INTRODUCTION TO DISASTER RISK REDUCTION

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1. INTRODUCTION

Disasters have always been a result of human interaction with nature, technology and other living entities. Sometimes unpredictable and sudden, sometimes slow and lingering, various types of disasters continually affect the way in which we live our daily lives. Human beings as innovative creatures have sought new ways in which to curb the devastating effects of disasters. However, for years human conduct regarding disasters has been reactive in nature. Communities, sometimes aware of the risks that they face, would wait in anticipation of a disastrous event and then activate plans and procedures. Human social and economic development has further contributed to creating vulnerability and thus weakening the ability of humans to cope with disasters and their effects.

Disasters impede human development. Gains in development are inextricably linked to the level of exposure to disaster risk within any given community. In the same light, the level of disaster risk prevalent in a community is linked to the developmental choices exerted by that community (UNDP, 2004). The link between disasters and development is well researched and documented. The fact that disasters impact on development (e.g. a school being washed away in a flood) and development increases or decreases the risk of disasters (e.g. introducing earthquake-resistant building techniques) is widely accepted. Yet, every year Africa suffers disaster losses which set back development and leave our communities living in a perpetual state of risk.

Africa has come a long way since the global arena emphasised the need for multi-stakeholder disaster risk reduction rather than continuing the unsustainable cycle of disaster management. The 2000s saw a number of declarations, policies, strategies, plans and programmes developed. Yet very little real implementation of the above is evident on the African continent, despite a number of inter-regional and high-level discussions and forms of collaboration.

The following module will introduce you to the field of disaster risk reduction. The first part of the module will focus on defining the basic, but most important, terms in relation to disaster studies. The different elements of disaster risk management will enjoy attention, and how these different elements contribute to our understanding and better management of risk and disasters will be explained. Different types of

hazards, vulnerability domains and risks will also be discussed. This module also provides a more theoretical look at the evolution of the study of disasters and in doing so emphasis will be placed on the transdisciplinary nature of disaster risk reduction. After the theoretical foundation for the understanding of disaster risk management has been laid, the emphasis will shift towards an understanding of how disaster risk management functions as an integrated approach within the context of sustainable development. The last part of this module will provide you with insight into some of the cross-cutting issues such as climate change and adaptation, disaster risk governance and gender and disaster risk issues.

2. DEFINING THE CONCEPTS

Various terms linked to the activities which we have come to understand as disaster risk reduction, have evolved and been refined over the past 50 years. An over-emphasis on disaster and humanitarian relief has made way for the contemporary terms such as disaster reduction and disaster risk management. However, a common understanding of the various terms underlying disaster risk reduction is crucial if one aims to ensure a standardised approach by all stakeholders. The section that follows aims to give perspective on the most important terms used in the field of disaster reduction. The definition of these terms has been universally accepted to be valid and is a compilation of the definitions according to the published terminology of the United Nations International Strategy for Disaster Reduction (UNISDR, 2009). UNISDR is the secretariat of the International Strategy for Disaster Reduction (ISDR). It was created in December 1999 and is part of the UN Secretariat with the purpose of ensuring the implementation of the International Strategy for Disaster Reduction. An alignment of the terminology used in disaster risk reduction in Africa with the internationally acceptable concepts is logical.

2.1 Disaster

Although the focus of disaster reduction is not on any actual disaster event itself, disaster remains the main focus. Thus our efforts must be geared towards the reduction of the risk of a disaster occurring. Before one can therefore focus on the more technical and complex terms of disaster risk reduction and disaster risk management, one must have a very clear understanding of what in actual fact a

"disaster" entails.

Probably one of the most debated terms in disaster reduction remains the basic definition of a disaster. Many scholars (see the work of Quarantelli, 1998b; Quarantelli & Perry, 2005) have expressed diverse views on what exactly constitutes a disaster. Some link the existence of a disaster to a specific amount of losses sustained (e.g. number of people killed and injured), others judge an event to be a disaster if a certain predefined threshold is breached (e.g. a trigger to a certain contingency measure is reached), some judge disasters on their geographical extent and significance with regard to "normal" conditions, while some express a disaster in terms of its monetary value in losses. However, since the International Decade of Natural Disaster Reduction (IDNDR) the various scientific understandings of disaster have culminated in a globally accepted definition.

The UNISDR (2009) defines a disaster as: "A serious disruption of the functioning of a community or a society involving widespread human, material, or environmental losses and impacts which exceeds the ability of the affected community to cope using only its own resources."

Some aspects of this definition need to be highlighted. Firstly the emphasis of the definition is on "a serious disruption". One can therefore expect a disaster event to be something which significantly changes the "normal". It is an event which the majority of the affected community will perceive as removing them from the "normal". Second and most important is the distinction which the definition places on abnormal events and an event which we can classify as being a disaster. If the event "exceeds the ability" of the affected community to handle the consequences by making use of all their resources, then the event can be classified as "a disaster". Lastly, note should be taken of the concept "community". Various disciplines define "community" quite differently. A community is a collection of people sharing common interests and values. Despite being culturally diverse, mobile or unstable, members of a community communicate with or on behalf of each other in order to achieve a mutually beneficial outcome – they are bound together by a common goal, their sense of belonging and a sense of place. However, the management of disasters and the risk associated with disasters in most Southern African Development Community (SADC) countries becomes the responsibility of Government. One

should therefore appreciate the fact that in order for a government to adequately manage disasters, the definition of "community" must be very clear. To this end it has become common practice for governments to use their administrative units to define the affected "community". Thus if an event exceeds the coping ability of a village, or local municipality, or district, or state/province or even the nation, then a specific type of disaster can be declared (i.e. local, state/provincial or national).

The UNISDR goes on to indicate: "Disasters are often described as a result

of the combination of: the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation."

It is important to note that the term "natural disaster" has not been used, the reason being it is inaccurate and misleading to refer to "natural disasters".

Disasters: Natural or not?

Disaster risk can be determined by the presence of three variables: hazards (natural or anthropogenic); vulnerability to a hazard; and coping capacity linked to the reduction, mitigation and resilience to the vulnerability of a community associated with the hazard in question. For example, let's assume we are dealing with a poor African community (i.e. an informal settlement situated in the 1/50 year flood-line). Certain socio-economic and political dynamics in the country force poor communities to settle in unsafe conditions (e.g. distance from employment opportunities, urbanisation, poor land use planning etc.). Along comes a natural hazard such as a significant flood, and the community settled in the flood-line is exposed to the point of experiencing a disaster. However, this should not be seen as a natural disaster. Although a natural hazard was the trigger for the disaster, it was in fact human-made. If proper settlement planning, land use planning, building codes, community awareness, economic policies, and the like had been in place, then this "natural disaster" would have been mitigated. Almost all exposure to natural hazards and vulnerability can be reduced. Thus human actions lead to natural hazards becoming

natural disasters. One should be mindful that we as humans do not have absolute capacity and have sustained and will sustain significant losses due to natural hazards in future. We however need to realise that we also have capacity to make the right decisions, implement the right measures, and engage in intelligent development planning which will reduce the risk of disasters occurring. The reduction of a risk manifesting in a disaster therefore requires a very broad multi-sectoral and multidisciplinary focus where the structural engineer, politician, social worker, agricultural extension worker and even kindergarten teacher all have equally important roles in ensuring natural hazards do not become disasters.

The above example highlighted a number of other terms which are important to understand to gain a full picture of what disaster risk reduction entails.

2.2 Risk and disaster risk

Risk has various connotations within different disciplines. In general risk is defined as “the combination of the probability of an event and its negative consequences” (UNISDR, 2009). The term risk is thus multidisciplinary and is used in a variety of contexts. Risk is usually associated with the degree to which humans cannot cope (lack of capacity) with a particular situation (e.g. natural hazard).

The term disaster risk therefore refers to the potential (not actual and realised) disaster losses, in lives, health status, livelihoods, assets and services, which could occur in a particular community or society over some specified future time period. Disaster risk is the product of the possible damage caused by a hazard due to the vulnerability within a community. It should be noted that the effect of a hazard (of a particular magnitude) would affect communities differently (Von Kotze, 1999:35). This is true because of the level of the coping mechanisms within that particular community. Poorer communities are therefore more at risk than communities that do have the capacity to cope.

Risks exist or are created within social systems. The social context in which risk occurs is an important consideration. It should also be noted that people therefore do not share the same perceptions of risk and their underlying causes due to their social circumstances. To determine disaster risk three aspects need to be present: a

hazard, vulnerability to the hazard and some form of coping capacity. These terms will now enjoy greater attention.

2.3 Hazard

A hazard is defined as "a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage" (UNISDR, 2009).

Hazards can be single, sequential or combined in their origin and effects. Each hazard is characterised by its location, intensity, probability and likely frequency. Typical examples of hazards can be the absence of rain (leading to drought) or the abundance thereof (leading to flooding). Chemical manufacturing plants near settlements can also be regarded as hazardous; similarly, incorrect agricultural techniques will in the long run lead to possible disasters. Hazards can either be a creation of humans (anthropogenic) or the environment (natural). Although the former can more easily be planned for than the latter, in both cases the management of the hazard will remain the same. Our development efforts and attention should therefore be focused on the presence of various hazards and this must inform our planning.

A distinction should also be made between normal natural occurrences and natural hazards. Natural phenomena are extreme climatological (weather), hydrological (water), or geological (earth) processes that do not pose any threat to persons or property. A massive earthquake in an unpopulated area (e.g. the Sahara desert) is a natural phenomenon. Once the consequences (a possible hazardous situation) of this natural phenomenon come into contact with human beings it becomes a natural hazard. If this natural hazard (due to the unplanned or poorly planned activities of the human beings), affects them so that they are unable to cope, the situation becomes a disaster.

Difference between a hazard and a disaster

"Strictly speaking there are no such things as natural disasters, but there are natural hazards. A disaster is the result of a hazard's impact on society. So the effects of a disaster are determined by the extent of a community's vulnerability to the hazard (conversely, its ability, or capacity to cope with it). This vulnerability is not natural, but

the result of an entire range of constantly changing physical, social, economic, cultural, political and even psychological factors that shape people's lives and create the environments in which they live." Twigg (2001:6).

2.4 Vulnerability

Vulnerability is defined as the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard. Vulnerability is a set of prevailing or consequential conditions arising from various physical, social, economic and environmental factors which increase the susceptibility of a community to the impact of hazards (UNISDR, 2002:24). It can also comprise physical, socio-economic and/or political factors that adversely affect the ability of communities to respond to events (Jegillos, 1999). Blaikie et al. (1994) are of the opinion that vulnerability is constituted by the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a hazard. Vulnerability can be expressed as the degree of loss resulting from a potentially damaging phenomenon or hazard. It is therefore the extent to which a community will degrade when subjected to a specified set of hazardous conditions.

Vulnerability has some distinct underlying causes. The magnitude of each disaster, measured in deaths, damage, or costs (for a given developing country) increases with the increased marginalisation of the population. This can be caused by a high birth rate, problems of land tenure and economic opportunity, and the misallocation of resources to meet the basic human needs of an expanding population. As the population increases, the best land in both rural and urban areas is taken up, and those seeking land for farming or housing are forced to accept inadequate land. This offers less productivity and a smaller measure of physical or economic safety, thus rendering the community vulnerable.

2.5 Coping capacity

Coping capacity for disaster risk reduction refers to the ability of people, organisations and systems, using available skills and resources, to face and manage adverse conditions such as hazards, emergencies or disasters. Coping capacities contribute to the reduction of disaster risks (UNISDR, 2009). The focus here should

therefore not only be on the individual or the community but also the capacity of the supporting mechanisms to the individual and the community at large. For example, one specific community might consist of a number of new immigrants but this new community might enjoy the support of the local municipality. In themselves the new community might not have cohesion yet, but their capacity lies in the support which they have. Similarly an impoverished community might not be the focus of development, but inherent in their internal social and economic structures they might possess significant coping capacity and resilience. Coping capacity is therefore just as much about what a community internally possesses, as the external structures on which they depend.

2.6 Resilience

In the natural environment, resilience means that an area or eco-system under threat is restored to its original pristine state. In the construction and engineering industry, resilience would be the ability of metal or a structure to return to an original state – being able to withstand shock, weight or pressure. However, human systems cannot be untouched by life events – they do not necessarily return to an original or former state and the challenge is to continuously develop, improve and refine existing structures, systems and environments in order to progress. Returning to an original or previous state therefore corresponds with the tendency of certain communities to return to vulnerable locations and rebuild their houses, without improving conditions and increasing chances to progress. Resilience, however, implicitly requires improvement.

The UNISDR defines resilience as “the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions” (UNISDR, 2009). This definition therefore considers the presence of a hazard and not a disaster. Thus once a disaster actually occurs, it would be incorrect to refer to resilience but rather to coping capacity. Resilience and the building of resilience should therefore be seen as an integral part of disaster risk reduction activities.

Resilience therefore means the ability to “spring back from” a shock. The resilience of a community in respect of potential hazard events is determined by the degree to

which the community has the necessary resources and is capable of organising itself both prior to and during times of need (UNISDR, 2009).

2.6 Emergency and disaster management

This involves: “The organisation and management of resources and responsibilities for addressing all aspects of emergencies, in particular preparedness, response and initial recovery steps. An emergency is a threatening condition which requires urgent action. Effective emergency action can avoid the escalation of an event into a disaster. It involves plans and institutional arrangements to engage and guide the efforts of government, non-government, voluntary and private agencies in comprehensive and coordinated ways to respond to the entire spectrum of emergency need” (UNISDR, 2009).

The expression “disaster management” is sometimes used instead of emergency management. The later discussion (see section 6.4) of disaster management and disaster risk management aims to put disaster management in perspective.

2.7 Disaster risk reduction

Disaster risk reduction (also referred to as just disaster reduction) is defined as the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse effects. Disaster reduction strategies include, primarily, vulnerability and risk assessment, as well as a number of institutional capacities and operational abilities. The assessment of the vulnerability of critical facilities, social and economic infrastructure, the use of effective early warning systems, and the application of many different types of scientific, technical, and other skilled abilities are essential features of disaster risk reduction.

2.8 Disaster risk management

Disaster risk management is the systematic process of using administrative directives, organisations, and operational skills and capacities to implement strategies, polices and improved coping capacities in order to lessen the adverse

impacts of hazards and their possibility of disaster. Disaster risk management aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness (UNISDR, 2009).

The interaction between disaster risk reduction and disaster risk management is clear. Disaster risk reduction concerns activities more focused on a strategic level of management, whereas disaster risk management is the tactical and operational implementation of disaster risk reduction.

3. INTERACTION OF HAZARDS, VULNERABILITY AND DISASTER RISK

In the previous section you were able to develop an understanding of core concepts which included the terms hazard, vulnerability and disaster risk. In this section we will examine how the interaction between hazards and vulnerability translate into disaster risk. In the process, we will identify the political, economic, physical, social, and ecological factors that interact to increase the susceptibility of individuals, households and communities to the impact of hazards. The identification of these factors provides the basis for the prioritisation of initiatives which will contribute to reducing vulnerability and thus to eliminating and/or reducing disaster risk. The initiatives so prioritised should then be integrated by the various spheres of government into sustainable development and disaster risk reduction planning. Disaster risk reduction is only valuable once one understands the contexts in which people live, the changing environment in which they find themselves, the impact of this environment on their ability to sustain their livelihoods and the presence of a number of natural forces (natural hazards).

Hazards in themselves do not constitute disasters. The magnitude of a disaster is usually described in terms of the adverse effects which a hazard has had on lives, property and infrastructure; environmental damage; and the costs attached to post-disaster recovery and rehabilitation. In other words there is a direct link between the capacity of those affected to withstand, cope and recover from the adverse affects of a hazard using only their own resources, and what constitutes disaster risk. Put simply disaster risk is the product of the combination of three elements – vulnerability, coping capacity and hazard (UNISDR 2002:41). The following notation

illustrates this interaction:

$$\textbf{Disaster risk (R)} = \frac{\textbf{Vulnerability (V) x Hazard (H)}}{\textbf{Capacity (C)}}$$

OR

Disaster risk = function of H and V/C

It is common cause that in countries where the majority of the population have been marginalised the adverse effects of hazards are of far greater magnitude. The interaction of political, physical, social, economic and environmental conditions which are linked to the marginalised state of those communities translates into extremely unsafe and fragile conditions thus rendering them most vulnerable to the impact of hazards (UNISDR 2002:47). In South Africa, for example, the apartheid ideology of the previous government (which resulted in the majority of the population being forced to live in severe poverty in extremely unsafe conditions without access to basic services) has left a legacy of individuals, households and communities highly susceptible to the impact of hazards. Vulnerability is the key element in the link between hazards and what constitutes disaster risk.

To understand disaster risk one needs to find answers to the following questions:

- ***Where do people live?***
- ***Why do people live there?***
- ***How do they make a living?***
- ***What is important for them to protect?***

Understanding and finding answers to these four basic questions goes a long way in making sense of the disaster risk which exists within various systems. Human beings are complex and sometimes culture, beliefs, political orientation, link to nature and the environment, economic well-being, and even social networks, have a profound impact on how people perceive the disaster risks which they face. Any perception of a phenomenon can be directly linked to the actions associated with it. Thus, if women and men find the economic benefit of living in a flood line more advantageous than the risk associated with placing themselves in harm's way, then people will not necessarily nor voluntarily take corrective actions to mitigate the disaster risk.

The section to follow will further pursue the idea of vulnerability and will provide

explanations of the various factors which increase or decrease vulnerability and capacity.

4. UNDERSTANDING VULNERABILITY

There is common consensus among disaster risk scholars on the factors which compound or alleviate vulnerability. These will be discussed below.

4.1 Political factors

The level of vulnerability in any community can be directly linked to the political will and commitment to developmental concerns. Vulnerability is as much about the exposure to a given hazard as the decision-making linked to development which will address conditions of vulnerability. A set of deep-rooted socio-economic elements which include aspects such as denial of human rights, denial of access to power structures, access to quality education, employment opportunities, land tenure, availability of and access to resources, access to infrastructure, basic services and information, together have the ability to create and maintain extreme levels of vulnerability.

Political will is fundamental to disaster risk reduction. This was demonstrated in 1994 when South Africa's new democratic government decided to adopt a new approach to the management of disasters and risks. This led to a total reform of the country's disaster risk management policy and legislation. Similar examples exist in countries such as Mozambique, Lesotho, Madagascar and the Seychelles, where political will to change, drove the disaster risk reduction agenda and reform processes. Political change is mostly accompanied by economic reforms which in turn have a spill-over effect on how development is planned and how poverty and vulnerability are reduced.

"Managing risk depends on political will. Political will depends on political leadership and a shifting of incentives, pressures and polemics. The political costs of redirecting priorities from visible development projects to addressing abstract long-term threats are great. It is hard to gain votes by pointing out that a disaster did not *happen. How can we, who see risk management as a central priority and who have valuable technical knowledge and skills to contribute, enter this policy arena? This question is at the centre of the [disaster risk reduction] discourse. We know now that we must*

engage, but do we know how?" ***(Christoplos et al., 2001:195)***.

4.2 Economic factors

Whilst a wide range of factors combine to contribute to levels of vulnerability to the impact of hazards in developing countries, poverty probably has the single most important influence. The eradication of poverty therefore is crucial to vulnerability reduction.

The economic status of the population relates not only to the degree of losses in terms of lives, property and infrastructure but also to the capacity to cope with and recover from adverse effects. Virtually all disaster studies show that the wealthiest of the population (women and men) either survive the impact of a hazard without suffering any adverse effects or are able to recover quickly (due mostly to the presence of insurance, savings, investments or some other financial instrument to fall back on). Poverty and lack of access to land and basic services explains why people in urban areas are forced to live on hills that are prone to landslides, or why people settle near rivers that invariably flood their banks. Poverty explains why droughts claim poor subsistence farmers as victims and rarely the wealthy, and why famine, more often than not, is the result of a lack of purchasing power to buy food rather than the absence of food.

Increasingly, poverty also explains why many women and men are forced to move from rural areas to the cities in search of job opportunities or to other parts of a country or even across borders to survive (e.g. Migration from Zimbabwe into South Africa). Such crisis-induced migration and rapid urbanisation pose considerable challenges to the authorities with unplanned settlements and longer-term development, as well as immediate assistance in the case of displaced persons. Poverty and lack of access to land force people to build temporary, unsafe dwellings in crowded, dangerous locations (UNDP, 1992:6).

Lack of access to basic services, like water and sanitation, forces people to use unsafe water sources for cooking and drinking and places them at risk of disease and epidemics. People without access to electricity or alternative fuel sources are forced to chop down trees for firewood which in turn leads to environmental degradation and increases the danger of flooding. Similarly naked flames used for

lighting and heat can result in catastrophic domestic fires especially in informal settlements such as those we find in urban centres such as Dar es Salaam, Lusaka, the Cape Flats in South Africa, and Antananarivo.

There is also an obvious connection between the increase in losses from a disaster and the increase in population. A rapid increase in population makes it inevitable that more people will be affected by the impact of hazards because more will be forced to live and work in unsafe areas. If there are more people and structures where a disaster strikes, then it is likely there will be more of an impact. Increasing numbers of people competing for a limited amount of resources (such as employment opportunities and land) can lead to conflict. This conflict in turn may also result in crisis-induced migration (UN 1992:6).

It remains imperative for every sector in each sphere of government to prioritise poverty eradication and the creation of sustainable livelihoods in all disaster risk reduction and development planning.

4.3 Physical factors

Physical vulnerability refers to the susceptibility of individuals, households and communities to loss due to the physical environment in which they find themselves (UNISDR 2002:47) (refer back to the question on: “Where do people live?”). It relates to aspects such as access to suitable land, land use planning, housing design, building standards, materials used for building houses, engineering, accessibility to emergency services and other similar aspects. Physical vulnerability may be determined by aspects such as population density levels, remoteness of a settlement, the site, design and materials used for critical infrastructure and for housing (UNISDR, 2002).

In many countries in Africa it relates particularly to the vulnerability of communities living in densely populated informal settlements, which are poorly sited and unplanned. Housing structures are built with improvised materials which are flimsy and highly flammable. Structures have poor, if any, foundations and are built in close proximity to each other. This poor physical environment exposes people to hazards such as landslides, floods, fires, wind, disease and epidemics. In addition, poor planning and the proximity of structures limit access by emergency services in the

event of an emergency or disaster.

Physical vulnerability also relates to remotely located settlements, their location, the design of building structures, and their ability to withstand the elements and hazards, as well as their lack of access to services, infrastructure and information.

4.4 Social factors

The level of social well-being of individuals, households and communities directly impacts on their level of vulnerability to hazards. Levels of education, literacy and training, safety and security, access to basic human rights, social equity, information and awareness, strong cultural beliefs and traditional values, morality, good governance and a well-organised cohesive civil society, all contribute to social well-being with physical, mental and psychological health being critical aspects. Vulnerability is not equally distributed. Minority groups, the aged, orphans, nursing mothers and their offspring, and the disabled are more vulnerable than others. The issue of gender and in particular the role of women requires special consideration (UNISDR 2002:47), and is taken up in a section below.

A lack of awareness and access to information can also result in increased levels of vulnerability. Disasters can happen because people vulnerable to them simply do not know how to heed early warnings and to get out of harm's way or to take protective measures. Such ignorance may not necessarily be a function of poverty, but a lack of awareness of the measures than need to be taken to build safe structures in safe locations, or safe evacuation routes and procedures. Other populations may not know where to turn for assistance in times of acute distress. Nevertheless, this point should not be taken as a justification for ignoring the coping mechanisms of the majority of people affected by disasters. In most disaster-prone societies, there is a wealth of understanding about disaster threats and responses. This understanding should be incorporated into any efforts to provide external assistance (UN, 1992:9). The incorporation of indigenous knowledge into disaster risk management activities supports the above statement.

Transitions in cultural practices inevitably take place and many of the changes that occur in all societies lead to an increase in the societies' vulnerability to hazards. Obviously all societies are constantly changing and in a continual state of transition.

These transitions are often extremely disruptive and uneven, leaving gaps in social coping mechanisms and technology. These transitions include nomadic populations that become sedentary, rural people who move to urban areas, and both rural and urban people who move from one economic level to another. More broadly, these examples are typical of a shift from non-industrialised to industrialising societies.

An example of the impact of these transitions is the introduction of new construction materials and building designs in a society that is accustomed to traditional materials and designs. This can be illustrated by the urbanisation of the rural population which also results in the loss of the social support system or network to maintain the moral fibre and to assist in the relief and recovery from the impact of hazards. The traditional coping mechanisms may not exist in the new setting and the population becomes increasingly dependent on outside interveners to help in this process. Conflicting as well as transitional cultural practices can also lead to civil conflict, for example, as a result of communal violence triggered by religious or socio-economic differences, such as the xenophobic violence in South Africa in the mid-2000s.

"A great social cohesion and regulation improves the coping capacities, whereas social insecurity increases vulnerability. In this sense the decline of traditional structures, civic groups or communities formerly engaged in the collective well-being, or in the protection of the weakest people, can strengthen the disastrous consequences of a hazard" ***(UNISDR 2002:47)****.*

4.5 Environmental factors

The discussion of environmental aspects of vulnerability covers a very broad range of issues in the interacting social, economic and ecological aspects of sustainable development relating to disaster risk reduction. The key aspects of environmental vulnerability can be summarised by the following five distinctions:

- The extent of natural resource depletion;
- The state of resource degradation;
- Loss of resilience of the ecological systems;
- Loss of biodiversity; and
- Exposure to toxic and hazardous pollutants (UNISDR 2002:47).

Many disasters are either caused or exacerbated by environmental degradation.

Deforestation leads to rapid rain run-off, which contributes to flooding. The creation of drought conditions and the relative severity and length of time the drought lasts are mainly natural phenomena. Drought conditions may be exacerbated by:

- poor cropping patterns;
- overgrazing;
- the stripping of topsoil;
- poor conservation techniques;
- depletion of both the surface and subsurface water supply; and
- unchecked urbanisation (UN 1992:9).

"As natural resources become more scarce the range of options available to communities becomes more limited, reducing the availability of coping solutions and decreasing local resilience to hazards or recovery following a disaster. Over time environmental factors can increase vulnerability further by creating new and undesirable patterns of social discord, economic destitution and eventually forced migration of entire communities" ***(UNISDR, 2004:43)****.*

It is a truism that our own exploitation of the environment is the source of our catastrophes. The issue of cholera in rural areas is a good example of this interaction. Water pollution by human waste material is the causal factor for cholera. Communities and authorities are aware of this fact, yet year after year, the same areas that are susceptible to cholera are overwhelmed by it.

On the one hand, the problem lies in the inadequate provision of sanitation and safe water by the relevant authorities. On the other, communities have choices to take action towards reducing their vulnerability and take responsibility for their well-being. A simple start would be the construction of pit latrines, treating water prior to consumption and educating children.

4.6 The progression of vulnerability and safety

First published in 1994 by Blaikie et al.(1994:23) and then again in 2004 (by Wisner et al., 2004:49-52), the Disaster Pressure and Release Model (PAR) has become the internationally accepted model for the explanation of the progression of vulnerability and the progression to safety (risk reduction). Although already published in 1994,

this model is even more relevant today (UNISDR, 2004:71). The Pressure Model indicates that there are certain underlying causes, dynamic pressures and unsafe conditions which contribute to vulnerability. Linking the above to a hazardous trigger event, increases the risk in communities.

Vulnerability is depicted in the model as the progression of three stages:

- Underlying causes: a deep-rooted set of factors within a society that together form and maintain vulnerability.
- Dynamic pressures: a translating process that channels the effects of a negative cause into unsafe conditions; this process may be due to a lack of basic services or provision or it may result from a series of macro-forces.
- Unsafe conditions: the vulnerable context where women and men and property are exposed to the risk of disaster; the fragile physical environment is one element; other factors include an unstable economy and low-income levels.

The Pressure Model shows that the progression of vulnerability plays an integral part in understanding community vulnerability and why communities are susceptible to disaster risks. From the model it is therefore clear that the main focus in reducing risks in communities is to address a significant number of development and socio-political issues. This correlates with our earlier discussion of the different domains of vulnerability. The pressure through the progression of vulnerability needs to be reversed. The Pressure Release model shows how.

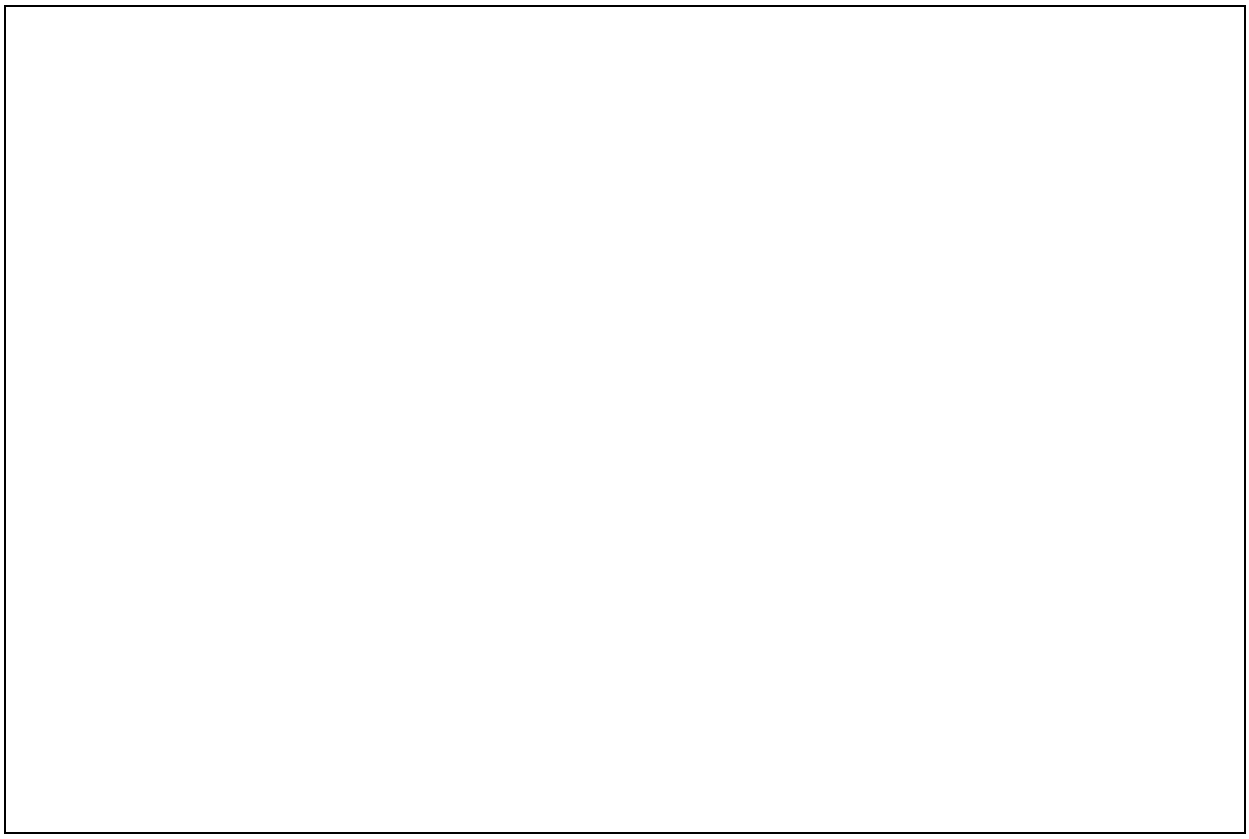

Figure 1: The pressure model (Wisner *et al*., 2004)

The Pressure Release Model explains reversing the risk pressure created by the aspects mentioned above in order to create safe communities. In order to reduce the risk of communities in accordance with the Pressure Model one needs to engage in certain risk reduction activities.

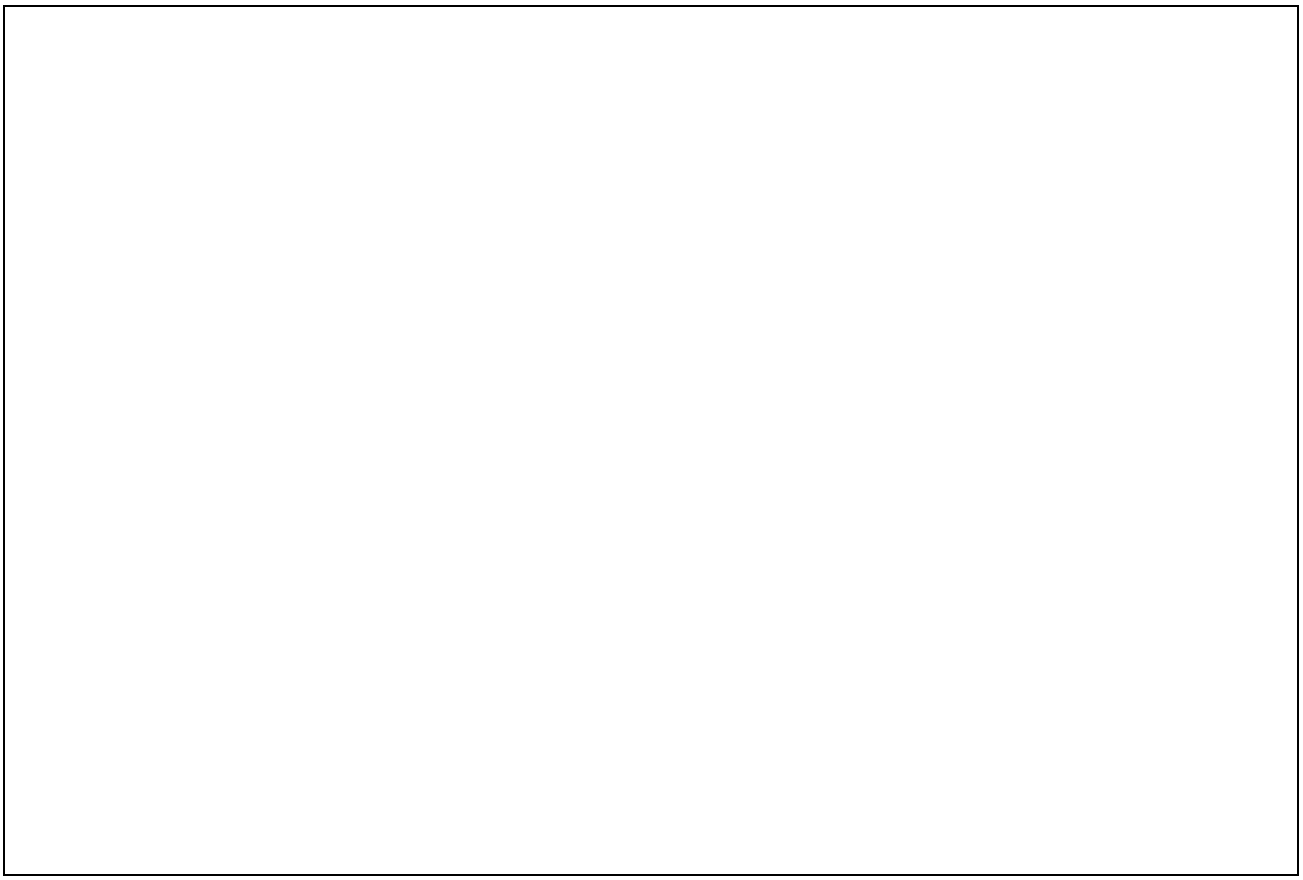

Figure 2: The pressure release model (Wisner *et al*., 2004)

As can be seen from the above model, a key factor influencing the level of vulnerability in any community is the existence of hazards. The next section will shed more light on hazard types and their dynamics.

5. UNDERSTANDING HAZARDS

The Earth as a dynamic, living environment consists of a number of processes which make life on this planet possible. The geology of the Earth, the Earth's proximity to the Sun, the carbon, nitrogen and water cycles all contribute to a sustainable planet. However, these life-giving cycles and processes in themselves are hazardous at times. Floods, earthquakes, cyclones, tornadoes, wild fires and the like, all occur due to the existence and interaction of natural processes. As has been mentioned, natural hazards in themselves do not constitute disasters but they can exploit human vulnerability and the systems on which humans depend. The section to follow will provide a brief introduction to hazards and their classification.

5.1 Classification of hazards

The management of hazards depends greatly on our understanding of the phenomenon. Science linked to the understanding of hazards is well defined through various disciplines and scientific knowledge bases. To this end it is important to note that specialised skills and understanding are necessary for their effective management. Some common characteristics of hazards allow us to classify them in overarching groups. Internationally various classifications are used. “Living with Risk: A global review of disaster reduction initiatives” (UNISDR 2002:44) chooses to classify hazards in the following three categories:

- Natural hazards;
- Technological hazards; and
- Environmental degradation.

Hazards can be single, sequential or combined in their origins or effects. Some hazards may have a natural or human-induced origin. For example wild fires and desertification can be classified as a natural hazard or referred to as environmental degradation.

5.1.1 Natural hazards

Natural hazards are natural phenomena that may lead to a disaster and that can be classified according to origin. The following table provides examples of phenomena of each of the types of natural hazards:

ORIGIN	PHENOMENA/EXAMPLES
Geological hazards	• Earthquakes • Tsunamis • Volcanic activity and emissions • Mass movements e.g. landslides, rockslides, rock fall, liquefaction, submarine slides • Subsidence, surface collapse, geological fault activity

Hydrometeorological hazards	• Floods, debris and mudflows • Tropical cyclones, storm surges, thunder/hailstorms, rain and windstorms, blizzards and other severe storms • Drought • Desertification • Veld fires • Heat waves • Sand or dust storms • Permafrost • Snow avalanches
Biological hazards	• Outbreaks of epidemic diseases • Plant or animal contagion • Extensive infestations

Table 1: Classification of natural hazards

5.1.2 Technological hazards

Technological hazards represent danger originating from technological or industrial accidents, dangerous procedures, infrastructure failures or certain human activities, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Sometimes referred to as anthropogenic hazards, examples include industrial pollution, nuclear activities and radioactivity, toxic wastes, dam failures; transport, and industrial or technological accidents (explosions, fires, spills).

5.1.3 Environmental Degradation

Degradation of the environment concerns processes induced by human behaviour and activities (sometimes combined with natural hazards) that damage the natural resource base or adversely alter natural processes or ecosystems. Potential effects are varied and may contribute to an increase in vulnerability and the frequency and intensity of natural hazards.

Some examples of these processes are:

- Land degradation;
- Deforestation;
- Desertification;
- Veld fires;
- Loss of biodiversity;
- Land, water and air pollution;

- Climate change;
- Sea level rise; and
- Ozone depletion.

5.2 Types of hazards

The various hazards differ in terms of their rate of onset. Broadly speaking a distinction is made between rapid and slow onset hazards. Note should be taken of the fact that one particular hazard can be both rapid and slow onset (e.g. flooding).

5.2.1 Slow onset hazards

Slow onset hazards are the easiest to predict and plan for, but can have the biggest environmental impact. This type of hazard is normally preceded by a number of early signs or indicators. Early warning and early warning systems play an important role in risk reduction, preparedness and mitigation of such possible disasters. Examples of slow onset hazards are droughts, landslides due to heavy rains, environmental degradation or pollution, deforestation, desertification and tropical cyclones. Interestingly enough, early warning signs often tend to be ignored until it is too late to take any risk reduction or preventive action.

5.2.2 Rapid or sudden onset hazards

As the classification indicates, rapid or sudden onset hazards strike without any or very little prior warning. Despite these hazards being mostly unpredictable, proper planning and preparedness can mitigate the effects of such disasters. Examples of this type of hazard are wild fires, floods and flash floods, volcanic eruptions, tsunamis (tidal waves), and pest infestations.

In assessing disaster risk, the impact of a given hazard - be it either natural or technological or be it environmental degradation - will depend on:

- the probability of its occurrence;
- its intensity and characteristics;
- the susceptibility of the elements at risk based on the political, physical, social, economic and environmental conditions prevailing; and
- the capacity of the affected individual, household and community to cope, withstand and recover from the impact of the hazard (UNISDR 2002:41).

5.3 Characteristics of hazards

Each hazard, depending on type (as listed above), has some known and quantifiable characteristics. Each of these characteristics has a direct correlation between the risk perception of the hazard and the historical and current data available on the hazard in question. The absence of information or perception leads to inadequate assessment of the hazard. The characteristics of a hazard can be classified in terms of its identity, nature, intensity, extent, scope, predictability and manageability. These characteristics should be considered in the light of “all being equal”, in other words without taking into consideration the possible presence of coping mechanisms. These characteristics can be divided into permanent and temporal.

5.3.1 Permanent characteristics of hazard occurrence

The permanent characteristics of hazards are:

- Hazard identify
- Nature;
- Intensity;
- Extent;
- Predictability; and
- Manageability.

5.3.1.1 Hazard identity

Hazard identity relates to the available knowledge of a hazard. As can be seen from the classification above, different types of hazards can be grouped according to their identity. The origin of the hazards was used in the above example to classify the hazards. The origin of the hazard can also be largely explained by considering the natural cycles of the Earth. The first aspect to consider in hazard identity is the development of the hazard. The environment in which it originates plays a crucial part in its effective management – be it primary (e.g. devastation caused by swift water) or secondary consequences (famine due to the destruction of crops by a flood). Should we use the above classification of hazards it is clear that each of these hazard types can be classified according to its behaviour. It is therefore crucial to first assign an identity to a hazard in order to classify and determine its nature.

5.3.1.2 Nature

The nature of hazards relates to the types of forces associated with the hazard. By determining the forces of the hazard (aspects that “drive” the hazard) one will be able to determine its likely intensity and extent. Understanding the different cycles and processes of the Earth therefore becomes crucial. In the event of earthquakes or volcanic activity an understanding of the movement of the earth’s mantle will provide one with an understanding of the possible forces of the hazard. Similarly, understanding the dynamics of water will contribute to its predictability (all other elements considered). The nature of a hazard is therefore those dynamic aspects and variables over which the human race has no control. This is mostly due to the interaction of the different systems and cycles of the Earth.

In the case of technological hazards and environmental degradation, the nature of the hazard relates to the careless and unplanned activities of human beings. If technological hazards are considered in this light, then one can easily argue that these types of hazards are easier to plan for and predict, because human beings have direct control over their outcome.

5.3.1.3 Intensity

The capacity or potential of destructive forces or the effects of the hazard contribute to its intensity. In the case of flash, surge or coastal floods, one of the primary effects is the destructive momentum that exists within a large body of water: The more water, the higher its intensity and its destructive capabilities. Should one therefore consider X amount of water, flowing at Y speed, one will be able to determine its momentum and possible impact on elements at risk (e.g. dam wall resistance or the capacity of wetlands to absorb the flow). Another potential capacity of floods is the rapid rise of water levels. Understanding the intensity of the hazard will allow for determining the amount of water run-off, linked to the prevailing water table, linked to the gradient of the area, and linked to the existing infrastructure etc. All of this will in the end contribute to determining the potential risk a hazard might pose. In simulation exercises, the intensity of the hazard can be used as a means of establishing its possible impact on a given society. It can also be used to determine the different levels of risk which the elements at risk are under. In this way certain acceptable parameters can be established which will allow for effective disaster risk

reduction, development and contingency planning.

5.3.1.4 Extent

The geographical distribution or range of impact of a hazard and the nature and intensity of the given hazard will determine its extent. Although the geographical distribution of hazards may vary (due to their identity), their impact will determine the degree of loss. The extent of a hazard will further be influenced by the prevailing circumstances of the elements at risk. The impact of the same hazard on different geographic areas will differ significantly. Imagine that flood “A” has a particular nature and intensity and occurs in a well-developed urban area. This area might have all the relevant infrastructure and forewarning to deal with the nature of the hazard. The same flood “A” in a different community (e.g. deep rural community) will have a much different extent. If there is no coping capacity, the elements at risk will be much greater and the intensity will be exacerbated. The extent of a hazard can also be different due to its secondary consequences. Should a fire “F” replace flood “A”, the extent of the hazard changes dramatically if applied to our two areas. The traditional rural village might not be influenced to the extent of losing lives and property as the urban area might be, due to the presence of fuel load (e.g. more buildings, industries etc.) and greater population density.

5.3.1.5 Predictability

The predictability of hazards contributes to the reduction, mitigation and prevention of the impact of the hazard. Hazard predictability is determined by the physical or temporal properties of the hazard. The identity and nature of hazards provide us with valuable historical information that can be used in order to predict their consequences. Research in cyclones, tornadoes and severe weather conditions, such as lightning and hail, has shown that certain emerging patterns exist and this provides us with early warning indicators of the hazard. Most weather patterns can, with modern technology, be predicted quite accurately. This does not mean that their impact is lessened, but it provides us with a window of opportunity to adequately implement disaster risk reduction or contingency measures.

5.3.1.6 Manageability

The manageability of a hazard is the result of the primary causes or properties of the

hazard in question. As the intensity and extent of the hazard increase and its predictability decreases, the manageability of the hazard is influenced. Manageability in this instance relates entirely to the human activity of instituting measures to deal with the hazard and prevent a disaster. The existing resources and capacity to cope therefore play an important role. Less manageability contributes to a higher level of risk. Manageability will also be determined by the perception of the risk and the will to engage in measures to lessen or prevent the consequences of the hazard faced. The ability of the human element relating to the hazard in question becomes important.

5.3.2 Temporal characteristics of hazard

Temporal characteristics of hazards are those elements linked to time. These characteristics are typically associated with the following questions:

- When do they occur?
- How often?
- How long do they last?
- How quickly do they strike?
- Can we predict their behaviour?

5.3.2.1 Frequency

The first temporal characteristic of hazards that we need to consider is: How often does this event occur? The frequency of a hazard contributes to the perception of risk prevalent in different communities. The higher the frequency the greater the perception of risk will be throughout the elements at risk. A much lower frequency contributes to an attitude of “This will never happen to me”.

A variety of different types of information will provide us with facts on which to base our frequency analysis. Historical data constitute one of the most well-known and widely used sources of information. Certain patterns in relation to the characteristics of the hazard can be identified and fairly accurate deductions can be made. In determining the frequency of a hazard, we will be able to establish the possibility of the next hazardous event and its time and space variables. An accurate assessment and analysis of the frequency will provide us with an early warning system. Many of the current weather predictions are based on frequency analysis. It remains to be

said that the frequency of hazards also depends on their seasonality. Natural hazards tend to follow seasonal patterns. Flood in the rainy season offers a much greater frequency than in the dry season.

However, current changes in global weather patterns are increasingly making it more difficult to accurately determine hazard frequency. The presence of El Niño or La Nina, global warming, the greenhouse effect and the melting of the polar caps, make the determining of the frequency of different hydrometeorological hazards less accurate.

5.3.2.2 Duration

Different types of hazards, with different characteristics, have a different duration. The magnitude of the hazards and the coping mechanisms will have an obvious contribution to their duration (e.g. the presence of water or storm water channels in urban areas). The pace of onset will further play a critical role. The slower the onset the longer the possible duration of the hazard will be (e.g. droughts). A more rapid onset might have a short duration but could have effects that are more devastating. It should be noted that although some correlation exists between the speed of onset and the duration, this should not be used as a benchmark to measure duration. Duration in this instance should rather be linked to the magnitude of the hazard and the affected community's ability to cope. A rapid onset hazard such as an oil spill could have a lasting impact on the immediate environment whereas a slower onset hazard, such as a possible epidemic, could be prevented by adequate research into a vaccine and its application.

The duration of a hazard determines the period in which a community will be affected and this impacts on their resilience. A hazard (e.g. Monsoon rains in Asia) could have a seasonal characteristic in terms of its frequency and, based on this seasonality, the possible duration of the hazard is determined and planning is done accordingly. Should the duration of the hazard exceed the projected and planned for period, then a rapid depletion of the resource base of the affected people will occur, thus rendering at risk communities even more vulnerable.

5.3.2.3 Speed of onset

The third temporal characteristic of hazards is the rapidity of the arrival of impact.

The speed of onset naturally relates to mitigation and prevention measures. Should we find ourselves in a situation where the rapidity of the arrival of impact can be determined, we will be able to lessen the extent of the hazard. The information obtained from studying the other temporal characteristics of hazards will provide us with an understanding of the possible speed of onset. If we are able to determine the speed, we are granted a window of opportunity and forewarning in which we can take reduction and preventative action. Of course, the greater the speed of onset the less time for reaction is available.

5.3.2.4 Forewarning

Forewarning or early warning is the time between the identification or warning of a hazard and its actual impact. The speed of onset will therefore determine the period of warning. A more rapid onset hazard provides less forewarning than a slow onset hazard. The way in which different hazards (with different forewarning) will be managed becomes relevant. The less the forewarning the better our planning and systems must be in order to reduce the risk or respond to the hazard to diminish its impact. The warning period allows us to prevent loss of lives and property by removing the elements at risk from the impact area.

The above sections aimed to provide you with a very broad understanding of the dynamics which we consider as disaster risk. However, disaster reduction goes beyond a mere focus on the elements of the mentioned disaster risk notation. To reduce disaster risks it is imperative that one understands the broader framework and system in which disaster risks are created and the factors which can contribute to their effective reduction. The sections to follow will provide a much wider macro perspective on disaster risk reduction, emphasising the transdisciplinary nature of disaster risk reduction.

6. THE EVOLUTION OF THE STUDY OF DISASTERS AND RISK

The notion of disaster has undergone a dramatic transformation of meaning over time (see the work of Quarantelli, 1998b; Quarantelli & Perry, 2005). In the early development of humankind and civilisations, many, if not most, of the cultures around the world viewed disasters as acts of God (Drabek, 1991:4), or attributed

them to some false casual attractions such as “Des Astro” or “evil star”, “bad luck” and “blind faith” (Dombrowsky, 1998:19). Disasters were perceived as inevitable events which impact on humanity due to our inability to please gods, or by provoking their wrath. Development in science gradually started to question these perceptions and “truths” of disaster (see the early work of authors such as Westgate, O'Keefe, Wisner, Davis, Ritchie, Cardona, Jeggle, Cannon, Kent, to name but a few). Investigation into the intrinsic nature of disasters as well as the human reaction to and underlying causal factors creating disasters, progressively came under the spotlight.

6.1 Social science perspective

The focus on disaster and risk came about through various initiatives and events after the Second World War. The scientific study of disaster and risk is one such event. A focus on the development of disaster risk reduction and management would therefore be incomplete without a discussion of the roots of disaster studies and research both within the social as well as the natural sciences.

Some of the earliest recorded ideas on disaster and risk within the social sciences were expressed by the likes of Carr (1932) and Sorokin (1942) who questioned the influence of catastrophe on social patterns. Although these authors were known to some in this field of study, they were seldom explicitly acknowledged for their pioneering work (Quarantelli, 1998a:1), and they greatly influenced the subsequent works by others in disaster studies. Some of the first systematic work in disaster studies and research occurred in the 1950s (Eldenman, 1952; Powell, Rayner & Finesinger, 1952; Quarantelli, 1954; Quarantelli, 1957; Moore, 1956; Fritz & Williams, 1957) and 1960s (Drabek & Quarantelli, 1967; Dynes & Quarantelli, 1968), with a noticeable heightened interest in the 1970s (Doughty, 1971; Hewitt & Burton, 1971; Kreps, 1973; Dynes, 1974; Mileti, Drabek & Haas; 1975; Glantz, 1976; Westgate & O’Keefe, 1976; O’Keefe, Westgate & Wisner, 1976; Jager, 1977; Torry, 1978; Turner, 1978). These earlier theorists approached the concept of disaster from a social science as well as a natural/physical science perspective. It is also evident in this period (1970s) that European scholars were much more interested in this phenomenon than their American counterparts. The enormous contribution of American social science scholars since the 1980s can, however, not be denied.

Gilbert (1998:11) indicates that the social science perspective approached the study of disaster from three different paradigms, that of content research, chronological development and, lastly, cleavages. In the first instance disaster was viewed as a duplication of war - an external agent can be identified which requires communities to react globally against the “aggression”. The second (chronological development) views disaster as an expression of social vulnerability – disaster is therefore the result of underlying community logic or social processes. Thirdly, disaster is an entrance to a state of uncertainty – disaster is the impossibility of identifying and defining (real or perceived) dangers. It is therefore an attack on our perception and known reality. Cardona (2003:14) and Kreps (1998:33) are of the opinion that the above early paradigms within social science emphasised the reaction and perceptions of communities during and after emergencies and did not explicitly focus on issues of risk, or mitigating the risk of physical harm and social disruption before an event occurred.

6.2 Natural science perspective

The natural and physical science approach to disaster emphasised the hazard component in terms of hydrometeorological, geodynamic and technological/anthropogenic phenomena such as earthquakes, floods, mudslides, cyclones, industrial accidents and nuclear fallout, to name but a few. The natural sciences therefore aimed to understand the dynamics of hazards (Smith, 2002; Cutter, 1994) and from this standpoint tried to quantitatively determine (and simulate) their possible occurrence and impact on humans and the environment. Dombrowsky (1998:28) cautioned that although this approach has proven to be scientifically sound, it is impossible to recreate reality based on algorithms that simulate changes over time exactly.

Gilbert (1995:232-233) proclaims that the scientific approach to disaster and risk is in many instances a reflection of the “market” in which disaster research became an institutional demand. The historical disaster (and risk) studies literature tended to focus on “how the rich nations feel” (Sachs, 1990:26) and did not necessarily address the social, economic, and political realities in poorer countries most affected by disasters (and from recent events in the developing world it is clear that not much has changed). The natural sciences were, however, the first to address issues of

probability and risk based on quantifiable hazard variables. Moreover the focus on risk (as apposed to disaster) as a social phenomenon became evident during the latter part of the 1970s. In the 1980s a global realisation developed that disaster is not so much the size of the physical event but the inability of the stricken community to absorb the impact within its proper set of constraints and capacities (Lechat, 1990:2; Lavell, 1999) – refer back to the definition of a disaster above. This realisation highlighted the need for a risk rather than disaster focus in disaster studies and research.

6.3 Contemporary study of disaster risk

The modern-day study of disaster risk relates closely to the first understanding and investigation of disaster, both within a social and natural/physical science perspective, as explained above. Increasingly, theorising about disaster risk has given attention to difference, including how gender, race, class, age and other social power relationships bear on disaster risk. Cardona (2003:2), Kelman (2003:6-8) as well as Smith (2002:49-52) identified two schools of thought that have developed in terms of disaster risk since the 1980s. Cardona refers to these as the constructivist and objectivist or realist schools of thought. Smith's interpretation is that of behavioural and structural paradigms. Kelman simply refers to the social scientist and physical scientist's focus on risk. After assessing the work of the three authors it became clear that for all means and purposes the constructivist school of Cardona, the behavioural paradigm of Smith and the social scientist focus by Kelman refer to the same approach in the investigation of disaster, so too the objectivist, structural and physical scientist paradigms. The work of Cardona will be used to differentiate between these two aspects. (Note: These two schools of thought below should not be confused with the central argument of this section of disaster risk management and disaster management. The schools of thought discussed below refer to the focus on and study of disaster risk only.)

6.3.1 Constructivism

Constructivist thinking relates to social sciences where risk is viewed as a social construct (similar to the earlier disaster focus). This approach requires an understanding of social representations and perceptions, and the interaction between different social actors and phenomena. A consciousness developed that it

is conditions of risk, and the attitudes to risk, rooted in societies that inevitably lead to disasters. These conditions and attitudes to risk in Less Developed Countries (LDCs) are greatly dependent on the economic conditions present in a country. Such conditions necessarily force vulnerable societies (e.g. the poor) to accept the risks which they face, whereas rich societies can choose to avoid such risks.

6.3.2 Objectivism

The objectivist or realist school finds itself more within the natural and physical sciences. Within this school of thought it is believed that risk can be quantified and objectively judged. As with the earlier emphasis on the quantification of disaster, so the accent within the natural and physical sciences remained on the quantification of risk. This estimation of risk also translated into the economic and actuarial sciences that believe that risk can be determined through mathematical formulae. Hewitt (1998:76), a geographer, acknowledges that the social understanding of disaster is much more crucial to the contemporary disaster risk scene.

It would be unjust to assume that both of the mentioned schools of thought or paradigms enjoyed equal status within the international arena. Hewitt (1998:77-78) says that the pure focus on the social construct of disaster risk by the constructivists ignores the hazard or “agent-specific” approach. This approach remained the most common visualisation of disasters, even in the work of social scientists within the 1980s. The truth of this statement is evident in the objectives of the International Decade for Natural Disaster Reduction (1990-1999). Both of these schools of thought have made the paradigm shift from a pure disaster oriented focus to that of disaster risk. The contemporary understanding of risk has greatly increased to the extent that various scholars from a variety of different disciplines (e.g. sociology, anthropology, geography, architecture, agriculture, meteorology, engineering, law, and public administration and development studies) are jointly researching issues of disaster risk (Comfort *et al*., 1999; Vogel, 1999). The question still remains: what is the difference between disaster risk management and disaster management?

6.4 Disaster risk management vs. disaster management

To gain a better understanding of disaster management and disaster risk management, the interrelatedness between them should be examined. The subject

of disaster and risk reduction draws its relevance from earlier contributions and previous practices in the disaster management fields, where traditionally the focus has been on preparedness for response. Disaster risk management comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards. In comparing disaster risk management and disaster risk reduction it therefore clear that disaster risk management is the application of disaster risk reduction.

Traditionally disaster management as defined by the UNDP (1992:21) is "the body of policy and administrative decisions and operational activities which pertain to the various stages of a disaster at all levels". Figure 3 depicts these various stages.

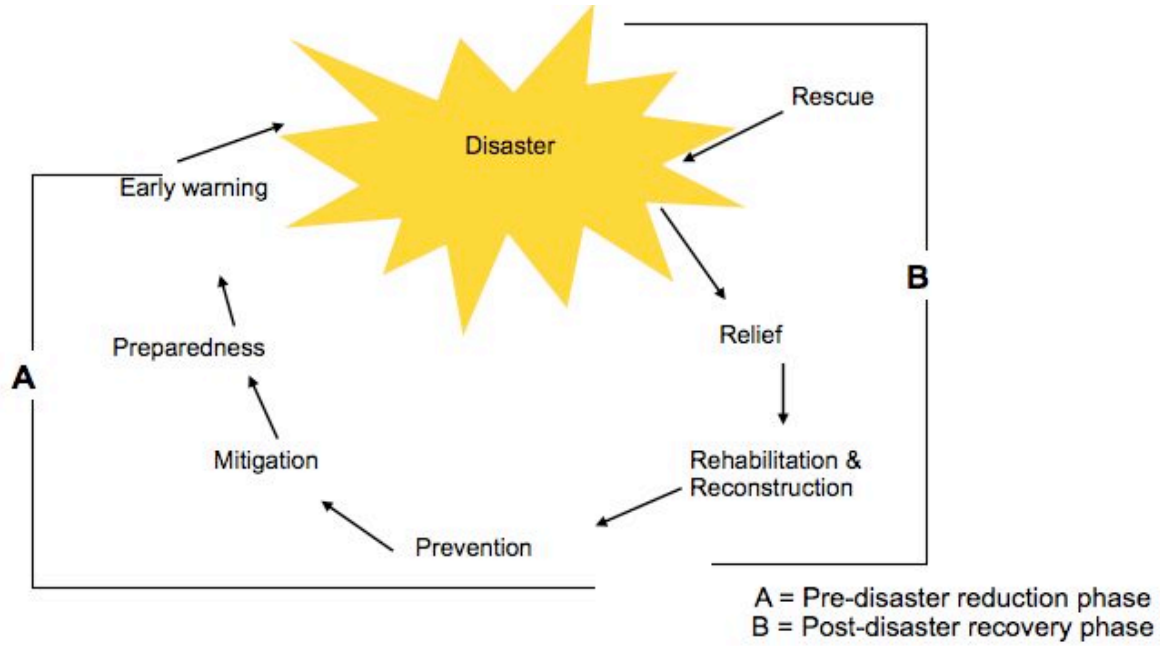

Figure 3: The traditional disaster management cycle

Disaster Management is defined by the South African Disaster Management Act 57 of 2002 as a continuous and integrated multi-sectoral, multidisciplinary process of planning, and implementation of measures, aimed at:

- preventing or reducing the risk of disasters;
- mitigating the severity or consequences of disasters;
- emergency preparedness;
- a rapid and effective response to disasters; and
- post-disaster recovery and rehabilitation.

Disaster management in its international form entails the integration of pre- and post-disaster activities in order to safeguard lives and property against possible disasters. At first glance, it seems as if disaster risk reduction forms an underlying tenant to disaster management in the definition supplied by the South African Disaster Management Act. Should this, however, have been the case in practice, then 15 years of disaster management in Africa should have yielded more results, less loss of life and livelihoods, and fewer disasters.

One significant problem with the disaster management cycle was that it still has a disaster-oriented focus. This means that all activities and resources are geared towards a disastrous event. A focus on the underlying causes of these disasters (e.g. risk, hazards and vulnerability) is in most cases not considered, or it is the product of bureaucratic ignorance. Many disaster managers still choose to refer to the “causal factors of disasters” as espoused by the UNDP Disaster Management Training Programme over two decades ago. When one critically judges these “causal factors” it becomes evident that most of them can be ascribed to some form of vulnerability created by human activity. Another weakness in the application of the disaster management cycle is that a number of practitioners viewed the implementation of the cycle as a phased approach where the activities follow a sequential path. The recognition that each of the cycle’s processes is simultaneous did not materialise in most cases.

Through multiple efforts, the importance and uniqueness of hazard and risk reduction for the future have become evident. In contrast to the earlier concepts of disaster management, hazard and risk reduction practices relate to significantly larger professional constituencies, and depend on much more diverse information requirements. While there is no doubt that emergency assistance and response will remain necessary, the potential consequences of increasingly severe hazards tell us that much greater investments need to be made to reduce the risk of social and economic hazards impacting on vulnerable conditions. The challenge for disaster risk management (though a mulit-pronged approach) in the coming years is to find effective means by which a much more comprehensive, and multi-sectoral, participation of professional disciplines and public interests can contribute to the reduction of disaster risk. Accomplishment of this goal requires both a political

commitment, as much as public understanding to motivate local community involvement. It is in no one's interest to continue to accept the rationale that the resources on which all societies depend must first be lost to hazards before their value is deemed worthy of protection, replacement, or repair. Disaster reduction policies and measures need to be implemented with a twofold aim: to enable societies to be resilient to hazards while ensuring that development efforts do not increase vulnerability to these hazards.

7. A FRAMEWORK FOR DISASTER RISK REDUCTION

In an effort to graphically display all of the various components of disaster risk reduction, the United Nations's International Strategy for Disaster Reduction developed a framework. Figure 4 is an initial effort to put disaster risk reduction into perspective given the transdisciplinary nature of the field. The framework must be studied with the preceding discussion on disaster risk management and disaster management in mind. One should take cognisance of the complex nature of disaster risk and all of the interrelated processes linked to disaster risk reduction. It would be foolish to think that one picture will encapsulate this very diverse field. However, this is an attempt to provide perspective on the phenomenon we call disaster risk reduction.

The most important aspect of the framework is the context in which disaster risk reduction occurs. If you reflect back to the definition of disaster risk reduction, the role of sustainable development is emphasised. It is thus not surprising that the foundation and context of the disaster risk reduction framework is sustainable development. The development/disaster reduction linkage will enjoy more attention later on in this text. Sustainable development means that we are using our current resources and doing our development planning in such a way that we do not compromise the abilities of future generations to also develop, utilising the same set of resources. Thus, if we deplete a major resource (e.g. fossil fuels), future generations inhabiting Earth must seek and development alternatives. This will thus be due to the present generation's inability to foresee the hardship which our development might bring. The same scenario applies to the disaster risk reduction field. Successful disaster risk reduction depends on its integration with much bigger issues such as the development agenda.

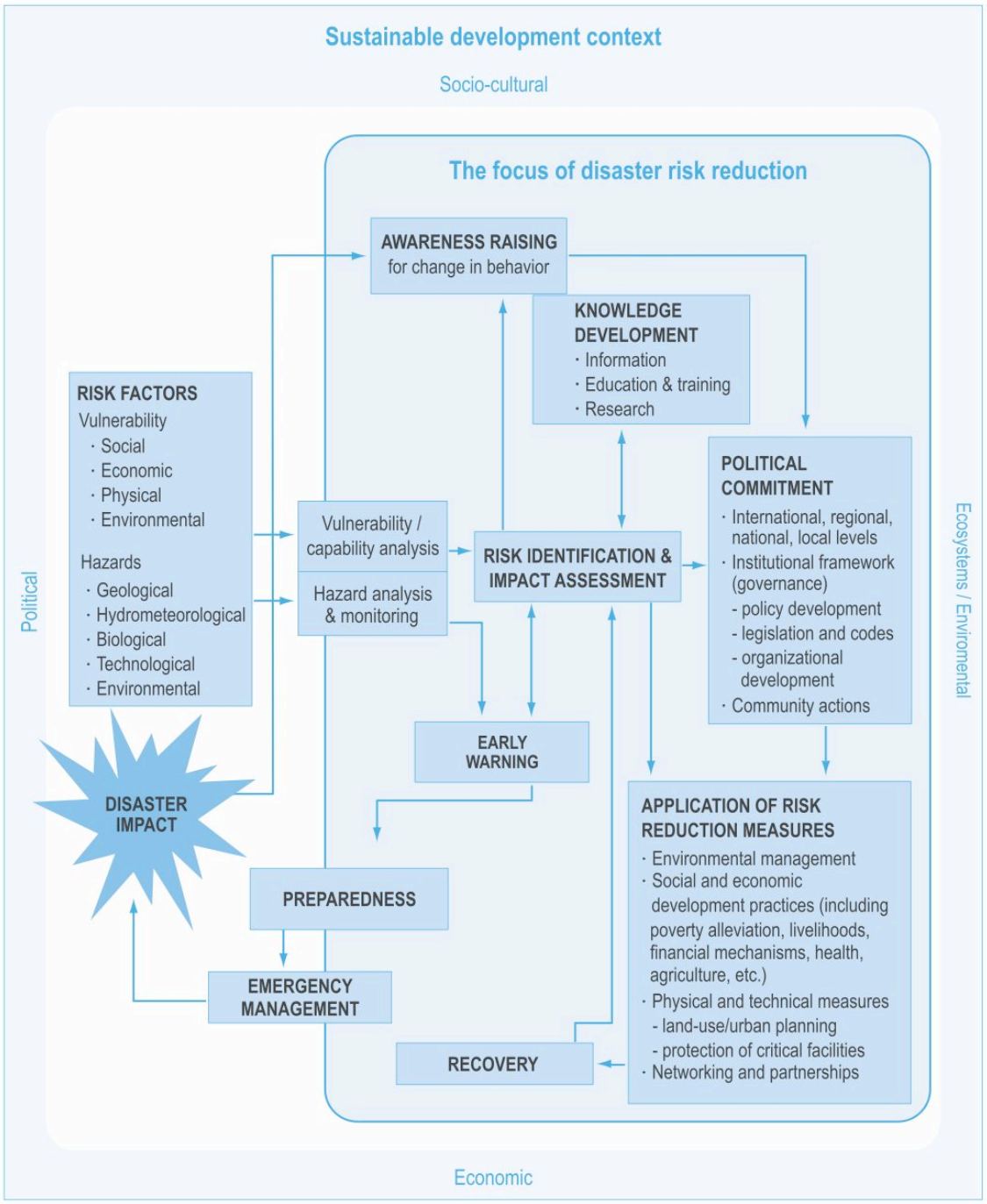

Figure 4: UNISDR Disaster Risk Reduction Framework (UNISDR, 2004)

One should note that the activities we as humans undertake for development and those linked to disaster risk reduction are very similar. Each aims at improving our current development state. The logic in this disaster risk reduction framework suggests that once we are successful in sustainable development efforts, we will greatly reduce the risks of disasters.

The sustainable development context consists of socio-cultural, political, economic,

and ecosystems or environmental domains (compare these aspects with the factors of vulnerability to identify the similarities). Each of these domains can either contribute to overcoming or exacerbating disaster risk.

The preceding sections aimed to put the elements which constitute disaster risk into perspective. It would therefore only make logical sense to start our explanation of the framework by focusing on the risk factors. The risk factors (both vulnerability domains and hazards) provide us with the context in which we need to understand and investigate the various levels of disaster risks. Vulnerability and capacity analysis, as well as hazard analysis and monitoring provide us with the required disaster risk information (refer back to the disaster risk notation). The above analysis allows for risk identification and also then the assessment of the possible impact of the hazardous event on vulnerable conditions. Once a disaster risk has been identified it can be managed. This is done in terms of creating awareness for behaviour change, but also through the creation of new knowledge. A change in behaviour could be or result in the needed political commitment for disaster risk reduction. In turn (as has been seen previously in this text) political commitment leads to changes in policy and governance aimed at enhancing disaster risk reduction capabilities and institutional capacities. We have many examples where political will has a direct impact on community actions and the ability of communities to take ownership of their own disaster risk reduction effort. However, a favourable environment is needed. Through political commitment certain disaster risk reduction measures can be implemented. This is where the transdisciplinary nature of disaster risk reduction comes into play. Such actions could include sound environmental management and socio-economic development practices such as: poverty alleviation; securing and enhancing livelihoods; gender equality; increased health; emphasis on sustainable agricultural practices; and even certain financial mechanisms such as social safety nets or even market-based insurance schemes. Certain physical and technical measures, for example land-use planning, urban and town planning, and the protection of critical infrastructure such as water and sanitation, electricity and communications are necessary for disaster reduction. Forming partnerships and networks (whether public-public, public-private or private-private) all lead to enhanced disaster risk reduction. The identification of the disaster risks should also be seen as a direct input into the risk reduction measures, e.g.

solving a flooding issue by building a dam or channels.

However, in an ideal world we will not have disasters if the aspects discussed above are all adhered to and functioning. We must make peace with the fact that we will never have complete knowledge on disaster risks, nor the full capacity to reduce their consequences. Some planning for disaster preparedness is necessary. Information linked to the hazard analysis and monitoring put us in a position which helps us to understand the various hazard characteristics. This in turn feeds into possible early warning systems. Identifying of hazard characteristics will provide us with triggers to monitor. These triggers are the tipping point in the hazardous impact which will guide either our preparedness or activation of appropriate emergency management contingencies.

From the framework it is thus clear that the actual disaster impact is neither the starting nor the ending point, but the main element which must be removed from the framework through all of the disaster risk reduction aspects discussed above. It should now be clear that disaster risk reduction functions in a much broader domain than a narrow focus on a disaster event. The UNISDR Framework is not complete, neither is it fully tested. It does, however, provide us with a very good indication and starting point for disaster risk reduction. The section to follow will provide information about the development/disaster reduction interaction and this in turn will be relayed to other crosscutting issues influencing our ability to reduce disaster risks.

8. DISASTERS AND DEVELOPMENT

In 1983, Fred Cuny published his seminal work on Disasters and Development. Although a number of studies had been published previously on the theme of disasters and social change, Cuny provided the first systematised and comprehensive series of ideas on the ways disasters may interrupt development processes, whilst at the same time offering opportunities for future development (Lavell, 1999:1). A considerable amount of academic thought was added to this debate during the eighties, particularly by Anderson (1985) and Anderson and Woodrow (1989). By the end of the 1980s the theme of disasters, environment and sustainability had also been alluded to in a number of articles edited by Kreimer (Kreimer, 1991; Kreimer & Zador, 1989b; Kreimer & Munasinghe, 1991). During the

1990s, the debate on disaster-development relations and the analysis of their practical implications for risk and disaster risk management finally came of age. The theme was to become the turning point in global thinking on dealing with disaster risk.

Increasingly around the world, governments and non-governmental organisations (NGOs) are assessing development projects in the context of disaster risk reduction and are designing disaster recovery programmes with long-term development needs in mind. To be successful, disaster reduction relies on being built into existing and ongoing development projects at every stage of the project management process, vis-à-vis: needs identification, project definition and planning, development of alternatives, implementation and monitoring.

For a long time, development programmes were not assessed in the context of disaster risk or disasters, nor the effect of a possible disaster on the development project, nor whether the development projects increased either the likelihood of a disaster, or increased the potential damaging effects of a disaster.

Without adequate disaster risk reduction planning as part of development projects (in the form of integrating disaster risk knowledge and development planning), the results can be catastrophic. It is therefore essential to develop a mind-set of long-term thinking for all actors involved in development programmes including government, professionals (engineers, architects, surveyors, town planners, and agricultural extension workers), legislators, inspectors, builders, councillors, and ultimately the beneficiaries.

Development requires institutional and structural transformations of societies to speed up economic growth, reduce levels of inequality and eradicate absolute poverty. Over time, the effects of disasters can seriously degrade a country's long-term potential for sustained development and cause governments to substantially modify their economic development priorities and programmes.

At the same time, disasters often provide opportunities for development. They can improve the atmosphere in favour of change and create a rationale to establish development projects such as job training, housing construction and land reform. The side effects of well-meaning development efforts sometimes have disastrous consequences. Development projects implemented without taking into account

existing environmental concerns may increase vulnerability to natural hazards. For example, projects designed to increase employment opportunities, and thus income, usually attract additional population growth. Low-income women and men may then have to seek housing in areas previously avoided, on hillsides or in floodplains. The costs of relief assistance after a landslide or flood can easily outweigh the benefits to the economy of more jobs. Similarly, development projects may lead to negative political consequences that increase the vulnerability to civil conflict. Development projects may even consciously force a choice between reducing disaster vulnerability and economic vulnerability. A project's design may require a trade-off between the two and force a decision on the lesser of two evils.

Despite increasing disaster and risk awareness in the international community, and the recognition of the importance of developing coherent plans for disaster risk reduction activities, it often takes the actual or imminent occurrence of a large-scale destructive event to stimulate individual governments to think about a developmental approach. Thus, a disaster can serve as a catalyst for introducing disaster risk reduction activities. Disasters often create a political and economic atmosphere in which extensive changes can be made more rapidly than under normal circumstances. For example, in the aftermath of a disaster, there may be major opportunities to execute land reform programmes, to improve the overall housing stock, to promote women’s economic empowerment, to create new jobs and job skills, and to expand and modernise the economic base of the community, opportunities that would not otherwise be possible. The collective will to take action is an advantage that should not be wasted.

9. TRANSDISCIPLINARY NATURE OF DISASTER RISK REDUCTION

An understanding of the transdisciplinarity of disaster risk reduction is crucial for its successful implementation. People are engaged in work, or in the course of pursuing their own livelihood interests, with actions that can either increase their vulnerability to potential loss and damages or alternately work to create safer conditions of resilience to disaster risks. As women and men’s lives become more complicated and unavoidably are associated with the activities of other people, additional and wider forms of social organisation and professional relationships become necessary.

Clearly it is not in the best interests of individuals, local communities, or the needs of any society to wait for damage to occur and losses to be counted before they take action to repair, recover or replace what has been lost. Many losses cannot be replaced – as in the loss of human lives.

The views about what can be possible may vary widely among people who are engaged in different types of work. Their roles can be described best in terms of the skills they possess or the subjects that they follow in the daily course of their livelihood activities. These may include such important roles in a community or a country as farming, fishing, buying, selling, transporting, manufacturing, building, teaching, etc. Seldom do ordinary people relate their daily work experience to "disaster management", and even less to "reducing disaster risks". This is the essence of efforts to minimise people's exposure to disaster risk and to protect their most important assets. As no type of work stands in isolation to others, all aspects of disaster risk management are dependent upon and related to the roles and abilities of many different women and men.

There certainly are specific specialised skills needed for providing emergency shelter, conducting search and rescue activities and ensuring physical and personal security at a time of widespread physical destruction or severe social disruption. By contrast, firefighters engaged in one aspect of a disaster are not likely to be involved in the reconstruction of damaged school buildings during later recovery activities. Few disaster management programmes encompass the multiple functions required for a comprehensive disaster and risk management strategy.

A transdisciplinary approach to realising disaster risk reduction is about relating a variety of informed outlooks and professional skills to make people's lives safer, and the livelihoods of women and men more resilient to loss and damage. Transdisciplinary disaster risk reduction begins with concerted efforts and political will.

10. DISASTER RISK GOVERNANCE

Each country has the sovereign responsibility to protect its people, infrastructure and economic and social assets from disasters. The State has the responsibility to ensure the safety and welfare of its citizens, their livelihoods and natural resource

endowments. The goal of disaster risk reduction programmes is to reduce disaster risks by building capacity and increasing the resilience of communities at risk, thus enhancing their security and wellbeing. This can be done through increased government commitment to implementing disaster reduction policies and programmes. This implies a central responsibility and commitment by the State in providing a proper and effective institutional framework and capacities for disaster risk management and disaster risk reduction.

Key governance issues in disaster risk reduction include roles in policy formulation, operational capabilities and capacities and varied forms of relationships among actors. In general, disaster risk governance needs to be guided by the following general principles and objectives:

- elevating disaster risk management as a policy priority;
- generating political commitment which translates into promoting disaster risk management as a multi-sectoral responsibility;
- assigning accountability for disaster losses and impacts;
- allocating necessary resources for disaster risk reduction;
- enforcing the implementation of disaster risk management and reduction; and
- multi-stakeholder involvement, increasing gender sensitivity, and facilitating participation by civil society and the private sector.

A number of international policies and frameworks have been developed since the 1990s; these include the Yokohama Strategy and Plan of Action (1990-1999), the Hyogo Framework of Action: Building the Resilience of Nations and Communities (2005-2015), the African Regional Disaster Risk Reduction Framework and its Plan of Action as well as the draft SADC Disaster Risk Reduction Framework. The above are examples of how disaster risk reduction has become a policy priority for governments world-wide. Such policies can well be seen as the first stepping stones towards sound disaster risk governance.

A core function of disaster risk reduction governance is ensuring that the necessary support exists within government to drive the disaster risk reduction agenda. There is wide international consensus that government as the administrative entity must ensure that disaster risk reduction becomes a priority. This can be done by the following measures:

- Develop and implement disaster risk reduction policies, laws, regulations, directives and standards;
- Establish adequate structures to govern disaster risk reduction such as:
  - national (and sub-national) disaster risk management centres/offices,
  - national multi-sectoral coordinating mechanisms (also called National Platforms),
  - political decision-making structures (on all levels of government),
  - civil society structures for disaster risk reduction, and
  - engagement with the private sector.
- Conduct nationwide disaster risk assessments;
- Integrate disaster risk reduction measures into development planning;
- Encourage research, training, education and public awareness of disaster risk issues;
- Ensure adequate emergency and contingency measures are in place for possible disasters; and
- Provide adequate funding to sustain disaster risk reduction efforts.

The most important emphasis in good governance for disaster risk reduction is the realisation that it requires a multi-sectoral and multi-disciplinary approach. There are thus a number of cross-cutting issues, beside the development agenda, which are important. These will be discussed in the sections to follow.

11. CLIMATE CHANGE AND ADAPTATION

Climate change and adaptation to the changes in climate is a subject widely covered by the popular media as well as various fields of science. Climate change has become a major global environmental challenge and one of the most acute issues of the twenty-first century. The climate of the world varies from one decade to another, and a changing climate is natural and expected. However, there is a well-founded concern that the unprecedented human industrial and development activities of the past two centuries have caused changes over and above natural variation.

The International Panel on Climate Change (IPCC) defines climate change as a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variable properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural

internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. Article 1 of the United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a change in the climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

11.1 The causes of climate change

The global climate system is driven by energy from the sun. Several gases in the atmosphere act to trap the energy from the sun, thus warming the earth. These gases are called greenhouse gases and the process is known as the greenhouse effect. Without this process, there would be no life on earth. Human activities over the past 200 years, particularly the burning of fossil fuels (oil, coal, natural gas) and the clearing of forests, have increased the concentration of greenhouse gases in the atmosphere. This is likely to lead to more solar radiation being trapped, which in turn will lead to the earth's surface warming up, called the enhanced greenhouse effect (WeatherSA, 2003).

11.2 Increasing vulnerability through climate change

An increase in climate change has far-reaching effects globally. Through climate change certain areas around the globe will record an increase in natural deforestation, a rise in sea levels and deceasing crop levels. Climate change further influences weather patterns which could cause an increase in the frequency and severity of cyclones. An influence on different surface water resources will also be felt which could lead to conflict and an increased risk of diseases. All of the above contribute to an increase in vulnerability within communities already at risk.

11.3 Climate change and disaster risk

It is important to understand the effects of climate change on the risk of disaster. Climate change in itself should not be viewed as a hazard. Rather the changes in climate affect climatic patterns and the cycles of the Earth leading to increases in frequency and intensity of various natural hazards. Climate change therefore affects disaster risk through the increase in weather and climate hazards and, second, by increasing a community’s vulnerability to these natural hazards. The latter takes

place through a degradation of the ecosystem, a reduction in the availability of water and food, and a change in livelihoods. In addition to environmental degradation and rapid unplanned urban growth, climate change adds additional stress that will further reduce the ability of a community to cope with existing climate hazards. However, climate change may also have some "positive" consequences, such as longer growing seasons and lower natural winter mortality. The likelihood of a future increase in climate extremes also raises the concern that climate-related disasters will increase in number or scale and it is therefore vital to address the vulnerability of communities.

11.4 Climate change adaptation

A valid question to ask is: How do we reverse this situation? There are quite varied opinions and scientific evidence to suggest either that the current process is irreversible, or that we as humans can still do something about climate change. It is not the aim of this text to justify or investigate either of these viewpoints but rather to put climate change in the context of disaster risk reduction. Doing so means that one must look at the "precautionary principle" which is linked to climate change adaptation.

The ***Precautionary Principle*** is applied in situations where the outcome of our actions are unknown (or consensus on the outcomes of certain actions has not been reached) or not proven through scientific enquiry. This means that in the event that we suspect that our actions could lead to harm, we have a social responsibility to protect the public from this exposure. In the case of climate change we need to err on the side of caution. Thus, it makes more sense to rather choose a less risky course of action (e.g. trying to reduce greenhouse gases), than not (e.g. having an endless debate on whether we as humans are in actual fact causing climate related change).

Climate change adaptation is the human's response to the changing climate. Such actions are aimed at reducing vulnerability to climate change and securing livelihoods. Humans' ability to adapt to climate change is distributed unevenly throughout the world. Just as it is the poorest of the poor who have most vulnerability to disaster risks, it is also this specific group of people who will have to carry the

brunt of climate change related impacts. Ironically it is also this group that contributes the least to the effects of climate change.

One should, however, not make the mistake of thinking climate change adaptation is something new or novel. Humans have been adapting to their natural environment since time began. Climate change affects all of the vulnerability domains we discussed earlier. It has the potential to significantly impact and change these domains which are crucial to sustain life. Climate change should thus be seen for what it is, a change agent. Disaster risk reduction measures should therefore seriously consider climate change but do not require all brand new actions by humans. Issues of climate change and adaptation must be incorporated into our understanding of disaster risks.

12. GENDER AND DISASTER RISK

A solid knowledge base now exists establishing gender as a factor in the social construction of disaster vulnerability and the unequal distribution of disaster risk; equally well established are the contributions of women, as well as men, to forestalling, reducing or preventing avoidable harm in the face of hazards of all kinds, helping the community at large build resilience (Enarson & Dhar Chakrabarti, 2009). In fact, the UN International Strategy for Disaster Reduction now identifies gender as a cross-cutting principle in disaster risk reduction.

Women, Men and Gender in the Hyogo Framework for Action

Gender is a core factor in disaster risk and in the implementation of disaster risk reduction. Gender is a central organising principle in all societies, and therefore women and men are differently at risk from disasters. In all settings - at home, at work or in the neighbourhood - gender shapes the capacities and resources of individuals to minimise harm, adapt to hazards and respond to disasters. It is necessary to identify and use gender-differentiated information, to ensure that risk reduction strategies are correctly targeted at the most vulnerable groups and are effectively implemented through the roles of both women and men. *Words Into Action: Implementing the HFA,* p. 5.

As stated in the Africa Regional Strategy for Disaster Risk Reduction, “Part of the

reason for the weak governance of disaster risk reduction institutions is the low level of gender sensitivity in disaster policies and programmes". Disaster risk managers striving to use all the tools at hand learn of multiple entry points for mainstreaming gender at every step in the process of reducing risk and responding effectively to disasters. Effective gender mainstreaming cuts across every sector and level of disaster risk management offices, and engages men as well as women.

Even the smallest community is complex, crisscrossed with intertwining, and sometimes competing, bonds built on age, language, culture, ability and everything else that makes women and men unique, including sex and gender. Sex and sexuality are the biological foundation on which the cultural construct of gender is built. Together, sex and gender shape our everyday lives decisively and come strongly into play in crises. Gender may or may not be a decisive factor as people strive to cope with hazards and reduce vulnerabilities, but it is never irrelevant — for men as much as for women.

There is no single "gender lens" but the relationships in society between women and men are a powerful force in every culture, resulting in differences as well as inequalities. In the SADC region, millions of women depend for their livelihood on sustainable natural resources, so environmental degradation hits them hard, whether produced by development decisions, disaster events, or slow shifts in climatic conditions. Migration, too, affects women directly, as rural-urban or cross-border migrants themselves, and indirectly, when coping with new and challenging issues raised by male migration. Cultural barriers constrain many women's personal autonomy and physical mobility, and girls' education is short-circuited by the effects of disasters and hazardous environments. Persistent barriers to women's economic security and political participation, high levels of sexual violence, and women's roles as caregivers are further constraints that, in addition to maternal health and other concerns, place girls and women at increased risk and undermine their capacity to be proactive in the face of danger. In urban and rural environments alike, women are disproportionately responsible for the safety and well-being of children, elders, the chronically ill and those who live with disabilities — even as they live with HIV/AIDS, lack of essential services, high levels of poverty and the threat of displacement.

When disasters do occur, on balance researchers have found women to be more

significantly affected including higher fatality rates, greatly increased domestic labour, slower recovery, higher reported post-disaster stress rates, and increased exposure to gender violence. It is thus necessary still to focus on women in order to identify these risk factors and plan ahead to minimise them.

At the same time, the grassroots efforts of women to reduce risk are evident —as they harvest rain water, adopt new farming techniques, and plant trees; raise awareness through community radio and drama; educate children about environmental stewardship and emergency preparedness; and provide essential local leadership when communities must act. The gender-based routines of everyday life position women and men differently, with women as well as men demonstrably concerned with adapting to the changes of a warmer climate, to the intersecting challenges of conflict, and to environmental and other hazards that shape life across the region today. Women, especially, have been found to be more aware of risks, more ready to engage in risk reduction activities such as risk mapping, and more responsive, when feasible, to warnings and preparedness guidance.

The hard work of reducing hazards and planning for effective response and recovery is only enhanced when the capacities of all people are utilised and all needs are addressed.We hope these materials are useful guides that will raise awareness about the gender dimensions of disasters and hence of good emergency planning. We offer this in support of the common goal of safer, more sustainable and more disaster resilient communities.

13. CONCLUSION

This text aimed to provide you with a broad understanding of disaster risk management and how the study of disasters and disaster risk evolved. Various aspects which constitute disaster risk were discussed and it was shown how the main concepts in disaster risk studies relate. Emphasis was placed on the various domains of vulnerability and the characteristics of hazards were also discussed. Some of the cross-cutting aspects of disaster risk were also alluded to. You are encouraged to further and deepen your knowledge of the various issues of disaster risk reduction.

Disaster risk is a societal commonality. It affects everyone and all the systems on

which we depend. Solving these intricate problems requires a transdisciplinary approach and focus. It is important that we adjust our “lens” of reality to include issues of disaster risk. The linkage with development provides us with an ideal opportunity to address and solve many of the issues associated with disasters and their impact.

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