



# **Approaches to Disaster Risk Reduction**

**Emergency Unit**

**September 2005**

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# 1. Introduction to Disaster Risk Reduction (DRR)

## 1.1 Disaster Risk Reduction - What is it and why do need it?

Disaster Risk Reduction (DRR) measures are designed to protect livelihoods and the assets of communities and individuals from the impact of hazards<sup>1</sup> by:

- **Mitigation:** reducing the frequency, scale, intensity and impact of hazards.
- **Preparedness:** strengthening the capacity of communities to withstand, respond to and recover from hazards, and of government, implementing partners and Concern to establish speedy and appropriate interventions when the communities' capacities are overwhelmed.
- **Advocacy:** favourably influencing the social, political, economic and environmental issues that contribute to the causes and magnitude of impact of hazards.

DRR is often a complementary or integral part of other programmes such as micro-finance, food security, promoting agricultural diversity, or capacity building. On occasions, particularly with preparedness planning and advocacy issues, it can be a stand-alone activity. The inclusion of DRR measures in programming does not require a complete departure from Concern's current programme planning approach; it can be included within project concept notes, programme cycle management and conceptually sits comfortably within the livelihoods model.

However, DRR does require the active adoption of a DRR perspective in our contextual analysis and programme planning. This requires undertaking a risk assessment that identifies the probability of a hazard occurring and its likely impacts on a given community. It furthermore requires knowledge of some of the wide range of measures that can be included in programmes in order to reduce risk to communities and individuals.

A disaster results when a hazard occurs and impacts on a community, overwhelming its capacity to cope.<sup>2</sup> Disasters affect people, their livelihoods and their environment. The magnitude of impact is directly related to the intensity and scale of a hazard and the vulnerability of individuals and communities.

It is apparent that the countries in which Concern works are particularly prone to disasters, many of them cyclical and of regular occurrence. These include:

- tropical storms - e.g. Bangladesh, India, Haiti, Sri Lanka
- volcanoes and earthquakes - e.g. Haiti, DRC, Afghanistan, Indonesia, Bangladesh
- landslides - e.g. Afghanistan, Burundi, Pakistan
- droughts - e.g. Haiti, Ethiopia, Kenya, Somalia, Eritrea, Sudan, Niger, Zambia, Zimbabwe, Timor Leste

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<sup>1</sup> **Hazards** are potentially damaging physical events, phenomena or human activities which cause any or all of the following: the loss of life, injury, physical damage, environmental degradation, and social and economic disruption. Examples include both *natural hazards* such as floods, landslides, cyclones, earthquakes and volcanoes and *man-made hazards* such as inappropriate policies, accidents, war and conflict. These two classes of hazard are not mutually exclusive and often interact with each other.

<sup>2</sup> Concern further defines an emergency as a disaster that has affected sufficient numbers of people to warrant a response from the organisation. This number in effect differs between communities and locations depending on the prior relationship between the affected communities and Concern or our implementing partners. See *Concern's Approaches to Emergencies*, (2002)

- floods - e.g. Bangladesh, Cambodia, Mozambique, Ethiopia, Kenya, Somalia, Pakistan, India

Many countries in which Concern works are recovering from or still experiencing conflict and insecurity - e.g. Haiti, Sierra Leone, Rwanda, Burundi, Somalia, Afghanistan, Liberia and Sudan – and the development of many of these countries is affected by poor governance, absent, inappropriate or non-enforced policies, and health hazards such as malaria and HIV.

DRR is a means of bridging the gap between development and humanitarian programmes and can be seen as a means of strengthening livelihood security. In countries faced with recurrent crises, development can only be sustained if there is a proper understanding of and response to the negative impact of disasters. DRR interventions seek to assist in the development of this understanding, to support livelihoods and to protect assets. It is hoped that DRR interventions will reduce communities' vulnerability and increase their opportunities of pursuing sustainable livelihoods.

The number of disasters has consistently increased since reliable records were begun in the early 1960s. Globally, an average year will see around 60,000 people killed by 'natural' disasters (though large events such as the recent south Asian tsunami will skew individual year tallies), and directly affect about 250 million people. Man-made disasters take a much heavier toll of life - the IFRC estimate that 230,000 people a year were killed by conflict during the 1990s, with an additional 31 million annually being directly affected.

Disasters disproportionately affect poor countries and poor communities. More than half of the deaths resulting from natural disasters occur in low human development countries, even though only 11% of the people exposed to hazards live in them. Poor countries suffer far greater losses relative to their GDP than richer countries. Of the 452 conflicts reported during the 1990s, 48% were in Asia and 42% in Africa. (IFRC World Disaster report 2002)

Poverty and vulnerability to the impact of hazards do not necessarily go hand-in-hand, but poorer people tend to be more exposed to hazards as they often live in marginal areas such as steep-sided ravines in Port au Prince that are vulnerable to earthquakes and land-slides, and low-lying islands that are prone to flooding in the delta region of Bangladesh. Disasters can, in themselves, induce poverty, making the better-off poorer and the poor destitute. Some argue that one causal factor in creating poverty is the incidence of recurring disasters.

There is general agreement amongst scientists that the earth is undergoing a climate change. The consequences of further, even relatively minor, average temperature rises include changes in rainfall amounts and patterns which will lead to both increased drought and flooding in localised areas. Extreme weather events, such as tropical cyclones, are likely to increase in severity and frequency, and sea levels are predicted to rise as polar ice-caps and glaciers melt. These changes will impact disproportionately on the poor, further reducing their ability to withstand and recover from disasters, as their assets and livelihood options are eroded by weather events that are increasing in frequency and severity.

## **1.2 DRR and Concern's Policies and International Mandates**

*...we must shift from a culture of reaction to a culture of prevention...it is more humane... also much cheaper...* Kofi Annan, 1999

The vision of Concern is centred on stable economic well-being and independence, freedom of choice, dignity, respect and the attainment of all human rights. The factors which exclude so many people from this vision are:

- Vulnerability
- Lack of assets or resources
- Inappropriate policies, institutions and processes

The centrality of DRR to Concern's work is reflected in the Strategic Plan and in policy documents including the HIV and Livelihood Security policies.<sup>3</sup>

The Code of Conduct for the International Red Cross and Red Crescent and NGOs in Disaster Response Programmes, to which Concern is a signatory, states in article eight that "*Relief aid must strive to reduce future vulnerabilities to disaster as well as meeting basic needs*".

Globally, DRR is being given a high priority. The World Conference on Disaster Reduction in Kobe (January 2005) concluded with the *Hyogo Declaration* which contends that "*States have the primary responsibility to protect the people and property on their territory from hazards and... to give high priority to disaster risk reduction in national policy, consistent with their capacities and resources available to them*".

Disasters have been identified as inhibiting the realisation of the Millennium Development Goals (MDGs). This includes the prime goal of halving poverty and hunger by 2015. The realisation of other goals which are being slowed down by disasters include those that concern schooling, (MDG 2), workloads, health, domestic and sexual violence as it effects women and girls (MDG 3 and 5), protection of children (MDG 4), disease control and spread of HIV (MDG 4 and 6) and a reduction in rural-urban migration (MDG 7). (DFID 2005)

### **1.3 DRR and the Livelihoods Model**

*Since disasters have the potential to undermine development, measures to prevent, prepare for and mitigate disasters should inform every plan and strategy for sustainable development.* Oxfam 2000

DRR needs to be mainstreamed into programme design, project concept notes, and monitoring and evaluation in much the same way as gender and HIV issues have been included, and used as reference points, in designing and choosing programmes.

The Livelihoods model provides a framework in which DRR can be seen as part of long-term sustainable development work. The model can be used to understand how risk reduction measures can be included within regular programme planning.

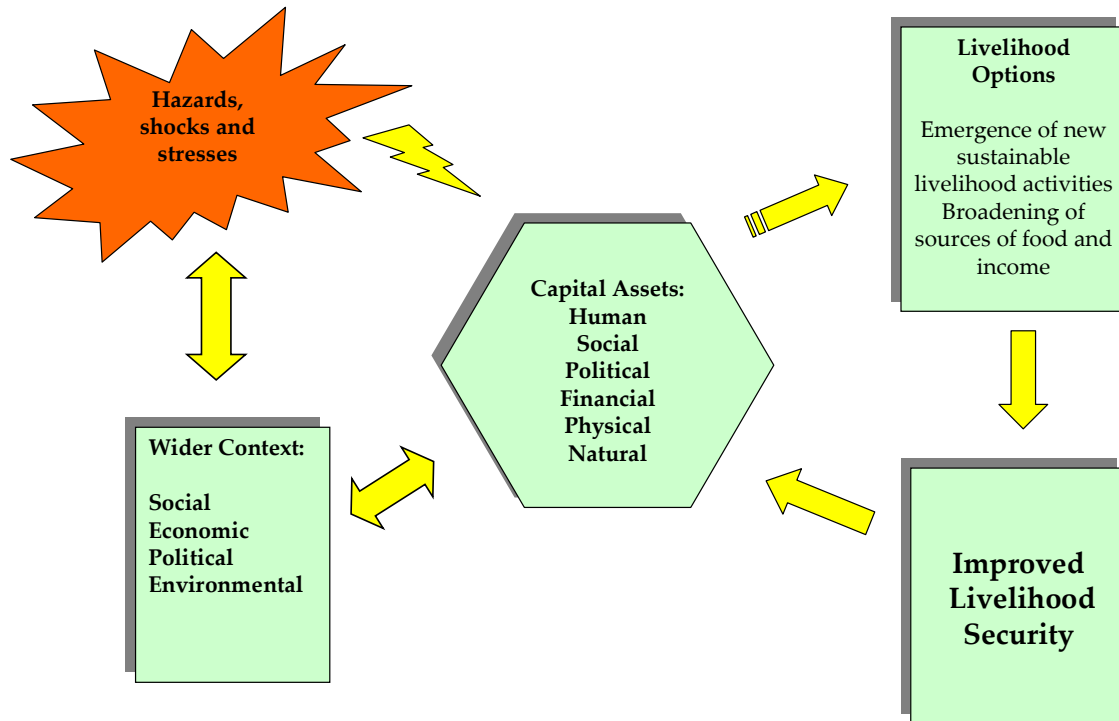
Concern defines livelihood security as: *the adequate and sustainable access to and control over resources, both material and social, to enable households to achieve their rights without undermining the natural resource base.* (Policy on Livelihood Security)

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<sup>3</sup> Mitigation of shocks is an important strategy in reducing vulnerability...and will be a key component of development programmes. Concern Strategic Plan (p.15) 2001

DfID uses a similar definition but emphasises that livelihoods are only sustainable *when they can cope with and recover from stresses and shocks*. Both mitigation measures and preparedness planning for emergency responses play a role in reinforcing these coping and recovery elements.

### The Livelihood Model



### Capital Assets

The model illustrates the holistic and people-centred orientation of the livelihoods approach. At the centre are the various strengths and capacities of an individual or community which have been divided into six categories that embrace assets and resources. They describe wealth not only in material terms of financial, physical and natural assets, but also in terms of education, health, social organisation and political influence.<sup>4</sup>

An individual or community that has a wide distribution of assets throughout the six categories will be less vulnerable, as they are in a stronger position to withstand and recover from the impact of hazards due to the diversity of their capitals. For example, communities in Afghanistan that have stone houses and well-organised community structures are in a better

<sup>4</sup> Examples of Capitals:

*Human:* Skills, Knowledge, Health, Ability to Work, Leadership, Education

*Social:* Networks, Membership, Relationships, Work Groups (trust, reciprocity, exchange, clan, trading groups)

*Political:* Power, Influence, Democratic Institutions, Access to Power Brokers,

*Financial:* Livestock, Cash, Jewellery, Credit, bank Deposits, Remittances, Pensions, State Payments

*Physical:* Infrastructure, Transport, Shelter, Housing, Buildings, Water Supply System, Sanitation, Energy Supply, Communications

*Natural:* Biodiversity, Atmosphere, Trees, Plants, Land, Water, Minerals, Wildlife, Game Animals

position to withstand and recover from the impact of a flash flood than displaced communities with flimsy shelter and poor social organisation in the same location. Not only do the better quality houses have more resilience against the effect of the water, but damage to other community assets such as irrigation canals can be repaired through social mobilisation.

The production of charcoal near Mogadishu for export to the Gulf is an example of a non-sustainable livelihood. In the short term it is boosting the financial capital of the traders selling the charcoal, but natural capital, in this case trees used for the charcoal, is being destroyed and eventually there will be insufficient trees left to sustain the trade. A programme of controlled cutting and planting could transform this livelihood option into a sustainable activity.

Within the livelihoods model, development interventions can be thought of as activities that increase the capital assets of individuals and communities. These activities cover the whole spectrum of development sectors and can include programmes such as education, HIV awareness, micro-credit, agricultural diversity or re-forestation. If this development is to be sustainable, then these actions must not inadvertently diminish or erode other categories or classes of capital assets.

DRR can be thought of as protecting the capital assets of communities which in turn promote more livelihood options and underpin the sustainable development process. DRR focuses on the left hand side of the livelihoods model – the parts concerned with shocks, stresses and the wider context as these interact and bear on the asset base.

## 2.0 DRR and Managing Risk

### 2.1 Principles of Risk Management

*Imagine a pick-up truck with two men in the cab with seat belts on, and two men standing in the back. If the pick up is involved in an accident with a lorry, commonsense would suggest that the two men in the back of the pick up are likely to be more seriously injured than the two in front. This illustrates that while the **hazard** (in this case the accident with the lorry) is the same for all four men, the **impact** is different. The two men in the back are more **vulnerable** (because of their position and lack of restraints) and are, therefore, more at **risk**. From this we can see that risk is a function of hazard and vulnerability.*

The same pick-up truck faces a number of hazards in its working environment. Some of these hazards are within, or partially within, our control. For example, it is possible to reduce the probability of running out of fuel by calculating the requirement for the journey and carrying some spare capacity. The probability of the vehicle being robbed may be reduced by avoiding certain areas and driving unpopular models. Other hazards such as the poor state of roads could be considered as being outside our control, but the impact of driving on them can be lessened by ensuring that the car is driven more carefully.

In terms of DRR, it might be useful to think of mitigation measures as including compulsory driving tuition, the erection of safety barriers on corners, and the use of seat belts. Preparedness planning could include having the means to call for roadside assistance, carrying first aid kits, and having drivers trained in their use. Advocacy issues could include

public campaigns on driving at sensible speeds and maintaining minimum distances from preceding vehicles.

Risk is defined as the probability of an event happening in a given time span and the magnitude of its impact when it does occur. The magnitude of the impact is related to the individual or community's vulnerability to that hazard.

Managing risk is a matter of reducing the frequency of an event happening or reducing vulnerability to its impact.

## **2.2 Principles of DRR**

Under the DRR approach, risk assessments are carried out to identify which hazards are more likely to occur and to have the biggest impact on a community's or individual's assets. It has two distinct components:

- **Hazard Analysis**
- **Vulnerability Analysis**

These two analyses allow us to assess the risk facing communities by identifying the hazards which are most likely to occur within a given time-frame and to determine which of them will have the greatest magnitude of impact on the assets and livelihood options of a community. It is important to remember that, over time, changes can occur in terms of both the vulnerability of a community and the type, causes, nature, and intensity of the hazards that it faces.

There are three categories of measures that can be implemented to reduce the risk identified in the initial assessment. The three categories are not mutually exclusive and it is more useful to characterise them below rather than trying to seek watertight definitions:

- **Mitigation Measures** *can be divided into infrastructural and non-infrastructural measures that reduce the frequency, intensity, scale and impact of hazards*
- **Preparedness Plans** *often include capacity building. They are usually knowledge based and include early warning systems that monitor and predict the occurrence of hazards, and contingency plans for effective response and recovery which can be implemented by the community, implementing partners or Concern itself*
- **Advocacy** *seeks to favourably change policies and practice by networking and influence*

## **3.0 Risk Assessment – Hazard and Vulnerability Analysis**

### **3.1 Understanding Hazards**

#### **3.1.1 Hazard Classification, Locations and Inter-Actions**

While it is common to find hazards referred to as “natural” or “man-made”, this distinction becomes very blurred as one realises the interaction that commonly occurs between various

types of hazards.<sup>5</sup> It can be seen that the root of many disasters lies in a number of hazards which can come together to have a compound effect. For example, landslides may appear to be caused primarily by heavy rains on steep slopes with certain soil types and profiles and, as such, they are classed as 'natural'. Further investigation could demonstrate however that the probability and intensity of the landslide have been increased by a combination of human activities such as clear-felling of trees, construction of a road across the slope, and agricultural cropping.

Conflict may be classed as a 'man-made' hazard, but the impact may include people being displaced and cutting vegetation cover for shelter and firewood in localised areas, resulting in soil erosion, water run-off and an increase in flash floods – a hazard that is normally classed as 'natural'.

Many hazards are only to be found in well defined physical locations. Monsoon-type storms are found within or close to the tropics; inundation-type floods occur in low-lying areas, often adjacent to rivers and lakes; flash floods occur generally in narrow restricted water-ways on or close to steep slopes and draining specific watershed systems. Volcano and earthquake zones are found along the interstices of tectonic plates. Areas prone to drought are well defined.

Hazards which are biological in origin are less well geographically defined, but many crop pests (e.g. locusts) are found in only specific areas, and diseases such as malaria are only found where conditions favour the breeding of the mosquito vector which is dictated by availability of lying water and temperature.

These hazards have well-defined measurable parameters, and records of previous events can be found in a variety of sources such as meteorological records, geological surveys, newspapers, government and local government archives, IFRC and UN specialist agencies reports, Centre for Research on the Epidemiology of Disasters (CRED), etc.

### **3.1.2 Hazard Analysis**

Hazard analysis is concerned with identifying the underlying causes that influence the occurrence of hazards and with giving us more details about their frequency, seasonality, geographical area of the hazards' occurrence, and whether there are any discernible trends emerging in relation to any of these. Many hazards, such as those associated with weather systems, are cyclical and seasonal in nature.<sup>6</sup>

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<sup>5</sup> Nevertheless you will find that it is common to identify under '**natural hazards**' hydro-meteorological events (floods, droughts, tropical storms, dust storms, blizzards, avalanches, mud flows etc), geological events (earthquakes, tsunamis, volcanoes, rockslides, landslides etc) and biological events ( diseases affecting man, animals and crops, pest infestations, locusts etc).

'**Man-made hazards**' are commonly identified as technological events (pollution, toxic waste, infrastructure collapse, etc.), conflict, accidents, inappropriate, non-enforced or absent legislation etc.

<sup>6</sup> CRED reports for 2004 suggest that, globally, the most common type of hazard facing people is that of flooding. (CRED does not include conflicts in these figures). During 2004, 97 flooding incidents were reported as qualifying as a 'disaster'. This was followed by 75 disasters associated with wind, 28 earthquakes, 27 epidemics, 12 droughts, 7 incidents each of extreme temperatures and wild-fires, 5 volcanic eruptions and 2 incidents of insect infestation and tidal surges – the latter including the Asian tsunami.

Floods also affected the greatest number of people. Of the 10 disasters of 2004 that affected the most people, 5 were floods that, in total, impacted on over 90 million people. Two of these - in China and Bangladesh - affected over 33 million. Three were typhoons and hurricanes that affected over 15 million people, and the remaining two were a drought in southern Africa that affected 15 million and a cold wave in Peru that affected over 2 million.

The numbers killed were dominated by the Asian tsunami (over 300,000), followed by two separate disasters of a hurricane and flood that hit Haiti, killing over 2,500 people on each occasion. Another three floods in India, Dominican Republic and Bangladesh accounted for another 2,500 deaths, two tropical storms killed 717 in the Philippines, and over 300 in Madagascar, and two epidemics (dengue and meningitis) killed over 1,200 in Indonesia and Burkina Faso.

Knowledge of the intensity and scale of past hazards is important as it allows us to understand the type and extent of possible impacts that a hazard will produce. Flooding will have a much higher physical impact on infrastructure if it is fast-flowing than if it is an inundation of just a few inches on a flood plain, although this may pose impacts of a different nature such as water-borne diseases and the occurrence of malaria.

Trends need to be identified so that changes in the patterns of frequency, seasonality, location and intensity can be identified, thus allowing better-informed decisions about programming to be made. For example, the changing rainfall patterns and the timing of the subsequent flooding of the Zambezi flood plain has resulted in Concern looking at, amongst other activities, introducing shorter maturation crops to counter the reduction in the growing season.

Frequency and probability have to be clearly understood. An awareness of the probability of a hazard occurring is only useful in hazard analysis when it is expressed within a given timeframe. Frequency is an expression of the average time that elapses between hazards recurring, but is also commonly used to express the interval between events of a measurable high impact. For example, floods that reach a certain level above normal may be described as being 'fifteen year floods' - i.e. floods of this magnitude occur on average once every fifteen years.

It is also important to realise that many hazards are not completely random events but are the consequence of other forces. For example, as pressure builds up along a geological fault, the likelihood of an earthquake occurring increases as time passes without the stored energy being released.

The importance of undertaking a hazard analysis can be illustrated by looking at the specific hazard of a tsunami occurring in the North Atlantic Ocean. There is a one hundred per cent probability that the north Atlantic will experience a tsunami sometime in the future, but as they are very infrequent, the likelihood in any one year of experiencing a tsunami is very low.

However, when the underlying causes that create tsunamis are studied, a more informed picture begins to emerge - tsunamis in the North Atlantic are caused by four known events: asteroid strikes; earthquakes; under-water landslides; and the collapse of any of a number of volcanic islands. Earthquakes and landslides are thought to trigger a tsunami once every thousand years or so. The frequency of the collapse of volcanic islands is in the order of once every one hundred thousand years or so - which is thought to be somewhat more often than that of meteorite strikes.

It has been suggested that the impact of a tsunami in the North Atlantic on Western Europe and the east coast of America would be so high and would, potentially, include wide scale destruction of infrastructure along coastlines and massive loss of life, that despite the low probability of a tsunami occurring in a given year, measures should be put in place to lessen these impacts. This analysis would indicate that resources should be focussed on the tsunamis that are caused by the more frequent events such as earthquakes and submarine land-slides. Land-slides become an even more plausible candidate for attention on learning that the trend

for these events suggests that they will become more frequent during periods of global warming.<sup>7</sup>

### **3.2 Understanding Vulnerability**

*Just as people's livelihoods opportunities and their pattern of assets and incomes are determined by wider political and economic pressures, vulnerability to the impact of hazards is also a function of this wider environment. All the vulnerability variables are inherently connected with people's livelihoods and with poverty.* Canon, Twigg & Rowell 2002

#### **3.2.1 Definitions of Vulnerability**

Concern describes vulnerability as people's susceptibility to a given hazard which is determined by the extent to which they can anticipate, cope with, respond to and recover from its impact. It is defined as: *a set of conditions and processes resulting from physical, social, economical and environmental factors, which increase the susceptibility of a community to the impact of hazards.* (Approaches to Emergencies, 2002)

It is possible to equate the vulnerability of an individual or community with the degree to which they have, or lack, assets identified within the six capitals of livelihood analysis. There is generally a very high correlation between the chance of being harmed by the impact of hazards and having few assets.

Under the DRR model, the concept of vulnerability needs to include a predictive quality that informs us of what may happen to a particular population or parts of that population under specific conditions caused by hazards. This predictive quality should allow us to use the information gathered to direct interventions that protect and enhance assets and livelihoods.

In northern Ethiopia, the Concern programme conducts regular nutritional surveys. When it is apparent that malnutrition rates are rising, a number of interventions can be made including increasing the supplementary ration entitlement and introducing Cash for Work (CFW) programmes. The immediate problem of malnutrition is addressed while the CFW programmes (typically environmental protection schemes and road rehabilitation) invest in the communities' assets and address some of the underlying causes of food insecurity. The programme has identified that the construction of roads and encouragement of marketing of agricultural produce may increase the vulnerability of the community to HIV infection as truckers enter the area, and this new vulnerability is being addressed with an HIV/AIDS awareness programmes.

#### **3.2.2 Dimensions of Vulnerability**

Vulnerability can be looked at under a number of different headings that include:

- *Economic* including levels of savings debt, and access to credit and insurance
- *Physical* including location and standards of infrastructure
- *Social* including lack of security, education levels, access to good governance, social equity, degree of respect for human rights, traditional values, knowledge, customs and membership or not of social organisations; ethnic, tribal, religious or political groupings;

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<sup>7</sup> However, the only early warning system currently being considered is a programme to monitor the approach of asteroids to the earth - the least frequent of any of these events and so the least probable in a given time span.

female headed households, unaccompanied children and women, the very young and the elderly, health, nutritional, and HIV status, and physical disablement.

One important aspect of vulnerability in relation to hazards is that of exposure. This is why we have the caveat that poverty and vulnerability are not always synonymous. As many hazards are geographically located in specific areas, it follows that anyone living in that area may be affected. Although, the impact on individuals can be very different and the poor are usually the worst affected, the following examples illustrate that this is not always the case:

- In Sierra Leone during the civil war, it was found that the urban middle-class (civil servants, teachers, shop keepers, etc.) were more vulnerable as refugees in Guinea than poorer rural families as they lacked survival skills such as the ability to build temporary shelters and forage for wild foods.
- In the Indian earthquake of 2000, many wealthier families were killed far from the epicentre when their houses collapsed. It was found that they had added additional structures to their dwellings – something that poorer people had been unable to do – but had done so without strengthening their foundations, and so increased the vulnerability of their houses to the impact of the earthquake.

It is important to remember that, over time, the vulnerability of a community can change. These examples further emphasise the need to identify historical trends and sensibly anticipate future ones.

- The imminent return of IDPs in south Sudan has opened the possibility of increased exposure to HIV as it is considered they have a higher prevalence than the non-displaced community. HIV awareness programmes have already been put place in an attempt to reduce this vulnerability.
- The 2000 food crisis in Malawi was less severe than the famines of 1945. However, its consequences were more devastating because so many more families were hugely vulnerable being weakened by poverty and HIV/AIDS.
- In south-east Asia, the tsunami killed a disproportionate number of women which has increased the vulnerability of the surviving community to a range of hazards. These have been reported as including an increase in alcohol abuse, less formal and informal education for girls, disruption to the marketing of fish (fishing was a principle livelihood and roles within it were gender defined) and an increase in sexual violence.

## **4.0 Risk Reduction Measures**

The three categories of measures – mitigation, preparedness and advocacy - are not exclusive, and arguments can be made for including some of the measures under a different, or more than one, heading. More details on practical measures are found in section five.

### **4.1 Mitigation**

Mitigation means ‘to make less severe’, and mitigation measures are undertaken to reduce the frequency, scale, intensity and impact of hazards. They are typically thought of as being

physical in nature and include infrastructures such as the construction of earth bunds, gabion cages, contour planting, check dams, strengthened dwellings and public buildings, raised river banks, re-forestation and storm drains. In Bangladesh, for example, schools have been constructed in some areas as solid, well-constructed, elevated buildings that can also act as cyclone and flood shelters for the local community.

However, these types of mitigation measures are largely associated with hydro-meteorological and geological hazards and we need to expand these typical structural measures to include such non-structural measures as public health campaigns, vaccination programmes (both for livestock and humans), introducing new agricultural practices such as short maturation or drought resistant varieties of cereal crops, promoting dialogue between communities in conflict, relocation of settlements, and awareness and education programmes.

It is important to have an understanding of the underlying causes of hazards. Flooding of the lower Shabelle in southern Somalia has about a dozen interacting causes of which excessive rain is only one. These range from conflict, social breakdown, poor agricultural practices and poor inter-community communication to lack of knowledge. The introduction of meaningful mitigation measures must consider all of these.

Many of these measures are highly technical in nature and to ensure that those supported by Concern are of the highest standard, we need to have a highly qualified cadre of professional staff working for country programmes capable of sharing experiences and technical skills throughout the organisation. This would include civil engineers, watershed management experts, environmental and ecological engineers, irrigation specialists (particularly small-scale), agriculturalists and arboriculturalists.

## **4.2 Preparedness**

Preparedness plans are, essentially, contingency plans for when a hazard overwhelms the capacity of a community and any mitigation measures that may have been put in place. Preparedness plans can be established at a number of different levels including village or community, central government, local authority, implementing partner or within Concern itself, both nationally and internationally. The Bangladesh programme is a good example of where Concern has a meaningful role at each of these levels.

Preparedness plans should acknowledge that the first response to a disaster occurs within the affected communities themselves. These community-led responses are particularly important where there is a requirement for search and rescue interventions following, for example, an earthquake, landslide or sudden flood. It is proposed that Concern will help specific neighbourhoods in densely populated urban areas of Dhaka and Chittagong respond to earthquakes by working with national partner organisations, by helping to build the capacity of ward-based disaster management committees and community groups including religious, schools and hospitals. This will include evacuation plans, search and rescue training, rehearsals and practice, and will be supported by pre-positioning rescue materials and pre-identification of safe areas for shelter and relief distributions, and facilitating a mass awareness programme on appropriate behaviour, during and immediately after, an earthquake and its aftershocks.

Concern will work in areas prone to seasonal and flash flooding with local authority (Upazilla) Disaster Management Committees, helping them to understand their roles and responsibilities and sharing technical skills including risk assessments, risk reduction

measures and facilitating the preparation of local disaster management action plans and their implementation. These include the pre-identification of safe areas within and adjacent to the flood plain. Concern will assist, where appropriate, with transport and communications needs of the committees for search and rescue and mass awareness campaigns.

At the national level, Concern will co-ordinate and share experiences with the Comprehensive Disaster Management Programme, particularly in areas such as approaches to DRR and capacity building of national partners and local authorities. Concern should be able to make the macro to micro links and be an effective and credible voice in helping protect the interests of the poor in the formulation and implementation of national responses to disasters.

Concern has currently over eighty national implementing partners in Bangladesh and intends to review the partnership arrangements with this group to ensure that we have a balance between geographical coverage of the most 'at risk' areas of the country and quality of response from our partners. To help achieve the latter, an on-going capacity building programme with our partners is envisaged which will initially focus on such issues as internationally agreed humanitarian principles, standards and practice, and ensuring that emergency programmes respond to both humanitarian needs and to the protection of assets and livelihoods. It will further include logistics for emergencies, assessment criteria and methodologies, health and nutrition for emergencies, water and sanitation, protection of participants, familiarisation with Concern emergency technical manuals and communication and coordination practices.

In parallel with the capacity building of national partner NGOs, Concern Bangladesh will undertake an internal capacity building process to ensure that our staff have a common understanding of humanitarian principles and responses, an understanding of the roles and responsibilities of our partner NGOs when they undertake emergency responses, and their role in monitoring and other support functions such as coordination and communications.

Internationally, Concern Bangladesh staff contribute to the Rapid Deployment Unit that contributes to our global capacity to quickly and effectively respond to new emergencies.

#### ***4.2.1 Early Warning Systems***

While the number of disasters occurring annually has trebled since the 1970s, the associated death toll has halved in this same period. (OFDA International Disaster Data<sup>8</sup>). Early warning systems (EWS) have played an important role in this. There are many already existing EWS that operate at a number of different levels. Concern and its partners have a role in making the macro-micro links and promoting the establishment of community based warning systems that can provide detailed local information.

There are three elements to be found within any EWS:

- It must be able to forecast when a hazard is going to occur, and predict its scale and intensity. The hazards must be identified through risk and vulnerability assessments and, to retain credibility, the forecasts must achieve a high degree of accuracy.
- The forecasts must be communicated within, and to, communities that are at risk from hazards' impacts.

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<sup>8</sup> OFDA include drought, earthquake, extreme temperatures, famine, flood, industrial accident, insect infestation, miscellaneous accident, landslide, transport accident, volcano, wave surges, wild fire and wind storm in their data.

- There must be a sensible response to the warning by communities and other players including local authorities, central government, and international organisations such as Concern.

While EWS are often discussed separately, they can serve no useful function to communities at risk if they are not supported by comprehensive preparedness planning. Hurricane Katrina that struck the Mexican Gulf states of the USA in August 2005 is an example of where an adequate warning was given but where the preparedness plan, particularly the protection and evacuation of the more vulnerable population, was found lacking.

The higher order EWS typically combine satellite imagery and macro-level indicators such as large-scale rainfall patterns, projected harvests at a regional or national level, the formation and projected paths of tropical storms, etc. Examples of these include the USAID-funded Famine Early Warning Systems (FEWS), the humanitarian early warning system (HEWS) and the US Hurricane tracking system. The last two allow those with access to the web to track tropical storms in real time. Though FEWS works on a macro level it also provides information on relatively small administrative or geographical areas as for example in Malawi. The information generated by these EWS is typically used by donors, governments and international agencies to make strategic decisions on the allocation of resources.

Lower level EWS are designed to provide information at the local level which is sufficiently detailed to allow individuals and communities threatened by hazards to act in sufficient time and in an appropriate manner so as to reduce the possibility of injury, loss of life, or damage to property and the natural environment. They are more commonly used in the event of sudden onset disasters such as flash-floods, tropical storms and volcanic eruptions.

In Bangladesh, Concern intends to work with *haor* communities living in flood plains that are subjected to both seasonal and flash-floods. As part of a comprehensive DRR programme that includes emergency response planning, construction of flood shelters, construction of protective walls, and the introduction of short-maturation rice varieties, a community-based flash flood warning system is to be established to give communities up to six days' warning that flash floods are likely to occur, allowing them to safeguard harvests, livestock and other assets.

This community-based EWS will combine information derived from higher level EWS that monitor rainfall patterns and river heights in the river catchment area both in Bangladesh and in India, and locally generated observations. The communities will be able to communicate directly with other flood plain communities, as well as with appropriate authorities, through the use of mobile telephones or other communication devices. Concern will play a role in disseminating the higher order EWS information and helping establish the community based elements.

#### ***4.2.2 Principles for Preparing Emergency Preparedness Plan***

The *Approach to Emergencies* paper recommends that all country programmes should develop a contingency plan for responding to emergencies. This should be regarded as an essential part of a broader DRR strategy but does not in itself constitute that strategy. The objective of an Emergency Preparedness Plan is to ensure that a speedy and effective response can be made in-country to emergencies.

This section looks primarily at the Emergency Preparedness Plan that should be prepared for Concern. Similar plans may be required by implementing partners.

As an international humanitarian organisation, we are required to respond to alleviate human suffering. In so doing we are guided by the Code of Conduct for the International Red Cross and Red Crescent and NGOs in Disaster Response Programmes, the Humanitarian Charter, the minimum standards proposed by the Sphere Project, and the principles of good personnel management outlined in People in Aid.

A country-specific preparedness plan needs to follow the recommendations and requirements made in the *Approaches to Emergencies* and apply and interpret them in their national context. Other relevant policies need to be reflected within the plan, include the Programme Participant Protection Policy, the Security Policy, the HIV Policy, and those policies dealing with partnership issues and financial management.

It is clear that Concern cannot respond to every event in the countries in which we work, but the *Approaches to Emergencies* paper offers a guide to the scale of disaster to which we should seek to establish an intervention.

A number of country programmes have established indicators based on the number of people affected, the extent of the damage that has occurred, and the cost of the response to determine whether and where we should make an intervention.

Further guiding principles in determining whether or not we should establish an intervention include that we seek to work with those who need us most rather than those who can most benefit from our intervention, and that we should only intervene if we can add value to the overall humanitarian response. This last point will be related to internal capacity of ourselves, existing and potential partners.

An Emergency Preparedness Plan should describe how to react to emergencies by defining roles and responsibilities, including co-ordination; how to carry out assessments; and give details on procurement and storage procedures. Details of any pre-positioning of emergency stocks should be included along with any prior arrangements to access emergency food stocks through WFP.

The plan must also detail what and how emerging disasters are to be monitored, and the role of EWS in this. A historical account of previous emergencies in the country would be useful in indicating types, frequencies and intensities of disasters.

Finally, the training needs of our staff and partner staff should be detailed in such areas as humanitarian principles and responses, Sphere standards, Concern policies and the manuals developed by the organisation to inform programme implementation and support functions.

### **4.3 Advocacy**

Advocacy can be thought of as a means of favourably influencing the wider political, economic, social and environmental context where these factors contribute to the vulnerability of a community, or are one of the underlying causes of hazards.

Examples of where advocacy can play a role in DRR interventions may include:

- encouraging the authorities in the Indian Punjab to share information with counterparts in the Pakistan Punjab about the release of flood waters in dams, a contributing factor to floods in Pakistan.
- advocating for the establishment and enforcement of building codes to mitigate against the impact of earthquakes.
- advocating for better land-use management in Afghanistan which could, in the longer term, reduce the number of localised floods, gully formations and land degradation.
- advocating against inappropriate designs and location of pieces of infrastructure such as bridges and roads where these have been implicated in flooding in Orissa.

Advocacy can also be employed to encourage other bodies to become involved in reducing identified risks. In Mogadishu, where the risk of epidemics to children is high, it was suggested that Concern could lobby one of the specialised medical agencies to carry out a mass vaccination programme.

## 5.0 DRR in Practice

### 5.1 Field Tools

There appears to be consensus that it is not necessary to develop new tools for hazard and vulnerability analysis. Fields should choose from their existing repertoire of techniques that fall broadly under the Participatory Rural Appraisal or Rapid Rural Appraisal approaches. It can be seen that it is quite convenient to include DRR analysis in baseline surveys and livelihoods analysis. Any hazard and vulnerability analysis should follow the recommendations in section 5.2.

It is assumed that any information gathered in the field will be cross-checked where possible with secondary data sources including government, publications of other INGOs or the Red Cross/Crescent Movement, geological surveys, meteorological data, health records, FEWS, International Crisis Group publications, newspapers and academic journals, etc. These secondary sources are particularly important to verify existing policies and legislation.

The field tools that are commonly used to identify hazards and vulnerability include:

- *Semi-structured interviews* with both groups and individuals to obtain both general and specific information on hazards, impacts, vulnerabilities, capacities, community perceptions, underlying causes, hazard inter-actions, and ideas on appropriate DRR measures.
- *Transect walks* with key informants to view the interaction between the physical environment and human activities, focussing on land use and tenure, environmental changes and physical areas vulnerable to the impacts of hazards.
- *Community mapping* of topography, houses, land use, etc can identify infrastructure vulnerable to hazards and areas safe from them. These maps can be expanded to demonstrate flows of resources in and out of the community and who controls them.
- *Historical profiling* will help in identifying trends in hazard and vulnerability characteristics. Methods used include group discussions, life histories, and historical tracing. This will also reveal trends in food security, livelihood strategies and environmental changes such as tree cover.
- *Seasonal calendars* are used to identify times of stress, hazard occurrence, disease, hunger, debt, migration, work patterns and job allocation.

- *Social and Gender Analysis* should be an inherent part of all these techniques to obtain information on particular vulnerabilities of different groups within the community including women, boys, girls, female and child headed households, minority ethnic and religious members, the disabled, people living with HIV, the elderly, etc.
- *Hazard and impact ranking* can be used to identify priorities and to stimulate discussions on under-lying causes and long term effects.

## 5.2 Analytical and Planning Tools

In a number of workshops held with Concern programme teams we have identified a set of useful analytical tools. The first of these helps us to systematically look at hazards in terms of risk they pose, their causes, characteristics and potential controllability. The next helps analyse vulnerabilities and subsequent impacts in terms of their negative influence on livelihoods in order that we can make a sensible risk assessment. The remaining tool is a simple planning logframe. These tools can also be used in fieldwork with communities to assist them in understanding their risks and suggesting DRR measures.

### 5.2.1 Hazard Characteristics

A simple matrix can assist in ensuring that the most important information for identified hazards is recorded. It is assumed that initial work with a community using some of the tools in the preceding section has been completed. The example below is imaginary to illustrate the points discussed:

**Hazard Name: (e.g. floods)**

<b>Causes</b>	<ul style="list-style-type: none"> <li>• <i>de-forestation,</i></li> <li>• <i>poor land-use policies,</i></li> <li>• <i>large refugee camp established four years ago with huge fuel wood demands,</i></li> <li>• <i>seasonal migration of men has resulted in river bank maintenance being neglected</i></li> <li>• <i>seasonal tropical rains</i></li> </ul>
<b>Intensity</b>	<ol style="list-style-type: none"> <li>1. <i>Not severe</i></li> <li>2. <i>Severe</i></li> <li>3. <i>Very severe</i></li> </ol>
<b>Seasonality</b>	<ol style="list-style-type: none"> <li>1. <i>every rainy season</i></li> <li>2. <i>main rainy season only</i></li> <li>3. <i>main rainy season only</i></li> </ol>
<b>Frequency</b>	<ol style="list-style-type: none"> <li>1. <i>Twice a year in both rainy seasons</i></li> <li>2. <i>Every two years</i></li> <li>3. <i>Last very severe floods in 1997 and 1981 so approx, every 15 years</i></li> </ol>
<b>Location</b>	<ol style="list-style-type: none"> <li>1. <i>Approx, 30 metres either side of river</i></li> <li>2. <i>Within the one metre contour above river level on either side of river (up to 100 metres)</i></li> <li>3. <i>Extensively alongside river up to 5 metres contour line above river height</i></li> </ol>
<b>History and Trends</b>	<ol style="list-style-type: none"> <li>1. <i>Increasing since the refugee camp was established</i></li> <li>2. <i>Increasing - Used to occur once every five years on average</i></li> <li>3. <i>Have no direct evidence but presume the frequency will increase as the less severe are increasing</i></li> </ol>
<b>Controllability</b>	<ol style="list-style-type: none"> <li>1. <i>The rainfall is outside our control but all the causes identified above are within our control to a greater or lesser degree</i></li> </ol>

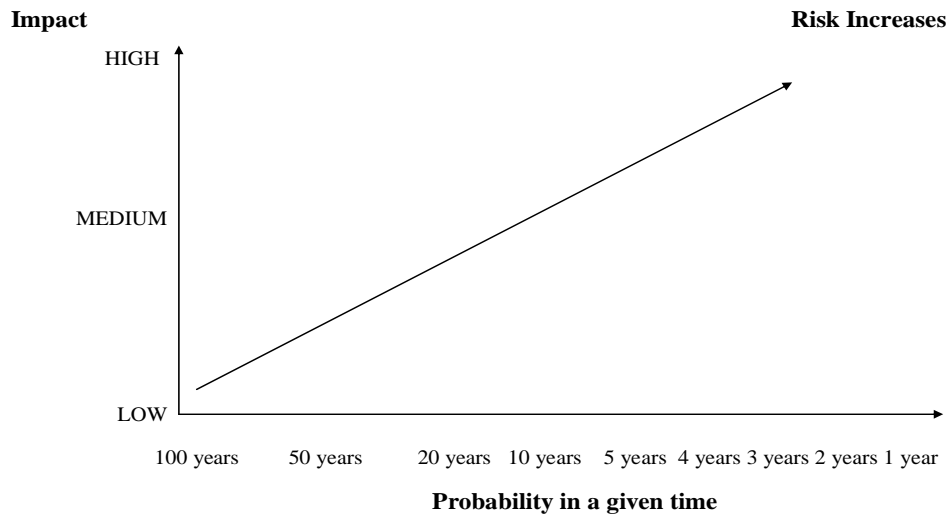
It is worth bearing in mind the following points as each of these headings is addressed.

- **Causes:** are often multiple and a combination of the hazard itself (or a number of them), human practice and governance issues
- **Intensity:** includes the ideas of amount, strength, extent and duration and these will have to be related both to seasonality, frequency and location. Different intensities will also result in different types of impact.
- **Seasonality:** is particularly relevant to hydro-meteorological events, but other hazards may also be seasonally bound including: disease, fires, pests and conflict.
- **Frequency:** is different from seasonality. Though floods may only happen in the rainy season, they may not occur every rainy season. The period between the occurrence of events is important as it allows us to prioritise the use of resources in tackling events that are both probable and have a high impact. We need to use the concept of average frequency between events of a given magnitude such as ‘ten year floods’.
- **Location:** Some hazards, such as landslides, rock-falls and avalanches, occur only in well defined places. The concept of describing events of a measurable high impact by average time elapsed between them can allow identification of, for example, the fifteen year high flood contour in a flood plain. Other locations may change over time such as places of conflict or drought due to changes in weather patterns.
- **History and Trends:** identified by discussions with the community, by EWS data and from our own staff’s perceptions. In some instances, we anticipate trends without waiting for empirical evidence - e.g. the opening of new trucking routes into rural areas is likely to increase the exposure of the community to HIV, or the return of IDPs is going to put stress on the availability of drinking water. This section is particularly important to capture the effects of environmental degradation and changes attributed to global weather changes.
- **Controllability:** Many hazards are outside of our control or are only partially controllable. Where we cannot influence the frequency, intensity or scale of a hazard, we need to focus on strengthening communities’ capacities to withstand, respond and recover from its impacts.

### **5.2.2 Hazard Ranking**

It is possible to rank hazards on a simple graph that plots magnitude of impact on an individual or community against the probability and frequency of a specific hazard occurring. Risk is high where an event has a high magnitude of impact and a high probability of occurring in a short time span. In the flooding example used above, it can be deduced that the most probable flooding is that of the twice yearly ‘not severe’ type, but this has a very low impact. The type of flooding that has the most impact is the ‘very severe’ that occurs every fifteen years or so, and which has a low probability of occurring. The ‘severe’ flooding that occurs every two years or so and has a fairly high probability and has a medium high impact. To illustrate these tools it has been decided to address these biennial floods.

The following graph can be used not only to judge the risk associated with impacts derived from a specific hazard, but can also be used to make judgements on the degree of attention that should be given to developing strategies to cope with different hazards. For example, if a second hazard of earthquakes had been identified for this region, then by comparing the different frequencies and magnitude of impact with flooding with those for the earthquake, we could identify what the priorities of the programme should be relative to these hazards.



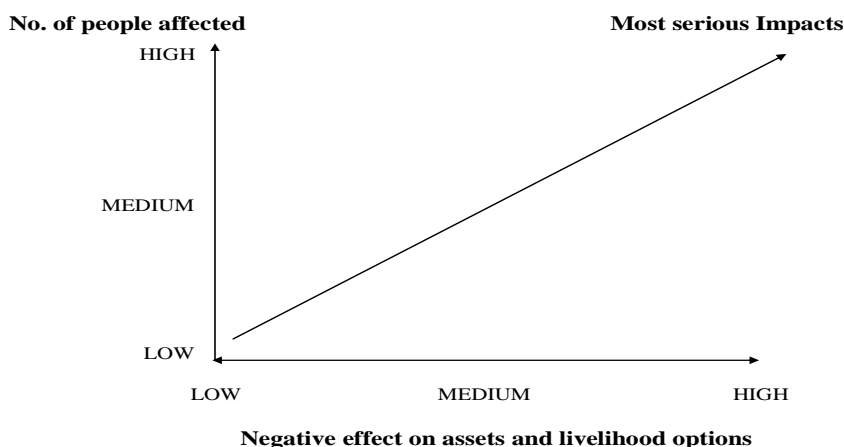
There are a number of points to bear in mind when utilising this tool:

- This is not a precise mathematical tool despite being presented on a graph. It requires the application of experience and commonsense in identifying where the coordinates should be placed. The precise coordinates are less important than getting an overall sense of ranking and where the greatest risk lies.
- The ranking will alter over time. New hazards may appear (HIV was not a major hazard until the early eighties), vulnerabilities and thus impacts may change (the Malawian population is much more susceptible to harvest failures now than it was sixty years ago because of the effects of increased population, poverty and AIDS). The frequency of events can change (severe tropical storms are increasing because of global warming) and other causal factors can change such as policy and legislation.
- EWS information can help us predict the changes to probability and impact.

### ***5.2.3 Vulnerability and Impact Identification***

It has been demonstrated that hazards often have multiple impacts and that the magnitude of the impact is related to the specific vulnerability of a community or individual. The table below can be used to rank the potential impacts of a given hazard. This will assist in determining where resources should be prioritised. The ranking takes into consideration the number of people affected against the magnitude of the negative effect on their assets and livelihoods.

## Impact Ranking



The vulnerabilities and, conversely, the capacities, of an individual or community are to be found in both their Capital Assets and in the Wider Context as identified in the Livelihoods model.

### 5.2.4 Impact and Vulnerability Table

We are seeking to make a link between impacts that are having a large negative effect on assets and livelihoods and specific vulnerabilities so that we can address those vulnerabilities. For example, while considering social capital in Somalia it was identified that the fact that the water and irrigation committees were no longer functioning was a contributory factor to the risk of flooding.

To illustrate the use of this table we refer back to the imaginary scenario of flooding. We have identified that one impact that negatively affects a large number of people and their livelihoods is that of making the road to market impassable after severe flooding that occurs every two years. These have been limited and selected for illustrative purposes.

<b>Hazard: Flooding</b>	
	<b>Reasons for Vulnerability</b>
<b>Impact:</b>  Road to market becomes impassable	<b>Capital Assets</b>
	<b>Human:</b> Because of seasonal male migration looking for work there is no labour available in the village to maintain the culverts and ditches
	<b>Physical:</b> The road passes through some low lying ground
	<b>Social:</b> There is no sense of responsibility within the community for the repair and maintenance of the road
	<b>Political:</b> No one in the village has influence with the National Road Authority
	<b>Financial:</b> No money within the community to pay for repairs or maintenance

	<b>Natural:</b> Cutting of trees for firewood for the refugee camp has resulted in the floods causing increased damage to the road
	<b>Wider Context</b>
	<b>Social:</b> Rural villagers are rarely listened to by decision makers
	<b>Economic:</b> The National Road Authority is consistently under funded
	<b>Political:</b> There is no political will to ensure that land-use policies are followed
	<b>Environmental:</b> Wide scale uncontrolled logging is causing more frequent and more severe flooding at national level

### 5.2.5 Examples of Vulnerabilities related to Livelihood Capitals

The following is not an exhaustive checklist, but it gives an indication of some of the vulnerabilities that have been identified under each capital heading at a number of DRR workshops held with Concern programmes:

- **Human Capital:** The health status including mental, psychological, nutritional, and HIV. Lack of skills and knowledge including lack of understanding of the hazard, their causes and how to reduce impacts. Illiteracy means people cannot access written information or correspond with authorities. Agricultural practices where these have resulted in environmental degradation or limited types of food produced by mono-cropping.
- **Social Capital:** The disintegration of family ties, social institutions and kinship support after conflict. Lack of peace and security, access to good governance, social equity, and degree of respect for human rights, loss of traditional values, knowledge, customs and social organisation. People belonging to different ethnic, tribal, religious and political groups may be excluded from collective community actions. Female headed households, unaccompanied children and women, the very young and the elderly.
- **Political Capital:** The political power or access to it of the communities themselves and the wider political environment are identified as being equally important. The lack of, or non-enforcement of, policies - for example, natural resource management may increase vulnerability to flooding and drought. Poor governance in the form of corruption, nepotism, favouritism, bias and lack of effective institutions were regularly discussed under this capital as was the improper allocation of money for development work.
- **Financial Capital:** Lack of wider financial infrastructure and organisation. The absence of banks and credit and savings schemes, lack of markets, jobs and income generating opportunities.
- **Physical Capital:** Physical location and the strength and suitability of built infrastructure including houses. Population density, remoteness of a community, its location in relation to topographical features, design, use and availability of building materials. Lack or destruction of public buildings such as community halls and training facilities, roads, airstrips, health posts, hospitals and schools. Lack or destruction of water supply infrastructure includes provision of potable and irrigation water, storage and flood drainage facilities including soil and water conservation infrastructure such as gabion cages and earth bunds.
- **Natural Capital:** These assets are particularly prone to seasonal changes and include the availability of water, game animals and annual plants. Land quality depends on its topography, soil characteristics and fertility, as well as rainfall patterns. Loss of access to

cultivation land through, for example, conflict or perhaps flooding. Access denied based on gender, ethnic identity or religious grounds. The right of exploitation of these assets is often not in the hands of local communities - e.g. minerals and timber.

### 5.2.6 DRR Implementation Logframe

The preceding analyses have identified hazards and risks, ranked them, and given us a deeper understanding of why hazards occur and what people's vulnerabilities are to their impacts. This last tool helps us in putting in place a logframe that captures the measures we want to introduce and indicates timeframes and responsibilities.

Firstly we consider the three types of measures and identify appropriate activities. Referring to the flooding example above, the following activities could be selected:

- **Mitigation:** Construct protecting bunds along river banks 1.5 metres high, raise the level of the road above flooding height, and protect vegetable gardens and school from floods by protective gabion cages. These can be implemented through cash for work schemes to provide seasonal labour for men. Begin integrated watershed management project to reduce run off from up-stream slopes that have been de-forested. This will be planned to be labour intensive to help counter the seasonal migration of men looking for work. Begin public health care programmes focussing on water borne diseases and malaria.
- **Preparedness:** Work with other communities up and downstream to monitor and communicate rises in river height. In the event of severe flooding, the community has pre-identified areas of high ground to provide safe shelter for people and animals. Concern partners are ready with small boats for search and rescue operations and Concern has pre-positioned food stocks readily available for distribution to its partners through an agreement with WFP.
- **Advocacy:** Assist the community to lobby UNHCR and central government to provide the fuel requirements of the refugee camp in such a manner that it does not result in deforestation of the watershed. Assist the community in lobbying the Ministry of Education to change term times so that they do not coincide with the main rainy season.

A simple logframe outlining responses can be constructed:

Approach	Activity	Who	When	How	Verification
<b>Mitigation</b>	Construction of earth bunds and gabion cages	Consultant engineer, local authorities and village committee	Next dry season	Cash for work programmes	Site visits and check against plans
	Watershed protection	As above	Over next three years	Cash for work	Site visits and check against plans
	Public health programme	Concern medical staff, village committee, school teachers	Over next two years	Village workshops, distribute mosquito nets	Reduction in water borne diseases and malaria
<b>Preparedness</b>	Establish community based EWS	Concern staff and village committees	Over next year	Sensitisation and helping with communications	Check that both monitoring and communication

	Identify high ground for flood shelter	Concern staff and community	Over next year	Study history and trends of floods to ensure that ground is sufficiently high	is being done Site visits and check against plans
<b>Advocacy</b>	Lobbying	Concern staff and representative of village	As soon as possible	Arranging meetings and preparing statement that includes recommendations	Change in policies

## 6.0 Examples of DRR Analysis and Planning

These examples are taken from workshops held with Concern staff and partners in the previous two years. They do not necessarily follow the formats suggested by the field and analytical tools in the preceding section as our ideas have developed over this period.

### 6.1 Somalia

Concern is working with communities that live and make their living adjacent to the Shabelle River. They are settled and make their living largely from agricultural production. There has been wide-scale political and social disintegration since the early nineties throughout southern Somalia. The river floods on a regular basis. The workshop was held in November 2002 and reflects the situation at the time.

The hazards identified in the lower Shabelle are conflict, floods, drought, pest infestation epidemics, animal and human and deforestation. The programme team ranked the hazards posing the most risk as conflict and floods.

<b>Causes</b>	<b>Intensity</b>	<b>Seasonality</b>	<b>Frequency</b>	<b>Location</b>	<b>Trends</b>	<b>Impacts</b>
<b>Conflict</b>						
Power struggle, control of resources, control of grazing, retaliation, struggle between business groups	Usually medium (e.g. localised and no use of heavy weapons)	No time in particular but can be influenced by national reconciliation efforts (more severe as parties try and reject these efforts)	Unpredictable but often at distribution of relief supplies	Check points, sea and air ports, clan boundaries	Less frequent than previously	Death, injury, displacement, loss of property, loss of livestock, malnutrition, physical and mental disorders, environmental damage,
<b>Floods</b>						
Poorly maintained river banks, heavy rains, poor management of irrigation canals and water gates, deliberate breaking of banks to irrigate land, deliberate flooding of land as offensive and defensive measures during conflict, siltation of river, poor farming techniques	From severe to moderate depending on which village is being considered	Gu and rainy season	Annually	A number of villages adjacent to the river were identified	Where river banks have been strengthened flooding is less severe	Damage to water gates, culverts and houses. Loss of crops and livestock, Loss of life. People become displaced

The groups of people considered most vulnerable to both hazards were identified as women, children, elderly, disabled and the poor. The workshop identified the following measures to counter the chosen impacts:

<b>Chosen Impacts of Conflict</b>				
	<b>Mitigation</b>	<b>Preparedness</b>	<b>Advocacy</b>	<b>Proposed next steps</b>
Displacement	Conflict resolution and peace awareness training, raise community awareness of peace issues. Prepare protection shelters (bunkers)	Identify sites for IDP camps, prepare emergency kits, prepare evacuation facilities	International Appeal for humanitarian assistance and peacekeeping force	Launch long term conflict resolution programme
Mental disorders		Establish mental health care and counselling centres	Lobby INGOs with capacity in mental health care to become involved. Call for international assistance. Raise community awareness of mental health illnesses	Establish mental health programmes
Malnutrition	Establish vaccination campaign	Plan for therapeutic feeding centres and distribution sites		Establish resettlement programmes for IDPs and demobilisation and re-integration
<b>Chosen Impacts of Flooding</b>				
Crop Losses	Strengthen river banks, improve irrigation canals, install better water management systems	Supervise and monitor weak points in river banks, pre-position sand bags and tools, coordinate and share information with other NGOs and communities	Encourage community participation and the engagement of other	Better and more detailed assessments needed of wells, canals, and river in order to prepare projects for funding
Internal displacement	As above	Prepare emergency kits and pre-assign staff to flood prone areas	Mobilise communities to become involved in IDP settlement programmes and encourage participation of other NGOs	Better assessments needed for contents of emergency kits and provision of farm inputs
Disease Outbreak	As above and raise awareness of sanitation issues and environmental hygiene	Monitor health statistics and pre-position hand tools	Encourage the involvement of other NGOs	More assessments and provision of hand tools

## 6.2 Pakistan

This workshop was held in May 2004 and reflects the situation at the time.

The Awaran programme in Balochistan identified the following hazards and impacts:

Flooding was considered highly probable with a medium impact (bearing in mind the already initiated flood protection measures being put in place). Drought had a medium probability but a high impact, and conflict had a less than medium probability and impact. Implementation of the devolution programme was judged to have both a low probability of being a hazard and a low impact.

### Hazard: **Drought**

<b>Impacts</b>	<b>Mitigation Measures</b>	<b>Preparedness planning</b>	<b>Advocacy Issues</b>	<b>Next Steps</b>
Migration, loss of farming jobs, skilled man power, soil erosion, bio diversity losses, decreased water table	<ul style="list-style-type: none"> <li>- Increase livelihood options in area,</li> <li>- Water harvesting and conservation,</li> <li>- Introduce drought resistant varieties</li> </ul>	<ul style="list-style-type: none"> <li>- Arid zone research,</li> <li>- Develop EWS,</li> <li>- Capacity building in target communities,</li> <li>- Temporary relocation plans</li> </ul>	<ul style="list-style-type: none"> <li>- Link with line ministries, development agencies,</li> <li>- Policy research and development of drought affected areas</li> </ul>	Integrate hazard and vulnerability analysis in PRA  Project reviews,  Capacity building and awareness in staff and partners
Conflicts over natural resources use (water & pasture) Social conflicts	Use local conflict resolution mechanisms	<ul style="list-style-type: none"> <li>- Mass meetings,</li> <li>- Conflict mapping,</li> <li>- Develop conflict resolution plans</li> </ul>	<ul style="list-style-type: none"> <li>- Link with local political and traditional leaders</li> <li>- Network with local institutions</li> </ul>	
Loss of animal herds	<ul style="list-style-type: none"> <li>- Rangeland management,</li> <li>- Provision of feeding supplements</li> </ul>	<ul style="list-style-type: none"> <li>- Promote fodder stocking</li> <li>- Drought hardy breeds and fodder crops</li> <li>- Vaccinations</li> </ul>	Link with relevant institutions	
Poor nutrition resulting in epidemics (eg hepatitis)	<ul style="list-style-type: none"> <li>- Vaccinations,</li> <li>- Food supplements,</li> <li>- School nutrition programmes,</li> <li>- Medical camps</li> </ul>	Safe drinking water, improve sanitation, hygiene education	Mass vaccination, health, hygiene & school nutrition campaigns	

### 6.3 Southern Sudan

This workshop was held in February 2005 and reflects the situation at the time.

The Nuba Mountain programme identified and ranked hazards as follows:

#### List of Hazards - Impact and Probability Ranking:

	<b>Hazard</b>	<b>Probability</b>	<b>Impact</b>	<b>Rank</b>
1	Bush fire/ Burning of Houses	10	6	
2	Pest and diseases to crops	7	5	
	Flood	8	2	<b>III</b>
4	Diseases for human and livestock (mainly Malaria)	9	8	
5	Drought	8	6	<b>II</b>
6	Attack by <i>Bagaras</i> and <i>Shanablas</i> (Nomads and Camel herders)	8	4	
7	Attack by wild bees	1	1	
8	Car and Bike accidents	6	3	
9	FGM and other harmful traditional practices	6	7	
10	Land slides/ rolling of rocks from hill slopes	1	5	
11	Wild animal attack on livestock	5	4	
12	Land mines	2	8	
13	Returnees & IDPs (Impact on community and environment)	10	9	<b>I</b>
14	Deforestation	8	8	<b>II</b>
15	HIV/AIDS	2	4	

#### Hazard- Returnees and IDPs (Impact on community and environment)

<b>Causes</b>	<b>Seasonality</b>	<b>Trends</b>	<b>Frequency</b>	<b>Location</b>	<b>Intensity</b>	<b>Impact</b>
- Peace - Stable security - Willingness	High during Nov – may Low during June – Oct	from 2002 till date (After ceasefire)	Daily Continuous rise still 2008 and declines later	All over Rashad County, slightly high in Ildo & Iral Payams	Highest in 2005 Medium in 2006 Low from 2007-2010	- Deforestation - Food shortage - Pressure on Drinking water, shelter and essential services - Cultural conflicts - Spread of HIV

#### Vulnerability Analysis to the return of IDPs:

	<b>LH Capital</b>	<b>Vulnerabilities</b>
1	Human	<ul style="list-style-type: none"> <li>• Lack of knowledge on prevailing situation</li> <li>• Lack of skills to cope with urgent needs</li> </ul>
2	Natural	<ul style="list-style-type: none"> <li>• Lack of construction materials</li> <li>• Lack of water resource</li> <li>• Lack of fire wood</li> <li>• Pressure on cultivable and non cultivable land</li> </ul>
3	Physical	<ul style="list-style-type: none"> <li>• Lack of water sources ( Bore wells &amp; dug wells)</li> <li>• Poor infrastructure facilities</li> </ul>
4	Finance	<ul style="list-style-type: none"> <li>• No financial institutions</li> <li>• Lack of markets and income generation activities</li> <li>• Lack of job opportunities</li> </ul>
5	Social	<ul style="list-style-type: none"> <li>• Lack of purchasing power</li> <li>• Dilution of traditional culture</li> </ul>

		<ul style="list-style-type: none"> <li>• Importation/spread of HIV/AIDS and STIs</li> <li>• Cultural conflicts</li> </ul>
6	Political	<ul style="list-style-type: none"> <li>• Lack of harmony on political ideologies</li> </ul>

### Mitigation

- Drilling sufficient bore wells and dug wells
- Provision of non- food items
- Distribution of seeds and tools as critical support
- Food distribution
- Ensure essential services

### Preparedness:

- Sensitisation of hosting community
- Sourcing and procurement of seeds, tools and non- food items
- Collection of data on returnees and forecast on influx
- Training stake holders ( mainly Concern, partners and community representatives) on service delivery

### Advocacy:

- Liaise with operating INGOs, LNGOs, local authorities in integration of efforts
- Influence authorities to regulate land allocation and to impose environment protection policies

### Action plan for DRR measures to reduce risks associated with returning IDPs.

	Activity	Time frame	Responsibility	M& E systems
1	Assessment of field situation	March – November	NRRDO, Concern, SRRC, Local Administration	Village visit, registration of returnees
2	Seed & tools procurement and distribution	April – May	Concern, NRRDO	Beneficiary list, distribution list, village visit
3	Non- food items distribution	April & November	NRRDO, SRRC, Concern	Returnees list, village visit
4	Liaison with other agencies for mobilisation of essential services like water and basic health care	March – May	Concern	Addressing issue in Inter Agency coordination meetings

## 7.0 References and Resources

The following were consulted in preparing this document:

- Know Risk, UNISDR, 2005
- Key Sheets # 1 – 7: Impact of Climate on Poverty. DFID 2004
- Disaster Profile UNDP 2001
- Disaster Risk Reduction: A Development Concern. DFID 2005
- Tsunami Hazards in the Atlantic Ocean, Benfield Hazard Centre, 2003
- Social Vulnerability, Sustainable Livelihoods and Disasters. 2002 Cannon, Twigg & Rowell
- Peter Crichton – field notes 1996
- Participatory Vulnerability Analysis – ActionAid 2004
- Malawi Famine. S. Devereaux 2002
- Concern DRR workshop reports (Somalia, Pakistan, Afghanistan, Ethiopia, south Sudan, Bangladesh, India and Indonesia)

Useful resources include:

- Disaster Risk Reduction, John Twigg, Good Practice Review, HPN, 2004
- World Disaster Reports, IFRC, annually
- Living with Risk, UNISDR, 2002

Web resources include:

- Benfield Hazard Research Centre <http://www.benfieldhrc.org>
- Famine Early warning System Net <http://www.fews.net>
- Humanitarian Early Warning System <http://www.hewsweb.org>
- World Climate research Programme <http://www.wmo.ch>
- Livelihoods Connect <http://www.livelihoods.org>