



Examining Linkages between Disaster Risk Reduction and Livelihoods

Literature Review

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Examining Linkages between DRR and Livelihoods: Literature Review

In the disaster context emphasis has been generally placed on the initial humanitarian and emergency response. However, recently there has been an increasing recognition of the importance and value of disaster risk reduction (DRR) programming. This comes from the understanding that though humanitarian efforts are important and required in the aftermath of a disaster, a comprehensive view of risk and vulnerability are important elements in preventing, reducing and mitigating the negative impacts of shocks on lives and livelihoods. As outlined in the International Strategy for Disaster Reduction (ISDR) and in the Hyogo Framework of Action (HFA), DRR includes early warning, improved governance, building up community and household resilience, and reducing the underlying risk factors while strengthening disaster preparedness (ISDR, 2004). Even though DRR has been recognized as invaluable, it still remains a somewhat nebulous concept, and includes elements of programming that are named various different things: mitigation, prevention, “building back better,” etc. Many organizations continue to struggle with what exactly DRR encompasses and how to incorporate it into their mandate. This review is the first output of a three year research program looking at the intersection of DRR and livelihoods and is intended to clarify DRR concepts and programming elements, identify good practice, and assess the impact of DRR programs on livelihood outcomes, assets, and institutions. The purpose of this review is to establish baseline definitions and trends, review existing literature and suggest gaps in knowledge that will help to focus the content of the subsequent field case studies. The report was compiled via an extensive literature review and interviews with members of international

organizations, NGOs, and government working in the sphere of disasters.

We first give an overview of DRR and its basic dimensions, from categories of risk to context and populations. We then present a recommended DRR framework that encompasses the different components of DRR and allows for better standardization of methodology as well as a clearer understanding of the possible gaps surrounding DRR programming. This framework is entrenched in the livelihood framework¹ and takes a holistic approach to incorporating DRR into humanitarian, relief, and development work. It explicitly recognizes the effects of hazards and disasters on livelihoods. The next section concludes with recommendations on issues that should be given greater attention in the DRR literature, research, and programming. Finally, an appendix of several topics that are relevant to thinking about DRR – migration, urbanization, the poverty trap and financial capital, microfinance, remittances, insurance, social and political capital, gender, indigenous knowledge, DRR frameworks, and conflict and the multi-hazard environment – is given as well as recommended respective readings. We conclude with an appendix of people interviewed for this report, a list of ISDR definitions for basic DRR terminology, and an annotated bibliography.

¹ The livelihood framework attempts to organize the various factors (assets, policies, institutions, processes, and outcomes) in a vulnerability context (shocks, disasters, trends) which constrain or provide opportunities and shows how these components relate to each other (DFID, 1997). See Appendix D for the full Livelihood Framework.

The goal of this report is to outline the existing literature on disaster risk reduction, which though diverse, presently reveals little insight on the potential livelihood dimension of DRR. For now, there exist more questions than solutions, and, as this report aims to show, more gaps in knowledge and programming than prescriptions for protecting livelihoods. Our overall understanding of livelihoods and DRR therefore, needs to be deepened through more comprehensive research, in-depth case studies, and innovative evaluations in order to reduce the costs of disasters in lives lost and livelihoods destroyed.

Introduction

Disasters have increased in number over the past century from under 100 natural disasters reported annually before 1975 to over 450 disasters reported in 2000 (See graph below).² This only takes into account natural disasters and is partly a factor of better reporting over time. However, a rise in population numbers, increased urbanization, building in more risk prone areas, and climate change are all contributing to the increased number of disasters. Depending on an affected household's vulnerability and the systems put in place to protect these populations, hazards can quickly cause a household to spiral down into new levels of destitution (Boudreau, 2009). Overall, a greater proportion of the population – double what it was the previous decade – is now exposed to hazards, transforming hazards into disasters (DFID, 2006). A disaster as defined by ISDR (the most common set of DRR definitions) is:

A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources. A disaster is a function of the risk process. It results from the combination of hazards, conditions of vulnerability

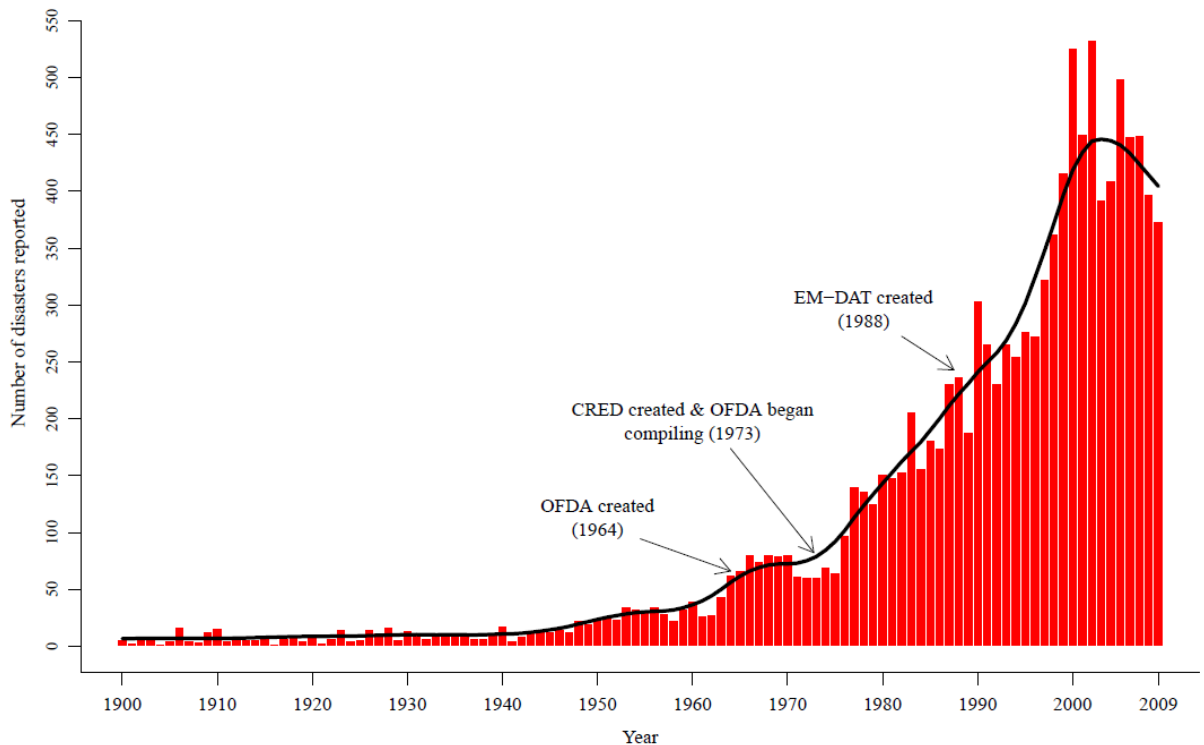
² EM-DAT: The OFDA/CRED International Disaster Database – <http://www.emdat.be/database>

*and insufficient capacity or measures to reduce the potential negative consequences of risk.*³

Disaster risk is a global concern, but not all areas or populations experience an equal threat from hazards. Disasters are highly concentrated in poorer countries with weaker governance, in low and low-middle income countries with rapid economic growth, and where the exposure of people and assets is growing faster than risk-reducing capacities are being strengthened (UN, 2009; ISDR, 2004; Twigg, 2007). The poor are particularly vulnerable to disasters given their already low income and depleted asset base, and therefore can ill afford to suffer increasing unemployment, crop and livestock losses, and lower wages or higher prices, especially on food items. Small-island nations (such as Andamans, the Maldives, etc) as well as land-locked developing countries are identified as having the greatest economic vulnerability to hazards; the amount of loss is seen as a function of decreased resilience (UN, 2009). Urban populations are becoming increasingly more vulnerable to the impact of a hazard given the rush of growth in large and mid-sized cities, causing an increase in shanty towns and slums in areas that are highly prone to landslides, flooding, and other hazards (UNDP, 2004).

³ ISDR Terminology: Basic Terms of Disaster Risk Reduction, <http://www.unisdr.org/eng/library/lib-terminology-eng%20home.htm> and Appendix C.

Natural disasters reported 1900 – 2009



EM-DAT: The OFDA/CRED International Disaster Database – www.emdat.be – Université Catholique de Louvain, Brussels – Belgium

Disasters lead to a severe destruction of physical, human, financial, natural, and social capital inevitably resulting in economic stagnation and the deterioration of livelihoods as well as overall development. Disasters typically result in large scale destruction of infrastructure, such as roads, bridges, ports, and sector specific capital, such as factories, plantations and irrigation facilities (Collier, 1999; Cavallo and Noy, 2009). The loss of **physical capital** is often exacerbated in poor and developing countries due to the use of less durable building materials, poor legal enforcement of regulations (i.e. building codes), and weaker prevention systems (Cavallo and Noy, 2009). **Human capital** can take even a greater toll through the loss of life, death, injury, disease and emigration. Disasters lead to increased malnutrition amongst children, poor mental and physical development, and therefore impact education with long-term consequences on livelihoods (Akresh et al,

2010; Bundervoet et al, 2009, Adelman et al, 2010).

Financial capital is also severely affected by a disaster – savings, insurance, and access to credit are all potentially lost or reduced. Households lose access to informal financial strategies, such as borrowing from a neighbor or reciprocal insurance. Savings with informal savings groups can be washed away or destroyed, or lost in the process of people fleeing from their villages. Lost or destroyed documents and records affect a household's ability to access remittances and formal banking services (Savage and Harvey, 2007). In situations of protracted conflict and insecurity, formal financial service providers withdraw their services (banks close), or reduce the range of their services (bank staff do not venture into insecure zones). National-level banking and economic planning is often suspended or not implemented; rural institutions are cut-off from

broader markets; and insecurity depletes the existing customer base (Hudon and Seibel, 2007).

The effects of a disaster can also have long-term consequences on **natural capital**. Floods, tsunamis, and cyclones often make large tracts of crop land unusable for several seasons (DFID, 2009). Saltwater intrusion is one of the biggest threats to livelihood systems – it decreases freshwater supply, crop production, and increases health problems as well as the fragility of mud homes (Pouliotte et al, 2006).

The effect of a disaster on **social capital** is more ambiguous (see Appendix A4). In some cases, traumatic experiences can sometimes alter norms in a positive direction with respect to collective action in either post-conflict (Bellows and Miguel, 2009; Blattman, 2009; Voors et al, 2010) or in a post disaster (Castillo and Carter, 2004) situations. More research needs to be conducted to better understand the consequences of a disaster on less tangible assets such as social capital.

Disasters have a strong and mostly negative impact on livelihood assets, leading to outcomes of increased vulnerability, reduced food security, and more fragile institutions. There is little dissent in the literature about the overwhelming consequences of a disaster on communities and their livelihoods, but very different approaches and some lingering confusion over terminology and language. Observers agree that households are experiencing increased vulnerability to the risks and consequences of hazards, especially the very poor, households in growing urban areas and surrounding slums, and those living in areas most sensitive to climate change. This has led to increased attention to disaster risk reduction, mitigation, and preparedness. Most organizations working in the humanitarian, development, and climate sphere have adopted, though not necessarily standardized, some form of DRR into their practices. However, national and community capacity and

education around disaster preparedness is weak, and the field of DRR lacks standardized definitions, tools, methodologies and assessments. Conceptually, vulnerability needs to be incorporated as an underlying risk driver with better coordination amongst climate, development, and humanitarian programming. A framework that incorporates DRR at all stages of the program cycle (preparedness, mitigation, response, and recovery) and uses the livelihood framework as an analytical base of analysis is necessary to understand the impact of DRR on household vulnerability, assets, and outcomes. As with all programming, better understanding of the local context, particularly markets and traditional coping methods, should be prioritized. Most funding is still allocated to relief and emergency response, with DRR seen and funded as a small component of this. We discuss these gaps in further detail in subsequent sections.

In the following sections we first discuss definitions of DRR and then some dimensions of disaster including risk and risk reduction. We then present a DRR framework to help think about the objectives, scope, and priorities for DRR programming and its effect on livelihoods.

1. Defining DRR

Both the benefit and problem of the most common definition of disaster risk reduction –

*The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.*⁴

– is that it is too all-encompassing a concept for specific programming. It potentially includes building up government capacity, resilience of the local and national economies, community-based preparedness, improved information

⁴ ISDR Terminology: Basic Terms of Disaster Risk Reduction, <http://www.unisdr.org/eng/library/lib-terminology-eng%20home.htm> and Appendix C.

systems, better analytical models and emphasis on analysis, improved partnership relations, building codes, savings groups, conservation agriculture, etc. Hence there are a broad range of programs that are currently labeled DRR and the presumption on the part of some actors is that anything that, for example improves income also reduces risk. Many organizations acknowledge that even though DRR and development are two separate concepts, sometimes the distinction between DRR and development programming is very small – programs that enhance a household’s well being either via provision of financial or physical capital, enhancement of human or social capital, or protection of natural capital could also make the household more resilient in the event of a disaster, though this is not always the case. For example, some ways of improving income (i.e. increased savings) do reduce risk, but other methods that are standard approaches to development (i.e. increased credit) can greatly exacerbate risk and hence emphatically do not fit under a DRR rubric.

Each organization adopts its own take on DRR for programming purposes. For example, one organizational approach is to incorporate the concept of risk reduction into development programming. This approach to DRR emphasizes improved disaster preparedness and is therefore about better readiness for responding to shocks, in addition to preventing shocks or mitigating their impact. On the other hand, DRR is sometimes incorporated as part of their disaster management cycle. However, the concern expressed with this approach is that given that that the goal of DRR programming is to build safer and more resilient communities, this raises the issue of whether DRR should be a part of all programming and not just in the context of disaster. Some organizations only label programs as DRR if they have a preparation and mitigation approach to a specific hazard component, including a hazard or risk analysis. For some risk management is the critical issue because the organization believes risk reduction focuses too narrowly

and misses opportunities to improve livelihoods and outcomes. In this model, the “D” in DRR is left out, allowing a broader focus on risk management as a humanitarian *and* development issue rather than being pigeon-holed as something for only the humanitarian sector to worry about.

One approach organizations have taken to reducing exposure and increasing a household’s or community’s ability to cope with hazards it to adopt the principle of ‘building back better’ (ALNAP, 2009). Though ‘building back better’ is mainly about recovery it can enhance DRR by creating opportunities for ‘transformation’ and the reduction of future risk. However there are often large cost implications. For example, when building transitional shelters in Indonesia after the Tsunami, the smart thing to do would have been to use sustainable wood such as bamboo, cane, mango, or maple in order to not further devastate the environment leading to increased disaster risk. However this would have required going off-shore with drastically increased costs, and the provision of fewer shelters. To date ‘building back better’ has not had the effect the name implies, because most projects have been centered on infrastructure rather than livelihoods. Furthermore, it is important to consider who the players are in considering what is ‘better.’

In some cases the destruction of local governance mechanisms by disasters requires an international intervention to prevent the subsequent destruction of livelihoods by international capital. After the 2004 Tsunami a portion of Sri Lanka’s east coast was transformed through the government’s reconstruction program under its plans to ‘build back better’ paid for by aid money. A ‘buffer zone’ was imposed on villagers that previously inhabited the beach (for safety reasons), but this zone was not enforced for the resort industry, which was seen to use the land more profitably. Households relying on fishing as their main form of sustenance and income were displaced several kilometers inland while their

coast was transformed into a resort industry (Klein, 2007).

Much of DRR programming comes under the rubric of natural resource management. Some organizations do much of their DRR work on soil and water conservation, conservation agriculture, healing environmental ‘hot-spots,’ drought mitigation, livestock asset protection, irrigation, drought resistant seeds, and agro-forestry. Given that these types of interventions are specifically focused on increasingly scarce natural resources, funding can be easily linked with climate change initiatives. Natural resource management partly addresses the consequences of the changing distribution of weather patterns and given the current popularity of programming that falls under the umbrella of climate change, DRR proposals in this realm seem to get the most traction with donors.

Most of the successful programming that has occurred in the realm of DRR has been around conservation agriculture and holistic management of farming, livestock, and agriculture. The use of ecological approaches to farming together with livestock and agricultural care has yielded positive results. For instance, OFDA programs in South Africa have increased harvest yields in good years, and reduced losses in bad years. This includes cultivation practices, small scale irrigation, and introduction of drought resistant or short cycle seeds. This type of programming fits nicely with DRR and most organizational mandates on capacity building and natural disaster response.

An area of DRR that has been relatively highly invested in is infrastructure and building codes. However, the overall usefulness of these programs is sometimes disputed. In order for buildings codes to be strictly adhered to in practice – as opposed to mere regulations that are often ignored – there needs to be greater information and understanding on the patterns of loss and damage likely to emerge from failure to adhere to such codes in high-risk areas. This

will require providing DRR training to engineers, creating public awareness to create both better supply and demand of DRR service, and creating a system of incentives for adhering to codes and repercussions when codes are ignored. Similarly with infrastructure investment, there has to be a clear and sustainable plan on up-keep and maintenance. Often governments get funding in order to achieve higher building standards or build necessary infrastructure without establishing what would be needed for longer term maintenance of the structures (World Bank, 2006). Through evaluation and analysis of case studies, one assessment found that building codes were not sufficient for DRR (UN and World Bank, 2010).

Another intervention that has been prominent is insurance within the agricultural sectors, specifically index based weather insurance. The focus on repairing safety nets via insurance schemes is meant to transfer risk outside of the community as well as encourage farmers to engage in higher potential, but higher risk farming technologies (Christoplos, 2010). However, most evaluations of insurance are still in their pilot phase, therefore little can be concluded about their effectiveness besides theoretical speculation. This is certainly one component of DRR that needs significant further exploration and proper evaluation.

Due to the small distinction between conducting programs in the name of DRR, development, or climate change some organizations feel that they have to constrain what can fall under the mandate of DRR. DRR programs are often limited to risk-prone geographic areas and working with risk-prone populations, while most development programming is in high potential risk areas. Conflict, though highly correlated to increased risk for and from disasters, is usually treated separately from DRR by the majority of organizations. Most disaster risk approaches are developed in a stable setting with donors and multilateral initiatives prioritizing DRR in natural disasters rather than in conflict zones.

This is largely because of the more highly politicized nature of conflict prevention and mitigation, the need –at least in some circles – to isolate humanitarian response from conflict resolution, and differing spheres of expertise in conflict mitigation compared to preventing or mitigating natural hazards. Although many donors and agencies address both conflict mitigation/resolution and DRR, they are often addressed separately by very different parts of the organization and frequently there is little joint analysis of the combined risks in a given operational context.

2. Dimensions of DRR

The first place to start is to define risk. Here we use the ISDR definition:

*The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions. Conventionally, risk is expressed as some function of hazards and vulnerability $R = f(H, V)$.*⁵

Hazards, in this formulation, are any event or phenomenon that may cause the death, injury or damage. Vulnerability is usually formulated to imply exposure to a hazard, and the ability (or inability) to cope with its consequences.

Risk is a function of the relationship between the hazards to which a household is exposed and the household's vulnerability to that specific hazard (Dilley & Boudreau, 2001). For example, the risk (R) of a famine due to drought is a function of the magnitude and location of the drought (H) and the household and community vulnerability (V): lack of income diversification or drought resistant seeds, limited access to a remittance sender, etc. Hazards can be broken down by climatic, geo-physical, pandemic, economic, political,

environmental, and technological. Vulnerability is defined in slight variation in the literature, but usually in terms of exposure, sensitivity, as well as a function of capacity to anticipate, cope with, and recover from a hazard (Thomalla et al, 2006). Though the 'hazard' part of the equation is well developed, 'vulnerability' has proved more elusive because of the lack of agreement over how to translate the terminological definition into an analytically robust one (Boudreau, 2009).

A key distinction is whether a hazard affects individuals or households separately or entire communities or wider regions. These different types of risk will have varying consequences. *Idiosyncratic* risks relate to individual households but not necessarily to the whole community. This includes events such as illness, the death of a wage earner, fires and accidents, theft, etc. Individual household's assets and capabilities may be severely affected while neighboring households may not be disturbed at all.

Covariate risk arises from hazards that tend to affect entire communities, such as drought, floods, or earthquakes and armed conflict. Such shocks involve entire areas or sub-regions, destroying or depleting a range of livelihood assets, including natural and physical capital. Nevertheless, individual households will be more or less exposed to covariate shocks depending on their own asset base.

The implication of the equation $R = f(H, V)$ is that in order to reduce risk, either action has to be taken to prevent a hazard from occurring, to reduce a household's exposure to that hazard, or to increase the household's ability to cope with the hazard. One example of a risk reduction approach is via the 'Disaster Management Cycle' which includes prevention, mitigation, preparedness prior to a disaster and response/relief, recovery, and rebuilding after the disaster (IUCN, 2008). Another method – the Harita Conceptual Framework – looks specifically at a more holistic approach to risk

⁵ ISDR Terminology: Basic Terms of Disaster Risk Reduction, <http://www.unisdr.org/eng/library/lib-terminology-eng%20home.htm> and Appendix C.

management consisting of risk reduction, risk transfer, and prudent risk taking (Oxfam, 2009). There are several other variations of these two models that also take into account risk prevention, mitigation and coping.⁶

At the core of reducing risk is an understanding of the intersection between risk, interventions, and livelihoods. Therefore we use the livelihood framework⁷ as our analytical base of analysis. The livelihood framework was developed by DFID to help understand and analyze the household economic systems of the poor and assess the effectiveness of poverty reduction programs (DFID, 1999). The framework consists of assets or resources held by households and communities, generally categorized as physical, natural, financial, human, and social. The effectiveness of these assets is framed by processes, institutions, and policies (PIPs) which define the household's and community's vulnerability context by shaping, enabling, and constraining what people can achieve with their assets. Households apply different livelihood strategies, which are ways in which assets are combined and deployed to achieve livelihood outcomes, which in a sustainable well functioning community match the goals the households are trying to achieve (Chambers and Conway, 1992). In order to reduce risk, a program can either intervene to protect human life and status (outcomes), protect assets (the asset framework), or create a less risky environment or more protective policies (the contextual PIPs environment).

A final dimension of DRR is the context and populations in which risk reduction is occurring. An important distinction is the difference between rural and urban populations and their livelihoods. These settings are vulnerable to different hazards and in very different ways, and these variables significantly impact the

choice and likely effectiveness of an intervention. It is also important to understand how risk differs amongst different social groups, such as women, youth, the elderly, and the disabled. For example, sexual exploitation can be a component of who does or does not get relief at the distribution level, where female headed households are most vulnerable (Barrett et al, 2009). Of course another important distinction is what livelihood systems are used by the hazard prone or affected household and community: agricultural, pastoral, labor based, trade based, etc. The ability of DRR programming to be aware and address these issues significantly impacts the degree to which risk can be reduced.

3. The DRR Framework

Given the above considerations we have developed a DRR framework by which we can better think about the objectives, scope, and priorities for DRR and how it intersects with livelihoods. This framework can both assist with identifying the gaps in previous research, literature, and programming and with program implementation itself. This framework attempts to summarize and share current thinking on DRR. It does not offer definitive answers and guidelines, but is meant to elucidate the process of DRR and put risk at the core of programming and analysis.

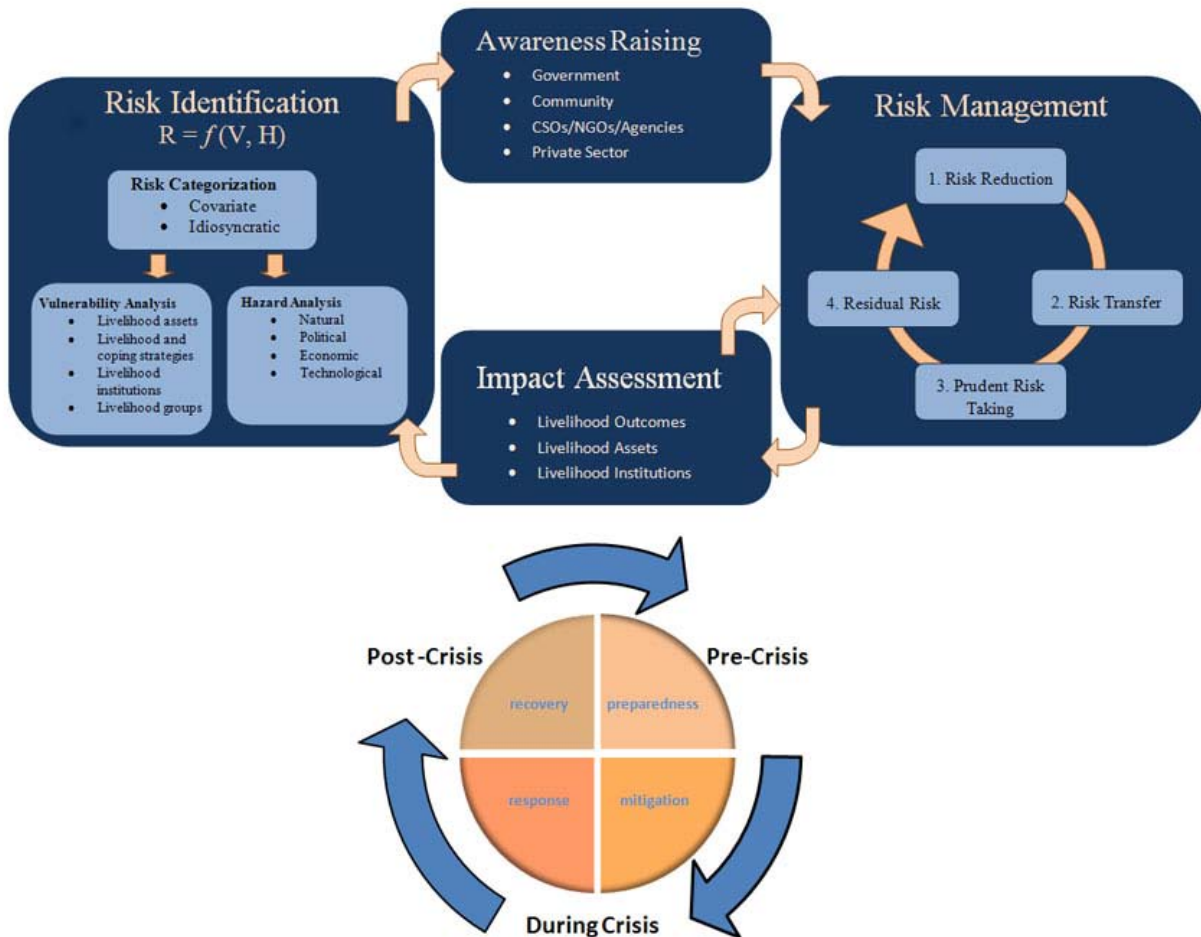
The term disaster or hazard is conspicuously absent from the framework. The reason for this exclusion is the belief that risk can be found in any context; it is not simply an extension of or addition to humanitarian response and recovery work. The omission of a disaster allows the framework to be used as a 'lens' for all risk reducing programming and is not limited solely to disaster response. This framework enables a view of DRR that is part of a collaborative, multi-hazard, cross sectoral program design that incorporates development, climate change, recovery, in addition to humanitarian response, in an effort to reduce household and community vulnerability to both covariate and idiosyncratic shocks. The point is that

⁶ For a list and evaluation of frameworks used in the field refer to Appendix A7: Overview of DRR Frameworks.

⁷ See Appendix D for the full Livelihood Framework

programming at any point of the program cycle can be risk reducing or risk enhancing,

depending on the characteristics of the programming.



The foundation of the framework therefore is risk identification and reduction through proper risk management. While most frameworks identify risk as a primary concept in disaster management, they fail to explicitly include the dimensions of risk, which can be categorized as both idiosyncratic or covariate and identified in terms of vulnerabilities and hazards, as specified by the risk equation: $R = f(V, H)$. This equation appeals to risk management directly by specifying the need to both reduce the occurrence of hazards and address household and community vulnerability in the context of these events. Vulnerability, as understood from a livelihoods perspective, is a reflection of individual and collective assets, strategies, and

PIPs, while hazards encompass the whole gamete of adverse events, including natural, political, economic, and technological. Both hazards and vulnerabilities should be identified with the help of community involvement and technical assistance (ISDR, 2004) with a real focus in the preparation stage on identifying contextual issues and nuances of the community

Political and government support of DRR programming is an important component, along with that of the community, CSOs, NGOs, agencies, and the private sector working in the same geographic vicinity or addressing similar vulnerabilities. Therefore, any institution that

aims to put in place a program with a DRR focus needs to raise awareness with the relevant groups in order to avoid both unnecessary replication and improve sustainability. For example, in Kenya, several different organizations created their own Local Peace Councils within the same district, creating problems that lead to the ineffectiveness of this conflict reducing program (Odendaal and Olivier, 2008).

Perhaps one of the largest exclusions amongst DRR frameworks is the notion of holistic risk management. Our framework incorporates risk reduction, risk transfer, prudent risk taking, and residual risk. This concept is drawn heavily from Oxfam International's Harita Conceptual Framework (Oxfam, 2009). Within our framework, risk reduction includes the promotion of resilience via physical interventions and social processes. The next component is transferring covariate risk from the household or community to an institution or agency that is better equipped to handle it, such as the government via social safety nets or an insurance agency. In both cases, some elements of risk are effectively shifted from the vulnerable population. Prudent risk taking allows a risk management strategy to both reduce the exposure to risk and improve the productivity of affected or hazard prone communities. This allows risk reduction to be easily incorporated with development programming and shows how DRR does not have to be limited to mitigation and coping strategies, but can be an opportunity for growth and wealth accumulation. Some form of residual risk always remains and therefore the process in effect is a feedback loop, one that however follows a very specific process from risk reduction, to risk transfer, and finally prudent risk taking.

Assessment of program effectiveness and the identification of new vulnerabilities are essential for the process of risk management. Vulnerabilities, especially in the light of climate change, will change over time as will the nature

of hazards. Incorporation of the livelihood framework into the DRR framework as well as the elements of vulnerability analysis gives clarity to the focus of the impact assessment on livelihood outcomes, assets, and institutions as related to the intervention. An evaluation component to any framework is necessary to continually monitor the specification of the context and effectiveness of programming. A proper impact assessment can lead to either a continuation of an intervention or the need to reassess risk, starting the process all over.

Though the model we have just discussed is not implicitly incorporated into the program cycle (preparedness, mitigation, response, and recovery) it does include programming as part of the overall DRR framework. Future DRR programming needs to be incorporated into all levels of the project cycle (ISDR, 2009) and therefore does not follow a specific linear trajectory. Risk identification and management needs to happen prior to a disaster, but also has to continue to happen throughout the disaster management cycle in the form of building back better and reducing the potential for future risk. Therefore, to place DRR simply in the pre-crisis stage would be to limit the potential and long term success of programming.

Our framework encompasses many of the key factors for a generalizable model of DRR. These factors include:

- an assessment of vulnerabilities and hazards, and, by extension, risk;
- learning: i.e. sharing knowledge with other stakeholders and raising awareness;
- managing risk; and
- a system for monitoring and evaluation.

The feedback loop allows for constant re-evaluation of risk identification and impact assessment. The framework permits for a conceptual and practical understanding of DRR to ensure better risk reduction in the future and highlights possible gaps within the literature and programming.

Current Gaps in DRR Knowledge and Programming

DRR is a relatively new field, and a number of gaps in knowledge and programming are evident:

- National capacity for implementing DRR is limited compared to international capacity.
- There is a lack of adequate funding modalities. The funding available for DRR is focused too narrowly on natural hazards and the rural sector. Conflict, multi-hazard environments, and economic shocks are often judged as being political and thus beyond the scope of DRR framework, even though they are important contributors to and catalysts of disasters.
- National and international actors lack consensus on a DRR framework and strategy for implementation, and coordination amongst the different sectors is weak, limiting cross-disciplinary insights into risk reduction.
- Vulnerability is often overlooked as an underlying risk driver in programming and analysis.
- There is a lack of an evidence base of what works and what doesn't and why within the field of DRR. The absence of monitoring, impact evaluations, and cost benefit analyses contribute to limited political commitment and weak funding from donors and governments. Without an evidence base it is hard to determine which DRR practices work and which may be more cost effective than other types of programs. For instance, are programs more effective (in regard to saving lives and livelihoods and minimizing funds spent) when they target vulnerability and focus on drivers of risk or when they provide ex post disaster relief?

In the next sections we explore these gaps in more detail.

1. Limited National Capacity

The capacity and understanding of DRR in the international community has increased. Almost all international organizations, NGOs, and national governments have some kind of programming around disaster risk reduction. These programs are not always effective or well funded, but the proliferation of these programs does indicate greater awareness and increased discourse. There is now better institutional policy for dealing with risk and recovery and increased hazard and risk mapping ability. Improved early warning systems have been adopted throughout the globe. However, increased agreement and interest amongst the international community and national governments does not always translate to the community or project level. National governments have limited enforcement and governance capacity when it comes to turning DRR policy into reality.

In order to increase capacity of national actors, information, education, and funding will need to flow from an international discussion to national governments and community organizations. This requires work on multiple levels – community groups, local and national governments, regional initiatives – and breaking down red tape between the levels so that emergency information, such as flash flood warnings, can filter down quickly. Without this, DRR programs such as risk and hazard mapping, earthquake resistant infrastructure, advanced early warning systems will not be utilized and expanded in poor and risk prone communities.

The majority of the funding for DRR still comes from international aid rather than government coffers, and this limits program sustainability (Christoplos, 2010). After a disaster, the institutional infrastructure for response may be mobilized, but the general approach to recovery and risk reduction remains primarily oriented towards analyzing natural hazards without looking carefully at factors of vulnerability likely to contribute to future disasters. This approach ignores the underlying risk factors that make a

specific community or household more vulnerable to the consequences of a disaster. Furthermore, attention is still geared towards how to *respond* to a natural disaster rather than how programs can treat the socioeconomic factors that determine who can avoid, mitigate, or cope with these risks.

2. Limited Funding for DRR compared to Relief Efforts

Disaster response and awareness has increased, with unprecedented donations and international aid after Hurricane Mitch in 1998, the Tsunami in 2004, and the Haiti earthquake in 2010. However, the majority of this aid still goes towards relief efforts. Most bilateral donors earmark only 5-10% of their annual humanitarian budget for DRR activities (German Committee for Disaster Reduction, 2007). To create greater balance between spending on relief and spending on DRR, emergency response needs to be linked directly to disaster risk reduction programs. For example, WFP's budget for early warning is tied to tonnage of food aid, and DRR funding from national donors is a percentage of their humanitarian budget rather than based on DRR need for that year.

There are several reasons for the discrepancy in funding between DRR and response. One is the obvious urgency of relief. The humanitarian imperative combined with the high profile of disasters mean that more and greater funds will always be allocated to emergency relief than DRR. The relief phase is often dominated by large donations and urgency regarding disbursement, and aid agencies sometimes bypasses important national structures to distribute the aid. In this process, the need to reflect on disaster risk and how it can be incorporated into humanitarian action and sustainable development is often bypassed (Christoplos, 2010).

Furthermore, funding for relief operations is usually a one-off payment as compared to mitigation and preparedness, which require sustained funding on a recurrent basis to be

successful. Most organizations report that it is impossible to get funding for programs that last longer than five years, and, more frequently, only three years. This has forced current DRR work to limit long-term, potentially higher-impact plans in lieu of a focus on short-term planning horizons. The opinion of some disaster experts is that DRR programming should affect future development decisions (i.e. where will a family build their house after they move out of this temporary shelter, and what will they have learned from this program about how to build a permanent house better?), and not simply deal with the current consequences of the disaster. In other words, DRR needs to identify, manage, and plan for future risk and, in order to do so, would need to be part of a multi-sector, multi-year, and multi-country plan. For example, some organizations are working hard to implement a 'program approach' which specifies longer-term objectives for a particular place or geographic area, and then uses specific projects to work towards those goals, rather than just implementing short-term programs.

If more funding is to be funneled towards prevention and mitigation, DRR programs will have to demonstrate that they are cost-effective in terms of future emergency response. A DFID study contends that for every dollar spent on mitigation approximately two to four dollars are saved in reduced disaster impacts (DFID, 2006). A similar finding was made in India in a cost benefit analysis of DRR programming in flood prone areas (Venton and Venton, 2004). However, this type of research is limited in quantity and scope. To increase funding towards DRR we need solid evidence that investment in DRR reduces economic and human losses as well as the cost of future response.

3. Lack of Standardized Definitions, Tools, Methodologies, or Assessments

In order to better incorporate DRR along different fields and practices there is a need for

standardized definitions, tools, methodologies, and assessments. The humanitarian community has no single operational framework for DRR.⁸ One consequence of having numerous operational approaches is the lack of both a comprehensive summary of DRR approaches, and a coherent strategy for addressing livelihood security. Although ISDR does provide broad definitions, terms like vulnerability, resilience, risk, disaster, hazard, and shock are used loosely in the literature (Webb and Harinarayan, 1999).

The term ‘vulnerability’ refers to the relationship between poverty, risk, and efforts to manage it. It is essential for a consistent definition to emerge in order to set appropriate vulnerability assessment methods. Vulnerability connotes exposure, sensitivity and reliance (Thomalla et al., 2006). In most definitions vulnerability is a function of capacity to anticipate a hazard, cope with it, resist it, and recover from its impact. Both vulnerability and its antithesis, resilience, are determined by physical, environmental, social, economic, political, cultural and institutional factors’ (Benson & Twigg, 2007), but there is no one clear and widely used definition.

⁸ Some examples are *The International Strategy for Disaster Reduction* (ISDR, 2001), the *Framework for Disaster Reduction from the Hyogo Framework for Action* (ISDR, 2005), *The Disaster Reduction Hyperbase* framework for at risk communities, the *Incorporation of Hazards in the Project Cycle* (Benson & Twigg, 2007), the *Integration of Disaster Risk Concerns into Country Programming* framework (Benson & Twigg, 2007), the World Bank *Five-pillar policy* framework (WB, 2007), the *Mainstreaming Disaster Risk Reduction into Development Projects in Hazard-prone Countries* framework (Benson & Twigg, 2007), the *Oxfam HARITA Conceptual Framework* (OXFAM, 2009), and the *World Vision Disaster Management Cycle* (World Vision, N.D.).

4. Limited Incorporation of Vulnerability as an Underlying Risk Driver

Risk remains associated with hazards and response, at the expense of concerns related to vulnerability. Less focus on the ‘event’ itself and more focus on the underlying causes of vulnerability by policymakers increase the resilience of communities, and avoid some of the impacts generated by disasters. Vulnerability is determined by social and political components, rather than a physical characteristic on its own. Given certain risks and hazards, a better understanding of vulnerability would allow for different outcomes for a given population (Handmer and Dovers, 2007). If adequately predictive, this definition of vulnerability serves to, protect livelihoods, reinforce coping strategies, and support existing institutions in disaster prevention (Cannon et al, 2003).

Vulnerability analysis promotes a more precise understanding of truly vulnerable populations, and further integrates development work and disaster recovery (Cannon et al, 2003). Development programming can thus be improved to target vulnerability in relation to shocks, hazards and threats as well as outcomes. Interventions stand to be greatly improved in terms of timing, location, target population and other similar characteristics (Dilley & Boudreau, 2001).

5. Minimum Coordination amongst Programs

One of the largest gaps in DRR programming is the need for collaboration amongst different sectors involved in risk reduction or management - development, poverty reduction, climate, and humanitarian programs - in order to encourage cross-disciplinary insights into risks, vulnerability, and household responses. It is essential to ensure that the developmental process does not unwittingly create new forms of vulnerability or exacerbate existing ones (Benson & Twigg, 2007).

A central theme of the literature is the importance of incorporating DRR across sectors. ISDR, the ProVention Project, the United Nations, the World Bank and other organizations have emphasized the need to mainstream disaster risk reduction into development, and to support development organizations that are adjusting operation practice accordingly (Benson and Twigg, 2007; ISDR, 2004). According to an UNDP report, there are two main types of disaster risk management. The first are prospective disaster management policies that are integrated into sustainable development programming and planning and the second is compensatory disaster management, involving disaster preparedness or response. Prospective disaster management is intended for medium-long term risks and warrants program monitoring to ensure that a development intervention is not exacerbating risk. Compensatory disaster management is to be used for contemporary risk to ameliorate existing vulnerabilities (UNDP, 2004). Both are necessary to successfully prepare and respond to disasters. Much of the literature seeks to change the thinking of disaster as an interruption in development to one of a necessarily discussed risk to development approaches of both countries and international institutions (World Bank, 2006).

6. Lack of Project Monitoring, Impact Evaluations, and Cost-benefit Analyses

One of the other major gaps in the collective knowledge is the lack of a globally accepted set of criteria for measuring the effectiveness of DRR (ISDR, 2004). In order to streamline relief and developmental responses, and achieve a comprehensive needs assessment mechanism, an appropriate combination of indicators and analytical methods are needed, as well as a comprehensive intervention strategy, flexible planning, and, of course, funding. Suggested tools and methods for covering these needs include information mapping, case study analysis and universal datasets to monitor

trends, a multi tiered system of disaster reporting, the use of poverty reduction papers to facilitate the incorporation of disaster management and environmental sustainability into development programs, building on existing systems and evaluating local coping strategies. In addition to previously mentioned strategies, hazard mapping, decentralization, monitoring and evaluation, incorporating disaster risk management into the project cycle, and transparency, are identified as essential for carrying out these methods. Current issues standing in the way of these indices and analytical targeting methods include multiple scales of analysis leading to aggregation problems, the absence of objective benchmarks, and dynamic systems that involve different combinations of explanatory variables over time and place (Thomalla et al, 2006).

A stronger emphasis needs to fall on monitoring, impact evaluations, and cost-benefit analysis in order to determine the overall effect of mitigation and preparedness interventions. ‘An ounce of prevention is worth a pound of cure’, but if there is no data to confirm this then funding will not be geared towards DRR. A greater focus on both qualitative and quantitative data is necessary to determine whether the intervention actually reduces risk providing a useful evidence-base tool for analysis of DRR and demonstrating an economic argument for the intervention (Venton and Venton, 2004). The literature review has found scant evidence on the impact of DRR with little empirical evidence one way or another on the claims and justifications made on behalf of it.

In regards to evaluations, most tend to be project specific and limited to project outputs. In order for organizations to fully understand the value of an intervention, impact (lives lost, affected, assets lost, reduction in response cost, etc) has to be measured, as well as the underlying drivers behind it. Otherwise project lessons are less likely to be institutionalized and interventions might be completely

inappropriate for the context, or, worse, exacerbate disaster risk. Another important distinction that needs to be made is the difference between *outcome indicators*, those that measure the broader result achieved through the provision of program goods and services (i.e. infant mortality rate, nutrition), versus *process indicators*, those that measure ways in which the program services and goods are provided (i.e. error rates). Evaluations need to focus on the former so that they do not simply evaluate the process of implementing programs without understanding their actual impact on the community level. Proper evaluation could both make a stronger case for more DRR funding as well as determine best-practices without requiring repetition of the same mistake. Though long term impact might be difficult to measure for short term projects, programs can establish and measure short term expectations. Another important concern is that the effect of DRR cannot be fully measured until an actual hazard strikes, and then it is difficult to separate out the real effect of the DRR intervention if a good counterfactual is not available – therefore a different kind of assessment is likely required to measure the impact of DRR (Maxwell et al., 2009).

7. Limited Scope beyond Natural Hazards and Rural Areas

DRR is frequently discussed in the context of natural hazards and climate change, but not in regard to conflict or political vulnerability. Given the challenges of remaining neutral due to the nature of international funding, security protocols, and political allegiances or associations, it is rare that intervention in a conflict is not tarnished with a political brush. This makes programming (of any sort) potentially complex and problematic when viewed through humanitarian codes of conduct. Although these problems cannot be avoided entirely in any context, many organizations prefer to work in natural disasters and in response to natural risk than to engage in more overtly political arenas. DRR programs often fall into this seemingly more apolitical area, with

programs addressing conflict siloed in a different part of the organizations.

Besides conflict there are numerous other hazards that are underrepresented in the DRR literature. Biological and economic hazards and multi-hazard environments receive little to no attention, particularly when reviewing the missions of the various organizational bodies in the DRR domain (ISDR, 2004). These topics warrant greater research if we are to begin to better understand the capacities of affected communities and better design programming.

Another area of focus that requires increased attention is urban DRR. The majority of professionals in the field come from work on famine and poverty in rural areas. The consequences of this dearth of urban know-how are that often DRR programming developed for rural contexts are simply transferred to urban environments. Due to significant differences in livelihoods, social capital, access to markets and infrastructure, this approach is often inappropriate and ineffective. An example of this is the OFDA temporary shelter construction project in Port au Prince, Haiti, after the January 2010 earthquake. In line with SPHERE standards, designs were to accommodate 5 people in 18 sq meters. Urban assessments, however, indicated that most urban dwellers in Port au Prince had access to significantly smaller pieces of land upon which to build temporary homes. Reflecting, in the view of one urban expert, the bias towards rural systems, the architectural submissions for the shelters were all one-story. This commonality failed to consider adaptations for an urban area in which space is at a premium. Given the increased vulnerability of households in urban areas, particularly slums, greater emphasis needs to fall on urban specific DRR programming and education.

Summary and Conclusion

Disaster risk is highly concentrated in middle- and low-income countries, and is felt most

acutely by people living in poor rural areas and urban slums. Hazards such as floods, droughts, conflict, storms, earthquakes, economic crises and other events, when combined with greater vulnerabilities, can lead to a loss of life and collapse of livelihoods. Reducing disaster risk can play a role in reducing poverty, safeguarding development and adapting to climate change, with beneficial effects on broader global security, stability and sustainability. In order to move forward in DRR, programs and research need to begin to address the gaps in DRR knowledge and programming and increased vulnerability of certain populations and locations. Based on the literature review and interviews, below is a summary of recommendations.

1. Increase focus on poor, urban areas, and island nations in addition to chronically risk prone areas

Growing urban populations and environmental changes make both urban informal settlements and small island nations increasingly susceptible to hazards. Thus, a new focus on urban vulnerability and island nations is called for.

2. Standardize definitions, tools, and methodologies

Agreed upon definitions, tools, and methodologies will help bridge different fields and types of programming and reduce confusion. A cross-sectoral framework that reflects how lives, livelihoods, and assets are preserved would allow for a globally accepted set of criteria against which to measure the effectiveness of DRR, and could guide action and steer monitoring.

3. Focus on reducing vulnerability

Risk remains overly associated with hazards and response, at the expense of concerns related to vulnerability, which is seen as too ambiguous and overwhelming. We lack tools to integrate vulnerability analysis into development planning. A better set of tools for vulnerability analysis can link humanitarian and development

responses and bring those responses in line with the sustainable livelihoods approach.

4. Integrate DRR with development, climate adaptation, and humanitarian programming

DRR is too often treated programmatically as a standalone activity. Development, humanitarian, and climate initiatives have to incorporate DRR programming in order to make their projects more sustainable and better address all community and household risk drivers. The challenge is to incorporate climate change, poverty reduction, and risk reduction in a way that can bring local and sectoral approaches into the mainstream. This will both address the goals of the Hyogo Framework for Action and the Millennium Development Goals.

5. Understand and incorporate the project cycle in programming

Given that the majority of funding is still channeled towards disaster response, the methodological focus needs to be broadened and made more comprehensive, incorporating risk reduction with mitigation and preparedness, response, and recovery. Frequently, relief efforts contribute to increased vulnerability due to conflicting program objectives.

6. Improve monitoring, impact evaluation, and cost-benefit analysis

A stronger emphasis on monitoring, impact evaluations, and cost-benefit analysis is needed to determine the overall effects of DRR interventions. Quantitative analysis of the cost and benefits of DRR programming can provide evidence and a clear economic argument for or against DRR interventions. Lack of hard evidence makes the case for funding DRR difficult, particularly because it is hard to determine whether targeting vulnerability and risk drivers prior to a disaster cuts down on losses and traditional disaster relief costs.

7. *Broaden focus to incorporate conflict, economic, biological and multi-hazard environments*

Most natural disasters now occur in a conflict or post-conflict setting (Sudan, Haiti, Somalia, Nicaragua, and many others) or as a mix of multiple hazards (Ethiopia, Philippines, etc). At

this writing (November 2010), the global financial crisis is still fresh in our memory, and we recognize the importance of economic crises on livelihoods, institutions, policies, and processes.

Appendix A: DRR Topics

A1: Migration

Out-migration is an inevitable result of disaster, and it often serves to exacerbate the impact (Hunter, 2005). However migration can also mitigate impact by reducing the number of people that need to be assisted in the affected area. Communities that are part of (pre-disaster) existing migration systems benefit from remittances sent after a disaster (see section 3b: remittances).

How much a disaster increases or decreases migration flows depends on the existing migration context. Halliday's research in El Salvador following the 2001 earthquakes showed that El Salvador had well established migratory flows to the United States and Canada (migration was used as an ex ante risk management coping strategy) but that earthquake damage had no discriminatory effect and was associated with decreased net migration across all wealth categories (Halliday, 2006). Flight from hazardous areas appears to be more related to family composition, community ties and job status than to concern for the risk posed by a given hazard. After a disaster, or in hazard prone areas, not all households are able to migrate. The costs of migration are a deterrent, but residents also choose not to migrate because of lack of information, or expectations about loss (Hunter, 2005).

There is some evidence that patterns of migration flows respond to environmental change such as desertification. In the Sahel, the composition of migrants and types of migration have changed, with more internal migration, characterized by short distance movements, shorter migratory cycles and a greater proportion of women and children. Research in Nepal also found environmental degradation associated with short distance movements, but with little effect on longer distance migration (Adamo, 2009). Short term migration caused by environmental shocks is linked to a household's seasonal coping strategy.

Large scale displacement caused by a disaster can create protection issues. The 'self-settlement' of displaced populations can expose both the migrants themselves and the communities that absorb them to increased risk (UNHCR, 2006). The speed at which migration takes place can also be a determinant of the overall impact. The more sudden and forced the displacement, the more disruptive it is likely to be to lives and livelihoods (Adamo, 2009).

Health, both mental and physical, can be negatively affected by relocation or forced migration. Research conducted following the 1988 earthquake in Armenia found that relocation following the disaster was associated with higher levels of depression as compared to households who remained *in situ*. Loss of social ties, interruption of livelihood activities and other disruption factors caused by out-migration can all affect vulnerability (see section 4: social and political capital). A displaced population is also susceptible to disease outbreaks and epidemics, as is evident with the spread of cholera in post-earthquake Haiti today (Watson et al., 2007).

A growing literature on the impact of conflict-displacement exists, exploring how livelihoods and entitlements play a key role in household resilience after displacement. E.g. A study in Sri Lanka explored the impact of displacement upon IDPs by livelihood type. Despite the covariate nature of the displacement and the loss of income experienced across the entire sample, important distinctions between groups were identified. Livelihoods were categorized by skilled and unskilled labor, civil servants and entrepreneurs. Entrepreneurs experienced the most substantial losses as a result of displacement, while skilled and unskilled laborers' losses were less dramatic (Amirthalingam & Lakshman, 2009; 2009).

Livelihoods programming suggests that households can be afforded some level of protection if they are prevented from liquidating their productive assets and are permitted to use those assets to cope with shocks (see section 3: the poverty trap and financial capital). In the event of disaster induced migration, asset stripping is common and attempts to protect these assets have been the focus of interventions. Oxfam GB programming in Colombia has worked with IDPs to provide productive packages containing contextually appropriate goods to improve productive capacity of those affected by displacement. These packages have been beneficial for those targeted, but mid to long term impacts were less clear. Most beneficiaries failed to maintain or improve the livelihood assets over the medium term and for those who had achieved asset accumulation, pre-displacement skills or training were likely responsible for the sustained productivity (Hill, 2004). The importance of pre-disaster skills training and interventions to provide vulnerable populations with basic skills can provide resilience against future shocks and suggest that transferable human assets are a determinant of successful displacement and disaster coping.

References

- Halliday, T. (2006). Migration, risk, and liquidity constraints in El Salvador. *Economic Development and Cultural Change*, 54, 893-925.
- Hunter, L. (2005). Migration and environmental hazards. *Population & Environment*, 26(4), 273-302.
- UNHCR. (2006). *State of the world's refugees*. New York, NY: Oxford University Press.

A2. Urbanization

“Africa is urbanizing faster than any other continent and the African urban populations will more than double its 2007 level of 373.4 million as early as 2030, when 51% of its population will be urban. There will be close to 800 million African urban dwellers by that year, which will be more than today’s total number of city dwellers in the entire Western hemisphere. In fact, it is conceived that by 2050 there will be more people living in African cities than the combined urban and rural populations of the Western hemisphere.”

- Anna Tibaijuka, Executive Director, UN-HABITAT, 2009.

Rural-to-urban migration, in addition to natural population growth and sudden movement into a city (in response to war or famine) contributes to urban growth, and the concomitant growth of informal settlements or urban slums. These areas suffer from overburdened health care systems, inadequate and insufficient drinking water, and substandard sanitation facilities and infrastructure; lack affordable and adequate land; and experience frequent food shortages (UN-HABITAT, 2009). Poor quality and overcrowded housing is a common characteristic of informal settlements, where there is little to no zoning, regulation or building codes – but in many large cities in developing countries, poor quality, overcrowded housing is common in planned areas too. Legal title and other ownership records on the households in the settlements seldom exist. Informal settlements (“slums”) are at more risk for hazards, however, and this section focuses on them.

Risk factors in informal settlements

Informal settlements are characterized by high risk for the following reasons:

“Invisible” groups lack protection. Large numbers of unnoticed at-risk individuals and groups, such as the elderly, street children, recent migrants and IDPs, lack protection and access to safety nets. (ALNAP, 2009). Local authorities are unprepared or unwilling to address the needs of the growing informal urban population. Lack of infrastructure and basic services such as drainage and emergency response increases risk. Poor urban governance exacerbates the risk through ineffective risk-reduction policies and programs. People living in informal settlements usually work in the informal economy, resulting in infrequent and irregular income and a limited capacity to pay for housing, purchase insurance, and develop savings or asset accumulation (see section 3: the poverty trap and financial capital).

Building collapse is a major issue in the course of most disasters. Informal settlements are by definition unplanned, and are often built on hazardous sites prone to floods, landslides and earthquakes (Pelling and Satterthwaite, 2007). These areas are highly exposed to urban pollution and hazardous materials;

These areas have recently begun to face increased violence and insecurity as a result of these deprivations in resources. They are often also the hardest hit by a disaster given the poor infrastructure, limited information on affected households, and often precarious foundation making them offer little resilience against earthquakes, floods, landslides, and other hazards.

Risk mitigation approaches

Risk mitigation approaches include understanding and mapping risks, building on local capacities engaging communities in risk reduction, and collaborating with local authorities and non-state actors to include disaster risk-reduction in urban development and planning.

Risk mapping is important for planning DRR techniques and contingency-planning efforts (UN-HABITAT, 2009). Context-specific risks can be understood by mapping information systems of unplanned areas, and through collaboration and information-sharing with different local government agencies in an effort to create a unified ‘base map’ of the region (ALNAP, 2009).

Collaboration must also take place in order to reinforce building codes and regulations advocating policies that address issues of poor housing and land, especially in earthquake-prone areas. Increasing the security of housing structures in informal settlements and preventing expansion of informal settlements onto hazard-prone land areas are key priorities for local governments. Land-use management programs should focus on limiting the extent of urban development on land sites at high risk for hazards (Pelling and Satterthwaite, 2007).

Additional preventative measures include improved drainage systems to reduce flood risk, and investment in roads and firebreaks to greatly reduce risks from fires in high populated urban areas (Pelling and Satterthwaite, 2007). In order to minimize future risks, DRR should be incorporated into all stages of a disaster response. The ‘building back better’ concept of rebuilding to reduce future vulnerabilities presented by ALNAP connects risk-reduction, migration, equity, human rights, gender, housing and land property rights to target smooth transitions from relief and recovery into long-term development. This can then be used as a model for future responses to disasters.

Local governance in many poverty-laden urban regions is inadequate. Efforts to enhance local governance could use risk-reduction as a vehicle for strengthening community-based organizations and CBO-local government linkages (Pelling and Satterthwaite, 2007). Local governments generally do not focus attention on disaster preparedness and preventative efforts; thus, it is important for nongovernmental organizations to implement DRR projects into urban development (planned and

informal) to cover the large gaps in urban DRR. A robust, multi-hazard approach for quick recovery, sustained development, and reduced risk is needed for CBO, governments, and humanitarian agencies (ALNAP, 2009).

In order to identify entry points to prevent interventions from undermining household, community and individual coping strategies, it is important to identify informal safety nets unique to urban settings (Morduch et al, 2009). Local resources and individuals should be utilized to build on and enhance local capacities and to design and implement social safety net programs. Successful slum upgrading must include a comprehensive policy framework that involves land tenure security, basic service provision and housing improvement (Brockman, 2009).

Urbanization brings about new hazards and risks that historically have not been addressed in urban environments. One challenge is how to relocate vulnerable populations out of unsafe settlements pre- or post-disaster without disrupting livelihoods. There is a recognized need to reduce vulnerabilities through housing resettlement, yet moving populations should be a last resort in DRR programming. Urban environments possess a diverse group of livelihoods, wealth, and inhabitants, and DRR responses must be context-specific and capable of addressing the needs and impact on women, men and other vulnerable groups (UN-HABITAT, 2009). Current tools and guidelines must be adapted to the urban setting to facilitate an appropriate response. One difficulty is lack of data and information on informal settlements and slums, making it difficult to identify context-specific tools and guidelines. Without adequate data, assessment will be incomplete, and vulnerable groups may not be accounted for. To make up for this lack of formal data, informal institutions and community based organizations should be utilized and identified as operational partners alongside NGOs, local authorities, and local governments.

While the local urban government is usually identified as primary actor for disaster-related functions, local governments often lack money for basic urban services and programs, let alone disaster-preparedness. Overcoming weak urban governance presents large problems. Often the greatest challenges of risk and vulnerability in urban centers emanates from the frequent inability of the formal planning and governance processes to address the full range of needs, interests and interactions among their citizens (ALNAP, 2009).

Recommended Reading

ALNAP Secretariat and ProVention Consortium Secretariat. (2009.). Responding to Urban Disasters: Learning from Previous Relief and Recovery Operations. *ALNAP Lessons* , 1-31.

Pelling, M., & Satterthwaite, D. (2007). Investigating Urban Risk Accumulation in Six Countries in Africa. AURAN.

Sanderson, D. (2000). Cities, Disasters, and Livelihoods. *Environment and Urbanization*; 12:93

A3. Financial Capital

A poor household without access to any kind to financial capital (savings, remittances, insurance, access to reasonable credit) can often fall deeper into poverty when hit with a hazard, either through asset depletion, the provision of large loans with exorbitant interest rates, the death of a productive member of the household, or even simply the loss of one's own health and hence productivity. Escaping from the grip of poverty is the most obvious step for reducing exposure to hazards, and would improve

resilience and the ability to cope with shocks. However, for households living in disaster prone areas or encountering the consequences of environmental change escape out of poverty can be almost impossible (Carter & Barrett, 2006). Since poverty and vulnerability reinforce one another, there is a cyclical nature to the persistence of poverty – the poverty trap theory (Sabates-Wheeler et al., 2008). There is a baseline asset level or critical minimum threshold – bifurcation point – below which asset accumulation is unlikely (Barnett, Barrett, & Skees, 2008; Carter & Barrett, 2006; Chantarat, Mude, Barrett, & Turvey, 2009). A household asset level above this point suggests that growth is possible, albeit threatened by the possibility of shocks knocking households below the threshold (Barnett et al., 2008).

Through informal risk management at the local level households may protect against slipping below the bifurcation point; however in the case of a covariate shock, such as a disaster, this is less likely. Households experiencing stress will cut non-immediate expenditures, for example foregoing planned house improvements or denying themselves needed medical attention. These short-term cash savings lead to greater expense later as the roof starts to leak or the medical condition worsens and require more costly treatments. In severe situations, households resort to more drastic coping mechanisms, including cutting food budgets, reducing number of meals per day, or granting caloric and nutritional priority to the members most vital to the household livelihood activities. Distress migration or forced displacement can occur multiple times when families without the financial resources to recover from the drastic loss of household and productive assets are forced to relocate repeatedly or to resort to IDP camps (Brouwer et al, 2007). Once displaced, the poor are further constrained if they are required to live in displaced camps (see section 1: migration).

Without the proper financial management tools or access to financial services households resort to sub-optimal or harmful mitigation and coping behavior, with potential long-term ill effects for household wealth-building.⁹ Households commonly make emergency divestitures of long-term productive assets, including selling off productive assets such as livestock for cut-rate prices. For example, pastoralists sell valuable cattle, animals that might have still had breeding potential or which would have sold for a better price had they enjoyed a few more years of fattening. Covariate shocks often lead to many households seeking emergency funds at the same time, creating a glut of goods in the market and depressing the selling price. Such strategies satisfy immediate cash needs, but stunt long-term wealth-building potential and potentially pull the household deeper into poverty.

From a programming perspective, a household can avoid or even escape the poverty trap via social safety nets, savings, microcredit, and insurance. A poor household's small and unpredictable income makes the availability of financial reserves and services an important financial management tool in the event of a disaster. But few poor households have the means to set aside reserves, and when confronted with the need for cash, households must look elsewhere. Those who have remittance senders elsewhere may be able to obtain additional support (see section 3b: remittances). But in most poor communities, relatively few households have access to remittances and most households must look to their own community for emergency credit. Pastoralists often seek loans during periods of severe drought, when they have to truck in water to keep their families and animals alive. This water costs money, leading to household debt burdens of \$50 to \$100 (Ali et al, 2005). Households are obliged to set aside concerns about security or cost and borrow from money lenders at exorbitant interest rates and often from similar sources that have cheated them in the past (USAID, 2008; Wamsler, 2007). Thus many households find their debt situation

⁹ See Wamsler, 2007; Pouliotte, 2006; SEEP, 2009; Collins et al, 2009; Brouwer et al, 2007; among others.

exacerbated after a disaster. In the absence of financial capital disasters leave households not only significantly worse off but also more vulnerable to future shocks.

Recommended Reading

Brouwer, R., Akter, S., Brander, L., and Haque, E. (2007) 'Socioeconomic Vulnerability and Adaptation to Environmental Risk: A Case Study of Climate Change and Flooding in Bangladesh', in *Risk Analysis* 27: 313-326.

Carter, M. R., Little, P. D., Mogues, T., & Negatu, W. (2007). Poverty traps and natural disasters in Ethiopia and Honduras. *World Development*, 35(5), 835-856.

Morduch, J., Collins, D., Rutherford, S. & Ruthven, O. (2009) *Portfolios of the Poor: How the World's Poor Live on \$2 a Day*. Princeton University Press. May South African edition, University of Capt Town Press.

3a. Microfinance and Credit

The adaptation of financial management tools a priori can help households better prepare and cope with an oncoming disaster (Warren and Geetha, 2000). Microfinance institutions could potentially play a significant role in helping clients prepare for a disaster with the provision of secure savings and access to credit. However, most microfinance institutions are fiscally constrained in the immediate aftermath of a disaster and therefore provide limited benefits. Problems of safes being looted, lack of appropriate documents on behalf of the clients, over withdrawal of savings, and difficulty in accessing dispersed and relocated clients (in camps) all contribute to a microfinance institutions inability to support affected households and clients (Geetha, 2001). Savings groups which also offer a potential for greater recovery often cease to function after a disaster. In Haiti after the 2010 earthquake, many of the savings groups suffered large losses in their membership either due to death or temporary migration to the countryside. However, despite these setbacks mutuelles have now started to meet and offer much needed social and financial support to its members (Wilson, 2010).

Given the value of the services provided by a microfinance institution to disaster affected households it is imperative that these organizations plan ahead in the case of a disaster in order to provide the much needed access to household savings and availability of credit, as well as create accounts that incentivize household savings for future disasters. In the case of a disaster, the best liquidity management strategy for a microfinance institution is to have a contingency plan and understand all potential sources of liquidity in times of crises. The strategies that an MFI can adopt are: setting aside emergency funds, gaining access to disaster fund facilities, negotiate an overdraft facility on their bank account, and develop client contingency funds that can be accessed by clients in case of an emergency. A strategy should be developed in advance of the disaster. One such strategy is the establishment of disaster loan funds (DLFs) – these are financial reserves, usually established initially by a donor grant, that allow the MFI to make loans to affected households (Anand, 2007). In Bangladesh, one MFI created easy deposit and withdrawal access to encourage clients to build savings rather than a small compulsory account that could only be accessed when a client leaves the MFI. The MFIs that offered a voluntary savings products as part of their portfolio experienced less liquidity constraints post disaster (Warren and Geetha, 2000).

Loans also play an important role in reducing the negative impact of a disaster. For seasonal flooding or drought, loans can be structured so as to reduce required repayments during the hazard event. An MFI can issue new loans prior to a disaster that have to be specifically used to sure up a households

resilience by investing in small boats, building stronger and more flood resistant housing, etc (Warren and Geetha, 2000). After a disaster strikes an MFI can reschedule loans, provide emergency relief loans, and reconstruct loans. Several potential general lessons emerge in regards to product delivery: customize solutions according to clients' situations, empower local staff, give clients options, and protect client records and information.

Allowing clients to immediately resume regular loan cycles can help both the clients and the MFIs. In Mozambique, the immediate disbursement of new loans made client desertion low and allowed the MFI to retain and therefore continue to make regular loans. Furthermore, the quick response on behalf of the MFI increased the demand for microfinance services in the area for those households affected by the flood (number of active clients grew by 58%), positioning the MFIs for recovery and growth post flooding (Geetha, 2001). However, it is important to note that loan recovery for subsequent loans were not as high indicating a possible grant mentality.

Another useful innovation is the implementation of mobile banking that can then be used for emergency cash transfer and access to savings after a disaster. In the Kerio Valley, the majority of households are pastoralists and highly dependent on livestock for their livelihoods. Environmental degradation and increased human settlements have increased the pressure on scarce natural resources leading to inter-ethnic tension. This community was attacked and displaced during the post-election violence in Kenya. Given the remoteness of the area food aid was too costly and insecure to deliver so Concern decided to instead provide cash via mobile phones (Datta et al, 2009). This allowed for improved communication and provision of financial capital to the otherwise inaccessible drought and conflict affected community.

In disaster contexts, the capacity of a microfinance institution to provide a ready and sufficient sum of cash to cover a short-fall is crucial. Though most MFIs can be significantly affected by the disaster, new and potentially useful ways of building financial resilience in the case of a disaster are being developed. These services can both potentially offer the necessary financial assistance for a household to recover after a disaster and are flexible and convenient enough to target the poor and most disaster affected.

Recommended Reading

Kidder, T. (2000) 'The Role of Savings and Remittances in Unstable Situations: Reflections after Hurricane Mitch', *Humanitarian Exchange Magazine* 14.

Kumar, Anand (2007) "Institutional preparedness and sustainability of micro finance institutions during post disaster scenario." *Disaster Prevention and Management*, Vol. 16, No 1.

Rose, Adam (2007) "Economic resilience to natural and man-made disasters: multidisciplinary origins and contextuel dimensions." *Environnemental Hazards*, Vol. 7: pg 383-398

3b. Remittances

Remittances are important for supporting developing countries and households, and recently have taken a more visible role in disaster mitigation and recovery. Historical examples also illustrate the rise in remittance flows following disasters in Bangladesh, Dominican Republic, Haiti and Honduras and other Central American countries. Disaster circumstances dictated by conflict have also seen rising remittances in Sierra Leone and Albania. And in the case of Somalia and government collapse, remittances have been a lifeline for survival (Sharma, 2009). For poorer countries, remittance flows are

positively correlated to natural disasters (Yang, 2008a). Mohapatra et al (2009) find that it is countries with a larger emigrant stock as a proportion of the population that experience these post disaster remittance increases.

Remittances are often used as a cushion against shocks in the event of an idiosyncratic or covariate emergency. Remittances are perceived as a kind of insurance for low income households who have migrants abroad. A study done on the effect of rainfall shocks in the Philippines showed that for households with overseas migrants essentially all of the exogenous declines in income were replaced by remittance flows from abroad (Yang and Choi, 2007). During shocks, remittances play an important role in helping households maintain their expenditure levels. Net gifts to other households also increases with income shocks for remittance recipients showing that remittance receipts of migrant households are being shared with other households. Therefore there is an overall benefit to smoothing both income and expenditure for households receiving remittances as well as communities that participate in informal risk-sharing arrangements with remittance receiving households (Yang and Choi, 2007).

Remittances provide additional financial resources for poor households that play an important role in consumption smoothing both outside and in the case of a disaster. Households in the Philippines that experienced exogenous increases in remittances were more likely to leave poverty status, send their children to school, and to invest in microenterprise (Yang and Martinez 2005, Yang 2006, Yang 2008b). For the 'poorest of the poor' remittances can compromise half or more of a households income (Terry et al., 2005; Adams and Richard, 2004). They also encourage and contribute to greater savings. Household surveys in Pakistan indicated that the marginal propensity to save was higher (0.711) for income from international remittances than from domestic urban remittances (0.49) or rental income (0.085) (Ratha, 2003).

Remittances can help also households in advance of a disaster. Work in Ethiopia found that remittance-dependent households faced fewer idiosyncratic shocks defined by illness, suggesting a link to nutrition and biological resilience. Research in Ghana and Burkina Faso revealed that remittance recipient households are more likely to live in more resilient housing and also more likely to have access to communications than those without remittances (Mohapatra et al., 2009). However, generally there is little evidence based literature to support the hypothesis that remittances facilitate ex-ante preparedness and serve to reduce the extent of damage experienced by recipient households when affected by disasters (Mohapatra, Joseph, & Ratha, 2009).

The ex-post disaster period is often characterized by agencies undervaluing the capacities of affected communities. Remittances should be viewed as an asset to the response and recovery. The impact of remittances extends beyond the recipient household. The restoration of remittance flows interrupted by disasters can be a quick and effective means of livelihood restoration (Savage & Harvey, 2007). Agencies need to account for remittances, but are cautioned against simply looking at standard assessments to measure remittances following disaster as they are unlikely to convey the importance of remittances. Pre-disaster secondary data is useful in understanding the impact of the disaster on migration and remittances (Savage & Harvey, 2007).

Though remittances represent a large portion of the financial flow to developing countries and an important form of income to poor households, there still exist gaps in financial institutions' ability to meet the needs of these transnational transactions. Many remittances are still hand carried or sent directly via cash-cash transactions utilizing institutions such as Western Union. However, remittances can serve as a point of entry for many remitters and their families to formal financial institutions via

special savings accounts. A recent study showed that when given migrants the opportunity to open savings accounts that allow them to exert more control over the remittances the migrant both remits and saves more (Ashraf, 2008). This represents a great business opportunity for banks, credit unions, and microfinance institutions in both the country of origin and the current migrant's residence especially in disaster prone areas where remittance flows can quickly expand in the immediate and short term aftermath of a disaster.

3b. Insurance

Insurance schemes are an important means by which to transfer risk away from vulnerable populations in risk prone areas. Insurance is not able to prevent losses, but it does transfer risk and provide incentives for risk reduction activities, particularly under an index scheme (Linnerooth-Bayer & Mechler, 2009). Financial services and the availability of credit are often inaccessible to vulnerable populations and insurance schemes offer an entry into the marketplace and access to a tool seen as necessary to cover the sunk costs associated with productive activities (de Hoop & Ruben, 2010).

Traditional indemnity insurance is laden with problematic issues for resource poor areas. Costs for monitoring and verification of claims as well as market imperfections associated with asymmetric information plague programs attempting to issue traditional insurance. However, index-based insurance is a modification that seeks to avoid many of these problems. An index is established based on an objective variable that serves as a proxy for individual policy holder loss, which can be tied to rainfall, aggregate crop yields, livestock mortality or other objective measures, and which addresses the issues of moral hazard and adverse selection (Barnett et al., 2008; Mahul & Skees, 2007). To the extent that this is not reflective of the actual loss experienced is termed basis risk and remains an issue with index programs. However, early indications suggest the index based insurance systems can be successful (Linnerooth-Bayer & Mechler, 2009). These programs have advantages in low income contexts along many fronts, including the removal of verification of individual claims and by a single transparent and objective index (Barnett et al., 2008).

A World Bank program was initiated in collaboration with the Government of Mongolia in 2005 that sought to insure against livestock losses that result from extreme weather. The pilot program shows great potential, at least in the ability to cover increasing numbers of herders. The scheme is comprised of three tiers, and has integration of international technical support, national level support from the government and private industry engagement (Mahul & Skees, 2007). Under the pilot program individual herders shoulder the finance losses associated with an initial level of aggregate loss, larger losses are absorbed by the private insurance industry and then the program is buffered by a state level extreme or catastrophic loss threshold above which the state assumes the losses as a public safety net program. This serves to protect insurers and maintain premiums at a level that can be afforded by the target population. The index is based on regional livestock mortality and enabled by a unique availability of data permitting the establishment of mortality thresholds for various livestock species (Mahul & Skees, 2007).

Similar programs have been adopted elsewhere. A Kenyan program uses sensing of vegetative cover to predict herd losses and establish thresholds. The literature on this program uses household level data to simulate the impacts of the index-based product on the welfare of pastoral households, but it should not be mistaken for an actual evaluation. In the absence of a true evaluation, the simulation suggests unsurprisingly that initial herd size would be the strongest determinant of product performance for households (Chantararat et al., 2009). Additionally the simulation projected that the product works least

well for the poorest, but is most effective for the vulnerable non-poor as they are in a position to avoid the downward spiral of asset atrophy associated with poverty trap thresholds (Chantarat et al., 2009). Further simulations found that relatively subtle subsidizations that target households with herds in certain ranges could significantly increase average wealth and decrease poverty (Chantarat et al., 2009).

It is important to note that these types of insurance schemes do not appear to have been yet properly evaluated and most remain in the pilot stage. The lack of evaluations questions the effectiveness of insurance schemes in their ability to affect the economic status of participants at the household level in disaster prone areas. Rather evaluations that do exist in the literature tend to focus on program coverage, obstacles and enablers to program uptake amongst other variables related to the scale up of programs (Chantarat et al., 2009; Linnerooth-Bayer & Mechler, 2009; Mahul & Skees, 2007). The potential of insurance schemes as a DRR program is huge, however this potential needs to first be validated before these schemes are widely adopted and funded.

Recommended Reading

Barnett, B. J., Barrett, C. B., & Skees, J. R. (2008). Poverty traps and index-based risk transfer products. *World Development*, 36(10), 1766-1785.

Chantarat, S., Mude, A. G., Barrett, C. B., & Turvey, C. G. (2009). The performance of index based livestock insurance: Ex ante assessment in the presence of a poverty trap. Unpublished manuscript.

Mahul, O., & Skees, J. (2007). Managing agricultural risk at the country level: The case of index-based livestock insurance in Mongolia.

A4. Social Capital

Social capital contributes towards DRR by increasing resilience for households and communities. Social capital, as defined by Nakagawa and Shaw (2004), is defined as a function of trust, social norms, participation, and networks, and is said to have the capacity to play an important role in recovery from disaster. Furthermore, research suggests that accumulation of such capital contributes significantly to social, political and economic performance (Nakagawa & Shaw, 2004), and thus may have a role in poverty reduction. The most widely used definition comes from Putnam (1995), stating that social capital 'features social life-networks, norms and trust that enable participants to act together more effectively to pursue shared objectives' (Pelling & High, 2005).

Understanding the different types of social capital in a community can help organizations better assess the likely direction and speed of adaptation and recovery (Pelling & High, 2005). Social capital is context specific, and the type of social capital will differ from one situation to the next. There are two types of interpersonal relationship that turn into social capital – bonding and bridging ties. Bonding ties are “shared between co-identifying individuals typified by ethnic and religious groups,” while bridging ties are “relationships of exchange, often of associations between people with shared interest or goals but contrasting social identities” (Pelling & High, 2005). Bonding ties are associated more with survival than development and they are often observed in recovery from natural disaster and conflict (Pelling, 2003). Post disaster, individuals tend to withdraw from wider society and will instead turn to smaller kinship groups; this in turn can contribute to a break down in wider social trust and interaction and slows the flow of information, building inequity and undermines collective action (Pelling & High, 2005).

Social capital may help reduce vulnerability to risk and aid recovery following disasters. When social capital is greater, communities may act together in a more effective manner to pursue shared goals or objectives (Albeur, Braun & Schuttemeye, 2009), which may in turn increase resilience and mitigate the impact of a disaster. Social capital is greatest when linkages among groups are strong and trust binds community members together. As such, some theorists argue that social capital is likely to be greater in more economic and ethnically homogenous societies (Yamamura & Shaw, 2008); the more heterogeneous a society, the weaker the overall social capital. This argument also implies that social capital will be greater in rural as opposed to diverse urban areas.

When thinking about interventions with a social capital component, local NGOs and community-based organizations with a long standing position in communities may be more effective than outside organizations in implementing projects that strengthen social capital, as the organizations themselves need to be embedded within the social network. In a post-disaster period, organizations can work to develop activities that strengthen trust and linkages to support successful rehabilitation. Community volunteers and organizations play the most important role at every stage during disaster response (O'Donnell, Smart & Ramalingam, 2009), and initiatives to support these efforts are likely to aid in recovery while also enhancing social capital. Local governments have a critical role to play, but may need assistance with capacity. Organizations working in a disaster context should balance engaging with local governments while assisting affected groups to advocate on their own behalf but must, however, take care not to omit informal organizations or vulnerable groups who may have less of a voice or presence within a community (O'Donnell, Smart, & Ramalingam, 2009). Studies have found that social capital alone does not lead to successful rehabilitation post disaster. Rather, effective leadership within the community is the main determinant of success (Yamamura, 2008).

Nakagawa and Shaw (2004) conducted an assessment of the rehabilitation efforts following the 1995 Kobe Earthquake in Mano, Japan. They found community involvement to be a key factor in the success of the rehabilitation, particularly in the absence of extensive government support for recovery efforts. Community participation increased speed and flexibility of recovery programs and promoted inclusion of marginalized and vulnerable groups. The authors also profile a case in Gujarat, India following the 2001 Gujarat Earthquake. The success of programming in both cases was attributed to the large amount of social capital present at the community level. Thus, although the two cases differed in socio-economic and cultural contexts, social capital and leadership were found to be the most effective elements in enhancing disaster recovery (Nakagawa & Shaw, 2004).

According to O'Donnell, Smart & Ramalingam (2009), there is much left to be understood before organizations can promote social capital in a way that is likely to increase resilience and reduce risk of disasters. The first step will be improved assessments, which will context-specific knowledge of the following: how social networks and paths lead to collective action; the identification of latent social capital; an understanding of local adaptations to shocks and hazards; and a means of measuring both formal and informal social resources. Once assessment methods are improved, interventions to support or enhance social capital will need to consider how to strengthen the pathways through which social resources are accumulate and how to positively engage with action being taken by local organizations and groups. Without a better understanding of the relationships, trust and reciprocity that combine to form social capital, it will be difficult for external actors to build upon social capital as potential means of reducing risk.

O'Donnell, Smart & Ramalingam raise the important issue of exclusion of certain groups. It may appear from the outside that all populations are included in a seemingly well-connected community, but this may not be the case. Outside programs or interventions must assess the extent to which all populations are accounted for and seek to include those that are likely to be particularly vulnerable or marginalized. The authors ask whether social capital is solely built from the accumulation of trust, norms and networks over time, or whether social capital can be fostered through external interventions that change the social rules and incentives in society. Furthermore, is there such a thing as dormant social capital that can be used to reduce collective risk (O'Donnell, Smart & Ramalingam, 2009)? The answer to these questions may determine if and how social capital can be strengthened in a disaster context in a way that does not exclude populations.

A report looking at numerous cities around the globe (Wisner, 2003) revealed that there is a large gap in understanding and approach to urban and social vulnerability between municipal officials and civil society groups. In these studies it was evident that municipal and civil society groups were conducting parallel or conflicting risk-reducing activities in post-disaster periods. Citizens were found not to trust the municipal authorities in the cases profiled by Wisner: Los Angeles, Manila, Mexico City, and Tokyo. On the other hand, local NGOs and civil society groups may know more about the population and be trusted, yet, in the Wisner sample, they lacked technical and financial resources. When compared to the international organizations and agencies, of course, it is usually the municipalities and local governments that are lacking in resources and capacity. These various inequalities can result in a lack of coordination and coherence in disaster preparedness and recovery, and can breed a culture of mistrust which undermines social capital at all levels.

Recommended Reading

O'Donnell, I., Smart, K., and Ramalingam, B. (2009). Responding to Urban Disasters: Learning from Previous Relief and Recovery Operations. *ALNAP Lessons* , 15-16.

Pelling, M., & High, C. (2005). Understanding adaptation: What can social capital offer assessments of adaptive capacity. *Global Environmental Change* , 15: 308-319.

Wisner, B. (2003). Disaster Risk Reduction in Megacities: Making the Most of Human and Social Capital. In The World Bank, *Building Safer Cities: The Future of Disaster Risk* (pp.188-194). Washington, D.C.: The World Bank.

A5. Gender

The common understanding about gender within the DRR literature is that women and children have greater vulnerability to disasters than men. While this generalization may be accurate in very broad terms, it is important to remember that men and women of different ages, ethnicities, wealth groups, social classes, and locations will experience disasters in different ways, and that their levels of risk and resilience differ accordingly. Gender may sometimes be the defining aspect, but this is not always the case. When gender is the most important variable in experiences of disasters, generalizations do not always hold true. For instance, there are numerous examples of the resilience and adaptability of women in pre or post disaster settings. And while men have fewer inherent risks than women, men are more likely to take risks during various phases of disaster management. Men are also more likely than women to be targeted for violence or attack in settings of conflict or insecurity.

In-depth analysis of how vulnerability differs across the board by gender and age is lacking, but much of the literature does recognize the need for more thorough and disaggregated data. Often, however, quantifiable impacts of interventions and programming by gender are difficult to find. Explanations of vulnerability are more common, but these often focus on one gender only (women), without examining how vulnerability differs for men and why these differences exist. Such discussions often also ignore generational differences as a component of gender analysis. For instance, the World Bank identifies factors contributing to female vulnerability (pre, during and post natural disasters), including a lack of information about evaluation warnings and shelter options, culturally restricted mobility and responsibilities within the family to care for the young and the elderly (WB/IVG, 2006). To reduce these vulnerabilities, the Bank recommends equitable treatment, decreasing the burden on female headed households, and training of women in agriculture and labor related fields as methods to reduce these vulnerabilities (WB/IVG, 2006).

Gender considerations have a place in all four phases of disaster management; pre-disaster, during, after and rehabilitation. Prior to a disaster, gender differences exist in physical and social vulnerability, as well as perception of risk. Men and women cope differently during or immediately after a disaster, and gendered coping strategies have been assessed and identified in several studies. For instance, in the recovery phase in Honduras and Nicaragua after Hurricane Mitch, men primarily partook in search and rescue activities, were less concerned for their personal safety in their efforts to benefit the community, engaged in higher risk reconstruction activities, and were more likely to cope with stress through the use of alcohol. Men were also more likely to engage in gambling and criminal activity, and to abandon their families (Delaney and Shrader, 2000). Women, in contrast, were more likely to become involved in social networks, women's groups, and to participate in wider community organization. Women shouldered a greater psychological burden of the experiences of family members, particularly children and the elderly. Women experienced psychological impacts and emotional trauma as headaches and sleep disorders. Women tend to take on a range of activities and play a triple role- reproductive work, productive work and community work-- yet their role continues to be viewed primarily as mothers and housewives (Bradshaw, 2004). Post disaster there is an increase in female headed households, and during the rehabilitation phase new vulnerabilities such as sexual violence against women and increased levels of aggression in men may emerge. Unlike many other sources in the literature, Delaney and Shrader (2000) recognize the importance of a balanced examination by gender, arguing that the 'consideration of gender and disaster should include an examination of the relationships between and among men and women and not be limited to an analysis of women's roles alone.'

Some post-disaster interventions specifically target by gender, such as efforts to limit targeted looting against female- or child-headed households. After the 2002 cyclone in Tonga, the World Bank sought to ensure gender-equitable rebuilding, and provided land titles to both men and women, allowing many widows to have homes in their names for the first time (WB/IEG, 2006). Many programs, however, overlook the capacities of women, as these skills are considered to be more domestic and less applicable to recovery efforts. The World Bank/IEG report posits that the main way to increase resilience to risks and reduce vulnerability of women is through female involvement in decision making and recovery activities, as well as through by incorporating indigenous knowledge and practices into programs.

Highlighted lessons learned from programming and analysis studies in general include the importance of working with both women and men to promote gender balance at the community level, the importance of including stakeholders at all levels, and the inclusion of a participatory approach to promote sustainable long-term activities (MacDonald as cited in ISDR, 2007). The need for a pre-disaster preparedness plan that does not force female headed households to choose between protecting their

family and protecting their assets is also identified (Delaney & Shrader, 2009). Furthermore, incorporation of rights-based approaches involving equitable roles for men and women in communities, as well as capacity building for women in participation, planning, implementation and monitoring and evaluation should be included in future programming (IRP, 2009).

To date, relatively little of DRR in practice includes a thorough gender perspective. A number of gender focused training manuals and guides do exist within the DRR literature, but the ‘tyranny of the urgent’ in disaster response frequently wins out over a gender-balanced good practice (Bradshaw, 2004). Some of the widespread recommendations to incorporate a gender lens into DRR include collecting data disaggregated by gender and age, implementing capacity building targeted at both men and women (Delaney & Shrader, 2009), encouraging the development of community based women’s groups in disaster prone and disaster affected regions, promoting equal participation between males and females, training staff on the relevance of gender issues and gender equality, and incorporating a gender perspective into national policies (Sultana, 2010).

Recommended Reading

Delaney, P. L., & Shrader, E. (2000). *Disaster and Post-Disaster Reconstruction: Hurricane Mitch in Honduras and Nicaragua*. The World Bank.

International Recovery Platform (IRP). (2009). *Disaster Risk Reduction Tools: Gender Assessments*. Philippines: Knowledge for Recovery Series Info Kit #7: Disaster Risk Reduction: Gender Assessment.

International Strategy for Disaster Reduction (2007). *Gender Perspective Working Together for Disaster Risk Reduction: Good Practices and Lessons Learned*. Geneva: United Nations Publications.

A6. Indigenous Knowledge

“Old skills, knowledge and technologies are not inherently inadequate and new technical approaches are not automatically superior.”

- Twigg, 2004.

Indigenous knowledge is defined as knowledge systems, skills and technologies that individuals in hazard prone regions have developed over time to protect themselves and their livelihoods (Twigg, 2004). It is a body of knowledge existing within or acquired by local people through accumulations of experiences, society-nature relationships, community practices and institutions passed down through generations (Mercer et al., 2009). Examples include body of water observation, mangrove and coral reef conservation, housing structures, and water resource management (EU, 2009).

Some of the challenges for the use of indigenous knowledge in DRR include identifying areas where indigenous knowledge is appropriate and where it is not. For example, modern early warning systems in the face of climate change are generally more appropriate than traditional early warning methods. Climate change in general has changed the relevance of indigenous knowledge and increased vulnerability of indigenous populations. Along with climate change, pollution, over-development, and globalization have increased general vulnerability. Additionally, indigenous knowledge is not appropriate for use in epidemics, such as HIV/AIDS, that have not been experienced in the past (Twigg, 2004). Mercer et al. (2009) noted a difficulty in the identification of indigenous practices. When surveying communities on their use of traditional knowledge to prepare for a particular hazard,

communities may not recognize their actions as unique. DRR strategies are often a part of everyday life. To overcome this challenge, researchers should observe communities and encourage community participation in knowledge identifying practices (cause/ effect diagrams) (Mercer et al., 2009).

Many organizations have been moving away from a top-down approach to DRR towards a bottom-up, community and participatory technique (Mercer et al., 2009). Identified priority regions for indigenous knowledge and DRR collaboration are mountain ecosystems, coastal zones and river basins (EU, 2009). Recent studies have integrated indigenous knowledge into climate change and food security, early warning systems, rural development, urban risk reduction, and gender focused projects. However, an overarching gap that remains in the research is that although communities have responded to their environment and adapted to change for centuries, inadequate consideration has been given to the intersection of scientific and indigenous knowledge bases for effective use in DRR programming. Generally, indigenous knowledge is underutilized and undervalued in modern DRR approaches.

After a review of Maneshra and Battagram districts in Pakistan, Komino (2008) suggests that in some cases, despite local mechanisms, indigenous coping strategies are insufficient for management of many disasters. Therefore, socio-economic analysis and a community-based livelihood approach should be integrated into disaster management planning and programming. Mercer et al. (2009) found that taping into indigenous knowledge practices increases sustainability, due to enhanced community involvement, and increases cost-effectiveness by reducing the need for external intervention. The Disaster Risk Hyperbase states that indigenous knowledge must be understandable to the user, implementable, originated within communities, based on local needs, and specific to culture and context, provide core knowledge with flexibility for local adaptation and implementation, use local knowledge and skills, and material based on local ecology.

For Indigenous knowledge to be an acceptable practice into DRR strategies, it must be recognized and validated, understood in the present context, systematically documented, value tested, appropriate practices for replication must be identified, and indigenous knowledge must be demonstrated through national and regional pilot programs (EU, 2009). Additionally, there is a need for a standardized institutional framework to incorporate into mainstream DRR. Although modern early warning systems have been recognized as the preferred technique over traditional early warning methods, GIS has been incorporated into local knowledge systems. A study in Vietnam showed the effectiveness of incorporating local knowledge into the process of mapping. In this case, indigenous knowledge was said to have provided important factual data and concepts about the social and physical environment. The involvement also aided in the identification of vulnerabilities and disaster management strategies. The study emphasized that projects involving scientific knowledge and indigenous knowledge can be incorporated into further activities and the study could be replicated with success in other regions (Tran et al., 1007). The ultimate goal and need involving indigenous knowledge is for development and relief organizations to create partnerships with communities and involve locals in the risk management process. This is said to increase understanding of skills and practices and lead to efforts that build upon indigenous knowledge rather than replace it (Twigg, 2007).

Recommended Reading

- Gaillard, J.-C. (2007). Resilience of Traditional Societies in Facing Natural Hazards. *Disaster Prevention and Management*, Vol. 16 No. 4.
- Mercer, J., Kelman, I., Taranis, L., & Suchet-Pearson, S. (2009). Framework for integrating indigenous and scientific knowledge for disaster risk reduction. *Disasters*, Vol. 34, No. 1; 214-239.
- Twigg, J. (2004). Indigenous Knowledge and Coping Strategies. In J. Twigg, *Good Practice Review: Disaster Risk Reduction: Mitigation and Preparedness in Development and Emergency Programming* (pp. 131-145). London: Overseas Development Institute

A7. Overview of DRR Frameworks

The development of a standardized framework for Disaster Risk Reduction (DRR) is essential for establishing cohesion and uniform response within relief and development fields. A review of DRR literature supports this need and concludes that coordination is deficient amongst programs and across sectors. A lack of cohesion is identified as one of the largest gaps in DRR programming because it is necessary for the implementation of broader, cross-disciplinary activities for risk and vulnerability reduction. The literature expresses a strong need to integrate DRR strategies and measures within an overall DRR framework in order to address poverty reduction strategies, ensure sustainability, and strengthen country and community resilience to hazards. Furthermore, a universal framework would help to prevent the undesired effect of creating new forms of vulnerability and the exacerbation of existing ones (Benson & Twigg, 2007). This section will review several publications that have attempted to mainstream disaster risk reduction into development and disaster recovery and mitigation frameworks. Principle proponents of the mainstreaming of DRR into development include the International Strategy for Disaster Reduction (ISDR), the ProVention Project, the United Nations, and the World Bank. These primary actors also support development organizations that aim to promote policy and procedural changes, and adjust operation practice through activities and emerging programming (Benson and Twigg, 2007; ISDR, 2004).

The frameworks selected for review include *The International Strategy for Disaster Reduction* (ISDR, 2001), the *Framework for Disaster Reduction* from the Hyogo Framework for Action (ISDR, 2005), *The Disaster Reduction Hyperbase* framework for at-risk communities, the *Incorporation of Hazards in the Project Cycle* framework (Benson & Twigg, 2007), the *Integration of Disaster Risk Concerns into Country Programming* framework (Benson & Twigg, 2007), the World Bank *Five-pillar policy* framework (WB, 2007), the *Mainstreaming Disaster Risk Reduction into Development Projects in Hazard-prone Countries* framework (Benson & Twigg, 2007), the Oxfam *HARITA Conceptual Framework* (OXFAM, 2009), and the World Vision *Disaster Management Cycle* (World Vision, N.D.). These frameworks were chosen because they encompassed an international strategy for DRR, incorporated development into DRR programming, incorporated a program cycle, or presented a unique, innovative or thought provoking element into DRR. Some of the frameworks reviewed presented a more general and universal view, and some were context and hazard specific, however they all offer insight into the key components of a standardized DRR framework.

In order for mainstreaming and better incorporation of cross-sectoral DRR practices to occur, the literature makes clear that there must be standardized definitions, tools, methodologies, and assessments (Webb and Harinarayan, 1999). The absence of a cohesive framework incorporating levels

and forms of risk, presents a large gap in DRR programming. An established framework would not only facilitate measuring the effectiveness of DRR in terms of lives and livelihoods, but also produce a standard response and programming guide that can be universally monitored (ISDR, 2004).

Nearly all reviewed frameworks stress the enabling endogenous factors within political, economic or social dimensions. Furthermore, most frameworks contain the identification of a shock, and relate any subsequent processes to that event. Risk is defined as a function of hazards and vulnerability. Common elements most frequently included in DRR frameworks include the acknowledgment of certain risk factors and hazards, the identification of risk, assessment of vulnerability, contextual assessment, preparedness, immediate response, and recovery. Some frameworks specifically include a program cycle into the design, while other frameworks merely imply its presence. Additional elements present in multiple frameworks include early warning systems, the raising of public awareness or behavior change, coordination mechanisms and public ownership, and the incorporation of past lessons learned into future programming and risk management. An increasing use of community based approaches involving community participation and local knowledge of disasters has been noted.

The majority of frameworks incorporate some element of a linear representation of the necessary steps of disaster management or mitigation. While a step by step process lends itself to a linear flow diagram, it does not indicate the use of a feedback loop, or present the idea of a cyclical process. The ISDR (2001) framework, for example, does not give any indication that previous steps should be reviewed and re-evaluated as the framework moves from one phase to the next. Additional differences involve the scope that the framework decides to take when addressing DRR. Some frameworks prefer to include a wide range of concepts that could fit into DRR for a variety of contexts, and others are developed from a more narrow scope. The Disaster Reduction Hyperbase, for example, is relevant for community based strategies only; although, key principles of the program cycle can be generalized to other contexts. Contexts and populations that may require a narrow focus or detailed framework for action include specific livelihood systems such as agricultural, pastoral, and labor-based, and trade-based, as well as urban versus rural frameworks, and gender based frameworks.

Elements identified as key factors for a generalizable framework include a feedback loop, a monitoring and evaluation system, specific evaluations of risk and the identification of forms of risk, past application of risk reduction measures, and a review of current programming. Framework success can also be determined by the incorporation of a collaborative, multi-hazard, cross sectoral program design.

Despite the need to involve a variety of organizations in DRR, several types of hazards are underrepresented in terms of organization specialties. Outside assistance or technical expertise is generally not included in these DRR frameworks. Although, technical assistance may be increasingly required due to the high level of expertise necessary for addressing these issues. These hazards include biological and economic hazards, and conflict related hazards (ISDR, 2004). Social dimensions, as they relate to vulnerabilities, and recovery and disaster preparedness are also often overlooked (IEG, 2009). One of the largest gaps in the reviewed frameworks is the failure to address implications of absent political, economic or social system; i.e. failed states. Also excluded is the notion of holistic risk management. This concept is presented in the *HARITA Conceptual Framework* however is otherwise missing from the literature.

Additional principles missing from the reviewed frameworks that indicate a possible needs for future DRR frameworks include the need to incorporate poverty reduction strategies into project design to promote sustainability (ISDR, 2009), and the incorporation of DRR into all levels of the project cycle.

Lastly, the emerging issue of climate change, in regards to the increase of frequency and magnitude, has provoked a need for continual re-evaluation of hazards and risks to account for changes in vulnerabilities and coping strategies.

Recommended Reading

Benson, C., and Twigg, J. (2007). *Tools for mainstreaming Disaster Risk reduction: Project Cycle = Management; Guidance Note 5*. The International Federation of Red Cross and Red Crescent Societies/ the ProVention Consortium. Geneva, Switzerland.

A8. Conflict and the Multi-hazard Environment

While natural disasters occur independently from conflict, vulnerability to and impact of disasters is often most pronounced in conflict-affected areas. Instability in the aftermath of a natural disaster can also exacerbate tensions and contribute to conflict. In many instances, conflict or the threat of conflict becomes one aspect of a multi-hazard environment in disaster-prone areas and therefore should be taken into account in assessment, analysis and programming. Unfortunately, conflict too often is treated as a standalone problem and is not included as one of many hazards in most DRR analysis and programs. Separate from the frequent linkages between conflict and natural disasters, a conflict is a hazard in its own right, and the vulnerability of communities to conflict should be included in how we think about hazards, risk, resilience and recovery.

Sri Lanka and Aceh province of Indonesia are two of the many possible examples where conflict and disaster intermingle (Birkmann, 2008; LeBillon & Waizenegger, 2007). Conflict was present in both locations at the time of the 2004 tsunami and had distinct effects on the locations. In Sri Lanka, post-disaster aid was distributed in such a way that tsunami survivors were prioritized over IDPs and other conflict-affected populations. The imbalance in aid distribution served as a catalyst for increased violence (Birkmann, 2008). This is line with LeBillon's (2007) argument that disasters can create a heightened sense of identity and that grievances resulting from the event itself or the response can serve to foster political action and change. Conflict can be seen to undermine disaster prevention and mitigation, and erode social and political capital (LeBillon & Waizenegger, 2007). In contrast to Sri Lanka, in Aceh, the shock served as a "window of opportunity" that may have helped to alter the value structures of survivors. The shared dependence upon relief fostered an environment of collaboration (LeBillon & Waizenegger, 2007). In the aftermath of the tsunami, Aceh moved steadily toward a peaceful resolution of the conflict with communities coming together for planning of their collective future (Birkmann, 2008).

Conflict adds an extra and complicating dimension to a disaster setting, affecting and changing the concept of vulnerability. Vulnerability assessments should take into account all threats and hazards within a disaster context—including conflict—and seek to understand how these aspects relate to and potentially exacerbate each other. Vulnerability is highly dynamic in the context of conflict, and this, in turn, affects exposure to the threats associated with natural disasters. For example, assets are generally seen as increasing household resilience, but in a conflict setting the same assets may become liabilities. Livestock, for instance, is raided, and people can be targeted based on their presumed education or white-collar professions (Lautze and Raven-Roberts, 2006). It is thus critically important that DRR research and programming account for the dynamic nature of multi-hazard environments (Birkmann, 2008).

The literature does offer guidance on programming in multi-hazards settings such as demand driven approaches to support livelihoods post-conflict, stressing contextually appropriate actions enacted in iterative fashion to build upon successes. Yet challenges remain in understanding program effectiveness due to generally sparse data (Goovaerts, Gasser, & Inbal, 2005). One example of a multi-hazard project evaluation was on a project conducted with the Ministry of Natural Resources in El Salvador from 1999 to 2004 – a relatively stable but post-conflict setting – that endeavored to reduce flood risks in a flood prone region through livelihood enhancement and poverty reduction activities. Activities to diversify agriculture and livestock production were enacted along with other activities that sought to protect the woodlands along the riverbed, elaborate a coastal management plan and increase local organizations' capacities for managing risk (Provention Consortium, 2004). Furthermore, tensions between ideologically opposed community members and local NGOs dissipated over the course of the multi-year project. Finally, the project concluded that implementation of risk reduction projects are best supported when they address livelihood enhancement and can stimulate the accumulation of wealth (Provention Consortium, 2004).

Recommended Reading

Birkmann, J. (2008). *Assessing vulnerability before, during and after a natural disaster in fragile regions: Case study of the 2004 Indian ocean tsunami in Sri Lanka and Indonesia* No. 2008/50). Helsinki, Finland: United Nations University - World Institute for Development Economics Research.

Cuny, F.C. & Tanner, V. (1995). Working with communities to reduce levels of conflict: "Spot Reconstruction." *Disaster Prevention and Management*, 4(1), 12.

LeBillon, P., & Waizenegger, A. (2007). Peace in the wake of disaster? Secessionist conflicts and the 2004 Indian ocean tsunami. *Transactions of the Institute of British Geographers*, 32(3), 411-427.

Opondo, S and Wepundi M. (2009) *Mobilizing Early Response Project: Kenya Assessment Report*. Institute of Human Security.

Appendix B: Interviews

Name	Organization	Title
Sarah Bailey	ODI	Research Officer – Humanitarian Policy Group
Mia Beers	USAID/OFDA	Humanitarian Policy Advisor
Bill Berger	USAID/OFDA	Regional Development Mission for Asia
Dina Brick	CRS	Technical Advisor for Food Security
Courtney Brown	USAID/OFDA	Economic Recovery Advisor
Gay Burpee	CRS	Deputy Regional Director for Latin America and the Caribbean
Steve Catlin	USAID/OFDA	Military Liaison
Mike Delaney	Oxfam America	Director of Humanitarian Response
Francis Ghesquiere,	World Bank	Lead Disaster Risk Management Specialist
Harlan Hale	USAID/OFDA	Chief Regional Advisor, Southern Africa
Susanne Jaspers	ODI	Research Fellow – Humanitarian Policy Group
John Mitchell	CARE	Director of Care Emergency Group
Laura Powers	USAID/OFDA	Agricultural Food Security Technical Advisor
Marion Pratt	USAID/OFDA	Social Science and Gender Advisor
Susan Romanski	Mercy Corps	Director of Disaster Risk Reduction
Nancy Schwartz	OMB	
Charles Setchell	USAID/OFDA	Shelter, Settlements, and Mitigation Advisor
Sezin Tokar	USAID/OFDA	Hydrometeorological Hazard Advisor
Rod Snider	The American Red Cross	Senior Advisor for Disaster Preparedness

Appendix C: ISDR terminology

All of these definitions were taken directly from the ISDR: Terminology web page: <http://www.unisdr.org/eng/library/lib-terminology-eng%20home.htm>

Capacity A combination of all the strengths and resources available within a community, society or organization that can reduce the level of risk, or the effects of a disaster.

Capacity may include physical, institutional, social or economic means as well as skilled personal or collective attributes such as leadership and management. Capacity may also be described as capability.

Climate change The climate of a place or region is changed if over an extended period (typically decades or longer) there is a statistically significant change in measurements of either the mean state or variability of the climate for that place or region.

Changes in climate may be due to natural processes or to persistent anthropogenic changes in atmosphere or in land use. Note that the definition of climate change used in the United Nations Framework Convention on Climate Change is more restricted, as it includes only those changes which are attributable directly or indirectly to human activity.

Coping capacity The means by which people or organizations use available resources and abilities to face adverse consequences that could lead to a disaster.

In general, this involves managing resources, both in normal times as well as during crises or adverse conditions. The strengthening of coping capacities usually builds resilience to withstand the effects of natural and human-induced hazards.

Disaster risk management The systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards

Disaster risk reduction The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.

The disaster risk reduction framework is composed of the following fields of action, as described in ISDR's publication 2002 "Living with Risk: a global review of disaster reduction initiatives", page 23:

- *Risk awareness and assessment including hazard analysis and vulnerability/capacity analysis; Knowledge development including education, training, research and information;*
- *Public commitment and institutional frameworks, including organizational, policy, legislation and community action;*
- *Application of measures including environmental management, land-use and urban planning, protection of critical facilities, application of science and technology, partnership and networking, and financial instruments;*

- *Early warning systems including forecasting, dissemination of warnings, preparedness measures and reaction capacities.*

Early warning The provision of timely and effective information, through identified institutions, that allows individuals exposed to a hazard to take action to avoid or reduce their risk and prepare for effective response.

Early warning systems include a chain of concerns, namely: understanding and mapping the hazard; monitoring and forecasting impending events; processing and disseminating understandable warnings to political authorities and the population, and undertaking appropriate and timely actions in response to the warnings.

Mitigation Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards.

Natural hazards Natural processes or phenomena occurring in the biosphere that may constitute a damaging event.

Natural hazards can be classified by origin namely: geological, hydrometeorological or biological. Hazardous events can vary in magnitude or intensity, frequency, duration, area of extent, speed of onset, spatial dispersion and temporal spacing.

Preparedness Activities and measures taken in advance to ensure effective response to the impact of hazards, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations.

Prevention Activities to provide outright avoidance of the adverse impact of hazards and means to minimize related environmental, technological and biological disasters.

Depending on social and technical feasibility and cost/benefit considerations, investing in preventive measures is justified in areas frequently affected by disasters. In the context of public awareness and education, related to disaster risk reduction changing attitudes and behavior contribute to promoting a "culture of prevention".

Relief / response The provision of assistance or intervention during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected. It can be of an immediate, short-term, or protracted duration.

Resilience / resilient The capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures.

Risk The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

Conventionally risk is expressed by the notation $Risk = Hazards \times Vulnerability$. Some disciplines also include the concept of exposure to refer particularly to the physical aspects of vulnerability.

Beyond expressing a possibility of physical harm, it is crucial to recognize that risks are inherent or can be created or exist within social systems. It is important to consider the social contexts in which risks occur and that people therefore do not necessarily share the same perceptions of risk and their underlying causes.

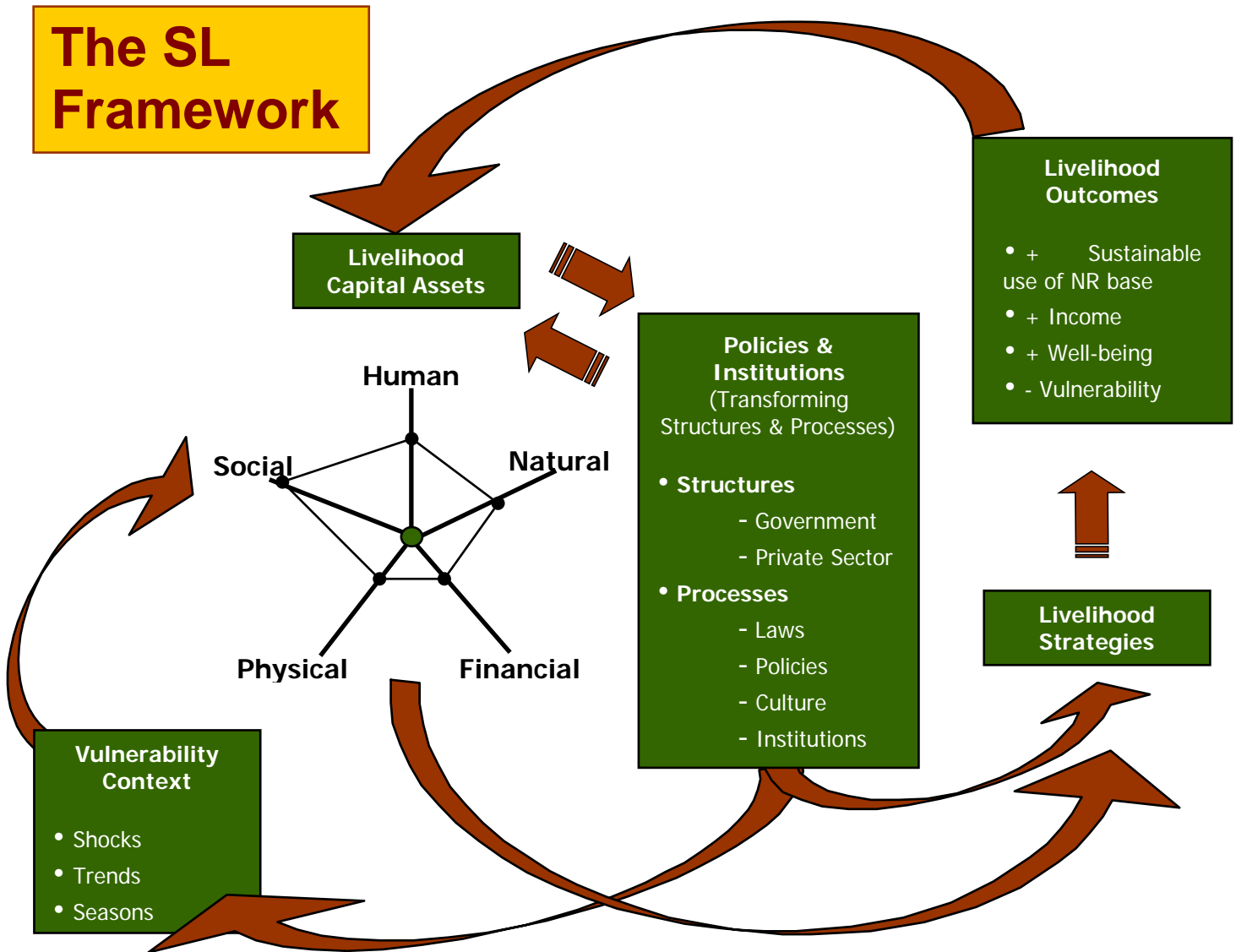
Risk assessment/analysis A methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend.

The process of conducting a risk assessment is based on a review of both the technical features of hazards such as their location, intensity, frequency and probability; and also the analysis of the physical, social, economic and environmental dimensions of vulnerability and exposure, while taking particular account of the coping capabilities pertinent to the risk scenarios.

Vulnerability The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards.

For positive factors, which increase the ability of people to cope with hazards, see definition of capacity.

Appendix D: Livelihood Framework



Source: DFID Sustainable Livelihoods Presentation

<http://www.livelihoods.org/info/Tools/SL-Proj1b.ppt>

Appendix E: Bibliography

Adams, R. H., & Page, J. (2003). *International migration, remittances, and poverty in developing countries*. No. WPS3179). Washington, DC: The World Bank.

Adamo, S. B. (2009). *Environmentally induced population displacements* No. IHDP Update International Human Dimensions Programme on Global Environmental Change Update.

Adelman, S. Giligan, D., and Lehrer K. (2010) Childhood Interrupted: How conflict-induced shocks shape human capital formation in Northern Uganda. Mimeo.

Akresh, R., Verwimp, P. and Bundervoet, T. (2010) Civil war, crop failure and child studying in Rwanda. Economic Development and Cultural Change. Forthcoming.

ALNAP Secretariat and ProVention Consortium Secretariat. (2009). Responding to Urban Disasters: Learning from Previous Relief and Recovery Operations. *ALNAP Lessons* , 1-31.

Amirthalingam, K., & Lakshman, R. W. D. (2009). Displaced livelihoods in Sri Lanka: An economic analysis *Journal of Refugee Studies*, 22(4), 502-524.

Asghar, S., Alahakoon, D., Churilov, L. (2006). A Comprehensive Conceptual Model for Disaster Management. *The Journal of Humanitarian Assistance*. The Department of Peace Studies, University of Bradford, UK: 1360-0222, 1-15.

Ashraf, Nava, Harvard Business School, "Remittances and The Problem of Control: A Field Experiment Among Migrants from El Salvador", Presentation , Harvard Kennedy School Empowerment Lab Conference, Sept. 2008

Asian Disaster Preparedness Center (ADPC). (2000). *Project completion report of the sri lanka urban multi-hazard disaster mitigation project* No. 3). Bangkok, Thailand: Asian Disaster Preparedness Center.

Aßheuer, T., Braun, B., & Schüttemeyer, A. (2009). *Social and Economic Adaptation To Climate Change: Brickfields and Informality in the Face of Natural Hazards in Dhaka* . Marseille, France: World Bank Fifth Urban Research Symposium: Social and economic adaptation to climate change.

Barnett, B. J., Barrett, C. B., & Skees, J. R. (2008). Poverty traps and index-based risk transfer products. *World Development*, 36(10), 1766-1785.

Bellows, J. and Miguel. E. (2009). War and local Collective Action in Sierra Leone. *Journal of Public Economics* 93 (11-12), 1144 – 1157.

Benson, C., & Twigg, J. (2007). *Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organizations*. The International Federation of Red Cross and Red Crescent Societies/ the ProVention Consortium.

Birkmann, J. (2008). *Assessing vulnerability before, during and after a natural disaster in fragile regions: Case study of the 2004 indian ocean tsunami in sri lanka and indonesia* No. 2008/50). Helsinki, Finland: United Nations University - World Institute for Development Economics Research.

Blattman, C. (2009) From Violence to Voting: War and Political participation in Uganda. *American Political Science Review* 103 (2) 231-247.

Borkhuu, B. (2008). Indigenous Knowledge for Disaster Risk Reduction of the Shiver Herder Community. Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learned from Experiences in the Asia-Pacific Region. United Nations ISDR (pgs. 27-29).

- Bradshaw, S. (2004). Socio-economic impacts of natural disasters: a gender analysis . Santiago, Chile: United Nations Publications.
- Breidlid, A. (2009). Culture, Indigenous Knowledge Systems and Sustainable Development: A critical View of Education in an African Context. *International Journal of Educational Development*, 140-148.
- Bundervoet (2009) Livestock, land, and political power: the 1993 killings in Burundi. *Journal of Peace and Research* 46 (3): 357-376.
- Buscher, D. and Heller, L. (2010) "Desperate lives: urban refugee women in Malaysia and Egypt" Forced Migration 34: pg 20-22.
- Brockman, R (2009). *Slum Upgrading Facility Mid-Term Review*. GHK International.
- Cannon, T., Twigg, J., & Rowell, J. (2003). Social vulnerability, sustainable livelihoods and disasters. London, UK: DFID.
- CARE International (2009). Women's Empowerment & Emergencies: CARE International Strategic Impact Inquiry on Women's Empowerment. CARE USA.
- Carter, M. R., Little, P. D., Mogue, T., & Negatu, W. (2007). Poverty traps and natural disasters in Ethiopia and Honduras. *World Development*, 35(5), 835-856.
- Cavallo, E. and Noy, I. (2009) The Economics of Natural Disasters. A survey, IDP Working Paper 124.
- Chantarat, S., Mude, A. G., Barrett, C. B., & Turvey, C. G. *The performance of index based livestock insurance: Ex ante assessment in the presence of a poverty trap*. Unpublished manuscript.
- Chowdhury, M. (2001). Women's Technological Innovations and Adaptations for Disaster Mitigation: A case study of Charlands in Bangladesh. DAW and ISDR Expert Group Meeting on Environmental Management and the Mitigation of Natural Disasters: a gender perspective: Ankara, Turkey.
- Christoplos, I., Rodriguez T., Schipper, L., Alberto, N., Mejia, K., Buitrago, R., Gomez, L., and Perez, F. (2010) "Learning from recovery after Hurricane Mitch." *Disasters*.
- Collier, P. (1999). On the economic consequences of civil war. *Oxford Economic Papers*, 51: 168-183.
- Collins, G. (2008). Technical Guidance Sheet: Urban Food Security and Nutrition Assessments. *Strengthening Emergency Needs Assessment Capacity (SENAC)*. World Food Programme
- Cuny, F.C. & V. Tanner. (1995). Working with communities to reduce levels of conflict: "spot reconstruction". *Disaster Prevention and Management*, 4(1), 12.
- De Hoop, T., & Ruben, R. (2010). Insuring against earthquakes: Simulating the cost-effectiveness of disaster preparedness. *Disasters*, 34(2), 509-523.
- Delaney, P. L., & Shrader, E. (2000). Disaster and Post-Disaster Reconstruction: Hurricane Mitch in Honduras and Nicaragua. The World Bank.
- Department for International Development, (2005) 'Natural Disaster and Disaster Risk Reduction Measures: A Desk Review of Costs and Benefits', Draft Final Report, London.

Department for International Development (2006) 'Reducing the Risk of Disasters – Helping to Achieve Sustainable Poverty Reduction in a Vulnerable World: A DFID policy paper', DFID, London.

Dilley, M., & Boudreau, T. (2001). Coming to terms with vulnerability: A critique of the food security definition. *Food Policy*, 26, 229-247.

Disaster Management Program (2009). *Summary report 2007-2009: Implementation of UN-HABITAT Strategic Policy on Human Settlements in Crisis (SPHSC)*

European Union (2009) Indigenous Knowledge for Disaster Risk Reduction: Policy Note. European Union

Gaillard, J.-C.(2007). Resilience of Traditional Societies in Facing Natural Hazards. *Disaster Prevention and Management*, Vol. 16 No. 4.

German Committee for Disaster Reduction (2007). "Integrating Disaster Risk Reduction in European Humanitarian Assistance" Working Draft, 30th March, 2007.

Giné, X., & Yang, D. (2009). Insurance, credit, and technology adoption: Field experimental evidence from Malawi. *Journal of Development Economics*, 89(1), 1-11.

Goovaerts, P., Gasser, M., & Inbal, A. B. (2005). *Demand driven approaches to livelihood support in post-war contexts* (A Joint ILO-World Bank Study No. 29). Washington, DC: The World Bank Group.

Halliday, T. (2006). Migration, risk, and liquidity constraints in El Salvador. *Economic Development and Cultural Change*, 54, 893-925.

Handmer, J., & Dovers, S. (2007). *The handbook of disasters and emergency policies and institutions*. Sterling, VA USA: Earthscan.

Harding, J. (2003). *Community Coping Strategies: Integrating all of the factor of disaster risk*. Delhi: ISDR.

Heitzmann, K., Canagarajah, S., Siegel, P. (2002) 'Guidelines for Assessing the Sources of Risk and Vulnerability', Social Protection Discussion Paper Series No 0218, The World Bank.

Hill, A. (2004). Protection versus promotion of IDP livelihoods in Colombia. *Forced Migration Review*, 20, 21-23.

Holloway, A. (2003). Disaster Risk Reduction in Southern Africa: Hot Rhetoric- Cold Reality. *African Security Review*. 12(1); 29-38.

Hunter, L. (2005). Migration and environmental hazards. *Population & Environment*, 26(4), 273-302.

Hudon M. & Seibel. H.D. (2007) Microfinance in post-disaster and post conflict situations: Turning Victims into Shareholders. *Savings and Development* 31 (1) 5.

Intergovernmental Authority on Development (IGAD). (2002). *Disaster risk management program in the IGAD region - improvement of regional collaboration in disaster risk management* No. Volume IV - Project 3)IGAD.

International Recovery Platform (IRP). (2009). *Disaster Risk Reduction Tools: Gender Assessments*. Phillippines: Knowledge for Recovery Series Info Kit #7: Disaster Risk Reduction: Gender Assessment.

International Recovery Platform (IRP). (2009). *Experience of Post Disaster Recovery from Gender Perspective-Shifting from Vulnerabilities to Capacities*. Knowledge for Recovery Series: Info Kit 5.

International Strategy for Disaster Reduction. (2004). Living with risk: A global review of disaster reduction initiatives. Geneva, Switzerland: Inter-Agency Secretariat of the International Strategy for Disaster Reduction (UN/ISDR).

International Strategy for Disaster Reduction (2007). Gender Perspective Working Together for Disaster Risk Reduction: Good Practices and Lessons Learned. Geneva: United Nations Publications.

International Strategy for Disaster Reduction (2009) "Global assessment report on disaster risk reduction" United Nations International Strategy for Disaster Reduction Secretariat.

Kalwikirize, S. (2001). Understanding Resettlement Capacities and Vulnerabilities of Displaced Male and Female Headed Households: A case of three camps in Northern Uganda. Kampala, Uganda: World Vision Uganda.

Komino, T. (2008). Indigenous Coping Mechanisms for Disaster Management in Mansehra and Battagram Districts, North West Frontier Province (NWFP), Pakistan. Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learned from Experiences in the Asia-Pacific Region. United Nations ISDR (pgs. 41-45).

La Trobe, S. (2005). *Mainstreaming Disaster Risk Reduction: A tool for development organizations*. Tearfund. Middlesex, UK.

LeBillon, P., & Waizenegger, A. (2007). Peace in the wake of disaster? secessionist conflicts and the 2004 Indian Ocean tsunami. *Transactions of the Institute of British Geographers*, 32(3), 411-427.

Lerner-Lam, Arthur (2007) "Assessing global exposure to natural hazards: Progress and future trends" *Environmental Hazards* Vol. 7: pg 10-19.

Linnerooth-Bayer, J., & Mechler, R. (2009). *Insurance against losses from natural disasters in developing countries* No. ST/ESA/2009/DWP/85). New York, NY: United Nations Department of Economic and Social Affairs.

Mahul, O., & Skees, J. (2007). Managing agricultural risk at the country level: The case of index-based livestock insurance in Mongolia.

Martinez, E. (200). The Courage to Change: Confronting the limits and unleashing the potential of CARE's programming for women: Synthesis Report: Phase 2: CARE International Strategic Impact Inquiry on Women's Empowerment. CARE USA.

McLeman, R., & Smit, B. (2006). Migration as an adaptation to climate change. *Climate Change*, 76, 31-53. doi:10.1007/s10584-005-9000-7

Mercer, J., Kelman, I., Taranis, L., & Suchet-Pearson, S. (2009). Framework for integrating indigenous and scientific knowledge for disaster risk reduction. *Disasters*, Vol. 34, No. 1; 214-239.

Mercer, J., Kelman, I., Suchet-Pearson, S., & Lloyd, K. (2009). Integrating Indigenous and Scientific Knowledge Bases for Disaster Risk Reduction in Papua New Guinea. *Geografiska Annaler: Series B, Human Geography*, 91 (2): 157-183.

Mohapatra, S., Joseph, G., & Ratha, D. (2009). *Remittances and natural disasters: Ex-post response and contribution to ex-ante preparedness* No. WPS4972). New York, NY: The World Bank.

Moser, C., Sparr, P., & Pickett, J. (2007). Cutting-Edge Development Issues for INGOs: Applications of an Asset Accumulation Approach. *Asset Debate Paper*, Number 1; July 2007

- Najarian, L. M., Goenjian, A. K., Pelcovitz, D., Mandel, F., & Najarian, B. (2001). The effect of relocation after a natural disaster. *Journal of Traumatic Stress, 14*(3), 511-526.
- Nakagawa, Y., & Shaw, R. (2004). Social Capital: A Missing Link to Disaster Recovery. *International Journal of Mass Emergencies and Disasters*, Vol.22, No. 1; 5-34.
- Nel, P., & Righarts, M. (2008). Natural disasters and the risk of violent civil conflict. *International Studies Quarterly, 52*(1), 159-185.
- Naude, W. (2008). *UNU-WIDER : Conflict, disasters, and no jobs: Reasons for international migration from sub-saharan africa* No. 2008/85) UNU-Wider.
- Ondendaal, A. & R. Olivier (2008). Local Peace Committees: some reflections and lessons learned. Kathmandu, Academy for Educational Development.
- O'Donnell, I., Smart, K., and Ramalingam, B. (2009). Responding to Urban Disasters: Learning from Previous Relief and Recovery Operations. *ALNAP Lessons*, 15-16.
- Oxfam America (2007) "Gender Mainstreaming During Disasters: The Case of the Tsunami in India" the Journal of Humanitarian Assistance March 2007.
- OXFAM (2009). *Horn of Africa Risk Transfer for Adaptation (HARITA): Project Overview*.
- Pelling, M., & High, C. (2005). Understanding adaptation: What can social capital offer assessments of adaptive capacity. *Global Environmental Change*, 15: 308-319.
- Pelling, M., & Satterthwaite, D. (2007). *Investigating Urban Risk Accumulation in Six Countries in Africa*. AURAN.
- Pelling, M., & Wisner, B. (2009). *Disaster Risk Reduction*. Sterling, VA: Earthscan.
- Pouliotte, J., Islam, N., Smit, B. & Islam, S. (2006). Livelihoods in Rural Bangladesh. *Tiempo* (59).
- Provention Consortium. (2004). *Program for prevention and mitigation of flood disasters in the lower lempa river basin* Provention Consortium.
- ProVention Consortium (2010) *Urban Master Planning Megacities: Mainstreaming Disaster Risk Management*.
- Schwoebel, M. H., & Menon, G. (2004). Mainstreaming Gender in Disaster Management Support Project: A report for the Women in Development IQC Task Order: New and expanded opportunities for vulnerable groups in India. Centre for Development and Population Activities and Chemonics International Inc.: Chemonics International Inc.
- Sabates-Wheeler, R., Devereux, S., Mitchell, T., Tanner, T., Davies, M., & Leavy, J. (2008). *Rural disaster risk - poverty interface*. Brighton, England: University of Sussex, Institute of Development Studies.
- Sanderson, D. (2000). Cities, Disasters, and Livelihoods. *Environment and Urbanization*; 12:93
- Savage, K., & Harvey, P. (2007). *Remittances during crises: Implications for humanitarian response* No. Briefing Paper 26) Overseas Development Institute.
- Stephen, I., Chowdhury, R.D., Nath, D. (2008). Soil and Water Conservation through Bamboo Plantation: A Disaster Management Technique Adopted by the People of Nandeswar, Assam. Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learned from Experiences in the Asia-Pacific Region. United Nations ISDR (pgs. 14-16).

Swift, Jeremy (2006) "Why are Rural People Vulnerable to Famine?" Institute of Development Studies IDS Bulletin, Vol. 37 No 4.

Thomalla, F., Downing, T., Spanger-Siegfried, E., Han, G., & Rockstrom, J. (2006). Reducing Hazard Vulnerability: Towards a Common Approach Between Disaster Risk Reduction and Climate Adaptation. *Disasters* , 30(1): 39-48.

Tran, P., Shaw, R., Chantry, G., & Norton, J. (2007). GIS and Local Knowledge in Disaster Management: A Case Study of Flood Risk Mapping in Vietnam. *Disaster*.

Twigg, J. (2004). Indigenous Knowledge and Coping Strategies. In J. Twigg, *Good Practice Review: Disaster Risk Reduction: Mitigation and Preparedness in Development and Emergency Programming* (pp. 131-145). London: Overseas Development Institute.

UN. (2009). *Global Assessment Report on Disaster Risk Reduction: Risk and Poverty in a Changing Climate: Invest Today for a Safer Tomorrow*. Geneva: The United Nations.

UNDP. (2004). *Reducing Disaster Risk: A Challenge for Development* . New York: United Nations Development Programme, Bureau for Crisis Prevention and Recovery .

UNEP. (2007). *Natural disasters and post-conflict response*. New York, NY: UNEP.

UN HABITAT (2009). *Humanitarian Consequences of Urbanization*. Inter-Agency Standing Committee, 73rd IASC Working Group Meeting; Washington D.C.

UNHCR. (2006). *State of the world's refugees*. New York, NY: Oxford University Press.

UN and the World Bank. (2010). *UnNatural Disasters: The Economics of Reducing Death & Destruction*. World Bank Publications.

Vasilescu, L.G., Khan, A., & Khan, H. (2008). Disaster management cycle- A Theoretic Approach. *Management & Marketing- Craiova*. Issue 1: 43-50.

Venton, Courtney and Paul Venton (2004), "Disaster preparedness programs in India: A cost benefit analysis" *Humanitarian Practice Network* No 49.

Voors, M., Nillesen E., Verwimp P., Bulte E., Lensink R., and van Soest D. (2010) Does Conflict affect Preferences? Results from Field Experiments in Burundi. *HiCN Working Paper* 71. January 2010.

Walker, P., Wisner, B., Leaning, J., & Minear, L. (2005). Smoke and mirrors: Deficiencies in disaster funding. *BMJ: British Medical Journal*, 330, 247-250.

Wamsler, C. (2007). Bridging the Gaps: Stakeholder-Based Strategies for Risk Reduction and Financing for the Urban Poor. *Environment and Urbanization* , 19;115-142.

Warner, K., Bouwer, L. M., & Ammann, W. (2007). Financial services and disaster risk finance: Examples from the community level. *Environmental Hazards*, 7(1), 32-39.

Watson, J. T., Gayer, M., & Connolly, M. A. (2007). Epidemics after natural disasters. *Emerging Infectious Diseases*, 13(1), 1-5.

Webb, P., & Harinarayan, A. (1999). A Measure of Uncertainty: The Nature of Vulnerability and It's Relationship to Malnutrition. *Disasters* , 23(4): 292-305.

White, M. J., & Lindstrom, D. P. (2005). Internal migration. *Handbook of population* (pp. 311-346) Springer US. doi:10.1007/b100598.

Wisner, B. (2003). Disaster Risk Reduction in Megacities: Making the Most of Human and Social Capital. In The World Bank, *Building Safer Cities: The Future of Disaster Risk* (pp.188-194). Washington, D.C.: The World Bank.

World Bank. (2006). Hazards of nature, risks to development: An IEG evaluation of World Bank assistance for natural disasters. Washington, DC: Independent Evaluation Group.

World Vision (n.d.). *Disaster Management and Response*. World Vision, Mississauga, ON.

Yamamura, E. (2008). *Learning Effect and Social Capital: A Case Study of Natural Disaster from Japan*. Japan : MPRA Paper No. 10249.

Yang, Dean (2008a) "Coping with Disaster: The Impact of Hurricanes on International Financial Flows, 1970-2002," *B.E. Journal of Economic Analysis and Policy*: Vol. 8, No. 1 (Advances), Article 13.

Yang, Dean (2008b) "International Migration, Remittances, and Household Investment: Evidence from Philippine Migrants' Exchange Rate Shocks," *Economic Journal*, Vol. 118, pp. 591-630.

Yang, Dean and HwaJung Choi (2007) "Are Remittances Insurance? Evidence from Rainfall Shocks in the Philippines," *World Bank Economic Review*, Vol. 21 (2), pp. 219-248.

Yonder, A., Akcar, S., & Gopalan, P. (2005). *Women's Participation in Disaster Relief and Recovery*. New York, New York: The Population Council, Inc.

Appendix F: Annotative Bibliography

Benson, C., & Twigg, J. (2007). *Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organizations*. The International Federation of Red Cross and Red Crescent Societies/ the ProVention Consortium.

The ProVention Project on Tools for mainstreaming Disaster Risk Reduction supports the process of mainstreaming disaster risk reduction into development, and supports the number of development organizations that have begun efforts to mainstreaming disaster risk reduction in their work. These organizations are undertaking various related institutional, policy and procedural changes and adjusting operation practice. This tool seeks to facilitate policy and institutional change and is directed at development organizations.

This project has provided a series of 14 guidance notes for use by development organizations in adapting programming, project appraisal and evaluation tools to mainstream disaster risk reduction into development work in hazard-prone countries. The guidelines are deliberately intended as short, practical briefs supplementing existing, more general, guidelines on programming, appraisal and evaluation tools. The series covers the following subjects: (1) Introduction; (2) Collecting and using information on natural hazards; (3) Poverty reduction strategies; (4) Country programming; (5) Project cycle management; (6) Logical and results-based frameworks; (7) Environmental assessment; (8) Economic analysis; (9) Vulnerability and capacity analysis; (10) Sustainable livelihoods approaches; (11) Social impact assessment; (12) Construction design, building standards and site selection; (13) Evaluating disaster risk reduction initiatives; and (14) Budget support.

Each section is intended as a short, practical brief, supplementing existing guidelines on programming, appraisal and evaluations tools. It focuses on where and how to take hazard related concerns into account in each of the tools offered.

Cannon, T., Twigg, J., & Rowell, J. (2003). *Social vulnerability, sustainable livelihoods and disasters*. London, UK: DFID.

DFID's humanitarian policy has been to save lives and relieve suffering, hasten recovery through protecting and rebuilding livelihoods and communities as well as to reduce risks and vulnerability to future crises. While implementation largely takes the form of the first two aspects, it is often the third component of risk reduction that is under represented. The idea of this report is that the use of the livelihoods approach should be supported in the disaster context to strengthen the links between sustainable livelihoods and reduction of vulnerability. As a way of addressing this third component more directly, vulnerability analysis (VA) can tie much of the DFID's work together and bring it in line with the focus on the sustainable livelihoods approach. The paper stresses the importance of a predictive quality to be conceptually captured in the use of the term vulnerability. That is, given certain risks and hazards, a better understanding of vulnerability should allow for conceptualization of the possible outcomes for a given population. If adequately predictive, this analysis of vulnerability should improve the directing of development interventions, serve to protect livelihoods, reinforce coping strategies, as well as support existing institutions in disaster prevention.

Building out the idea of vulnerability, the authors focus on the idea social vulnerability, meant to encompass one's initial status (nutritionally, physical or mental health), livelihood and resilience, self-protection, social protection, and social and political networks and institutions. In exploring the concepts of vulnerability and capacity, it is stated that they often are viewed as two ends of a spectrum.

It follows then that a high level of capacity would suggest a low level of vulnerability and vice versa. In general, DFID views VA as an opportunity to integrate development work through a livelihoods approach with DRR.

Several individual tools are reviewed in the case studies that follow. Each of which have obvious strengths and weaknesses in their respective flexibility, analytical appeal, extent to which they actually prescribe, generalizability of data and other factors.

Christoplos, I., Rodriguez T., Schipper, L., Alberto, N., Mejia, K., Buitrago, R., Gomez, L., and Perez, F. (2010) “Learning from recovery after Hurricane Mitch.” Disasters

After the devastating hurricane that struck Nicaragua and other Central American countries in 1998, they agreed with the international community that the recovery effort was an opportunity for building back better. However, little effort has been made to assess whether indeed this was the case and who has benefited from the improvements over time. This paper attempt to do so using literature review, interviews with stakeholders at the national level, and field studies in the three municipalities that were heavily affected by the hurricane. This paper examines three aspects of recovery:

- The role of state and civil society in humanitarian action and recovery
- The relationship among poverty, sustainability and recovery processes; and
- Risk reduction and the changing nature of vulnerability.

It is essential to understand that the initial massive aid response was a humanitarian operation and therefore dominated by huge donations, which required bypassing structure to move aid fast. In this stage the state and civil society were ignored or seen as an obstacle to the international relief operation; the fact that Nicaragua was seen as a “post-conflict” country contributed to this. Large recovery efforts did not begin until one or two years after the hurricane.

After the disaster it was observed that there was no significant reduction in poverty in any of the three municipalities even though the recovery program made claims to wanting to stop the poverty trap via rehabilitation – two of the municipalities appear to be largely forgotten in terms of development investments after the initial recovery period. Part of the programming was to “pick winners” with the assumption that they could create jobs, investment or other spin-off effects that would address poverty and inequality. Though this method has worked to make the winners better off, positive externalities have not been apparent. On the social protection issues two conclusions were drawn in the article:

- “The first is that the existing socioeconomic dynamics within a given community are more important than the models used for designing recovery programming.
- “The second is that access to resources for recovery and ongoing externally supported social protection is inevitably fragmented and uneven, as it has more to do with access to patrons than with models of equity.

The only way that disaster and risk reduction will become sustainable is if aid is matched or supported by government funding. The prospects of this do not appear to be good. Another important component is the need for better vulnerability analysis – “without an understanding of the multitude of structural and local factors that create vulnerability, there is no conceptual basis for justifying an explicit poverty focus when addressing disaster impacts and risks.”

Department for International Development, (2005) ‘Natural Disaster and Disaster Risk Reduction Measures: A Desk Review of Costs and Benefits’, Draft Final Report, London.

With the rising number of disasters and the devastating toll that the Asian Tsunami, Pakistan earthquake, and the hurricanes on the American Gulf Coast and Central America took on millions of populations DFID came out with this policy paper and a renewed promise to support Disaster Risk Reduction. DFID's focus and policy on DDR comes out of five assumptions: disasters affect poor countries and poor people the most; absolute levels of disaster risk are increasing due to various pressures, including climate change; disasters pose significant and growing threat to development; there exist cost effective policy choices that poor countries can take up to reduce the cost of a disaster and; national governments, donors, and the international community have to invest greater resources to tackle disaster risk. This paper outlines DFID's policy on disaster risk reduction as well as sets out key elements to disaster risk reduction and why it is important. These reasons are highly relevant to our paper's focus on DDR/mitigation over livelihood support and humanitarian relief.

Department for International Development (2006) 'Reducing the Risk of Disasters – Helping to Achieve Sustainable Poverty Reduction in a Vulnerable World: A DFID policy paper', DFID, London.

With the rising number of disasters and the devastating toll that the Asian Tsunami, Pakistan earthquake, and the hurricanes on the American Gulf Coast and Central America took on millions of populations DFID came out with this policy paper and a renewed promise to support Disaster Risk Reduction. DFID's focus and policy on DDR comes out of five assumptions: disasters affect poor countries and poor people the most; absolute levels of disaster risk are increasing due to various pressures, including climate change; disasters pose significant and growing threat to development; there exist cost effective policy choices that poor countries can take up to reduce the cost of a disaster and; national governments, donors, and the international community have to invest greater resources to tackle disaster risk. This paper outlines DFID's policy on disaster risk reduction as well as sets out key elements to disaster risk reduction and why it is important. These reasons are highly relevant to our paper's focus on DDR/mitigation over livelihood support and humanitarian relief.

Dilley, M., & Boudreau, T. (2001). Coming to terms with vulnerability: A critique of the food security definition. *Food Policy*, 26, 229-247.

This article seeks to explore the concept of vulnerability, in part by comparing and contrasting the definitions and ways in which it is used in DRR programming and in food security work. In particular, it is the use of the term in the food security context as one in relation to an outcome (food insecurity or famine), as opposed to that which evaluates the susceptibility of a population to shocks as is the case in disaster management. They define vulnerability as necessarily encapsulating both the likelihood of being exposed to shocks as well as the capacity to withstand those shocks as that which determines the extent to which people suffer.

A simple framework is laid out for prevention and preparedness. This framework has the classification of events, susceptibility to those events and the resulting outcomes as the three components of the framework. By using the general disaster formulation of vulnerability, greater differentiation of causal factors and effects is possible. The food security concept of vulnerability tends to lack the imperative of linking causal shock factors and factors of vulnerability. The result is a generally less coherent idea of what the vulnerability component seeks to capture.

German Committee for Disaster Reduction (2007). "Integrating Disaster Risk Reduction in European Humanitarian Assistance" Working Draft, 30th March, 2007.

The toll on lives and livelihoods due to disasters is large and expanding. Therefore it is in the interest of humanitarian actors – multilateral and bilateral alike – to invest in disaster risk reduction. The majority of DRR work has actually been funded out of humanitarian sources. The German Committee for Disaster Reduction published this report to explore the integration of DRR into humanitarian assistance provided by the European Union. The information comes from a questionnaire that was developed and circulated to the humanitarian aid departments of the EU Member States and to ECHO. The questionnaire address eight points on DRR: general aspects, funding modalities, funding strategy and decision making, regional distribution of intervention, technical capacities, mainstreaming of DRR, disaster risk reduction at European level and disaster reduction and climate change. The findings from this study show that there does exist a clear understanding that humanitarian and development aid not only need to work together, but have to coordinate their actions for the long term benefit of disaster prone and affected communities.

Handmer, J., & Dovers, S. (2007). The handbook of disasters and emergency policies and institutions. Sterling, VA USA: Earthscan.

Largely an investigation of the policies and policy instruments available to institutions working to address issues that arise from disasters, the book, nonetheless outlines some key points related to underlying issues as well as an examination of risk that may be useful. Central to the book is the notion that if policy and policymakers seek to be strategic and increase the resilience of communities, and even avoid some of the impacts generated by disasters, then the reactive act of focusing on the ‘event’ itself needs to be replaced by disaster policy that addresses the underlying causes of vulnerability therein. Migrating the discourse from vulnerability as a physical characteristic to a phenomenon that is constructed of both social and political components as well. A discussion of residual risk, that risk which is still there even after working to alleviate much of the risk to communities, takes place aligning with other discussions of prudent risk taking that have been raised in the disaster risk reduction dialogue. The concept of complex unbound problems (CUPs) was introduced and characterized by an event causation due to the interaction of processes on multiple time scales. The magnitude and consequences may be extreme but not predictable, boundaries not localized in space nor time, and uncertainties may be high or unknown with important features of the event resistant to quantification.

This book does explicitly address conflict as a driver or even cause of disaster. A discussion of the characteristics of conflict that drive up vulnerability include the exodus of trained community members, absence of inward investment, destruction or abandonment of infrastructure and shelter, redirection of resources to military, collapse of trade and commerce, abandonment of subsistence farms, lawlessness and disruption of social networks.

Heitzmann, K., Canagarajah, S., Siegel, P. (2002) ‘Guidelines for Assessing the Sources of Risk and Vulnerability’, Social Protection Discussion Paper Series No 0218, The World Bank.

In order to best understand the changing face of vulnerability, discussion on resilience and poverty alleviation need to bring the concept of risk and its management at the center of the dialogue. The use of the term ‘vulnerability’ itself has proliferated and refers to the relationship between poverty, risk, and efforts to manage it. Though one definition of vulnerability is hard to identify there exist some general principles: it is forward looking and defined as the probability of experiencing a future loss; a household is said to be vulnerable to future losses of welfare caused by uncertain events; the degree of vulnerability depends on household and risk characteristics; and vulnerability depends on a time horizon, such that households may be vulnerable to risk over the next week, month, or year.

The World Bank's social risk management (SRM) strategy is a new means to look at these concepts in order to help households become less susceptible to potentially damaging welfare losses. SRM includes the broad range of formal and informal proactive and reactive risk management strategies used by individuals, communities, and nations, including actions by the public, private, and informal sectors. Given the large literature on poverty, the objective of this paper is to provide some basic concepts and guidelines for organizing ideas and information relevant to risk and vulnerability assessment.

Households face risk. If this risk is realized than it can leave households more vulnerable than before to manage future risks. Whether or not this happens depends heavily on the assets of the household, the risks they face, and the household characteristics ex-ante a hazard event or shock. However, households face constraints to adopting best use strategies for managing risk. These constraints are usually related to problems of asymmetric information, the inability to access appropriate financial management tools, inability of informal migration, and exclusion from social networks. Therefore, for a specific household, the set of available risk management options is determined by their assets, broadly defined and encompassing financial markets and access.

International Strategy for Disaster Reduction (ISDR). (2004). *Living with risk: A global review of disaster reduction initiatives*. Geneva, Switzerland: Inter-Agency Secretariat of the International Strategy for Disaster Reduction (UN/ISDR).

This report is a review of the state of affairs in disaster risk reduction, attempting to take a holistic view of the enterprise. In doing so, if a central theme can be extracted from the report it is that the importance of DRR as a process and not a specialty, the need for DRR to be incorporated across sectors, that it is not a sectoral specialty. Practitioners and researcher alike will have to ask the question "What did not happen?" to be able to provide the necessary evidence for better informed programming.

The ISDR has created a global framework for action that seeks to reduce human, social, economic and environmental losses due to natural hazards and related technological and environmental phenomena. This framework (found in figure 1.3, page 15) seeks to increase public awareness to understand risk, vulnerability and disaster reduction, promote public commitment to DRR, stimulate cross sectoral collaboration on DRR and to improve scientific knowledge (Hyogo). Special areas of concern are highlighted as the recognition of special vulnerability of poor and socially marginalized peoples, environmental, social and economic vulnerability assessments, ecosystems management, land use management and international, regional and national legislation with respect to DRR.

The discussion of risk is rooted in conditions of physical, social, economic and environmental vulnerability and necessarily incorporates coping and overall capacity as key elements in the risk component. Building upon the definitions provided in the matrix, the vulnerability concept here is a reflection of both individual and collective physical, social, economic and environmental conditions at hand which are shaped by attitudinal, behavioral, cultural, socio-economic and political influences.

As a review of the state of affairs, a multitude of organizations, committees, research institutes and task forces are mentioned as involved in furthering work on DRR. However, there are several types of hazard that appear woefully underrepresented in terms of organizational specialization within these areas. Biological and economic hazards as well as the hazards associated with armed conflict receive little to no attention, particularly when reviewing the missions of the various organizational bodies involved in work within the DRR domain. Numerous challenges are laid out, but critically important is decentralization of

DRR and the involvement of varied stakeholders to build out the breadth of the work across sectors. One of the major gaps in collective knowledge previously identified within the document was the arrival at a globally accepted set of criteria against which to measure the effectiveness of DRR, reflecting how both lives and assets are preserved through a framework in which the various elements could be harmonized to guide action and steer monitoring.

International Strategy for Disaster Reduction (2009) "Global assessment report on disaster risk reduction" United Nations International Strategy for Disaster Reduction Secretariat.

This report looks at disaster risk, analyses its causes and effects, shows that these causes can be addressed and recommends means to do so. The key message of the report is that disaster risk reduction can function to reduce poverty and be incorporated into development and climate change objectives. The report is published under the International Strategy for Disaster Reduction (ISDR) which serves as a framework to coordinate actions to address disaster risks at all levels: local, national, regional, and international.

Disaster risk affects all countries, but tends to disproportionately fall on the poor and marginalized within and have long term negative impacts that perpetuate the poverty cycle. Climate change is a key issue that magnifies the uneven social and territorial distribution of risk, disproportionately falling on the poor and amplifying their levels of poverty. Though this view is understood, efforts to reduce disaster risk, address poverty, and adapt to climate change are poorly coordinated. However, innovative tools and approaches exist on a local and community level. The challenge presented by this report is to incorporate climate change, poverty reduction, and risk reduction in a way that can bring local and sectoral approaches into the mainstream. This will both address the goals of the Hyogo Framework for Action (HFA) and the Millennium Development Goals.

Lerner-Lam, Arthur (2007) "Assessing global exposure to natural hazards: Progress and future trends" Environmental Hazards Vol. 7: pg 10-19.

This paper makes a global analysis of disaster threat in order to quantify the relative importance of different natural hazards as a function of location. The goal of this exercise is to make disaster risk management a more attractive and feasible investment, rather than simply a focus on humanitarian aid post disaster. The authors use potential loss derived from exposure as a quantitative proxy for risk. There is an important distinction between risk-based (hazard, vulnerability, exposure leading to risk) and impact based approaches (hazard mortality and economic loss) to measuring vulnerability. This study takes focuses on the later in order to calculate multi-hazard occurrence and severity by developing robust measures of the geographic extent and duration of a particular hazard occurrence, thus integrating the severity of the event in space and time so that it can be linked to measures of human impacts.

The greatest percentage of people is affected by flooding (37.7%), followed by drought (18%), and cyclone (9.1%) as measured by population numbers. Geophysical hazards – earthquakes, volcanoes, and landslides – together account for another eight percent. High population densities and hazard severity are correlated for volcanoes, cyclones, and floods. Drought ranks as the top hazard for levels of mortality, followed by geophysical, and hydro. An interesting point is that the mortality analysis in the hazard context is a relatively accurate depiction of actual mortality, which suggests that the mortality 'rate' calculation may accurately represent actual human vulnerability in regions with similar socio-economic parameters. Similar analysis based on economic losses are less telling because greater

economic losses are linked with higher levels of development rather than relative loss. It is important to note that in order to make a global synthesis in order to promote uniformity, the study has to sacrifice more high-quality regional analysis due to its limited geographic availability.

Swift, Jeremy (2006) “Why are Rural People Vulnerable to Famine?” Institute of Development Studies IDS Bulletin, Vol. 37 No 4.

The author of this paper looks at what makes an individual vulnerable. He makes a clear distinction between variables that are a direct link to famine and the indirect/primary factors, such as policies, institutions, and processes, as well as general economic and ecological conditions. Though originally it was perceived that factors in production directly affect consumption, however as Amartya Sen showed in his book and how it is further expounded in the article – it is failures in exchange or market mechanisms that are the key cause of famine amongst the poor. The two main sources of terms of trade vulnerability for the rural poor are the wage labor market and commodity markets for agricultural and pastoral products. Some key things not answered by Sen’s theory are: timing is still difficult to predict, partly because it appears that there is a threshold of individual or community impoverishment and each new event or hazard further degrades the communities resilience to that and future events; differential vulnerability within some communities or between similar communities facing apparently similar risks; expectations of government assistance and; war and civil disturbance is seen as external to the model. Assets (investment, stores, and claims) create a buffer between production, exchange and consumption.

Given this model it appears that increased economic integration of traditional societies, though has benefited some producers, has also increased vulnerability through increased dependence on market transactions and a reduction in physical assets and effective local claims, inadequately compensated by a non-functional social contract with central government. In order to reduce this vulnerability, any policy should include actions in the field of production, exchange, and assets. This could include – early warning, exchange interventions (employment guarantees, price support), and improving assets and claims.

Thomalla, F., Downing, T., Spanger-Siegfried, E., Han, G., & Rockstrom, J. (2006). Reducing Hazard Vulnerability: Towards a Common Approach Between Disaster Risk Reduction and Climate Adaptation. *Disasters* , 30(1): 39-48.

The discussed risks include idiosyncratic and covariate risk factors as they related to climate adaptation and DRR. The article suggests that DRR has historically managed risk from a response and recovery categorization, yet has begun a transition to an awareness and preparedness method, focused on reducing exposure to hazards and increasing ability to cope with hazards (risk mitigation and coping); climate change tends to address vulnerability to hazards (risk identification and reduction). The hazards under discussion are climatic and environmental risk factors, with a mention of tectonic risk factors, as determinants of vulnerability. The article briefly calls attention economic factors as an exacerbating force towards the other hazards.

This article defines the three major components of vulnerability as exposure, sensitivity and resilience. A population is not identified; however, the article does specify the need for a clear understanding as to who is most vulnerable to the impacts of hazards and how the interactions between nature and society shape the underlying factors that contribute to vulnerability. Lastly, this article identifies the need for a unified framework between DRR and Climate Change Adaptation. Climate change adaptation is said to

involve national communications to the UNFCCC and NAPA for least developed countries, while DRR uses IDNDR, Yokohama Strategy, ISDR and the HFA.

United Nations. (2009). *Global Assessment Report on Disaster Risk Reduction: Risk and Poverty in a Changing Climate: Invest Today for a Safer Tomorrow*. Geneva: The United Nations.

The report uses the Hyogo Framework for Action (HFA) for incorporating livelihood and DRR principles. The HFA is listed as a positive development in DRR, along with climate change adaptation initiatives (NAPAs) and the inclusion of disaster management in development strategies through Poverty Reduction Strategy Papers. The overall findings for the report are that global disaster risk is highly concentrated in poorer countries with weaker governance, in low and low-middle income countries with rapid economic growth and where the exposure of people and assets to natural hazards is growing faster than risk-reducing capacities are being strengthened. Small-island developing states and land-locked developing countries are identified as having the highest economic vulnerability to natural hazards. The amount of loss from disaster is seen as a function of decreased resilience and lacking insurance and social protection. Climate change is seen as a threat to resilience of poorer countries to absorb loss and recover from disaster impacts. Risk due to climate change is therefore seen as a function of increasing exposure and decreased resilience.

The report is focused on prevention and is geared towards policy change and institutions. It warns that a failure to address the underlying risk drivers will result in dramatic increases in disaster risk and associated poverty outcomes, and sees addressing these underlying risk drivers as an investment in building more sustainable programs. The identified underlying risk drivers include poor urban governance, vulnerable rural livelihoods, and declining ecosystems. The urgent action request for climate change adaptation and combined DRR efforts in this report is supported via documented case studies, datasets and trend monitoring. Constraints in data and methodology identified were the inability to produce a model of drought risk or an adequate characterization of losses in the agricultural sector and rural areas. Hope of the report is to stimulate improved data collection and research.

United Nations Development Programme. (2004). *Reducing Disaster Risk: A Challenge for Development*. New York: United Nations Development Programme, Bureau for Crisis Prevention and Recovery.

This Report introduces a pioneering Disaster Risk Index (DRI) that measures the relative vulnerability of countries to three key natural hazards — earthquake, tropical cyclone and flood — identifies development factors that contribute to risk, and shows in quantitative terms, just how the effects of disasters can be either reduced or exacerbated by policy choices. Our hope is that the index will both help generate renewed interest in this critical development issue and help bring together stakeholders around more careful and coherent planning to mitigate the impact of future disasters.

This report recognizes the risk of natural disasters as one of the major threats to achieving the Millennium Development Goals (MDGs), particularly the goal of halving extreme poverty by 2015. The main forms of hazards discussed in detail in this report are earthquakes, tropical cyclones, floods and drought. Risk is evaluated as a function of hazard and vulnerability, with development seen as a factor that can have a positive effect or can exacerbate existing vulnerability. This report suggests incorporating disaster management programming into developmental efforts for disaster mitigation. There are two main types of disaster risk management according to this report. The first is prospective disaster management policies that are integrated into sustainable development programming and

planning and the second is compensatory disaster management; involves disaster preparedness or response. Prospective disaster management is intended for medium-long term risks and warrant program monitoring to ensure that a development intervention is not exacerbating risk. Compensatory disaster management is to be used for contemporary risk to ameliorate existing vulnerabilities.

Natural hazards and corresponding risks are looked at in the context of urbanization and rural livelihoods (2 key components of the DRI). Areas of heightened risk at the current time are identified as urban regions of Africa, Asia, Latin America and the Caribbean. The urban risks are new and not well understood. The risks affecting rural livelihoods involve the complex livelihood strategies (seasonal migration or income from remittances) as well as isolation which leads to fewer coping strategies and higher vulnerability. While urbanization is seen as a large risk factor for disaster, rural regions are seen as lacking capacity to manage and adapt to climate related risks and climate changes. The report contains a Disaster Risk Index Summary table for international disasters between 1980 and 2000, examples of international initiatives modeling risk, and various current indicators used to assess and determine risk, vulnerability and hazards.

United Nations. (2009). *Global Assessment Report on Disaster Risk Reduction: Risk and Poverty in a Changing Climate: Invest Today for a Safer Tomorrow*. Geneva: The United Nations.

The report uses the Hyogo Framework for Action (HFA) for incorporating livelihood and DRR principles. The HFA is listed as a positive development in DRR, along with climate change adaptation initiatives (NAPAs) and the inclusion of disaster management in development strategies through Poverty Reduction Strategy Papers. The overall findings for the report are that global disaster risk is highly concentrated in poorer countries with weaker governance, in low and low-middle income countries with rapid economic growth and where the exposure of people and assets to natural hazards is growing faster than risk-reducing capacities are being strengthened. Small-island developing states and land-locked developing countries are identified as having the highest economic vulnerability to natural hazards. The amount of loss from disaster is seen as a function of decreased resilience and lacking insurance and social protection. Climate change is seen as a threat to resilience of poorer countries to absorb loss and recover from disaster impacts. Risk due to climate change is therefore seen as a function of increasing exposure and decreased resilience.

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United Nations and the World Bank. (2010). *UnNatural Disasters: The Economics of Reducing Death & Destruction*. World Bank Publications.

This report is directed towards governmental bodies that control governmental spending. The focus is on the long term benefits of disaster preparedness and incorporation of DRR into development planning, early warning systems, and environmental preservation, and sees these benefits as cost

effective. The economic effects of disasters reflect not only the damage but also the network of economic links with undamaged areas; the stronger and more extensive these links with undamaged areas, the smaller the output loss and quicker the recovery. Excessive relief and aid dependency could weaken these economic links. Through evaluation and analysis of case studies, the Assessment finds that of the three specific prescriptions for disaster planning, building codes and insurance are neither necessary nor sufficient for DRR, that improving weather forecasting is likely to be beneficial and cost effective, and that environmental buffers should be protected.

The DRR approach is prevention, focusing on the risks of death, injury and damage from disasters and how to ensure risk reduction in a cost-effective manner. Hazards are conceptualized as becoming a disaster when welfare is affected. To prevent a hazard from becoming a disaster, governments are called upon to enact laws, regulations and public policy, develop stronger infrastructure and public goods that inform the public and provide incentives for preventative measures. Individuals have the responsibility to use resources such as insurance, remittances and relief aid as to prepare for and react to a hazard. Individuals are said to choose how much risk to bear and how to reduce it. Households can take prevention measures that reduce the loss from a hazard. It is seen as essential that governments and institutions understand why people take the measures they do in order to effectively provide people with information with suitable incentive and programs.

Data sources used for evaluation in this Assessment include EM-DAT, NatCat and Sigma. Based in these data, the analysis has determined that floods and storms are more frequent hazards than droughts, or earthquakes. Furthermore, East Asia is the region with the greatest disaster frequency followed by Europe and Near East, Central and South America and Africa. Data on deaths showed several years of low death rates, without an upward trend in mortality when population exposure had risen. On other words, prevention measures have likely been effective. Case studies used to provide evidence for the Assessment's main points include "Spotlights" on Bangladesh, Turkey, Haiti, Ethiopia and the 2004 Tsunami. Economic measurement techniques include ECLAC's tool, and tools for projecting the likely effects of a disaster on different segments of the economy include input-output matrices, social accounting matrices and Computable General Equilibrium models (CGE) models.

In the case study on Haiti examining the damage from Hurricanes in 2008, the resulting destruction was seen as an effect of natural resource over-exploitation (deforestation), destruction of civil programs during government misrule, and a result of a government that does not support reconstruction and prevention activities.

Venton, Courtney and Paul Venton (2004), "Disaster preparedness programs in India: A cost benefit analysis" Humanitarian Practice Network No 49.

This paper looks at two disaster mitigation and preparedness interventions in India. The novel component of the study is that it uses a cost-benefit analysis to determine the overall cost-effectiveness of mitigation and preparedness interventions. This is in response to the international community asking greater evidence based analysis on the impact of such interventions. This is in light of a recent trend towards DRR work in anticipation of a hazard. Traditionally the bulk of donor and government support has gone to relief work – post disaster resources and aid. However, despite this shift in thinking, the integration of disaster management programming into humanitarian and development work has still been insufficient. A lack of evidence in this field has partly contributed to the separation and slow incorporation of DMP.

This paper presents a quantitative analysis of the costs and benefits of the DMP program, showing that a) that cost benefit analysis can provide a useful evidence-based tool for analysis of DMP programming and b) the analysis demonstrates a clear economic argument for DMP. The authors understand the limitations of cost-benefit analysis and that it cannot be taken in isolation but function as an important contributor to the debate on DMP initiatives. The hand pup interventions in both of the case studies are a good investment in development, but would be rendered useless if a DMP component is not incorporated. These results have clear policy implications to the development and humanitarian community as well as make a good argument for more programs to incorporate a cost-benefit analysis to better inform programming.

Walker, P., Wisner, B., Leaning, J., & Minear, L. (2005). Smoke and mirrors: Deficiencies in disaster funding. *BMJ: British Medical Journal*, 330, 247-250.

This brief piece outlines some of the ways in which funding for disaster response is insufficient and in many cases misleading. It outlines some of the factors that make contributions from donors conditional including both commercial and policy agendas. Furthermore, many monies get counted as assistance, when in effect they may be structured loans that can serve to actually increase the vulnerability of developing countries through an increased debt load. In quantifying the financial resources that flow into the humanitarian relief system, two major areas are either underreported or outright omitted from much of the literature. Those areas are contributions from diaspora groups, as well as investments made by disaster survivors themselves. This last point warrants greater research if we are to begin to better understand the capacities of affected communities and better design programming to work in conjunction with rather than independent of local efforts. Through the livelihoods lens, three factors are laid out that classically align themselves with the notion of the processes, institutions and policies. They are climate change, global urbanization, and the overall complexity of the development process. All of these factors are seen to be increasing both the magnitude (severity) and the depth (number of affected) of the vulnerability of populations.

Webb, P., & Harinarayan, A. (1999). A Measure of Uncertainty: The Nature of Vulnerability and Its Relationship to Malnutrition. *Disasters*, 23(4): 292-305.

Terms such as “vulnerability’ and insecurity’ are used widely in the general nutrition literature as well as in work on humanitarian response. Yet these words are used rather loosely. This paper argues that more clarity in their usage would benefit those seeking a bridge between development and humanitarian problems. Since vulnerability is not fully coincident with malnutrition, poverty or other conventional indices of human deprivation, public action must be based on a better understanding of the nature of crises and human uncertainty beyond physiological and nutritional outcomes. More attention is needed to be paid to the context-specific nature of risks, the capacity of households to manage such risks and the potential for public action to bolster indigenous capacity through targeted development investments, not just relief.

The equation used in this paper to better understand the concept of vulnerability is $V = (\text{vulnerability}) = (\text{Hazard}) - C (\text{Coping})$. This paper does not focus on any particular category of risk or method of risk reduction for interventions. Hazards are not viewed as a category, but rather examined as they refer to vulnerability status. In the vulnerability equation, Hazard is a function of probability (the statistical likelihood of an event or process occurring), primacy (shock value based on time elapsed since previous occurrence), predictability (the degree of warning available), prevalence (the extent and duration of

hazard impacts) and pressure (intensity of impact). Vulnerability is addressed in all populations and contexts, with a concentrated focus on malnutrition.

World Bank. (2006). Hazards of nature, risks to development: An IEG evaluation of world bank assistance for natural disasters. Washington, DC: Independent Evaluation Group.

The report seeks to change the thinking of disaster as an interruption in development to one of a necessarily discussed risk to development in approaches of both countries and the World Bank alike. Criticism is made of how the general approach of the World Bank to disaster is largely reactive and tactical while a proactive and strategic response bodes well for longer term benefits.

The report reviews different project areas. A review of 21 projects that were wholly devoted to prevention yielded 8 that have been completed, and of those eight 63% were rated satisfactory. Despite the small sample, it may highlight some important shortcomings in the understanding of both social issues and vulnerabilities.

The report states that the Bank is pushing forward with plans of action for countries based on their vulnerability level, with those at high risk of known hazards focusing to a greater extent on disaster preparedness and mitigation in their country assistance strategies (CASs).

The long term effects of what is done in the immediate aftermath of disasters has been highlighted by the report as an area of concern. Social dimensions are too often overlooked with local power structures often sidelined, people and institutions left out of the relief response due to limited knowledge of communities by responding institutions. All of this oversight may serve to increase rather than decrease vulnerability, particularly of the poor and other vulnerable groups.

The report cited the preservation and security of existing social relationships when providing emergency shelter and other efforts to keep families and neighborhood groups intact as strategies that yielded positive outcomes. During the recovery and relief phase, the type of work most beneficial to the most vulnerable must have stakeholder input and is often close to the ground. Targeting the vulnerable is often easiest through civil society organizations and disaster assistance can be seen as a way to simply increase the scale of some aspects of work these organizations are already engaged in.

One of the major systematic, or perhaps rhetorical, problems with DRR programming particularly in World Bank projects is the notion of 'building back better.' Often governments borrow in order to achieve the higher building standards without establishing what would be necessary for longer term maintenance of the structures.