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**The Political Economy of Disaster
Vulnerability: A Case Study of Pakistan
Earthquake 2005**

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**The Political Economy of Disaster Vulnerability:
A Case Study of Pakistan Earthquake 2005**

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August 23, 2009

ABSTRACT

Literature on natural hazards typically perceives disasters to be acts of God (or nature) while restricting the examination of their causes to biophysical and geographical explanations. This paper takes a different approach; first, it argues that disasters are socially constructed and, second, it situates the interactions of large-scale natural forces with local political-economic conditions within the context of vulnerability to contend that disasters are consequences of unresolved development challenges. Using the Pressure and Release (PAR) Model the paper suggests the usefulness of the concept of vulnerability that shapes local geographies of risk and weak institutions which transform and enhance the negative impacts of ‘natural’ hazards into ‘man-made’ disasters.

Key words: Vulnerability, Natural Hazards, Disasters, Political Economy, Pakistan

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TABLE OF CONTENTS

| | |
|---|-----------|
| List of Acronyms and Initialisms | 04 |
| List of Figures and Tables | 05 |
| Introduction | 06 |
| Literature Review | 08 |
| Understanding Vulnerability | 08 |
| Vulnerability as Multi-Dimensional | 09 |
| Vulnerability and Poverty | 11 |
| Vulnerability and Risk | 12 |
| Vulnerability Analysis | 14 |
| Analytical Framework | 17 |
| The PAR Model | 18 |
| Limitations of the PAR Model | 21 |
| Research Methods and Limitations | 22 |
| Research Method | 22 |
| Limitation of the Study | 22 |
| Case Study: Pakistan Earthquake 2005 | 23 |
| Background | 23 |
| Economic Vulnerability | 25 |
| Social Vulnerability: The Underlying Root Causes | 26 |
| Institutional Failure of Disaster Preparedness Measures | 28 |
| Dynamic Pressures | 29 |
| Unsafe Conditions | 33 |
| Conclusion | 36 |
| Bibliography | 38 |

LIST OF ACRONYMS AND INITIALISMS

| | |
|--------|--|
| ADB | Asian Development Bank |
| APWLD | Asia Pacific Forum on Women, Law and Development |
| DFID | Department for International Development |
| EERI | Earthquake Engineering Research Institute |
| ERRA | Earthquake Reconstruction and Rehabilitation Agency |
| ICG | International Crisis Group |
| LOC | Line of Control |
| PAR | Pressure and Release |
| RH | Risk Hazard |
| UNDP | United Nations Development Programme |
| UNDRO | United Nations Disaster Relief Organization |
| UNHCR | United Nations High Commissioner for Refugees |
| UNICEF | United Nations Children Fund |
| UNISDR | United Nations International Strategy for Disaster Reduction |
| UNOCHA | United Nations Office for the Coordination of Humanitarian Affairs |
| USGS | United States Geological Survey |
| UTC | Coordinated Universal Time |
| WB | World Bank |

LIST OF FIGURES

| | |
|--|----|
| Figure 1: Relationship between Hazard, Vulnerability and Risk ----- | 13 |
| Figure 2: Risk Hazard Framework ----- | 18 |
| Figure 3: PAR Model (The Progression of Vulnerability ----- | 19 |
| Figure 4: The Pakistan Earthquake 2005 ----- | 24 |
| Figure 5: Pressures that Result in Disasters: Pakistan Earthquake 2005 ----- | 30 |
| Figure 6: Destruction Caused by a land slide in Balakot ----- | 33 |
| Figure 7: Collapsed Stone Masonry Building ----- | 34 |
| Figure 8: The Fall of the Twin Margalla Towers in Islamabad ----- | 35 |

LIST OF TABLES

| | |
|--|----|
| Table 1: Preliminary Estimate of Total Losses and Reconstruction Costs ----- | 25 |
|--|----|

“Nature creates hazards, but the actions or inactions of people, societies and governments create disasters”

Ronald S. Parker, World Bank

INTRODUCTION

Over the past few decades the world has witnessed an increasing number of natural disasters that have caused social, economic and human losses across the globe. Pelling (2003, p.i) observes that the frequency of human disasters triggered by natural hazards has been doubling every decade since the 1960s. UNDP (2004) estimates show that approximately 75% of the world population living in more than 100 countries has been exposed to at least one disaster between 1980 and 2000. UNISDR (2009), in its latest analysis of global risk, has reported a total of 8,866 events occurring between 1975 and 2008 that have claimed more than 2.3 million lives with economic losses amounting to US\$ 1.53 billion. Approximately 90% of these disaster-related losses are incurred by developing countries that are facing an increasing occurrence of natural disasters within short-time periods (UNISDR 2002). Further estimates show that around half of the deadliest disasters since 1975 have occurred within a short time span of six years (2003-2008) with a larger number of regions exposed to small-scale disasters (UNISDR 2009).

No matter how the disaster impact statistics are viewed, their frequency and geographical concentration reflect on the increasing exposure of people and their economic assets to natural hazards. Initially, the understanding of pre and post disaster contexts was limited to acts of God or nature where human action was the only thing that was not considered from either point of view (Weichselgartner 2001). The presumed mystical causes of natural disasters, their unpredictable occurrences and the large-scale losses that accompanied them have traditionally shaped the understanding of natural disasters in more of a supernatural and fate-oriented context with the general belief that little can be done to prevent and overcome their occurrences and impacts. This conventional attitude, as Weichselgartner (2001) notes, not only hinders mankind’s ability to manage the impacts of natural disasters but in-turn accentuates the inability to contextualize the framework for understanding natural hazards.

This traditional approach has come under heavy criticism in light of the evidence which shows that nature is not changing as drastically as expected yet disasters are becoming more frequent, destructive and deadly (Wijkman and Timberlake 1988, p.11). Furthermore, Burton et al. (1993, p.31) and Wisner et al. (2004, p.3) contend that even if extremities in natural environment might be increasing they do not necessarily prove hazardous to the people without taking into consideration the social system in which hazards occur and endure as disasters. Gaining traction from the above, alternate approaches to disaster analysis have emerged that emphasize the concept of vulnerability to understand the various ways in which social systems operate and interact with natural hazards to produce disasters (Wisner et al., 2004, p.10).

This paper draws its ideological impetus from these alternative approaches to challenge the traditional belief in divine causality of natural disasters by addressing the underlying question of the production of vulnerability in political-economic spaces and argues that disasters are the consequence of poorly coordinated development outcomes. The remainder of this paper is organized as follows: Chapter 1 sets out the detailed literature review to analyze how the concept of vulnerability offers a different perspective of disaster analysis. This is linked up with “poverty” and “risk” that co-exist in disaster literature to show that some aspects of vulnerability need not be confused with the two terms. Likewise, some major theoretical debates on vulnerability analysis are explored that underpin development of conceptual frameworks in analyzing vulnerability. Chapter 2 provides a detailed architecture and an in-depth review of the Pressure and Release (PAR) Model as a useful framework for vulnerability analysis and discusses some of its theoretical limitations. Chapter 3 outlines the methodology and limitations of the study. A case study of the 2005 earthquake in Pakistan is presented in Chapter 4 to illustrate a practical application of the PAR Model and demonstrate its relevance as a method of understanding the vulnerability of a society to be impacted by a natural hazard with adverse effects. Chapter 5 revisits the findings of the case study in light of the disaster literature to address the theoretical challenges and limitations that call for holistic and multi-disciplinary approach to vulnerability analysis and concludes by discussing future implications of linking human development with vulnerability reduction for long-term disaster recovery and prevention.

LITERATURE REVIEW

Questions regarding the persistent occurrence of natural disasters and their geographical concentrations are central to much past and current debate on the extent of vulnerability and public policies to address it. Early discussions on natural hazards implicitly assumed disasters to be natural phenomena that were consequences of acts of God (or nature) with little or no reference to human induced actions (Weichselgartner 2001). This single disciplinary view ignored the much needed broad and all-embracing approach to natural hazards that focuses not only on the physical, biological, geographical and technological aspects but also social, economic and political realities (Alexander 1998, p.xvi). However, more recent discussions of natural disasters have shifted their attention towards social factors, elevating the importance of political economy to other methods of explanations (Wisner et al. 2004, p.4; Cohen and Werker, 2008).

In this ideological transition, the principal challenge in developing a holistic framework of disaster analysis is the lack of sound theoretical basis of general principles and models (Alexander 1998, p.xvi). According to Weichselgartner (2001) incorporation of all factors that cut across different disciplines into one framework is difficult yet an attempt to do so will offer an advantage over single disciplinary views by broadening the focus and accepting potential new approaches of analyzing disasters. Within this perspective, a rethinking of natural disasters has shifted focus from reactive actions of measuring risk (to external physical processes) to a proactive approach of understanding and modifying social actions that shape vulnerability of internal structures of the society. Adger and Brooks (2003, p.21) observe that if the magnitude of natural hazards exceeds the coping capacity of these internal processes the society becomes more vulnerable to hazardous events. Thus the concept of vulnerability provides a more flexible and contextual approach to disaster loss reduction by linking policy prescriptions to these internal processes for long term sustainable development.

Understanding Vulnerability

Vulnerability is a term blessed with rich vocabulary in disaster management literature yet its definition remains contested and one which is phrased in different ways.

Originally constructed by engineers for application to physical structures the term has been expanded over the years by social scientists to include socio-economic, political and institutional aspects (Twigg 2007). Birkman (2006, p.11) and Bohle (2002a, b) identify more than 25 different definitions of vulnerability present in current literature reflecting on its multi faceted nature. Bogardi (2006, p.2) notes that vulnerability is used interchangeably with other terms like risk, resilience, resistance etc. resulting in a terminological cacophony.

Intense research and discussion of this term has left a high potential for ambiguity and confusion which Birkman (2006, p.11) alludes to as the ‘vulnerability paradox’ – a term that needs to be analyzed and measured accurately yet is devoid of any precise definition. Weichselgartner (2001) traces the sources of these terminological discrepancies to the epistemological foundations and diverse methodological applications of the term. Adding to this confusing lexicon are the variations in describing hazards and the regions in which they occur (Cutter 1996). Considering the complexities and uncertainties associated with the term, elaborating and analyzing all the academic definitions of vulnerability is beyond the scope of this paper. Rather the paper will attempt to explore the concept of vulnerability and its evolution within the context of natural hazards to address issues of long-term loss reduction and sustainable development.

Vulnerability as Multi-Dimensional

The origins of the word vulnerability can be traced back to its Latin root *vulnerare* – meaning ‘to wound’ or in a broader perspective to be susceptible to any physical attack with the incapability to defend (Lundy and Janes 2009, p.616). More specifically, in reference to natural hazards, vulnerability can simply be defined as being exposed to natural hazards with insufficient coping capacity to overcome their impacts. Though the notion of vulnerability as a passive response to natural hazards was introduced into disaster studies in the 1970s it gained prominence in the 1980s when the conventional divine causation of disasters was increasingly challenged (Bankoff et al. 2004, p.29; Birkman 2006, p.11).

Initially vulnerability was defined as a threat or limiting factor to a society’s capacity to absorb and recover from an adverse hazardous event (Gabor and Griffith 1980;

Timmerman 1981; Kates 1985; Bogard 1989). Later on it was approached in terms of the degree to which a society or its people are exposed to elements of risk (Petak and Atkisson 1982; Susman et al. 1983; UNDRO 1982, 1991). Some distinguished geographic vulnerability (physical conditions) on the one hand and social vulnerability (human conditions) on the other (see Liverman 1990). Downing (1991) viewed vulnerability as a negative consequence rather than a cause and as a relative concept that helped to differentiate amongst socioeconomic groups instead of being an absolute notion.

In the 1990s the concept of vulnerability underwent further change to focus on people's capacity to react and protect themselves from disasters rather than being limited by it (Dow 1992; Watts and Bohle 1993; Green et al. 1994; Weichselgartner and Bertens 2000). Blaikie et al. (1994, p.60) for example defined vulnerability as the characteristics possessed by people or society that determine their capacity to anticipate, cope with, resist and recover from the impact of natural hazards. According to UNISDR (2004) the conditions under which these characteristics are determined mainly relate to the physical, social, economic and environmental factors that produce vulnerability to natural hazards. In addition to these socio-economic processes, Dow and Downing (1995) add other demographic aspects such as population ages, economic dependency, racism etc. in the examination of natural hazards. Wisner et al. (2004, p.14) contend that instead of limiting attention to these factors there is a much greater need to focus on the problems that arise out of their interaction. The significance of this approach is acknowledged in the sense that it transforms people from being mere passive recipients to active players by increasing their propensity to bring about positive change (Hewitt 1997, p.167)

In this connection, Cutter (1993) argues that vulnerability can be thought of as an interaction of hazard (physical space) with the profile (social space) of the communities. Thus vulnerability is seen more of a conceptual nexus that relates the processes of the people and institutions to their environment (Oliver-Smith 2004, p.10). This dynamic view integrates all the socio-economic exposure to natural hazards giving vulnerability a multilayered and multidimensional perspective (Bohle et al. 1994, Vogel and O'Brien 2004, p.4). But what vulnerability precisely means is quite ambiguous in the sense of the terms that are used to describe it. It can be

described as a potential exposure or risk, the degree of loss associated with a particular hazard, the coping responses of the society or a combination of both biophysical risk and social responses (Weichselgartner 2001). There is much that overlaps and there are fault-lines in the current debate, for example the conceptualization of vulnerability as a pre-existing condition takes a static view. It identifies the causal socio-economic factors while overlooking the importance of the relationships between these factors and the related problems that arise due to their interactions. Similarly those who view vulnerability as a dynamic process focus on the interactions between natural hazards and the social responses but restrict their analysis to a specific geographical domain discounting its wider applications (Weichselgartner 2001).

Other studies have used a more integrative approach of defining vulnerability as a combination of potential exposure and social response within a specific geographic domain. According to Alexander (2000, p.12) this view confuses exposure and vulnerability rather than taking them as two inherent components of risk. The different research themes in vulnerability studies show how complex and diverse the concept is, making it difficult to develop policy responses to definite targets and measure progress in a quantified and standardized way. This paper recognizes the multi-dimensional nature of vulnerability as indispensable and views it as a dynamic interaction of socio-economic factors and their negative outcomes. The approach adopted helps to identify the causal factors that create political, economic and social conditions and also facilitates in understanding the progression of vulnerability from its root causes through dynamic pressures to the resultant unsafe conditions.

Vulnerability and Poverty

Literature on disaster also associates vulnerability with deprivation and marginalization often confusing it with poverty (Tandon and Hasan 2005). Research on the linkages between vulnerability and poverty has shown that these two closely interact with each other (Bourdelaïs 2005; Blaikie et al. 1994; Sen 1981) while also emphasizing a clear distinction between the two (Hoogeveen et al 2004, p.5). Both the concepts share commonalities in terms of their multi-dimensional nature, however are seen as a constituent factor of each other depending on the discipline and objectives of the study (Makoka and Kaplan 2005). Prowse (2003) for example identifies some

studies that view vulnerability as a component of multi-dimensional poverty within the larger ambit of 'well being' of people. A converse empirical link expresses poverty within vulnerability as a particular form of latter emphasizing limited access to resources (Adger 1998, p.7; Vogel 2001, p.3, Cardona 2004, p.48).

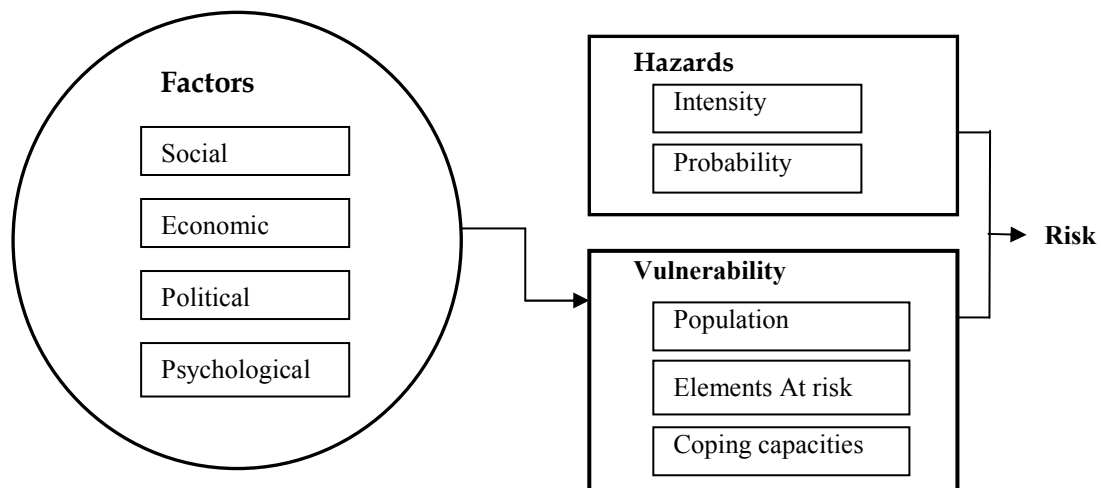
Furthermore, Blaikie et al. (1994, p.61) find vulnerability to be a more complex concept since it combines both external hazards with internal characteristics of the people while poverty tends to focus more on people's lack or need. Alwang et al. (2001) and Cannon et al. (2003) articulate vulnerability as forward-looking (probability of potential loss from hazards) while poverty in contrast is considered to be a measure of current status. Another perspective highlights the difference between vulnerability and poverty within the context of policy prescriptions. In this vein, Chambers et al. (1989) view anti-poverty programmes focused towards improving the income of people whereas anti-vulnerability programmes are geared towards enhancing security and reducing potential losses of natural disasters. Blaikie et al. (1994, p.61) identify a trade off existing between poverty and vulnerability in the sense that interventions to reduce poverty (e.g. borrowing or investment) may increase vulnerability though the authors acknowledge that a correlation also exists between the two. These common formulations and differing relationships convey the idea that it is not easy to establish the relative importance of vulnerability and poverty. The purpose of this paper is not to prove or disprove causalities between vulnerability and poverty, nor does it seek to solve differences between the two, instead it adopts a more systematic engagement with the study of the interconnections between the two to arrive at macro-level interpretations of disasters (Makoka and Kaplan 2005).

Vulnerability and Risk

Diversities in theoretical approaches to disaster studies and development reflect on the need to review key concepts that situate natural hazards within the vulnerability context. In order to evaluate the extent to which hazards affect people or societies it is necessary to distinguish between 'hazard', 'risk' and 'vulnerability' components in disaster analysis. Hazard in this case can simply be defined as an extreme geophysical event that poses a potential threat of causing a disaster (Alexander 2000, p.7). Risk (Figure 1), therefore, for the purpose of this study, can be understood as the

probability of loss resulting from the interaction of a given level of hazard and vulnerability (Stewart and Donovan 2008; Wisner et al. 2004, p.49; Alexander 2000, p.10).

Figure 1: Relationship between Hazard, Vulnerability and Risk



Source: Frantzova et al (2008)

Wisner et al. (2004) schematise this relationship as follows:

$$R \text{ (Risk to Disaster)} = H \text{ (level of hazard)} \times V \text{ (degree of vulnerability)}$$

Building on the above equation Alexander (2000, p.10) equates total risk as follows

$$\text{Total Risk} = (\sum \text{elements at risk}) \times (\text{hazard and vulnerability})$$

From the above it becomes evident that total risk is a complex production of its different constituent elements (populations, communities, infrastructure, economic activities and services etc) which are exposed to the threat of a hazard by placing themselves in a situation of vulnerability (Alexander 1993, p.7; 2000, p.10). The coping capacities are the means and the abilities of the people or society by which they utilize available resources to withstand the impact of disasters and are in turn determined by the interaction of socio-economic factors. It is within this conceptual understanding that Cardona (2004) and Wisner et al. (2004) challenge the traditional approach of treating risk and vulnerability as one and the same thing. According to Baker (2009) differences between the two concepts are very subtle in nature and hard to identify as both are latent constructs. Difficulties in differentiating between the two terms also reflect on the complexities of empirical generalizations that are associated with their causal explanations. Johnson (2004), for example, views vulnerability as

the materialization of risk while Bolin and Stanford (1999) view risk to be a property of vulnerability. In some cases the causal relationship tends to be bi-directional (Baker 2009). For example, actions of taking risk create a situation of vulnerability while the existence of vulnerability to a potential hazard poses a risk (Alexander 2000, p.12). This view contrasts with the common 'unidirectional' relationship between risk and vulnerability found in disaster literature and instead sees both as particularly important in understanding one another.

Additionally, policy decisions to address risk and vulnerability have provided another useful method of anchoring the two terms within the disaster context. According to this approach if one looks at the consequences of ignoring either vulnerability or risk the distinctions between the two terms can become more apparent. Using this approach Sarewitz et al. (2003) view that the success of risk-based approaches and estimation of risk do not depend on vulnerability. Conversely, Alexander (2000, p.12) argues that though vulnerability can be estimated in the absence of risk, it cannot be quantified without including risk in the total equation. Furthermore, vulnerability is seen as more of a human rights issue which is difficult to justify politically while risk reduction is not (Sarewitz et al. 2003). As stated earlier the purpose of this paper is not to redefine or introduce new terms but rather to explore the concept of vulnerability and risk in terms of their practical applications. Thus risk becomes central to understanding vulnerability and in simplified terms can be seen as a compound outcome of the interaction between vulnerability and natural hazard.

Vulnerability Analysis

As with the definition of vulnerability, approaches to vulnerability analysis also vary widely. Discussions in the previous sections have attempted to provide a way of conceptualizing vulnerability in different ways and identifying the main themes that run unparallel courses. However, the lack of consistency between these definitions makes it difficult to operationalize the analysis of vulnerability. Current methodologies of vulnerability analysis have widely recognized the need for developing more comprehensive approaches that shift attention from threshold-based methodologies to functional-based frameworks focusing more on processes rather than the static threshold limits of the social system (McFadden 2007). Rothman and Robinson (1997) recognize this changing perspective as an important ingredient in the

evolution of integrated assessment frameworks that move from simplistic, non-adaptive linear models to sophisticated, adaptive and complex chain analysis facilitating the understanding of the diverse approaches to vulnerability assessment.

Building on these emerging trends, Wisner (2004) identifies four main approaches to vulnerability assessment each having its own policy implications. The first approach takes the demographic perspective of viewing vulnerability as a societal status and considers people in specific social categories as vulnerable. Though associated with the benefit of identifying those who require assistance this approach adopts a reductionist view of people by homogenising them into a single category without differentiating them according to the scope, level and intensity of their vulnerability (Fordham 2004; Cardona 2004; Escobar 1995). Sen (1999, p.8) believes that this approach eventually leads to the marginalization of specific groups within the society further aggravating the development process. The second approach employs a taxonomic attitude by using classification schemes that are based on the causes (physical, economic, social etc.) of vulnerability. This approach expands upon the demographic method by way of introducing causal agents in differentiating people, however remains limited in terms of its static and one-dimensional view of vulnerability (Wisner 2004; Baker 2009).

The third approach which Wisner (2004) alludes to as the 'situational approach' takes the multi-dimensional perspective of vulnerability as a dynamic process rather than a static concept. The basic premise of this approach is that disasters are not viewed as 'exceptional events' but rather extensions of everyday living problems where vulnerability is a temporal phase that extends the normal conditions into exceptional situations (disasters). This situational approach has an advantage over the first two traditional approaches, as it encourages the development of a comprehensive framework that allows for a more complex chain analysis of the dynamic processes within a systems perspective. While tailored to deal with organized complexity, the situational model is limited by its geographical specificity and lacks the ability to generalize findings from one disaster context to another. Though this criticism equally holds true for the first two models, the situational approach tends to be less generalized hence obviates the development of a standardized analytical framework (Wisner 2004).

The fourth approach regarded as ‘contextual and proactive’ by Wisner (2004) takes a participative view of vulnerability analysis where community members are involved as active agents of change rather than being passive recipients of dictated assistance. With the participation of the community in the actual assessment process the contextual and proactive approach moves beyond vulnerability to empowerment of the society which forms the essence of the democratic society, yet its success remains limited by the participative capabilities of the community members and the long time-frame required to engage fully in the assessment process.

Taken together, these approaches point out that vulnerability analysis needs to adopt a more comprehensive approach requiring a shift in the conceptualizing of vulnerability from a static status to a dynamic process hence a movement away from demographic and taxonomic models to situational approach. Though the contextual and proactive approach provides an added benefit of analyzing the capacity and resilience of the society it requires community-based participation which is beyond the scope of this study. This paper limits itself with the assessment of vulnerability within the political-economic perspective and adopts the situational approach that concentrates on identifying the root causes of social inequalities that effectuate vulnerability. This concept is built on the $R = V \times H$ framework where risk (to disaster) is situated between the interstices of vulnerability and the occurrence of a hazard. Vulnerability is therefore explained in terms of the underlying social conditions that produce it and the causal structures that identify the different social impacts and determine the ability to cope with the disasters.

This paper incorporates this view and argues that vulnerability is produced with the intersection of a hazard event with unsafe conditions (e.g. exposure) and attempts to examine the relationships between processes that give rise to these unsafe conditions. The benefit of using this conceptual framework is that it helps to identify linkages at different levels and allows for developing appropriate strategies at each point of interface for addressing the political and economic forces that are the root cause of unsafe conditions.

ANALYTICAL FRAMEWORK

Much of the disaster literature has dealt with the placement of vulnerability within individuals and communities and the extent to which their abilities reflect and determine their resilience towards disasters (Baker 2009). Less systematic attention has been devoted to the situational approach that studies the forms and consequences of interaction between specific socio-economic factors and their more or less immediate social environments such as the institutions in which they evolve and endure (Dyer 1999). From either viewpoint, it is clear that vulnerability is more than a static concept; it is in the continuous process of development and change. This directs attention to such questions as: how these socio-economic changes impact individuals, communities and institutions? How do human and institutional actions attenuate and amplify these changes and their consequences? And lastly what can be done to reduce vulnerable change?

To answer these and related questions, this paper proposes to use an analytical framework for mapping and analyzing the interactions of these socio-economic factors, for such an approach can help study the causal structure and progression of vulnerability to both reflect and determine resilience in a society. This warrants attention for at least two reasons: 1) it attempts to differentiate the diverse ways in which socio-economic factors and their interaction affect the immediate environment and traces their progression from root causes to dynamic pressures and the resultant unsafe conditions that determine vulnerability; and 2) it offers a perspective through which policy responses can be determined to address the issue of reducing vulnerability within the long-term sustainable development perspective. This approach is reflected in two conceptual frameworks for vulnerability analysis: the Pressure and Release (PAR) and the Access Model. Both of these models have been developed by Blaikie et al. (1994) and centre on the organized complexity of the interactions between natural hazards and human / institutional actions.

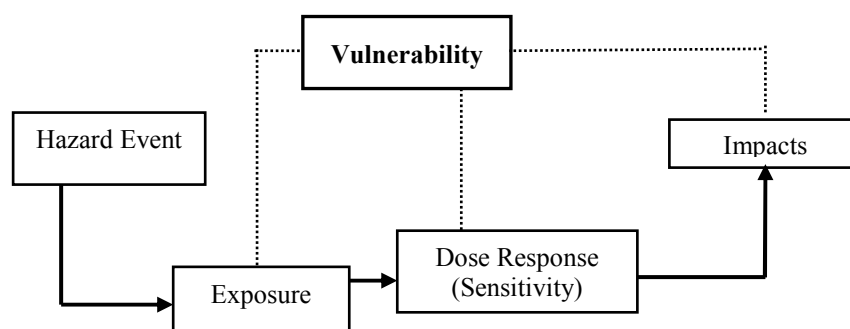
The paper will focus on the PAR model in order to trace out the progression of vulnerability from the root causes to resultant unsafe conditions and their interaction with natural hazards; both exerting pressure on the individuals and society. It will concentrate on the identification of various forces and their interactions at the macro-level and will not focus on the Access Model which provides a micro-level

interpretation of vulnerability at the individual and household levels. The Access Model deals with the analysis of the impacts of disaster on the livelihood and coping strategies of the individuals, households and communities however its application remains beyond the scope of this study. Nevertheless, it is important to acknowledge that both these models, in a combined form, offer an in-depth interpretation of vulnerability to understand complex and varied set of socio-economic forces and their associated long-term processes within a specific disaster context.

The PAR Model

In evaluating the causes of disasters and reducing their impacts, it is fruitful to give equal importance to the study of vulnerability as it is devoted to understanding the causes of natural hazards (Wisner et al 2004, p.49; Cannon 1994). As discussed earlier this paper views risk as a compound function of vulnerability and hazard ($R = V \times H$) and suggests an examination of the different ways in which socio-economic factors affect people's vulnerability. Traditionally the Risk-Hazard (RH) Model was designed to analyze the impacts of hazards by breaking them down into two main constitute elements; the sensitivity of the people exposed and the exposure to the hazard (Figure 2). However the main problem associated with the RH model is that it limits the analysis of disasters to perturbations or stressors (of natural hazards) which is insufficient for understanding the hazard impacts on and the responses of the systems (Turner et al. 2003).

Figure 2: Risk-Hazard (RH) Framework



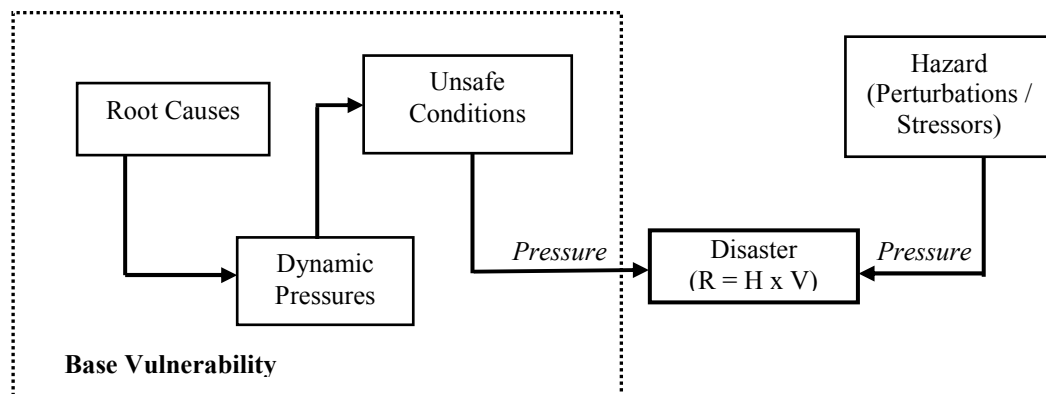
Source: Turner et al. (2003)

The straight line between the composite elements symbolizes the pathways from the hazard to its impact while working its way through exposure and sensitivity to stressors and perturbations. The arrows refer to the presumed linear direction of

assumed causal influence. The dotted lines depict vulnerability being implicitly addressed if not incorporated formally in the model. According to Turner et al. (2003) the RH model provides a limited analysis of disaster as it does not address the ways in which the systems influence the impacts of hazards. The authors further argue that this linear analysis does not allow an examination of the subsystems to account for the variations in the consequences of hazards and ignores the role of political-economic institutions in shaping the outcomes of disasters.

The PAR Model (Figure 3) developed by Blaikie et al. (1994) addresses the inadequacies of the RH framework by illustrating the ties between the causal forces of vulnerability and the natural hazards. It refers to the dynamic as well as static relationships, for it is in their changing state that the nature and strength of vulnerability becomes more apparent. This model places the disaster within the intersection of two opposing forces: processes that generate vulnerability on one side and the natural hazards on the other (Blaikie et al. 1994, pp.21-22). It seeks to trace out the root causes of disaster within the political and economic context that shape human and institutional actions and responses.

**Figure 3: PAR Model
(The Progression of Vulnerability)**



Source: Turner et al. (2003)

The idea of ‘release’ focuses on reducing the impacts of disaster by releasing pressure through a reduction in vulnerability (Wisner et al 2004, p. 50). Thus the model concerns itself with identifying the conditions that make exposure unsafe leading to the construction of vulnerability and the causes that create these conditions. Though not explicit, through the use of this model, disasters can be indirectly rendered possible by the power system of the society and can be reduced by addressing the root

causes (Nathan 2005). It is from this praxis the PAR model traces out the progression of vulnerability from the root causes, through dynamic pressures to the consequent unsafe conditions and links their interactions to the disaster.

In their chain of explanation, Wisner et al. (2004, p.52) define root causes as the interconnected systems of processes within a society and the world economy. The authors argue that the most important root causes that (re)produce vulnerability have economic, political and demographic foundations and are themselves a function of economic, social, political, legal and ideological structures. These root causes establish and distribute power in a society by allocating and distributing resources, among different groups of people. For example, the poor are economically marginalized hence tend to have less social and political power over their environments than the rich and as a result are more vulnerable. The progression of vulnerability is then manifested by the dynamic pressures which are the intermediary mechanisms (e.g. rapid urbanization, state of war, epidemics) through which root causes are temporally and spatially transformed into unsafe conditions specific to the hazard type (Wisner et al. 2004, p.54). The authors further contend that these dynamic pressures operate in different ways to channel root causes, at the ground level, facilitating a micro-level analysis of unsafe conditions at the household / specific-group (e.g. women, children, elderly) level.

The resultant unsafe conditions, therefore, are the specific contexts of vulnerability (e.g. unsafe buildings and structures, dangerous livelihood occupations) where people are exposed to hazard and the risk of disaster. The release phase of the PAR Model encompasses the idea that the pressure can be reduced by developing policy prescriptions at each phase of vulnerability progression to address root causes, dynamic pressures and unsafe conditions. Cardona (2004) takes a hierarchical perspective of the PAR Model and contends that root causes operate at the global level; dynamic pressures are the manifestations of the root causes at an intermediate level while unsafe conditions are the results of the dynamics pressures at the local level. Thus root causes tend to be similar for some disasters as they flow from the global level while dynamic pressures and unsafe conditions remain specific to the hazard event under study (Frantzova et al. 2008).

Limitations of the PAR Model

Like any theoretical model, the PAR framework suffers from a variety of limitations, the foremost being its inability to provide an expanded and precise analysis of the causal structure of hazard and the interactions between the environment and society (Wisner et al. 2004, p.87). Furthermore the PAR Model is a static framework in the sense that it views hazard as an isolated event and distinct from the causal forces of vulnerability. In reality hazards also influence the socio-economic factors that determine the availability of resources and the ability of people to use them in developing coping strategies. The access to resources and coping mechanisms can only be understood in combination with the Access Model. In addition, Turner et al. (2003) argue that the PAR model remains insufficient within the broader concerns of sustainability science since it does not consider the vulnerability of biophysical systems within the human-environment interaction, nor does it emphasize on the feedback received beyond the system under consideration. Nevertheless, the PAR model serves as a useful tool for providing alternative approaches to the more traditional agent-specific methods to disaster analysis.

RESEARCH METHOD AND LIMITATIONS

Research Method

The research work carried out for this study was based on books, academic journals, various reports, online resources as well as some brief interviews with Pakistani government officials over electronic correspondence.

Limitations of the Study

As discussed earlier this study is more of an explanatory investigation into the identification of root causes of vulnerability. In addition to the theoretical limitations of the analytical framework, as outlined in the previous chapter, review of literature also reveals some practical limitations associated with the application of the PAR model. Perhaps the biggest challenge is posed by the unavailability of accurate and reliable disaster statistics. Albala-Bertrand (1993) notes that the statistics generated in the immediate aftermath of the earthquake usually cater to assistance requests and need not be accurate to fulfil this purpose however they remain fraught with gross overestimations compounded by unreliable data gathering methods and vested interests. For example, a rapid assessment conducted by ADB (2005) within four weeks of the Pakistan Earthquake 2005 revealed 2.8 million people as homeless while this figure was later scaled up to 3.5 million by the Government of Pakistan (ERRA 2005). These overestimations remain unchecked by international donor agencies primarily because they tend to enhance the success of these organizations and also help in avoiding conflict with national governments that are seeking all possible ways to manipulate impact and garner maximum assistance.

In addition to the above, basic disaster statistics not only are incomplete but also remain inconsistent making it difficult to establish any valid patterns over time and across sources. Such incompatibility can be largely traced to the variety of institutions (government, international agencies, NGOs, media etc.) that are involved in data gathering but do not work with a common definition of disaster nor collect data and information outside their sphere of interest. Although questions remain about the quality, reliability and accuracy of disaster data, it nevertheless provides sufficient information that spawns research in the study of disasters.

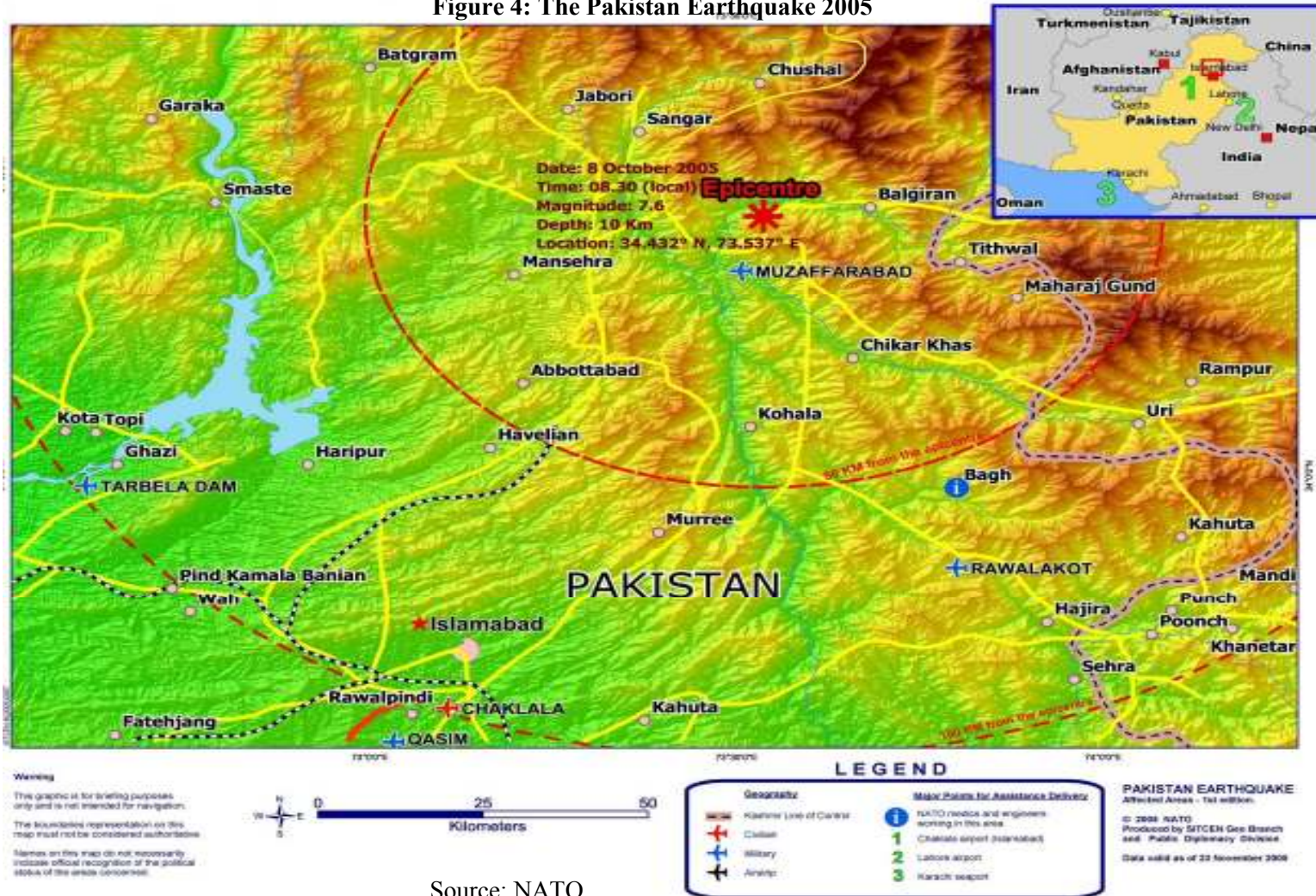
CASE STUDY: PAKISTAN EARTHQUAKE 2005

In an attempt to highlight the complex interplay of socio-economic factors that create and reproduce vulnerability this paper will undertake a detailed case study of the Pakistan Earthquake which occurred on 8th October 2005. It will analyze this disaster with the help of the PAR Model to argue that vulnerability is socially constructed and also identify the vulnerable factors that are of crucial importance in earthquakes. In light of this case study, the paper will contend that the understanding of disasters should not restrict itself with the study of natural forces that cause it but also examine the social, economic and political environment that shape and structure the lives of the people contained by the social system. It is within this environment that social inequalities are produced and accentuated consequently transforming the impacts of natural events into disasters. While the study focuses on the people and institutions in Pakistan, the basic framework of analysis can be applied across a range of environmental hazards that occur in diverse social contexts. It is however important to note that this paper does not present a trend analysis of earthquake in Pakistan rather is based on the disaster experience to deal with some policy conclusions on how vulnerability could be reduced to adapt with earthquake risk.

Background

On Saturday morning, October 08 2005, at approximately 08:52:37 hours, Pakistan Standard Time (03:52:37 hours UTC), a massive earthquake struck Pakistan and the adjoining areas of Afghanistan and India. The earthquake lasted for 25 seconds, registering a moment magnitude of 7.6 and is considered to be the tenth deadliest earthquake on record (USGS 2009). Also known as the 2005 Kashmir Earthquake or the South Asian Earthquake, the disaster claimed 73,338 lives; more than half of them being women and children (ERRA 2005). It left 69,412 people seriously injured and displaced 3.5 million people (DFID 2006) making it the deadliest earthquake in Pakistan's history since the Great Quetta Earthquake of 1935 which claimed 30,000 – 60,000 lives. The epicentre of the earthquake was located about 19 km northeast from Muzaffarabad, capital of Pakistani Kashmir, and 100 km north-northeast of Islamabad, the Federal Capital of Pakistan. The earthquake affected an area of 30,000 sq. km from the epicentre damaging infrastructure, communications and agricultural land with the North West Frontier Province being the worst hit area (ERRA 2005).

Figure 4: The Pakistan Earthquake 2005



Source: NATO

Economic Vulnerability

The earthquake was relatively shallow, with a depth of only 10 km, thus having a high intensity and greater destructiveness. A preliminary assessment of total losses and reconstruction costs (Table 1), carried out by ADB (2005), revealed that losses from direct damages amounted to US\$ 2.3 Billion; the largest share of damage was borne by private housing (US\$ 1 Billion) followed by education (US\$ 335 Million) and transportation (US\$ 340 Million). Indirect losses were the highest in the Agriculture and Livestock and Industry Services sector though they did not account for the losses to future output (ADB 2005). The reconstruction costs, based on the standard replacement rate were estimated to be US\$ 3.5 Billion and were mainly focused towards restoration of rural areas (78%) and private assets (61%) where the greatest damage had occurred. Apart from the extensive loss of life and physical damage the earthquake had an adverse impact on the economy reducing the GDP growth rate by 0.4% and constraining the amount of government revenues required for long-term development.

Table 1: Preliminary Estimate of Total Losses and Reconstruction Costs as of November 10, 2005

| Sector | Direct Damage (Rs. Million) | Indirect Losses (Rs. Million) | Reconstruction Costs (Rs. Million) | Reconstruction Costs (US\$. Million) | Share of Total Reconstruction Cost (%) |
|--|--------------------------------|----------------------------------|---------------------------------------|--------------------------------------|--|
| 1. Social Infrastructure | | | | | |
| Private Housing | 61,220 | 7,218 | 92160 | 1,552 | 44 |
| Health | 7,114 | 1,378 | 18012 | 303 | 9 |
| Education | 19,920 | 4,133 | 28057 | 472 | 13 |
| Environment | 12 | - | 8985 | 151 | 4 |
| Public Administration | 2,971 | 687 | 4254 | 72 | 2 |
| 2. Physical Infrastructure | | | | | |
| Transport | 20,165 | 4,061 | 24699 | 416 | 12 |
| Water Supply & Sanitation | 1,165 | - | 1900 | 32 | 1 |
| Irrigation | 324 | - | 623 | 10 | 0 |
| Energy, Power and Fuel | 744 | 1,561 | 2377 | 40 | 1 |
| 3. Economic Sectors | | | | | |
| Agriculture & Livestock | 12,933 | 6,770 | 17846 | 300 | 9 |
| Industry Services | 8,578 | 8,379 | 9178 | 155 | 4 |
| 4.0 Total = 1+2+3 (Rs. million) | 135,146 | 34,187 | 208,091 | 3,503 | 100 |
| o/w : Azad Jammu & Kashmir | 76,375 | 17,671 | 116,625 | 1963 | 56 |
| : NWFP | 58,771 | 16,516 | 91,467 | 1540 | 44 |
| o/w : Public Assets | 48,131 | 12,175 | 82,187 | 1384 | 39 |
| : Private Assets | 87,015 | 22,012 | 125,094 | 2120 | 61 |
| o/w : Urban Areas | 26,490 | 13,675 | 46,163 | 777 | 22 |
| : Rural Areas | 108,656 | 20,512 | 161,928 | 2726 | 78 |

Source: ADB (2005)

Social Vulnerability: The Underlying Root Causes

Though the Pakistan Earthquake was produced by the unstable seismicity in the region that led to the collision of Eurasian and Indian tectonic plates, its risk could be situated within the historical context and traced back to its colonial legacies. The British had followed the divide and rule strategy in dealing with their colonial settlement in Pakistan. They tended to secure the regions of interest, primarily Sindh and Punjab, which were agriculturally productive and generated revenue for the colonialists. The remaining North West Frontier Province (NWFP) and Baluchistan were marginalized due to their rugged terrains and rocky crags, serving only as military buffers against potential colonial competitors (Bruce 1900, p.14). This geographical structure divided the inhabitants of NWFP and Baluchistan (known as *Pakhtuns*) into those living in the mountainous areas and those living in fertile plains (Lynch 2005). As a result the living patterns between the two *Pakhtuns* evolved differently. The tribal *Pakhtuns* were mostly involved in plundering traders and travellers while those living in the plains had their livelihoods based around agriculture and town life with greater access to socioeconomic resources.

Concurrent with this physical divide, a new social geography was being created by the British colonialists. The colonial rule was deliberately made more repressive in NWFP in order to deny basic social and human rights to the *Pakhtuns* so that they remained uneducated, disorganized and non-unified (Lynch 2005). By bribing the *Pakhtuns* living in the plains, the British were able to prevent any cooperation between the two *Pakhtun* groups. Furthermore, employment opportunities were made limited for the tribals as they were banned from taking up jobs in the towns and cities. As a result the tribals led mostly impoverished lives with almost no education, poor social and economic development and with little hope for themselves and their future generations. Even today the literacy rate among the tribals continues to be the lowest in the country with only 3% of tribal females receiving basic education (Markey 2008).

In addition, differential vulnerability was not only confined to income or education but also extended to the occupational status as well. Cohen (1968, p.381) notes how the *Gujars* within the *Pakhtun* tribes were dealt in a discriminatory manner. The *Gujars*, originally nomads involved in transhumant breeding were a floating

population that was never accepted by the host population (*Pakhtuns*). They were assimilated within the *Pakhtun* society as an ‘occupational case of herders’; their livelihoods depending on the herding of sheep, goats, cattle etc. which were primarily owned by the rich *Pakhtun* lords, known as the *Maliks* (Cohen 1968, p.382). Due to their exclusionary status the *Gujars* were never allowed to enter certain areas inhabited by the *Pakhtuns* and hence were deprived of the socio-economic opportunities that were available to the *Pakhtuns*. The persistence of *Gujar* class and their seemingly non-acceptance in the society still continues, offering speculative evidence that status differences in past and current social environments may help in understanding vulnerability, especially through its effect on the differing segments of the society. Thus, in the aftermath of the earthquake, when it came to receiving assistance, the political connections of the powerful classes successfully managed to get hold of both monetary and non monetary aid while the poor and marginalized were devoid of any basic support.

Natural disasters such as the Pakistan earthquake always hit marginalized groups in the society harder than they do other segments. Though the earthquake hit both men and women equally, its impact differed between the two, leaving a profound negative influence on the latter. Consequently, it also brought into sharp focus more or less the same issues related to the marginalization of women and their inadequate representation in socio-political activities. Traditionally, a male dominated conservative society, women in Pakistan are seen as the honour and integrity of the family institution that need to be protected and safeguarded. Furthermore, strict adherence to religious values, ancient codes of honour and ethics require women to be chaperoned whenever leaving their home, restricting their mobility in the society. Burki (2006) cites this as one of the main reasons why women were unable to access emergency relief assistance and were exposed to incidences of sexual harassments.

Issues related to relief camp security and management were further compounded by the inadequate provision of medical and nutritional facilities to pregnant women who were not allowed to see the male doctors and remained at the mercy of fate until a female doctor was made available to attend to them. Similarly, women who were widowed and had lost their sole bread-earner were denied rights to their rightful claim over the assistance provided by the government. For example, a fact finding mission

led by a local NGO, found that due to the ‘cultural’ limitations the father in law received monetary assistance on behalf of the widow, but the money never made it to the widow or her family (APWLD 2005). In another case, an old woman was left alone with no one to care when her daughter-in-law went back to her own parents taking the children and money with her. Thus women, many of whom are the primary care givers for their children and play a crucial role in family building, were vastly, under-represented, reflecting not only the gendered norms of the society, but the glaring fact that they are more likely to live under the poverty line and remain impoverished, because too many are simply left to struggle due to the difficulties in approaching them. As Burki (2006) notes, coping mechanisms and provision of gender sensitive assistance was non-existent within the relief operations making women and other marginalized groups more vulnerable to earthquake. These are some of the compounded effects of the intersection of socio-economic class, gender, age and caste inequalities that play a crucial role in creating vulnerability to hazards (Wisner et al. 2004, p.35). The evidence of centrality of these social inequalities is considerable and requires attention to the ways in which these divisions have played a historically significant role in producing vulnerable spaces (Figure 5).

Institutional Failure of Disaster Preparedness Measures

The government of Pakistan was severely criticized for its failure to deliver immediate support to the surviving population. The lack of planning and poorly executed emergency response was clearly discernible in the Prime Minister’s desperate appeal to the survivors in which he asked them come down the mountains to the valleys and cities for relief since the government was unable to provide assistance to remote areas due to bad weather, mountainous terrain, landslides and blocked roads. Furthermore, the ruling military dictator at that time, rejected any civilian control and parliamentary oversight of the relief work. The army however failed to respond within the critical first 48 hours of the disaster and in some cases it took more than 72 hours to access the worst-hit areas. Even in Islamabad, the Federal Capital, the army arrived hours after the Margalla Towers had collapsed despite its headquarters being a 45 minutes drive from the location of destruction.

In some instances, the local residents, who were actively involved in retrieving dead bodies and rescuing survivors, criticized the army for being ill-equipped and lacking

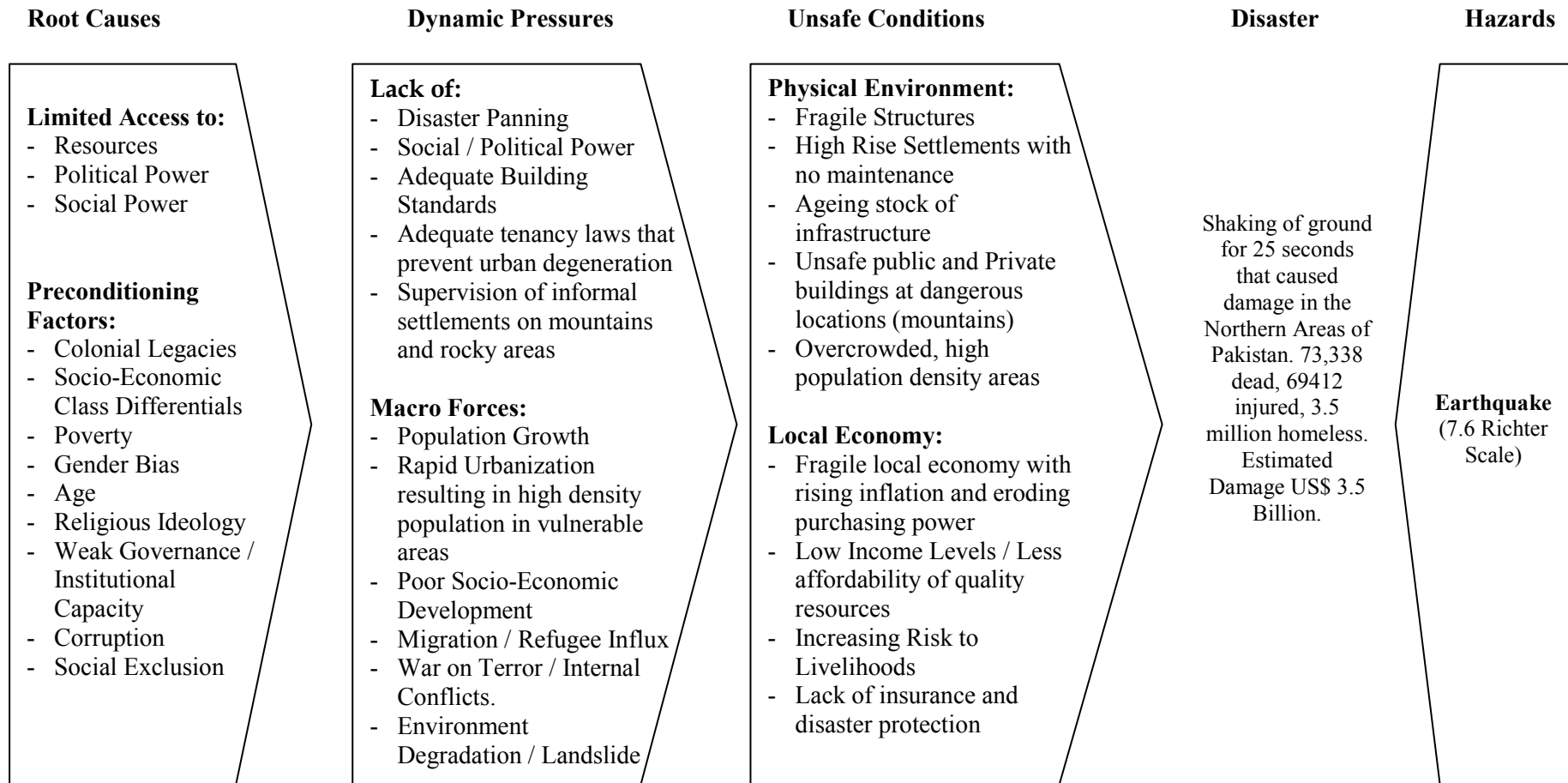
the motivation to take up the humanitarian challenge. A report by the Crisis Group (2006) pointed out that the first and foremost priority of the military was to secure its positions in Kashmir and the adjoining areas along the Line of Control (LoC) where the stationed troops and the bases were completely destroyed by the earthquake. This was one of the reasons why delay was experienced in humanitarian assistance as reinforcements were being deployed across the border in light of the ongoing military skirmishes with India.

Pakistan, having ample resources at its disposal was unable to cope with the challenges of the disaster because of the inherent failures in the institutional mechanisms that emanate from the lack of transparency and accountability standards within its political setup. Even with the relief work underway, the military was accused of pleasing its clients at the local and provincial levels through selective distribution of state resources and assistance. In some cases, this led to a public outcry against the state authorities, like in the case of *Balakot*, where earthquake survivors led a rally to protest against the corruption and discrimination in the distribution of relief good. This economic and political marginality of the civilian authorities and the NGOs in the relief works can reinforce sources of vulnerability as people tend to lose confidence in their own-self and stop trusting the state for self-protection and hence take up alternate activities that further exacerbate vulnerability (Wisner et al. 2004, p.53).

Dynamic Pressures

The revelations of the inadequate response to the Earthquake's aftermath are not just about failures in emergency response at the local and national level but are also the failures of the systems to address largely visible processes and activities that result in the production of unsafe conditions (Wisner et al. 2004, p. 54). Pakistan as a developing country is in the midst of a substantial population growth and rapid urbanization though very little attention has been paid to these processes. According to Roger (1990) rapid population growth in the early half of the 20th century (1901-51) resulted in the first doubling of population in Pakistan which was later achieved in a matter of 25 years (1951-72). The current population growth rate averages around 1.73% (Economic Survey 2008-09) and is expected to result in the doubling of population by 2050 if it continues on the same rate (UNOCHA 2009).

Figure 5: Pressures that result in disasters: Pakistan Earthquake 2005



Source: Adapted from Wisner et al. (2004)

In addition to the burgeoning population, Pakistan has witnessed many migrant movements since its independence in 1947. The largest and major migration took place at the time of independence when it received six million migrants from India. The Soviet invasion of Afghanistan during the cold war resulted in the second largest exodus when approximately 3 million refugees fled to Pakistan (Tahir and Shahnaz 2003). Subsequent repatriations of Afghan refugees by the UNCHR were offset by the second refugee influx caused by the war on terror and as a consequence 1.7 million Afghan refugees still reside in Pakistan (UNHCR 2009).

Rapid urbanization has also been one of the most important factors in Pakistan's demographic growth (Roger 1990). World Bank (2005) estimates show that 34% of the total population lives in urban areas with an average annual growth around 3.3% (1990-2003) that has allowed Pakistan to expand its urban population by seven folds during the 1950-2008 period. The large movement towards cities and megacities is driven by the search for employment, better living standards, quality medical and educational facilities and improved transportation (Shirazi 2006). The increasing population and rapid urbanization can be closely related to the damage caused by the Pakistan earthquake. Pressure on the land pushes newcomers to move out of the city and settle in unsafe lands which in this case are the mountainous areas. Furthermore, Pakistan shares its borders with Afghanistan through NWFP and most of the refugees settle in the mountains to avoid being identified by the government and also to live in close proximity to their original home town in Afghanistan. This rate of informal and unplanned growth across the densely populated mountain areas puts a large number of people at risk (Wisner et al. 2004, p.70). Informal and irregular settlements result in poor quality vital infrastructures related to utilities, water, sanitation and drainage systems making the conditions unsafe and vulnerable as the example of the Pakistan earthquake shows.

War has also played an important role as a dynamic pressure. Since its independence Pakistan has been continuously involved in frequent wars with its neighbours. The two foremost wars were fought in 1965 and 1971 with India on the issue of Kashmir. Later, in the 1980s Pakistan was a key ally of United States in the Soviet War in Afghanistan and still remains a crucial partner in the 'War on Terror'. The resultant impact of these prolonged conflicts has amplified over the past decade into small

scale civil wars and internal clashes within the country in a bid to eradicate home-grown terrorism. Conflicts, such as these have disastrous consequences for their own for they exacerbate the vulnerability not only by raising population density, through internal displacement, but also the demand for food, local services and infrastructure, putting pressure on the environment (Wisner et al. 2004, p.74). Scarcity of resources creates a high potential for conflict, trapping households that are caught between conflicts, into a vicious circle consequently increasing their vulnerability to hazards.

Poor water quality and inadequate sanitation facilities are likely to increase the risk of epidemics and communicable diseases as was feared by UN Secretary General when he voiced his concerns about massive wave deaths if relief efforts were not stepped up to provide medical attention, food, clean water and shelter to the survivors in the remote areas. Pakistan, already suffering from low human development indicators, was put under further strain when a rapid assessment report by UNICEF (2005) identified 9,000 cases of pneumonia, 6,000 cases of diarrhoea and 1,130 cases of dysentery. Though the losses were minimized to the maximum possible extent, UNICEF notes that these illnesses can often be more deadly than the hazard itself hence their prevalence as a precondition to natural hazard can intensify the negative impacts of disasters.

In addition to the above, the earthquake was accompanied by numerous land slides that varied from minor to moderate intensity but in some cases were massive causing death and injuries with subsequent destruction of infrastructure. The high relief of unstable and poor quality housing made households vulnerable to the extensive landslides when the earthquake struck the region (Figure 6). The conditions were further worsened by the occurrence of monsoon rains and the frequent and numerous aftershocks. For example, the largest landslide occurred approximately 32 kilometres from the epicentre in the valley of Jhelum river transporting 80 million cubic meters of rock falls over a distance of 1.5 kilometres (Harp and Crone 2006). The landslide completely buried the village of *Dandbeh* and claimed 1,000 lives destroying the infrastructure and blocking the roads, isolating the stricken region. Though it is difficult to create direct linkages between land degradation and the policy shortfalls that cause them, Wisner et al. (2004, p. 81) note that landslides as a result of human-

induced actions such as deforestation, soil erosion and slope instability can act as dynamic pressures to increase vulnerability to hazards in the long term.

Figure 6: Destruction caused by a landslide in *Balakot*



Source: Global Security 2005

Unsafe Conditions

Literature on earthquake disasters shows that vulnerability of the people is inevitably linked to the stability of the buildings they occupy (Wisner et al. 2004, p.295). The nature and extent of damage and casualties in the Pakistan earthquake provides further convincing evidence. An assessment of the exposure of structures to seismic risk revealed that 25% of the buildings completely collapsed that were within the 25 kilometre radius from the epicentre while 50% were severely damaged (EERI 2005). Detailed analysis of the damage disclosed that the primary factors causing damage to buildings were their poor quality construction that comprised earthen walls of unreinforced structures with irregularly placed undressed stones laid out in cement sand. A significant number of deaths and injuries occurred with the complete collapse of single-story unreinforced earthen wall stone masonry buildings (Figure 7). The low quality of mortar and stones coupled with poor workmanship seem to be a major

cause of the widespread collapse and can be traced to the economic constraints of the people.

Figure 7: Collapsed Stone Masonry Building



Source: EERI (2005)

Interestingly, the impact of the earthquake was not only restricted to the poor living in informal settlements on steep mountain tops. As discussed earlier, even the posh localities in the ‘well planned’ city of Islamabad succumbed to the earthquake as was evidenced by the collapse of the twin Margalla towers that killed 250 people including foreign nationals (Figure 8). The death of ‘well known’ people resulted in an enquiry that led to the identification of the government oversight as the main culprit in the tragedy. Technical test results carried out by a team of engineers revealed design faults, construction defects with no records of quality control or technical supervision. The use of inferior quality construction material, concrete and lightweight steel coupled with poor workmanship were attributed as the main causes of the destruction. Furthermore the owners were the builders themselves and were involved in suspicious relationships with the Central Development Authority (CDA). Lack of professional supervision and government negligence to building standards further accentuated the impact of the earthquake. This also shows that vulnerability

cannot be made synonymous with poverty, though strong association exists between the two (Wisner et al. 2004, p.281).

Figure 8: The Fall of the Twin Margalla Towers in Islamabad



Source: Unknown

One of the key lessons learned in the Pakistan Earthquake destruction was the deliberate disregard and negligence for building standards, the absence of adequate enforcement systems, and the non-existence of land planning within seismic standards. As discussed, earthquakes do not kill people but buildings do. The ineffectiveness of the building standards regulation system and low levels of compliance create unsafe living conditions and increase vulnerability (Wisner et al. 2004, p.285).

CONCLUSION

This paper has attempted to examine the different factors that cause and accentuate vulnerability based on two premises. The first is that the root causes of disaster can be traced to the socio-political environment of a place which can be used to account for the differential access to resources and the varying impact of disasters on different social groups. The second is that disasters occur at the intersection of natural hazards and vulnerable spaces, and are socially constructed rather than God (nature) driven. In this process, the paper has made an effort to identify the major channels through which dynamic pressures can transform these socio-economic factors into unsafe conditions. The paper contends that within these unsafe conditions vulnerability is produced at various spatial and temporal levels and needs to be addressed through specific long-term policy prescriptions rather than broad-based top-down responses that are driven by the impulse of returning to the previous arrangements as soon as possible.

This paper offered a preliminary sketch of the social elements that came together with the earthquake to produce vulnerability and disaster in the specific context of Pakistan. The Pakistan Earthquake 2005 intersected with the socio-economic conditions in the affected areas with some of the most dynamic social, political and economic pressures that resulted in a totalizing experience for the people exposed to its impacts. Its aggregate effects were felt well beyond the immediate physical impacts and appeared as major perturbations culminating into a national crisis.

There are many lessons that should be taken away from this tragic earthquake. Among them, is that authority must be made transparent and accountable as well as incorporate multi-organizational cooperation in addressing complex emergencies. Moreover the interpretation and analysis of social and physical causes of vulnerability must be underpinned by knowledge of their integrated interactions with the environment under question. However analyzing vulnerability does not simply serve the purpose, its proper communication to the concerned stakeholders is equally important and forms the core of the risk-reduction strategies (Wisner et al. 2004, p.330). Furthermore disasters, though associated with negative outcomes, must be viewed positively through a developmental perspective. They provide opportunities for better planning and innovation in improving safety, enhancing equity and

rebuilding safer communities with sustainable livelihoods for people (Bolin and Stanford 1998, pp.223-225).

To develop a better understanding of the social construction of vulnerability in developing countries, such as Pakistan, calls for new research which draws from a general framework for analysis such as the one presented in this paper. Such research needs to be carried out within the perspective of viewing disasters as a culmination of socio-economic processes rather than extraordinary and uncontrollable events. Vulnerability therefore needs to be studied across complex social, political and physical topographies and requires attention to the presentism of existing conditions of production and their interactions at the local and national level. While this paper has focused on socio-economic causes of disaster, it does not suggest that physical factors are unimportant. Disasters occur within geophysical spaces and emanate from the vulnerability of structure rather than structures of vulnerability.

Disasters will continue to occur however to lessen their impacts in the future requires a reduction in the socio-economic vulnerability and increased resilience that can be achieved through policies geared towards improving social conditions and living standards.

BIBLIOGRAPHY

Adger, W.N. 1998. Indicators of Social and Economic Vulnerability to Climate Change in Vietnam. *CSERGE Working Paper GEC 98-02*. Centre for Social and Economic Research on the Global Environment University of East Anglia and University College London.

Adger, W.N. and Brooks, N. 2003. Global Environmental Change. In M. Pelling, ed. *Natural Disasters and Development in a Globalizing World*. London: Routledge. Ch. 2.

Albala-Bertrand, J., 1993., Political Economy of Large Natural Disasters. New York: Oxford University Press

Alexander, D. 1993. *Natural Disasters*. London: UCL Press

Alexander, D. 2000, *Confronting Catastrophe*, Terra Publishing, Hertfordshire

Alwang, J., Siegel, P.B. and Jorgensen S.L. 2001. Vulnerability: A View From Different Disciplines. *Social Protection Discussion Paper Series*. Social Protection Unit, The World Bank: Washington

Asia Pacific Forum on Women, Law and Development. 2005. *The Pakistan Earthquake's Impact on Women*. APWLD Forum News, 18 (3) [Online] Available at: <http://www.apwld.org/vol183-01.htm> [Accessed 14 August 2009]

Asian Development Bank. 2005. *Preliminary Damage and Need Assessment, Pakistan 2005 Earthquake*. [Online] Available at: <http://www.adb.org/documents/reports/pakistan-damage-needs-assessment.pdf> [Accessed 10 August 2009]

Baker, S.M. 2009. Vulnerability and Resilience in Natural Disasters: A Marketing and Public Policy Perspective. *Journal of Public Policy and Marketing*, 28(1) Spring: pp.114-123

Bankoff, G., Frerks G. and Hilhorst, D. 2004. *Mapping Vulnerability: Disasters Development and People*. London: Earthscan

Birkman, J. ed. 2006. *Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies*. New York: United Nations University Press

Blaikie, P., Cannon, T., Davis, T., and Wisner, B. 1994. *At Risk: Natural Hazards, People's Vulnerability, and Disasters*. London: Routledge.

Bogard, W.C. 1989. Bringing social theory to hazards research: conditions and consequences of the mitigation of environmental hazards. *Sociological Perspectives* No. 31: pp.147-68

- Bogardi, J.J. 2006. Introduction. In J. Birkmann, *Measuring vulnerability to hazards of natural origin. Towards disaster resilient societies*. United Nations University Press, Tokyo, New York
- Bohle, H-G. 2002a. Editorial: The geography of vulnerable food systems. *Die Erde* 133(4): pp.341-344
- Bohle, H-G. 2002b. Land Degradation and Human Security. In , E.J. Plate, ed. *Environment and Human Security – Contributions to a Workshop, 23-25 October 2002, Bonn*. pp.3/1 – 3/6
- Bolin, R. and Stanford, L. 1998. *The Northridge Earthquake: Vulnerability and Disaster*. Routledge, London
- Bourdelaïs, P. 2005. What is Vulnerability. *Annales De Demographie Historique*, No.2: pp.11-15
- Bruce, R., 1900. *The Forward Policy*. London: Longmans, Green, and Co.
- Burki, E. 2006. The Pakistan earthquake and the health needs of women. *Humanitarian Exchange Magazine*, Issue 34 [Online] Available at <http://www.odihpn.org/report.asp?id=2809> [Accessed 13 August 2009]
- Burton, I., Kates, R.W. and White, G.F. 1993. *The Environment as Hazard*. 2nd ed. New York: Guilford
- Cannon, T. 1994. Vulnerability Analysis and Natural Disasters. In A. Varley. Ed. *Disasters Development and Environment*. John Wiley & Sons Ltd. London, pp. 13-30.
- Cannon, T. 2008. Reducing People's Vulnerability to Natural Hazards, Communities and Resilience. *Research Paper No. 2008/34*. UNU-WIDER Publications
- Cannon, T. Twigg, J. and Rowell, J. 2003. Social Vulnerability, Sustainable Livelihoods and Disasters. *Report to DFID*. Conflict and Humanitarian Assistance Department (CHAD) and Sustainable Livelihoods Office London.
- Cardona, O.D. 2004. The Need for Rethinking the Concepts of Vulnerability and Risk from a Holistic Perspective: a Necessary Review and Criticism for Effective Risk Management. In G. Bankoff, G. Frerks, and D. Hilhorst. Eds. *Mapping Vulnerability: Disasters, Development and People*. London. pp. 37-51.
- Chambers, R., Pacey, A. and Thrupp, L. Eds. 1989. *Farmer First*. London: Intermediate Technology Publications
- Cohen, C. and Werker, E.D. 2008. The Political Economy of Natural Disasters. *Journal of Conflict Resolution*, 52(6): pp.795-819
- Cohen, Y.A. 1968. *Man in Adaptation: The Cultural Present*. Chicago: Aldine Publishing Co.

Cutter, S.L. 1996. Vulnerability to environmental hazards: *Progress in Human Geography*. No. 20: pp. 529-39

Department for International Development (DFID). 2006. *South Asia Earthquake, Situation Report No. 44*. [Online] Available at: [http://www.reliefweb.int/rw/RWFiles2005.nsf/FilesByRWDocUNIDFileName/HMYT-6HRLDP-dfid-southasia-02nov.pdf/\\$File/dfid-southasia-02nov.pdf](http://www.reliefweb.int/rw/RWFiles2005.nsf/FilesByRWDocUNIDFileName/HMYT-6HRLDP-dfid-southasia-02nov.pdf/$File/dfid-southasia-02nov.pdf) [Accessed 13 August 2009]

Dow, K. 1992. Exploring differences in our common future(s): the meaning of vulnerability to global environmental change. *Geoforum*, No. 23, pp.417-36

Dow, K. and Downing, T.E. 1995. Vulnerability research: where things stand. *Human Dimensions Quarterly*, No.1: pp. 3-5

Downing, T.E. 1991. Vulnerability to hunger and coping with climate change in Africa. *Global Environmental change in Africa*, No.1: pp. 365-80

Dyer, Christopher L. 1999. The Phoenix Effect in Post-Disaster Recovery: An Analysis of the Economic Development Administration's Culture of Response after Hurricane Andrew. In A.

Oliver-Smith and S. M. Hoffman, eds. *The Angry Earth*. New York: Routledge, pp.278–300.

Earthquake Engineering Research Institute. 2006. Special Earthquake Report. [Online] Available at: http://cobweb.ecn.purdue.edu/~ayhan/EQ/2005%2010%2008%20Kashmir/kashmir_eri_1st_report.pdf [Accessed 13 August 2009]

Earthquake Reconstruction and Rehabilitation Authority. 2005. *Annual Review*. Prime Minister Secretariat, Government of Pakistan, Islamabad. [Online] Available at: <http://www.erra.gov.pk/Reports/ERRA-Review-200506.pdf> [Accessed 10 August 2009]

Economic Survey of Pakistan, 2008-09. Ministry of Finance, Government of Pakistan, [Online] Available at: http://www.finance.gov.pk/finance_survery_chapter.aspx?id=21 [Accessed 14 August 2009]

Economic Survey of Pakistan, 2005-06, Ministry of Finance, Government of Pakistan [Online] Available at: <http://www.accountancy.com.pk/docs/economic-survey-of-pakistan-2005-06.pdf> [Accessed 13 July 2009]

Escobar, A. 1995. *Encountering Development: The Making and Unmaking of the Third World*. Princeton, NJ: Princeton University Press

Fordham, M. 2004. Gendering Vulnerability Analysis: Towards a More Nuanced Approach. In G. Bankoff, G. Frerks, and D. Hilhorst, eds. *Mapping Vulnerability: Disasters, Development & People*. London: Earthscan, pp.174–82.

Frantzova1, A., Mardirosian, G. and Ranguelov, B. 2008. Methodology for complex risk analysis of floods in Bulgaria, *BALWOIS 2008 – OHRID*. Republic of Macedonia – 27, 31 May 2008

Gabor, T. and Griffith, T.K. 1980. The assessment of community vulnerability to acute hazardous material incidents. *Journal of Hazardous Materials* No.8: pp. 323-33

Global Security. 2005. *Balakot, Pakistan 2005 Earthquake Emergency*. [Online] Available at: <http://www.globalsecurity.org/military/world/pakistan/balakot-pi20051018a8.htm> [Accessed 15 August 2009]

Green, C., Veen, A. van der, Wierstra, E. and Penning-Rowsell, E. 1994. Vulnerability refined: analysing full flood impacts. In Penning-Rowsell, E.C. and Fordham, M. Eds. *Flood across Europe: Flood Hazard Assessment, Modelling and Management*. Middlesex University Press: London, pp. 32-68

Harp, E.L. and Crone, A.J. 2006. Landslides Triggered by the October 8, 2005 Earthquake and Associated Landslide-Dammed Reservoirs. USGS. [Online] Available at: <http://pubs.usgs.gov/of/2006/1052/of06-1052.html> [Accessed 13 August 2009]

Hewitt, K. 1997. *Regions of Risk: A Geographical Introduction to Disasters*. Essex: Longman.

Hoogeveen, J., Tesliuc, E., Vakis, R. and Dercon, S. 2004. *A Guide to the Analysis of Risk, Vulnerability and Vulnerable Groups*. Washington: The University of Oxford

International Crisis Group. 2006. *Pakistan: Political Impact of the Earthquake*. Asia Briefing No. 46. [Online] Available at: <http://www.crisisgroup.org/home/index.cfm?id=4023> [Accessed 14 July 2009]

Kates, R.W. 1985. The interaction of climate and society. in R.W. Kates, J.H. Ausubel and M. Berberian. Eds. *Climate Impact Assessment*. Wiley: New York, NY, pp. 3-36

Liverman, D. 1990. Vulnerability to global environmental change. In R.E. Kasperson, K. Dow, D. Golding and J.X. Kasperson. Eds. *Understanding Global Environmental Change: The Contributions of Risk Analysis and Management*. Clark University: Worcester, pp. 27-44

Lundy, K.C. and Janes, S. 2009. *Community Health Nursing: Caring for the Public's Health*. 2nd ed. Jones and Bartlett Publishers, Inc: Massachusetts

Lynch, D. 2005. Structure, Chance and choice for Abdul Ghaffar Khan and Khudai Khidmatgars, *Asian Reflection* [Online] Available at: <http://www.asianreflection.com/structurechancechoice.pdf> [Accessed 13 August 2009]

Makoka, D. and Kaplan, M. 2005. Poverty and Vulnerability - An Interdisciplinary Approach. Unpublished. [Online] Available at: <http://mpira.ub.uni-muenchen.de/6964/> [Accessed on 1st August 2009]

Markey, D. S. 2008. *Securing Pakistan's Tribal Belt*. Council on Foreign Relations.

McFadden, L. Vulnerability Analysis in Environmental Management: Widening and Deepening its approach. *Environmental Conservation* 34(3): 195-204. 2007.

Nathan, F. 2005. Vulnerabilities to Natural Hazards: models and application on Landslide Risks in La Paz, Bolivia. *World International Studies Conference (WISC) at Bilgi University, Istanbul, Turkey, 24-27 August 2005*

Oliver-Smith, A. 2004. Theorizing vulnerability in a globalized world: a political ecological perspective. In G. Bankoff, G. Frerks and D. Hilhorst. Eds. *Mapping vulnerability: disasters, development & people*. Sterling, VA: Earthscan, pp.10-24.

Pelling, M. ed. 2003. *Natural Disasters and Development in a Globalizing World*. London: Routledge

Petak, W.J. and Atkisson, A.A. 1982. *Natural Hazard Risk Assessment and Public Policy: Anticipating the Unexpected*. Springer: New York, NY

Prowse, M. 2003. Towards a clearer understanding of 'vulnerability' in relation to chronic poverty. *CPRC Working Paper*, No 24: Manchester.

Rogers, T. 1990. Population Growth and Movement in Pakistan: A Case Study. *Asian Survey*, 30 (5), pp. 446-460

Rothman, D. S. and Robinson, J.B. 1997. Growing pains: A conceptual framework for considering integrated assessments. *Environmental Monitoring and Assessment* 46: pp. 23-43.

Sarewitz, D., Pielke, R. and Keykhah, M. 2003. Vulnerability and Risk: Some Thoughts from a Political and Policy Perspective. *Risk Analysis*, 23(4)

Sen, A. 1981. *Poverty and Famines: An Essay on Entitlement and Deprivation*. Oxford: Clarendon

Sen, A. 1999. *Development as Freedom*. New York: Alfred A. Knopf.

Shirazi, S.A. 2006. Patterns of Urbanization in Pakistan: A Demographic Appraisal *Department of Geography, University of the Punjab Lahore-Pakistan*

Stewart, I. and Donovan, K. 2008. Natural Hazards. In S. Buckingham and M. Turner. *Understanding Environmental Issues*. SAGE Publications, Ch.9

Susan L. Cutter, 1993. *Living with Risk*. London: Edward Arnold. 214 pp.

Susman, P., O'Keefe, P. and Wisner, B. 1983. Global disasters: a radical interpretation. In Hewitt, K. ed. *Interpretations of Calamity*. Allen & Unwin: Boston, MA, pp. 264-83

Tahir, P. and Shahnaz, L. 2003. Pakistan: Background Information and Some Analysis of Migration. *Regional Conference on Migration, Development and Pro-poor policy Choices in Asia*, Dhaka, Bangladesh: 22-24 June

Tandon, A. and Hasan, R. 2005. Conceptualizing and Measuring Poverty as Vulnerability: Does it Make a Difference. *Asian Development Bank ERD Policy Brief Series No. 41*, Economics and Research Department

Timmerman, P. 1981. *Vulnerability, resilience and the Collapse of Society*. Environmental Monograph No. 1, Toronto: Institute of Environmental Studies, University of Toronto

Turner, B.L. II, Kasperson, R.E., Matson, P., McCarthy, J.J., Corell, R.W., Christensen, L., Eckley, N., Kasperson, J.X., Luers, A., Martello, M.L., Polsky, C., Pulsipher, A. and Schiller, A. 2003. Framework for vulnerability analysis in sustainability science. *Proceedings of the National Academy of Sciences* 100, 8074–78.

Twigg, J. 2007. Disaster Reduction Terminology: A Commonsense approach, *Humanitarian Practice Network*. Issue 38, [Online] Available at: <http://www.odihpn.org/report.asp?id=2893> [Accessed 25 July 2009]

UNHCR. 2009. *UNHCR and Pakistan sign new agreement on stay of Afghan refugees*. UNHCR News Stories, 13 March. [Online] Available at: <http://www.unhcr.org/49ba5db92.html> [Accessed 14 August 2009]

UNDP. 2004. *Reducing Disaster Risk – A Challenge for Development*. [Online] Available at: http://www.undp.org/cpr/disred/documents/publications/rdr/english/rdr_english.pdf [Accessed 20 July 2009]

UNDRO. 1982. *Natural disasters and vulnerability analysis*. Office of the United Nations Disaster Relief Co-ordinator, Geneva.

UNDRO. 1991. *Mitigation Natural Disasters; Phenomena, Effects, and Options*. Office of the United Nations Disaster Relief Coordinator, Geneva

UNICEF. 2005. Post Earthquake Health Situation. [Online] Available at: http://www.pakhumanitarianforum.com.pk/modules/cjaycontent/Post_Earthquake_Health_Situation.pdf. [Accessed on 14 August 2009]

UNISDR. 2002. *A Global Review of Disaster Reduction Initiatives. Preliminary Report, Geneva*. [Online] Available at: http://www.undp.org/cpr/disred/documents/publications/isdr_livingwithrisk2002.pdf [Accessed 21 July 2009]

UNISDR. 2004. *Living with Risk – A Global Review of disaster Reduction initiatives*. [Online] Available at: http://www.unisdr.org/eng/about_isdr/bd-lwr-2004-eng.htm [Accessed 21 July 2009]

UNISDR. 2008. *Linking Disaster Risk Reduction and Poverty Reduction – Good Practices and Lessons learned*. [Online] Available at: http://www.unisdr.org/eng/about_isdr/isdr_publications/14_Linking_Disaster_Risk_Reduction_Poverty_Reduction/Linking_Disaster_Risk_Reduction_Poverty_Reduction.pdf [Accessed 21 July 2009]

UNISDR. 2009. *Global Assessment Report on Disaster Risk*. [Online] Available at: <http://www.preventionweb.net/english/hyogo/gar/report/index.php?id=1130&pid:34&pih:2> [Accessed 21 July 2009]

USGS. 2009. Most Destructive Earthquakes on Record in the World [Online] Available at: http://earthquake.usgs.gov/regional/world/most_destructive.php. [Accessed 13 August 2009]

Vogel, C. 2001. Vulnerability and Global Environmental Change. [Online] Available at: http://www.aiaccproject.org/resources/ele_lib_docs/vogel_vulnerability.pdf [Accessed 2nd August 2009]

Vogel, C. and O'Brien, K. 2004. Vulnerability and Global Environmental Change: Rhetoric and Reality. *AVISO* March 13, 2004.

Watts, M.J. and Bohle, H.G. 1993. The space of vulnerability: the causal structure of hunger and famine. *Progress in Human Geography*, No. 17: pp.43-67

Weichselgartner, J. 2001. Disaster mitigation: the concept of vulnerability revisited. *Disaster Prevention and Management*, 10 (2): pp.85-94

Weichselgartner, J. and Bertens, J. 2000. Natural disasters: acts of God, nature or society? – On the social relation to natural hazards. In M.A. Andretta. Ed. *Risk Analysis II*. WIT Press: Southhampton, pp. 3-12

Wijkman, A. and Timberlake, L. 1988. *Natural Disasters: Acts of God or Acts of Man?* New Society Publishers: Pennsylvania

Wisner, B. 2004. Assessment of Capability and Vulnerability. In G. Bankoff, G. Frerks, and D. Hilhorst, eds. *Mapping Vulnerability: Disasters, Development & People*. London: Earthscan, pp.183–93.

Wisner, B., Blaikie, P.M., Cannon, T. and Davis, I. 2004. *At Risk: Natural Hazards, People's Vulnerability, and Disasters*. 2nd ed. Routledge: London

World Bank. 2006. *Hazards of Nature, Risks to Development*. An IEG Evaluation of World Bank Assistance for Natural Disasters, International Evaluation Group,

World Bank. 2005. World Development Indicators [Online] Available at: <http://devdata.worldbank.org/wdi2005/Cover.htm> [Accessed 13 August 2009]