of the coin: that is, how development processes can increase the risks from natural hazards in some communities. Contemporary states, through legislation, policies, and development projects at national level, and even outside their boundaries through development aid, have transformed traditional agrarian societies elsewhere. The nation state has taken control of community resources, thereby changing (and often restricting) community access to, and benefit from, resources and often undermining their traditional management strategies and local institutions (Linkenbach-Fuchs2002). The alienation of communities from their environment as a result of state intervention has been documented most in the context of natural resource management and change in community access to natural resources (e.g., forest and non-forest products, land, water, and stones). These changes have led to increasing dependency on external aid and market forces, as well as increasing vulnerability of the community to perturbations such as natural hazards. (e.g., hydropower projects) and centered on service activities (e.g., tourism). It has contributed to an increase in accessibility because of the establishment of infrastructure, intensification of resource use, monetization of the economy, and commercialization of resources; and it has created new (natural hazard) risks for local communities and led to the loss of material and land resources for many (Linkenbach-Fuchs 2002).

Government development projects, such as dams for electricity generation and irrigation, mining operations, plantations, and recreation areas that convert agricultural land to industrial and commercial uses are undermining people's capacities to cope with natural hazards by restricting their access to land and other resources they used to fall back on before, during, and after disasters. Ironically, some of these development projects are perceived to be more disastrous than natural hazards from a community perspective (Heijmans 2001).

Das (1998), in a case study in Dibrugarh town in Assam, India, the study relates how the construction of a dam following a major earthquake led to gradual changes in the river ecology in and around the town. The control measures disrupted the traditional, local flood management system. Before, recurring floods were responsible for fertilizing the soil, cleaning the stagnant water from the town, and providing a source of protein because of the large quantity of fish caught but this system has disappeared now. Local environmental warning signals for natural hazards that people used to rely on have become obsolete due to rapid change in climatic conditions combined with excessive human intervention (Rural Volunteers Centre – Dhemaji district, Assam, India). Elsewhere the impacts of development projects are influencing animal migration patterns, which used to provide local warning signals of hazards (Jaarsma et al. 2001 in a case study on flood early warning in Mozambique).

Economic globalization. Market-induced demands in combination with the rapid population growth has led to an increased focus on cash cropping (e.g., horticulture, vegetable cropping) pushing staple food crops on to more marginal, fragile slopes (Jodha 2001). The increasing commercialization of agriculture and resources associated with economic globalization has often led to the conversion of resilient, diversified agro-ecosystems focused on subsistence into monocultural ecosystems focused on (often short-term) cash cropping (Farooquee 2004 [Western Himalayas], [South Pacific, especially Fiji]) – that said, cases illustrating a reverse tendency can also be found. This, together with the dominance of a few seed companies, promotes an extremely negative attitude to 'old' crops and open-pollinated varieties (Stiger et al. 2005) and is leading to a reduction of traditional crops that are less marketable but more tolerant to hazards (Mercer no date [Fiji]; Heijman 2001 [Kalimantan, Indonesia]). Similarly, new materials and building practices used for house construction do not provide the same disaster-proof features as the traditional ones (Dekens 2007; Rautela 2005[India]; Jigyasu 2002 [India and Nepal]). Economic changes are also leading to the loss of craftsmanship.

Cultural globalization is also influencing how people perceive their own resources and knowledge. Local coping strategies are eroding also because the people themselves, especially the younger generation, tend to disregard their own resources and knowledge because of growing exposure to global and national influences and the pressure of modernization and cultural homogenization. They are exposed to different (western)standards, values (e.g., individualism, consumerism), and lifestyles. Linkenbach-Fuchs(2002) mentions how: heteronomy has to a large extent replaced local autonomy and how a culture of indifference has started to replace a culture of solidarity. As a result, traditional communication networks are breaking down, meaning that elders are dying without passing their knowledge on to children. (Langill, "heteronomy has to a large extent replaced local autonomy. A culture of indifference has started to replace a culture of solidarity." Also due to formal education, the position of elders within the community is undermined. Changes in information technology influence the geography of personal networks. Parker and Handmer (1998) argue that personal networks are dispersing because of information technology. Hence local knowledge will be hard to obtain. In order to understand how to identify and use local knowledge and the process of marginalization surrounding local knowledge, one has to contextualize local knowledge and practices on disaster preparedness within the wider context – rather than merely describing knowledge per se. Although it might seem obvious, often the content of local

knowledge has been recorded leaving out the context in which it had developed (Antweiler 1998).

In fact, understanding the context and processes surrounding local knowledge creation, transmission, and interpretation is more important than understanding the knowledge outcome per se. This is because local knowledge is context-specific in both time and space. Understanding transformation processes in the socio-cultural, political, and economic contexts and how they cascade through different scales (international, national, regional, local) can help to identify the changing natureand status of local knowledge and practices and the consequences for changing vulnerability (Jigyasu 200).

Vulnerability and Resilience

The criticism of research helped to generate a growing interest in the concept of vulnerability in hazard literature (Blaikie et al. 1994) as elsewhere and it is also a central component of the sustainable livelihood approach, and especially led to a focus on reducing social and community vulnerability and examining its links to disaster and risk responses. Some researchers argue that the focus should be directed towards vulnerability and local coping strategies instead of hazard per se (Battista and Baas 2004). In any case, the shift towards the vulnerability perspective in research into natural hazards and disasters encourages looking at disasters through the lens of socioeconomic and political structures and processes. The recognition is growing that research should broaden its analytical scope to include questions of sustainable development such as livelihoods, poverty, governance, equity, climate change (which some research links with the threat of increased extreme events), and natural resource management (UNEP 2004; Van Aalst and Burton 2002; Sudmeier-Rieux et al. 2006) The maintenance of sustainable livelihoods is based on people's adaptation to environmental changes (including natural hazards) together with economic and political changes. Researchers examining adaptations to natural hazards and disasters study adaptation in terms of social and power relationships also (political-economic perspective) and not only from a biological point of view (i.e., adaptation perspective) (Goodman and Leatherman 2001). Some studies focus on community adaptation to climate variability and climate change (Allen 2006; Ahmed and Chowdhury 2006; Rojas Blanco 2006; Hageback et al) and multiple stresses.

Recently, resilience literature has examined the processes of adjustment and self organization from a more dynamic and complex perspective than the adaptation literature (IFRC 2004; Gardner and Dekens 2007). The resilience perspective also attempts to investigate adaptation to change from a more positive angle than the vulnerability perspective, focusing on people's strengths rather than on their vulnerabilities. Overall local knowledge was absent from the early mainstream research into natural hazards and disasters. Then, the change from a focus on natural hazards to vulnerability and resilience was accompanied by a growing recognition of the importance of local knowledge and practices. Yet, even though research and development organizations acknowledge the existence and importance of local knowledge and practices related to disaster preparedness, in practice little documentation of its application through official channels exists. Ultimately, the growing interest in local knowledge, including in disaster management and preparedness, should be understood in the context of governance issues and the movement to participatory approaches in development and resource management.

Local Knowledge is Political

The use of local knowledge is political because it threatens to change power relations between different groups, ideologies and cultures (Berkes 1999). Conflict of interests can reflect divisions between natural sciences and social sciences; science and politics; the official and the non-official (or international, national, and local interests); highland and lowland; centre and periphery; and short and long-term interests, as well as among social groups within a community. White etal. (2001) report from a review of the natural hazard and disaster literature: "Conflicting interests and lack of political will to resolve them seems to be at the base of many failures to apply knowledge effectively." Conflicts of interest may be increasing, especially in mountain communities that face the influence of a range of different actors and interests (state agencies, industry, development and research organizations, and tourists). Each actor tends to impose its own agenda and define local knowledge differently according to its own culture, experience, and agenda. People may also use local knowledge in discourse because it is now becoming politically correct; however it may not reflect their real agenda and practices.

Summary, Conclusions and Lessons Learned

The purpose of this report is to re-affirm the importance of accounting for local knowledge in disaster risk reduction by presenting a general framework through which to understand local knowledge on disaster preparedness based on a literature review. The literature review and related framework revealed the following.

- *Despite evidence since the early 1970s, at least, that local knowledge and practices can help implementing organizations to improve their disaster preparedness activities, local knowledge and practices are marginalized from the mainstream disaster literature and within institutions working in disaster management and this has been the case elsewhere around the world both in developing and developed countries.*

Key factors that have prevented the use of local knowledge include historical factors (e.g., the legacies of colonialism), ideological factors (e.g., the beliefs that conventional or scientific knowledge is superior), institutional factors (e.g., it is difficult to identify and use local knowledge and practices because of their invisibility, complexity, diversity, and changeability), political factors (e.g., natural hazards and disasters have been conceived primarily as an issue pertaining to national defense and security),economic factors (e.g., the impact of multiple stresses in a context of rapid change render some local knowledge and practices inappropriate or inaccessible over time),and geographical and temporal factors (e.g., distance management).

- *Local knowledge and practices are complex adaptive responses to internal and external change. Combined with conventional knowledge and understood in the wider context of sustainable development, they have a potentially valuable role to play in disaster risk reduction.*

A local knowledge system is not only composed of what people know but also of what people do (practices) and believe in (beliefs, values, and worldviews). Local

knowledge and practices are being transformed all the time through the influence of power relations both within and outside the community and the way hazards (in combination with exogenous and endogenous perturbations and responses) are cascading down across different scales. As such local knowledge and practices need to be understood as adaptive responses to internal and external changes that increase, or not, disaster preparedness at the local level. In order to identify local knowledge on disaster preparedness, one should focus at least on four key aspects of local knowledge: peoples' ability to observe their local surroundings, anticipation of environmental indicators, adaptation strategies, and people's ability to communicate about natural hazards within the community and between generations. Finally, the ability a community has to prepare itself for disaster preparedness should be understood in the broad context of livelihood security and sustainability and building community resilience in the long term. Focusing on local knowledge and practices can help understand local contexts and needs that influence how people perceive and respond to natural hazards, risks, and disasters. Local knowledge can provide information related to local environmental variability and specificities; local perceptions of natural hazards; risk trade offs in the context of multiple stresses; vulnerable groups and individuals; the local elite and power relations; and changes in people's vulnerability to natural hazards over time. Examples of potential applications of local knowledge in disaster preparedness include accounting for local advice about safe locations, construction sites (buildings and roads), combining local knowledge with conventional knowledge for hazard mapping, surveys and other inventories in order to verify information, adapting communication strategies to local understanding and perceptions, and integrating local values into decision-making processes.

- *Recognizing and respecting local knowledge and practices empowers local communities. While not all local knowledge, practices, and beliefs are relevant, they always need to be taken into account to ensure project acceptance and sustainability.*

Understanding local knowledge and practices can help identify what can be promoted at local level and how to foster people's participation to ensure the support of local knowledge and practices for external action. Solutions in disaster management need to go beyond the dichotomy between local versus state management levels and to integrate cross-scale institutional linkages. Due to changes in the education system and the growing influence of the west, among other things, communities themselves need to be convinced that some of their local knowledge and practices are of relevance to disaster preparedness. The current systems of education should be reconsidered in order to clearly link local communities with schools so that school curricula are adapted to local needs and realities and incorporate and foster local knowledge and practices. The focus on local knowledge and practices helps to identify and capitalize upon people's existing strengths and local institutions (instead of creating parallel institutions). In the context of rapid change and multiple stresses such as complex, changing, and growing hazards, the extent to which local knowledge and practices actually contribute to improving disaster preparedness at the local level or not is not white or black. We cannot afford to ignore any knowledge or potential low-cost strategy which might improve survival and mitigate property losses.

● *There are many challenges to the documentation and use of local knowledge in disaster preparedness, and they can only be resolved through respect, understanding, and reflexivity as well as through creative and innovative solutions. Best practices at the local level in the context of disaster risk reduction that capitalize on local strengths need to be up-scaled.*

Ultimately, the use of local knowledge raises ethical and practical questions about social justice, because local knowledge can be used against the people themselves and because it can be used also as an umbrella to mask what still remains 'business as usual' (the status quo). Innovative initiatives at the local level are happening but they are scattered, fragmented, and often not documented. Lessons learned from such initiatives should be documented and up scaled to foster creative solutions in this field. Based on the assumption that different things can be done better on different scales, depending on the nature and type of natural hazards, for example, partnerships among local government, private sector, non-government organizations, and community groups should be explored.

A Conceptual Framework for Disaster Risk Reduction

Introduction

Most of the people (98%) affected by disasters are from communities of low /medium human development. The impacts are extremely felt by poor and marginalized people at the local level. Subsequently, vulnerability is identified as the primary reason for increased hazards. The main strategy of vulnerability reduction at the household level is to strengthen local capacities and reinforce coping mechanisms. The limited knowledge, awareness and preparedness of disaster risk are the major constraints to effective disaster risk reduction both at local, national, and international levels. Understanding the casual factors of risk and vulnerability are critical in designing effective risk reduction interventions. Thus, it requires an appropriate conceptual framework to understand the relationship between vulnerability and the development process.

The proposed framework is designed to start from local level (people's perspectives) for ease implementation. This is adapted from the Enhanced Pressure-Release (Disaster Crunch) Model: Progression of Vulnerability.

Participatory Disaster Risk Assessment (PDRA)

Step 1. Hazard(s) Assessment

- Identification of past, present and future hazard(s)
- Determine the nature and behavior of the hazard(s)

Step 2. Disaster Impact Assessment

- Most vulnerable groups
- Elements-at-risk
  - Social
  - Natural Resources
  - Physical Infrastructure
  - Economic / Livelihoods
- Priority unmet needs
  - Physical Security

- Health Care
- Water / Sanitation
- Food / Nutrition
- Shelter / Clothing / Essential Non-Food Items
- Livelihoods / Employment
- Education
- Hope

Step 3. Unsafe Conditions

Vulnerability and Capacity Analysis:

•Vulnerability Assessment:

Identify the factors that create unsafe conditions making communities susceptible to the impact of a hazard (fragility)

•Capacities Assessment:

Identify people's strengths (means, assets and resources) used to counter the unsafe conditions and meet basic needs (resilience)

Disaggregate information into the following categories:

Human Factors
Social Factors
Natural Factors
Physical /Infrastructure Factors
Economic Factors

Note: Adapted from Sustainable Livelihoods Framework

Step 4. Dynamic Pressures

•Organizations and Actors (State, Civil Society, Private Structures and Institutions)

- Community / Household level
- Municipal
- Regional
- National

• Policies and Practices (Formal / Informal Processes)

- Policies /Frameworks / Strategies
- Legislation and Laws
- Culture / Customs
- Power Relations (I.e. age, gender, caste, class, ethnicity)
- Vested Interests

Step 5. Underlying Causes

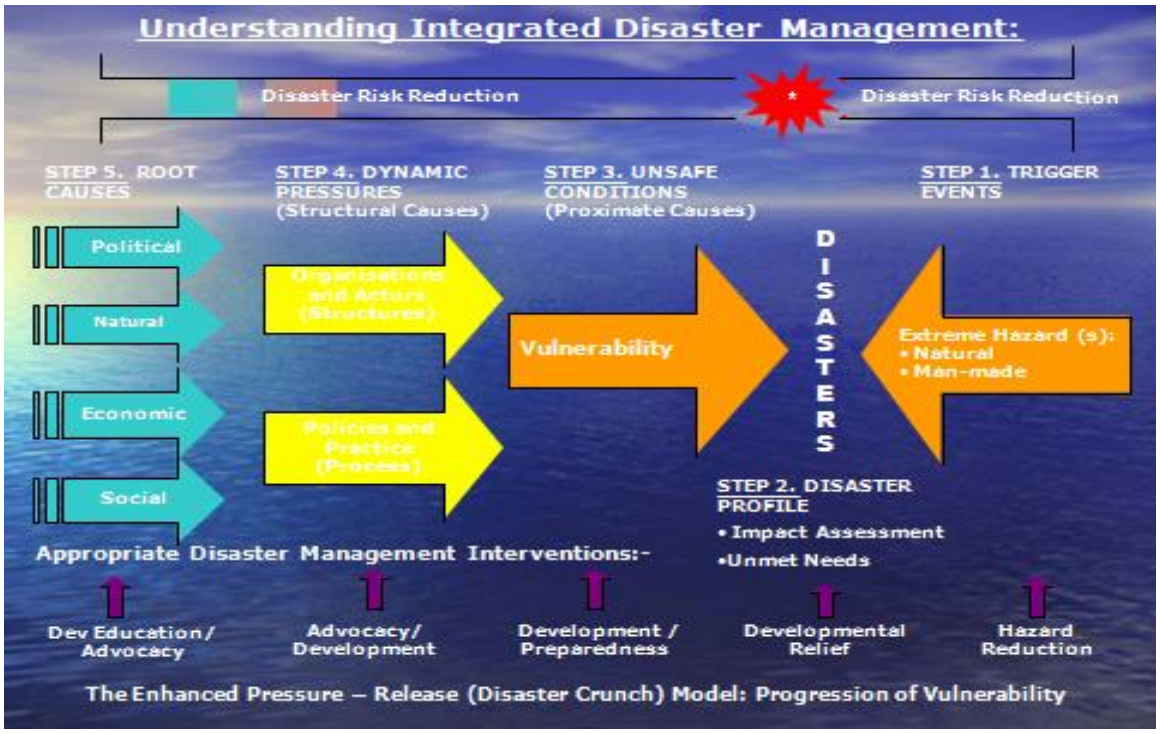
• **Social;** Value and Norms, Customs & Culture, Religious Beliefs, Philosophies, Rights and Responsibilities, Societal divisions linked to issues of inequality, greed, prejudices (e.g. class, caste, creed, ethnicity, gender)

• **Political;** Ideologies, Priorities, Patronage

• **Physical;** Bridges, River Control, Buildings

• **Economic;** Doctrines, Terms of Trade

• **Natural;** Natural environment



(Adapted from UN/ISDR)

Conclusions

The Participatory Disaster Risk Reduction Assessment (PDRA) methodology engages affected communities in a participatory process that helps people to identify and understand disaster risk. The awareness of inherent capacities and vulnerabilities forms the basis of informing community action planning to manage risk. Local-level actors cannot alone address all the structural and underlying causes of vulnerability. Effective community-based disaster risk reduction must be adopted into government structures to scale upto address huge numbers "at risk". This will require effective partnership between civil society and governmental bodies.

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