POST-DISASTER HOUSING RECONSTRUCTION: A Study of The Government of Pakistan's Housing Reconstruction Programme in Azad Jammu & Kashmir after October 2005 Earthquake

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Abstract

Qabil Ajmeri (an Urdu poet) once wrote:

وقت کرتا ہے پرورش برسوں

حادثہ ایک دم نہیں ہوتا

Translation: *Time nurtures for years*

Accident is never sudden

Same is true for disasters; they just don’t happen suddenly. It is our actions (or inaction in certain cases) over the years that turn a hazard into a disaster. Development policies, governance system, disaster management system, poverty, and level of hazard are some of the most important factors that contribute towards disaster vulnerability. Most of the developing countries suffer higher disaster losses (as compared to the developed countries) due to their inability to properly address these factors. Societies need to have better development policies, good governance, efficient disaster management system, and improved livelihoods to minimise disaster vulnerability.

Conducted from the positionality (Robinson 2014) of a victim of the earthquake and an important functionary of the post-2005 earthquake reconstruction programme in AJK, this research is an auto-ethnographic study in order to understand how societies become vulnerable to natural disasters and what role post-disaster housing reconstruction can play in addressing this vulnerability. By loosely following Blaikie *et al*.’s (1994) ‘Pressure and Release’ (PAR) model and Collins’ (2009) “disaster and development approach”, this research attempts to find what factors made people vulnerable to seismic hazard in AJK and turned an otherwise not so big Mw=7.6 earthquake into one of the deadliest environmental disasters in the world. The performance and impact of the post-2005 earthquake housing reconstruction program is evaluated in this study by using the mixed-methods research approach. The study finds that the sustainability of the seismic resistant construction and continuation of the pre-earthquake vulnerability factors are still issues. Till the time issues mentioned in this study are not addressed properly, communities in general and the study area in particular will remain vulnerable to environmental disasters.

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List of Acronyms and Abbreviations

ADB	Asian Development Bank
AIT	Assistance & Inspection Team
Bahattar	Traditional style of construction mostly found in KPK province of Pakistan in which stone and mud walls are given timber bands
BDA	Bagh Development Authority
Biradari	Clan/Tribe
BR	Bagh Rural
BU	Bagh Urban
Build back better	The use of the recovery, rehabilitation and reconstruction phases after a disaster to increase the resilience of nations and communities through integrating disaster risk reduction measures into the restoration of physical infrastructure and societal systems, and into the revitalization of livelihoods, economies and the environment. (UNISDR)
CBO	Community Based Organization
CGI Sheet	Corrugated Galvanized Iron Sheet
CNIC	Computerized National Identity Card
DAM	Development Authority Bagh
Dhajji-dewari	Traditional seismic construction typology mostly found in northern Kashmir in which timber frame walls are filled with small stones. The walls are usually plastered with mud
Disaster	A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. (UNISDR)

Disaster damage Damage that occurs during and immediately after the disaster. This is usually measured in physical units (e.g., square meters of housing, kilometres of roads, etc.), and describes the total or partial destruction of physical assets, the disruption of basic services and damages to sources of livelihood in the affected area. (UNISDR)

Disaster impact The total effect, including negative effects (e.g., economic losses) and positive effects (e.g., economic gains), of a hazardous event or a disaster. The term includes economic, human and environmental impacts, and may include death, injuries, disease and other negative effects on human physical, mental and social well-being. (UNISDR)

Disaster management The organization, planning and application of measures preparing for, responding to and recovering from disasters. (UNISDR)

Disaster risk The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity. (UNISDR)

Disaster risk reduction Disaster risk reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development. (UNISDR)

Dogra An Indo-Aryan ethno-linguistic of Rajput clan in the Indian Sub-continent who ruled the former state of Jammu & Kashmir from the 19th century

DRR Disaster Risk Reduction

DRU District Reconstruction Unit

EEAP Earthquake Emergency Assistance Project

Emergency is sometimes used interchangeably with the term disaster, as, for example, in the context of biological and technological hazards or health emergencies, which, however, can also relate to hazardous events that do not result in the serious disruption of the functioning of a community or society. (UNISDR)

Environmental Vulnerability The type of vulnerability which is created mainly due to degradation of the natural environment e.g. deforestation

EQAA Earthquake Affected Area

ERRA Earthquake Reconstruction & Rehabilitation Authority

Gazetted Officer An officer of the government in Pakistan or PAK whose appointment is notified in the official Gazette

Geological Vulnerability The type of vulnerability which prevailed due to geological factors, it especially relates to exposure to seismic hazard

GoAJK Government of Azad Jammu & Kashmir

GoP Government of Pakistan

Hazard A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. (UNISDR)

Environmental hazards may include chemical, natural and biological hazards. They can be created by environmental degradation or physical or chemical pollution in the air, water and soil. However, many of the processes and phenomena that fall into this category may be termed drivers of hazard and risk rather than hazards in themselves, such as soil degradation, deforestation, loss of biodiversity, salinization and sea-level rise. (UNISDR)

Geological or geophysical hazards originate from internal earth processes. Examples are earthquakes, volcanic activity and emissions, and related geophysical processes such as mass movements, landslides, rockslides, surface collapses and debris or mud flows. Hydrometeorological factors are important contributors to some of these processes. Tsunamis are difficult to categorize: although they are triggered by undersea earthquakes and other geological events, they essentially become an oceanic

	process that is manifested as a coastal water-related hazard. (UNISDR)
Gohaal	A cattle shed along with a house in rural areas of Jammu & Kashmir region
Hazardous event	The manifestation of a hazard in a particular place during a particular period of time. (UNISDR)
HFIR	Housing Foundation of Islamic Revolution
Iftari	Breaking of the fast by the Muslims in the evening
Imam	A Muslim title for a person who leads prayers, especially in a mosque.
KPK	Khyber Pukhtoon Khawa (a province in Pakistan formerly known as NWFP)
Kotha	An unreinforced masonry structure comprising of one of more rooms used for living purposes mainly in Jammu & Kashmir region
Larri	A multi-storey wooden house traditionally built in Jammu & Kashmir region
LSO	Local Support Organization
LUP Cell	Land Use Plan Cell
LVU	Land Verification Unit
Marla	An Indian unit of area equal to 272 ft2.
Mitigation	The lessening or minimizing of the adverse impacts of a hazardous event. (UNISDR)
MoU	Memorandum of Understanding
MR	Muzaffarabad Rural
MU	Muzaffarabad Urban
NADRA	National Database & Registration Authority
Nala	A watercourse or nullah
NGO	Non-Governmental Organization
Numberdar	A hereditary title for a village leader appointed by the government in the Indian Subcontinent

ODR Owner Driven Reconstruction

PAK Pakistan Administrated Kashmir

Pakka/Pukka Literally means strong/solid/ripe. Also means a type of building usually made with burnt bricks/dressed stones/concrete blocks and cement. It may or may not be a frame structure

Patwari An official of the land administration department (called Revenue Department) in the Indian Sub-continent who has the land record of a particular area and is responsible for matters relating to land administration and land revenue

Physical Vulnerability The type of vulnerability which prevailed due to physical factors. It is different from environmental vulnerability and geological vulnerability in the sense that it relates mainly to vulnerability of the housing stock caused by poor quality of construction

PKR Pakistan Rupee

P&DD Planning & Development Department

PO Partner Organization

Preservation Zone Areas in Muzaffarabad and Bagh cities declared unsuitable for future urbanization due to potential environmental hazards

Promotion Zone An area safe from natural environmental hazards such as landslides and floods in earthquake affected urban areas of AJK designated for future urban development

PSI Per Square Inch

Qiyamt The Day of Judgment in Arabic/Urdu language

RCC Reinforced Concrete Cement

Reconstruction The medium-and long-term rebuilding and sustainable restoration of resilient critical infrastructures, services, housing, facilities and livelihoods required for the full functioning of a community or a society affected by a disaster, aligning with the principles of sustainable development and “build back better”, to avoid or reduce future disaster risk. (UNISDR)

Recovery The restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and “build back better”, to avoid or reduce future disaster risk. (UNISDR)

Red Zone Areas within 500 meters of fault lines, landslide areas, and land pulverised due to seismic activity in 2005 earthquake in Muzaffarabad city

Rehabilitation The restoration of basic services and facilities for the functioning of a community or a society affected by a disaster. (UNISDR)

Resilience The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management. (UNISDR)

Response Actions taken directly before, during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected. (UNISDR)

Retrofitting Reinforcement or upgrading of existing structures to become more resistant and resilient to the damaging effects of hazards. (UNISDR)

SERRA State Earthquake Reconstruction & Rehabilitation Agency

SIDA Swedish International Development Cooperation Agency

Socio-economic Vulnerability The type of vulnerability which is created mainly by socio-economic factors such as poverty, high population density, high population growth rate, poor living conditions, lack of voice, lack of stable local political structures

SRTs Seismic Resistant Techniques

Structural and non-structural measures Structural measures are any physical construction to reduce or avoid possible impacts of hazards, or the application of engineering techniques or technology to achieve hazard resistance and resilience in structures or systems. Non-structural measures are measures not involving physical construction which use knowledge, practice or agreement to reduce disaster risks and impacts, in particular through policies and laws, public awareness raising, training and education. (UNISDR)

Union Council Basic administrative unit of the local government system in Pakistan. A Union Council consists of many villages

VRC Village Reconstruction Committee

Vulnerability The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards. (UNISDR)

Declaration

It is hereby declared that this thesis represents my own work and has not been previously submitted to any institution for the award of any academic degree. Every care has been taken to properly acknowledge the material used in this thesis from other sources.

Statement of Copyright

LIAQAT HUSSAIN

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Dedication

To those who lost their lives in the 8th October 2005 Kashmir earthquake

Prologue

A man's house burns down. The smoking wreckage represents only a ruined home that was dear through years of use and pleasant associations. By and by, as the days and weeks go on, first he misses this, then that, then the other thing. And when he casts about for it he finds that it was in that house. Always it is an essential – there was but one of its kind. It cannot be replaced. It was in that house. It is irrevocably lost... It will be years before the tale of lost essentials is complete, and not till then can he truly know the magnitude of his disaster.

Mark Twain

CHAPTER 1: INTRODUCTION

1.1. Soliloquy

I was born and bred in Azad Jammu & Kashmir, a small hilly semi-autonomous region in the north of Pakistan. After completing my education I took on a dream job of millions in the country, within the civil service. I started my career as Assistant Commissioner in 1991. Within 10 years I was promoted to the rank of Deputy Commissioner. The Deputy Commissioner is a unique entity in the governance system of Pakistan and other Indian subcontinent countries. Introduced by the British during the Raj, the office of the Deputy Commissioner wielded immense power and authority to control and run India (Kalia 2013; Tanwir & Fennell 2013). The Deputy Commissioner was considered to be the direct representative of the British Raj in the District. Initially, only white British citizens were appointed Deputy Commissioners, however later on native educated people could also join the highly prestigious Indian Civil Service (ICS) through a highly competitive examination. This legacy continued even after the British left the subcontinent in 1947 and two independent states of Pakistan and India were created. The Indian Civil Service (ICS) was transformed into Civil Service of Pakistan (CSP) and later into District Management Group (DMG), but the office of the Deputy Commissioner survived in Pakistan. Though the power and authority of the Deputy Commissioner has eroded to a great extent after independence in 1947, especially in 1970s (Shafqat 1999; Tanwir & Fennell 2010), it is still considered the representative of the government in the district and is the most important and influential office in a District.

It was in the backdrop of this great legacy that I was working as Deputy Commissioner in Muzaffarabad District. On personal level I tried to match my lifestyle with the grandeur of the office; wearing crisp suites and ties, polished shoes, living in a police guarded huge official house where national flag was hoisted every day, and, armed police guard with me in the flag hoisting official car.

1.2. Fast Forward

On 8th October 2005 early in the morning everything came down with a bang. My grand house came down in seconds; we were very lucky to have crawled out of the rubble only slightly injured. There I was standing on the rubble of the house, bare footed wearing sleeping clothes with all my expensive suites and boots buried under the rubble. My driver retrieved his old sandals from the rubble of his room and gave them to me to wear; and I spent next few days in these sleeping clothes and my driver's old sandals doing all my official work. My family spent the whole day under the open sky near the rubble of the house without anything to eat or drink. Our chef was there, but there was nothing to cook. The night followed with heavy rain and extreme cold. My family was lucky to find some space in a neighbour's tent where many other families were already crammed. This was a humbling, if not humiliating, situation on a personal level.

Immediately after the earthquake telephones stopped working, the wireless system became silent after a few hours due to power outages. There were some bulldozers in Muzaffarabad but their operators had run away to see their families. There was utter chaos. I immediately started visiting different accessible parts of the city. Wherever I went people, including my very close friends, expected me to do something to retrieve their loved ones from tons of rubble, being the most powerful man in the district. The biggest hospital of the city had become a heap of debris along with some staff and patients. There were many schools where hundreds of children were buried, their parents wailing outside requesting me to do something. It was then that I realized how useless my authority and power was; it was a moment of epiphany for me (Bowen 1981; McDonald 2008).

Over the next few days we continued to count the death toll. I had lost many dear friends and their families. I still remember that when people saw each other they would not talk but gesture with their fingers how many people were killed in their family; there were very few lucky, like myself, who hadn't lost any. I saw so much death, destruction and misery in those days that life itself lost its meaning at one point.

The experience of the earthquake and subsequent events are the main motivation behind my research project (see section 4.2).

1.3. Research Aim

The aim of the research is to assess Pakistan government's initiative of "Owner-driven" housing reconstruction in Azad Jammu & Kashmir in the aftermath of the 8th October 2005 earthquake, to identify lessons learnt and to make recommendations for sustainability and transferability of owner driven reconstruction (ODR). The study also aims to contribute towards the wider academic and policy-focused body of knowledge on the subject of disaster management and post-earthquake private housing reconstruction programme in Azad Jammu & Kashmir in particular.

1.4. Research Questions

In Robinson's (2014) words my life story has provided me a research topic which is closer to my heart and very clear in my head. My positionality, being from the same country and working in the earthquake affected areas for a long time before and after the earthquake, has given me the advantage to know the subject under research and what questions to frame (Finlay 2002, p. 213; Lofland & Lofland 1995, cited in Robinson 2014, p. 34). I have framed the following research questions to strive to develop a new way towards understanding the phenomenon of housing, in post-disaster situations (Heidegger, 1977) especially:

1. What factors made people vulnerable to seismic hazard in AJK?
2. How successfully has the Government of Pakistan implemented the housing reconstruction policy in the aftermath of 2005 earthquake and has this policy been successful in geography, economic, and social contexts?
3. After the completion of the housing reconstruction programme:

    a. To what extent are seismic-resistant construction techniques sustainable, especially in rural areas?
    b. How far has ODR been able to reduce/address pre-earthquake vulnerability issues in the study area?

c. To what extent has the implementation of the ODR re-worked family and household structures and patterns of land ownership?

4. What lessons can be learnt from the Pakistan experience and what are the recommendations for transferability/replication of this approach to future disaster events?

1.5. Pakistan – A Disaster Prone Country

Pakistan is highly vulnerable to many environmental and human-induced disasters. Earthquakes, floods, landslides, droughts, torrential rains, tropical cyclones, extreme temperatures, major traffic accidents, and more recently terrorism, are recurrent phenomenon. Poor construction practices, population growth, poverty, environmental degradation, poor agricultural practices, weak early-warning systems, lack of awareness and education, weak governance and absence of comprehensive Disaster Risk Reduction (DRR) policies are some of the factors responsible for vulnerability to environmental disasters (Arshad & Shafi 2010; NDMA 2011, 2013). Environmental disasters have caused exceptionally high losses to the country. Table 1.1 shows that floods and earthquakes have caused the most damage in every respect. Though earthquakes and floods are the two most devastating disasters, due to relevance with my research, I will only discuss the seismic hazard in this chapter.

Table 1.1 Losses due to environmental disasters in Pakistan (1987-2011)

Disaster Type	People Homeless	People Killed	People Injured	People Affected	Total Affected	Total Damage $000	%	Rank
Flood	8,927,685	11,702	1,262	38,669,447	47,589,394	2,746,030	86	1
Earthquake	2,853,585	142,812	88,096	1,294,429	4,236,110	5,019,255	8	2
Drought	-	223	-	2,269,300	2,269,300	247,000	4	3
Famine	-	-	-	300,000	300,000	-	1	4
Epidemic	-	283	211	16,275	16,486	-	0	5
Wind Strom	22,579	11,654	1,183	1,057,000	1,080,780	4,100	2	6
Landslides	3,100	384	114	200	3,414	-	0	7
Extreme Temperature	-	1,406	324	250	574	-	0	8
Total	11,806,967	168,464	9,190	43,606,901	55,505,058	8,016,385	-	-
Flood 2010	1,744,471	1,984	2,946	20,184,550	20,184,550	10,000,000	-	-

(Source: NDMA 2011, p. 5)

1.5.1. Seismic Hazard in Pakistan

Pakistan is located at the collision of the Indian and the Eurasian plates (Avouac *et al*. 2006; ERRA 2006; Kumar *et al*. 2001; Sato *et al*. 2007; Szeliga *et al*. 2010; Valdiya 1980). The boundary between these plates forms the Himalayan arc that extends approximately 2,500 km across the continent. Three major thrust faults strike the length of the Himalayan arc (*Fig. 1.1*).

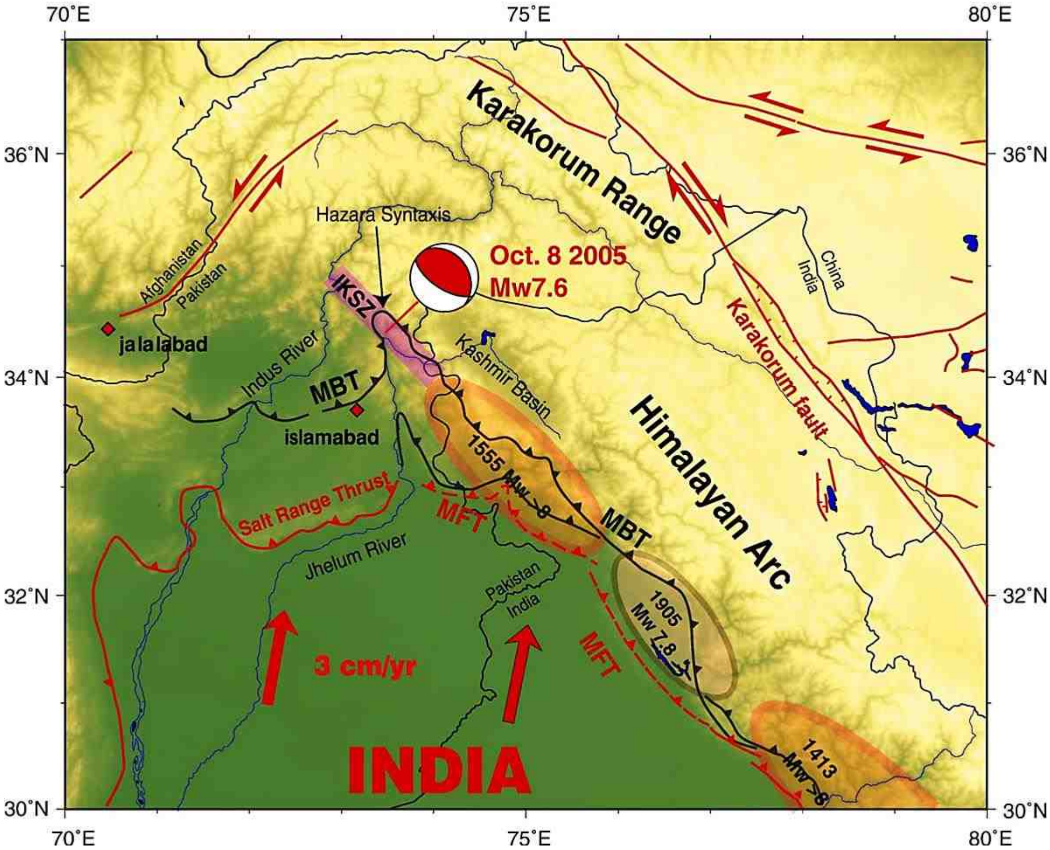


Figure 1.1 Tectonic setting of Pakistan (Source: Avouac et al. 2006, p. 515)

The Main Central Thrust (MCT) is located along the southern edge of the High Himalaya and is generally inactive. The Main Boundary Thrust (MBT) marks the southern edge of the Lesser Himalaya. The Himalayan Frontal Thrust (HFT) located at the northern limit of the Indian Plate and is the most active of the three faults (*ibid*). This area is one of the most seismically active in the world. Countries around Pakistan (e.g. Afghanistan, Iran, China, and India) have been subject to frequent major earthquakes. There have been some major earthquakes in Pakistan in the past; for example 1935 Quetta earthquake, 1945 Makran coast earthquake, 1974 Pattan earthquake, and, 2005 Kashmir earthquake (NDMA 2011; NESPAK 2006). The seismic hazard is present almost throughout Pakistan (*Figure 1.2*).

High seismic hazard coupled with large population, a high rate of urbanization, faulty land use planning, poor building control mechanisms, inadequate infrastructure, and poverty will continue to pose a major threat in future also (Ainuddin *et al.* 2014; Ambraseys & Bilham 2011; Mona Liza 2009; Peiris *et al*. 2008; Szeliga *et al*. 2010). Aging building stock in cities like Karachi, Lahore, Peshawar, and Rawalpindi are a major hazard for future. A recent media report aired after the 26th October 2015 M_w=7.5 Hindu Kush earthquake revealed that there were at least 10,000 old and dilapidated buildings in the walled city of Lahore which were still inhabited by people and could collapse in case of an earthquake (Geo News, 27th October 2015).

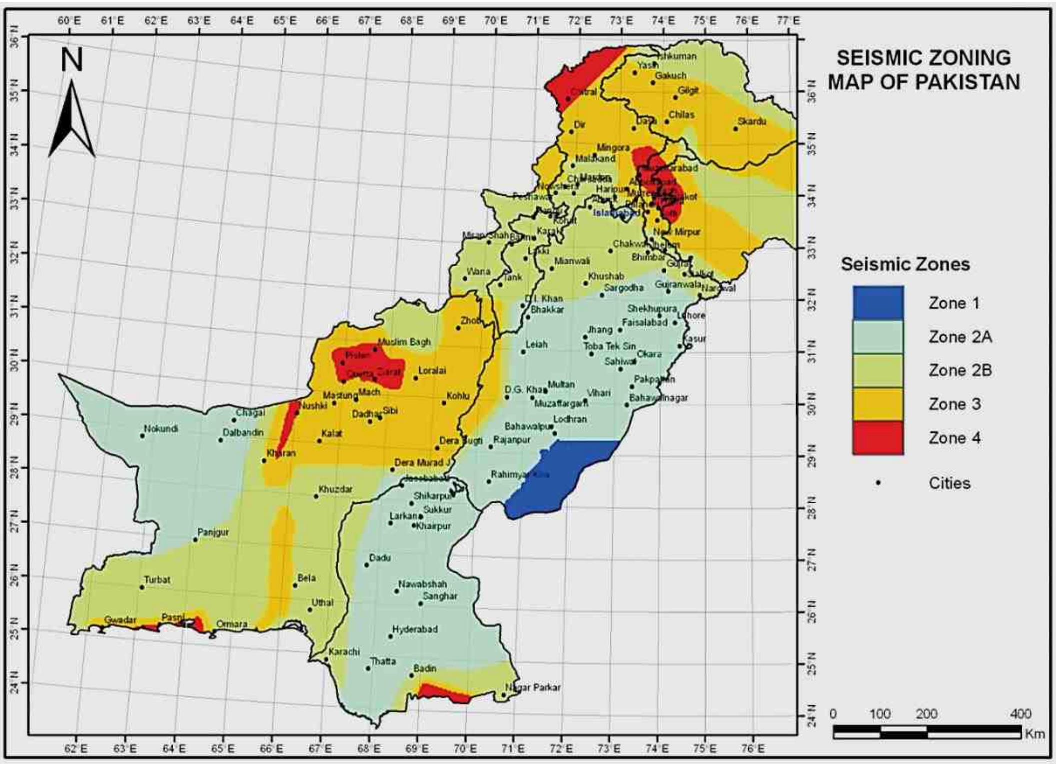


Figure 1.2 Seismic zoning map of Pakistan *(Source: NDMA 2009, pp. 6)*

1.6. The Study Area

The 2005 earthquake hit Muzaffarabad, the capital of Azad Jammu & Kashmir (aka AJK/AJ&K) where my research is focused. Many people might find the term Azad Jammu & Kashmir (AJK/AJ&K) and its relationship with

Pakistan confusing. So I will briefly explain the geographical, historical, and constitutional position of AJK in below sections.

1.7. Jammu and Kashmir

Jammu and Kashmir is the name given to the northern most state in the Indian Sub-continent stretching from the east of the river Indus to the west of the river Ravi (Ray 1969). According to Gilani (2007, p.1) the State of Jammu and Kashmir comprises of *'Gilgit Wazarat, Ladakh Wazarat comprising of districts of Ladakh, Kargil, and Baltistan. Kashmir Division comprising of the Valley of Kashmir and Muzaffarabad, and Jammu division or province consisting of the rest of the territories of the State, including Poonch, which of course was a sort of princely state within the State of Jammu and Kashmir'* (*Figure 1.3*). The Jammu & Kashmir state *'is bounded by China in the north and east, Afghanistan in the North West and Pakistan in the west. It is only in the south that the state is linked with the rest of India. Here the state boundaries of Himachal Pradesh (south) and Panjab (south–west) touch the southern boundary of Jammu and Kashmir'* (Chaudhary 2005, no pagination).

The total area of the State is controversial. According to Gilani (2007, p. 3) India claims that the area of the State, as bequeathed by the Maharaja in 1947, was 86,000 sq. miles while Pakistan claims that it was 84,000 sq. miles. Saraf (1977) quotes the figure of 82,258 sq. miles.

Kashmir is an old state having history of conquests, oppressive rules, and environmental disasters. In about 5,000 B.C. Sri Ram Chander of Ceylon established the early Hindu kingdom in Kashmir. The Buddhists conquered Kashmir under Ashoka in about 250 B.C. The Tartar chiefs subjugated Kashmir from about 150-100 B.C. The Huns raided it in the first half of the 6th Century. Buddhism disappeared in Kashmir by 638 A.D. (Alexander 1995; Bhattacharjea 1994; Lal 1995; Parmu 1969; Ray 1996; Schoflied 1996).

The Muslims under Mahmood Ghaznavi raided Kashmir in 1015. Since then the Muslims started to rise to power and established Muslim rule in Kashmir for the next 500 years – 1320 to 1819 (Parmu 1969, p.1). This period can be loosely divided into three eras: the Independent Sultans (1320-1586), the Mughals (1586-1753), and the Pathans (1753-1819) (*ibid*). Sultan Zain-ul-Abidin aka Badshah, the most famous Kashmiri ruler of the first era, came to power in 1423 and peacefully ruled for 50 years. The Mughal king Akbar conquered Kashmir in 1586 (Gilani 2007; Lal 1995; Kapur 1976; Mahajan 1982). This was the end of the rule of the local Kashmiris for times to come and establishment of tyrannical rules (Parmu 1969). The Afghans conquered Kashmir under Ahmad Shah Durrani in 1753 (Lal 1995; Schoflied 1996) and continued the tyrannies of the Mughal era.

The Sikhs under Maharaja Ranjit Singh defeated Afghans in 1819 and captured Kashmir and continued the legacy of repressive rule (Gilani 2007; Lal 1995; Saraf 1977; Schoflied 1996).

The British defeated the Sikhs in the Punjab in the battle of Sobroan in 1846 and received Kashmir as part of war indemnity. The British sold Kashmir and its adjoining areas – the whole tract eastward of the Indus River and westward of the Ravi River – to Maharaja Gulab Sigh for 7.5 million rupees under the infamous Treaty of Amritsar on 16th March 1846 (Bazaz 1976; Gilani 2007; Lal 1995; Khan 2007; Panikkar 1995; Saraf 1977; Schoflied 1996; Singh 1996). This established the *Dogra* rule in Jammu and Kashmir - one of the most tyrannical rules in the history of Jammu and Kashmir - until 1947 when the British left India and two separate countries – India and Pakistan – came into being (Bazaz 1976; Bhattacharjea 1994; Gilani 2007; Khan 2007; Schoflied 1996; Suharwardy 1983).

Jammu, Rajuori, Poonch, and Gilgit-Baltistan provinces became part of the State of Jammu and Kashmir in different eras either through conquest or treaties (Gilani 2007), hence the name Jammu and Kashmir.

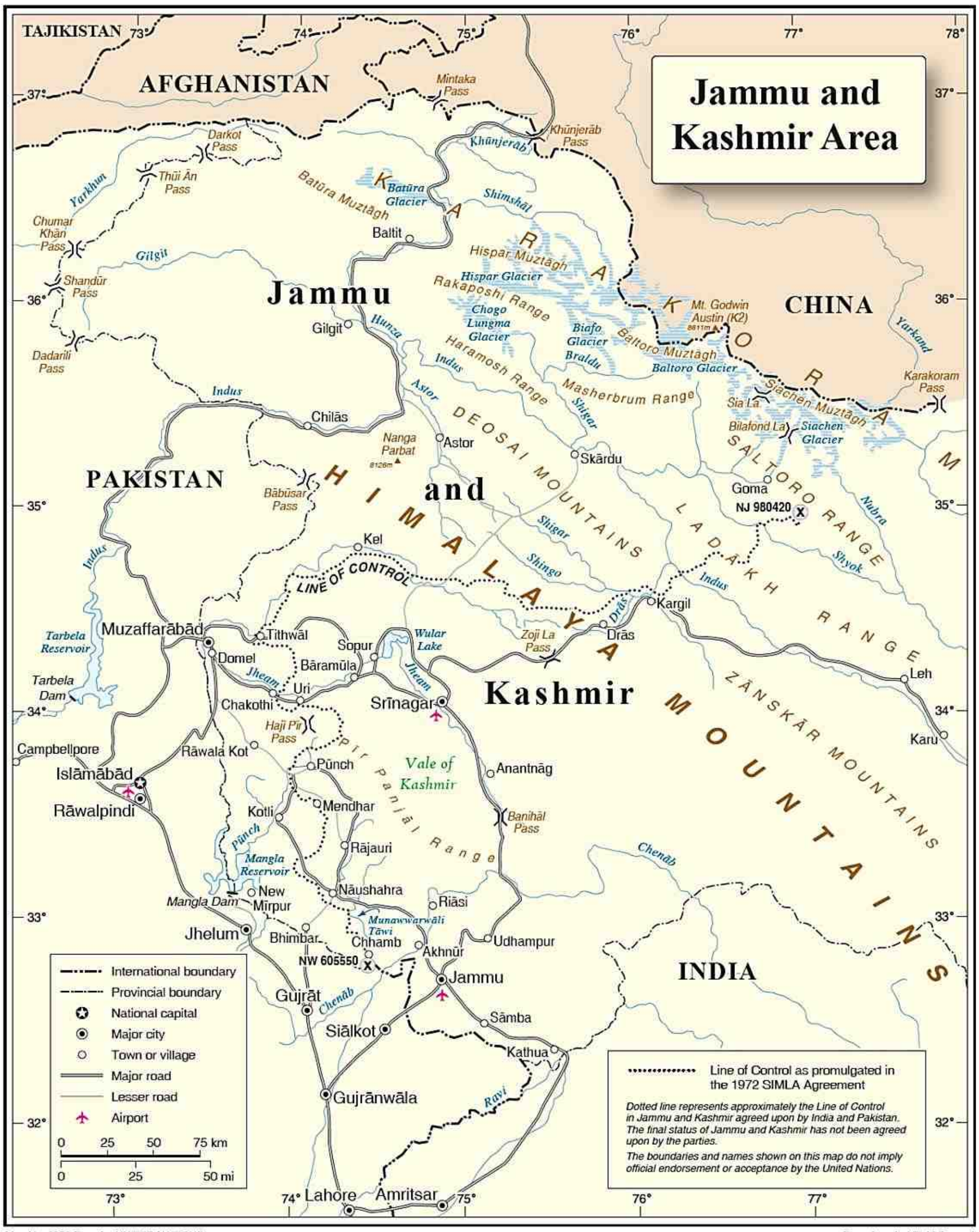


Figure 1.3 Map of Jammu and Kashmir. *(Source: UN 2015)*

1.7.1. Azad Jammu and Kashmir (AJK/AJ&K)

The partition of India was announced by the British on 3rd June 1947 (Gilani 2007; Saraf 1977; Schoflied 1996; Singh 1996). According to the partition plan, the rulers of the princely states of the Indian Dominion were free to join India or Pakistan while considering geographical placement, economic compulsions and wishes of the majority of the people (*ibid*). The majority of the population of Jammu and Kashmir was Muslim (95% in Kashmir Valley and 61% in Jammu were Muslims according to 1941 census (Bhattacharjea

1994; Saraf 1977)) and wanted to join Pakistan. But the non-Muslim Maharaja was reluctant to decide in favour of either India or Pakistan (which effectively meant end to his rule) and was more inclined to remain independent and perpetuate his rule over Jammu and Kashmir (Alexander 1995; Bhattacharjea 1994; Saraf 1977). Being tired of the tyrannical rule and encouraged by the wave of independence in the Sub-continent the Kashmiris rose against the Maharaja (Singh 1996). Violence broke out in the Poonch and Mirpur areas which the *Dogra* troops tried to quell by force. This led to armed struggle by the people of these areas; which was later joined by the armed Pathan clansmen from the tribal areas of the North West Frontier Province (NWFP) (Gilani 2007; Khan 2007).

A substantial portion of Poonch, Muzaffarabad, Mirpur, and Gilgit-Baltistan (called Northern Areas) was 'liberated' from the Maharaja's troops (Gilani 2007; Saraf 1977; Suharwardy 1983). An interim revolutionary government was established in these areas called the Azad (independent) Government of the State of Jammu and Kashmir (AJK/AJ&K) on 24th October 1947 (Gilani 2007; Schoflied 1996). Seeing his rule slipping from his hands, the Maharaja hastily and secretly signed a shady agreement (facilitated by the British Viceroy) called 'The Instrument of Accession' with the newly formed Indian government on 27th October 1947 (Gilani 2007; Suharwardy 1983) or on 26th October 1947 as claimed by Bhattacharjea (1994). The Indian forces landed in Kashmir on the same day and a war broke out between India and Pakistan. The Pakistani troops along with local Kashmiri fighters and Pathan tribesmen continued to advance towards the capital Srinagar seeing which India went to the UN Security Council on 1st January 1948 and agreed to hold a free plebiscite and let the people of Jammu and Kashmir decide to join India or Pakistan (Gilani 2007; Schoflied 1996). A ceasefire was declared between the two sides and a 'standstill' position still maintains (i.e. the major part of the Jammu & Kashmir is controlled by India, Azad Jammu & Kashmir has semi-autonomous status in Pakistan and Gilgit & Baltistan have special constitutional status within the federation of Pakistan). Despite many UN Security Council resolutions and demands by the Kashmiris the issue remains unresolved to this day and has become a bone of contention between India and Pakistan resulting in three wars (*ibid*).

Azad Jammu & Kashmir (AJK) is situated in the north of Pakistan between longitude 73°-75° and latitude 33°-36° (*Figure 2.5*). The total area of AJK is 5,136 square miles and the population is approximately 3.9 million (P&DD 2010). The topography of AJK is mainly hilly having mountain valleys in the north and plains in the south. The Jhelum, Neelum and Poonch are the main rivers. The climate is sub-tropical highland type with an average yearly rainfall of 1300 mm. The elevation from sea level ranges from 360 meters in the south to 6325 meters in the north. The snow line is around 1200 meters in winter and 3300 meters in summer season (*ibid*). AJK is mainly a rural society having the rural urban population ratio of 88:12. It falls into low income countries category having annual average per capita income of US$1254 (P&DD 2014, 2015). The economy of AJK is mainly rural with average farm size of 1.2 hectares. Maize, wheat, rice and pulses are the main crops (*ibid*). There is very little industry in certain areas. The public sector is the other main source of employment. Traditionally, men have been migrating to main cities of Pakistan as seasonal workers. A sizeable number of people are now working in Europe, the Middle East and the UK.

AJK has a semi-autonomous constitutional status within the Federation of Pakistan with its own directly elected Legislative Assembly, President, Prime Minister, Supreme Court and High Court. The Kashmir Council works as the Upper House of the Parliament with the Prime Minister of Pakistan as its Chairman. The link between the Government of Pakistan and the Government of Azad Jammu & Kashmir is established through the Government of Pakistan's Ministry of Kashmir Affairs (P&DD 2010).

Though AJK is constitutionally a semi-autonomous area, for all practical purposes it is a part of Pakistan (Cabinet Division 1971, Schild 2015). So my research is in the wider context of Pakistan. For the purpose of my study I have chosen District Muzaffarabad and District Bagh, the two most affected districts in 2005 earthquake (Please see *Section 4.7* for details).

1.7.2. *Seismic Hazard in the Study Area*

The study area falls in a highly seismic zone called Hazara-Kashmir Syntaxis. Muzaffarabad District is especially at risk because some of the most critical tectonic features such as Main Mantle Thrust, Mansehra Thrust, Oghi Fault, Banna Thrust, Balakot Shear Zone, Main Boundary Thrust, Panjal Thrust, Jhelum Fault, Muzaffarabad Fault, Sanghargali, Nathiagali, and Thandiani Thrusts are located within 50 km radius of Muzaffarabad city (PMD 2007, p. 1). A post-2005 earthquake study has assigned a potential earthquake of maximum magnitude of 7.8 at Balakot-Bagh fault (which falls in the study area and is very close to Muzaffarabad city) with PGA value of 0.25g (10% probability of exceedance for 50 years) (*ibid*). The study area has been assigned Zone 4 in Seismic Zoning Map of Pakistan (Mona Liza 2009) (*Figure 1.2*).

Following are some of the important faults associated with the study area (*Figure 1.4*):

i. ***Himalayan Main Boundary Thrust (MBT):*** This is one of the three faults of the 2,500 km long Himalayan arc. The MBT is seismically one of the most active faults in the region (Kumar *et al*. 2001; Valdiya 1980). About 100 km of this fault travels from Bagh District in AJK to nearby Batagram District of Khyber Pakhtunkhwa province passing through Muzaffarabad city. The 8th October 2005 earthquake is associated with the rupture of this fault (Bilham 2004; Bilham & Ambraseys 2005; Jouanne *et al*. 2011; Mona Liza 2009; Rossetto & Peiris 2008). The return period of earthquakes across this range is about 30-40 years at the shortening rate of ~14 mm/yr. Prior to 2005 earthquake, there has been no major earthquake on this range since 1555 AD; so stress has been building here and a major earthquake was long overdue in this region (Avouac *et al*. 2006; Bilham 2005).

ii. ***Himalayan Frontal Thrust (HFT):*** This is a northwest-southeast trending intra-formational thrust fault near Muzaffarabad (NESPAK 2006). Its southern extension runs from Muzaffarabad towards Chikar Kas in the east running almost parallel to the Jhelum River on the right bank and then disappears after crossing the river in the south. In the north it travels from Muzaffarabad up to Balakot and further north into Allai valley (*ibid*).

iii. ***Main Mantle Thrust (MMT):*** This fault is a northward dipping regional thrust which separates the Indian Plate from the Kohistan Island Arc (NESPAK 2006). In the west it extends from Khar (Bajaur Agency) Naran (Kaghan Valley) in the north. In the east it takes a northeast-ward bend towards Bunji and is truncated by the Raikot fault. The Mw=6.2 Pattan earthquake of 1974 is associated with it (*ibid*).

iv. ***Panjal Thrust:*** It runs northwards parallel to the MBT on the eastern side of Hazara-Kashmir Syntaxis (NESPAK 2006). Both the Panjal Thrust and MBT come closer to each other and join about 5 km north of Balakot (*ibid*).

v. ***Jhelum Fault:*** This fault extends from north of Muzaffarabad along Jhelum River into the Potowar region in the south and further southward (NESPAK 2006). It is a north-east trending strike-slip fault and follows the western margin of Hazara-Kashmir Syntaxis and apparently dislocates from the MBT in Muzaffarabad and disappears eastwards (*ibid*).

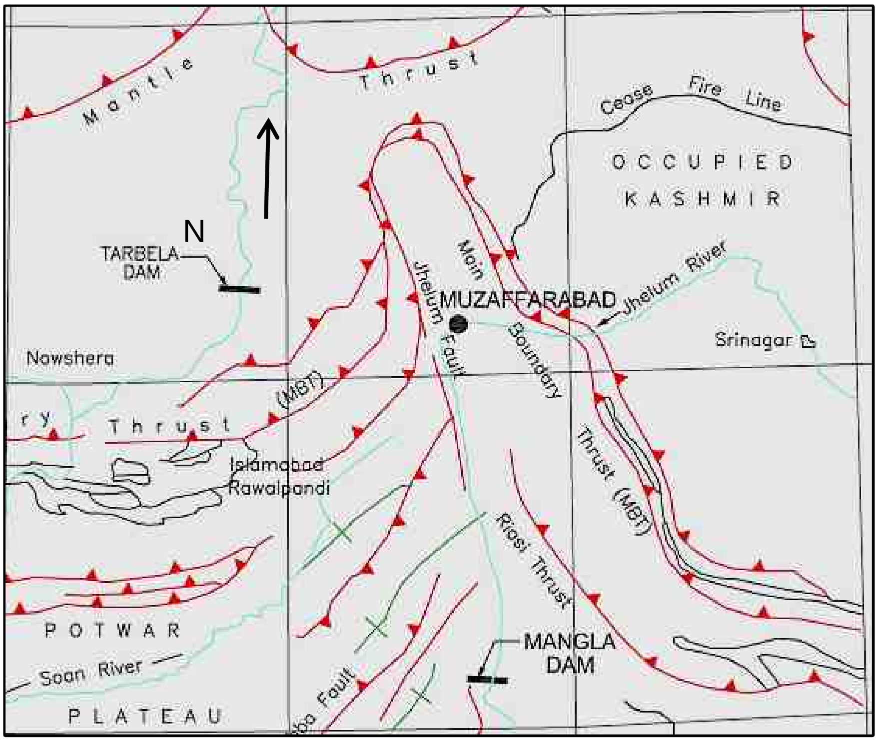


Figure 1.4 Tectonic setting of the study area, Muzaffarabad city is bound by the MBT and HFT in a 'hairpin shaped structural feature. *(Source: ERRA 2006, p. 21)*

Though the study area has a long history of major seismic activity, no statistical data of these events is available. Szeliga *et al*. (2010, p. 42) observe that the traditional Kashmiri architecture consisting of earthquake resistant "*Taq*" and "*Dhajji-dewari*" construction techniques might have developed due to constant seismic activity in the past. A quote from King Akbar's court historian, Abul Fazl, about construction in Kashmir valley also proves this point: "[O]n account of the abundance of wood and the constant earthquakes, houses of stone and brick are not built" (*ibid*). Some historical records show major seismic events in 4th Century B.C., 25 A.D., September 1555, and May 1885 in the study area (Avouac *et al*. 2006; Ambraseys & Bilham 2011; Hough *et al*. 2009). The 8th October 2005 Kashmir earthquake is by far the most lethal (Avouac *et al*. 2006; Bilham 2005). It has also been suggested by some scientists that another major seismic activity, even greater than the 2005 earthquake, is also long overdue in Kashmir (Bilham 2004; Hough *et al*. 2009). A study (ERRA 2006) has suggested the probability of earthquakes of Mw=7.5 to Mw=8.1 in the area in future. Due to absence of building control mechanisms, absence of disaster mitigation, poverty, lack of service provision, and population intensity (EEFIT 2008) any major seismic activity in the area might prove even more devastating than the 2005 earthquake (Bilham 2009). Fault ruptures, slope instabilities, earthquake related flooding, and soil liquefaction are some hazards associated with any future major seismic activity (NESPAK 2006).

1.8. Thesis Structure

Like Oven (2009), this study encountered many challenges; writing the thesis being one of them. The first challenge was to reconcile with the enormity of the subject and complexity of the research methodology. The type of research that I wanted to conduct necessitated the use of mixed methods approach; however this approach was challenging as to how to integrate the quantitative data, the qualitative material, and my own experiences. I draw results from the quantitative data and then qualify those results with the qualitative data. I have made frequent use of quotes from interviews and focus groups to emphasise the point. I mention my experiences and observations also, sometimes expressly but most of the time inconspicuously throughout the thesis. In this way one might find my study more of an autoethnography. Reed-Danahay (1997, cited in Holt 2003, p. 2) defines autoethnography as “writing practice [that] involves highly personalized accounts where authors draw on their own experiences to extend understanding of a particular discipline or culture”. However, in my thesis I have relied more on the quantitative and qualitative data collected from the field to avoid the objection of being ‘too self-indulgent and narcissistic’ (Coffey 1999, cited in Holt 2003, p. 3). I mostly mention my experiences only to qualify the findings of the fieldwork or where no data is available.

The 2005 earthquake was an event of epic proportions. It impacted peoples’ lives in every respect. So it was very difficult for me to bisect those interrelated aspects and keep myself confined to the issue of housing only. It is due to this reason that at times one might find this study slightly transgressing into other issues.

1.8.1. Sequence of Chapters

Instead of following the sequence of the research questions, the thesis starts with the day of the earthquake, 8th October 2005, and then flashbacks to research question 1 in Chapter 5. This might sound confusing to some but this fits the final path that my research has taken. Throughout the thesis I keep going back and forth in time because whatever happened in the study area on the day of the earthquake had roots in the past and will impact the future as well.

Chapter 2 (The Kashmir Earthquake 2005), describes the event of the earthquake and ensuing situation. The earthquake damage will be briefly described to give an idea of the scale of the destruction and importance of the topic being researched. I will discuss in detail the housing reconstruction policy which was adopted by the Government of Pakistan for the reconstruction of the damaged housing stock in the study area.

Chapter 3 (Theoretical Framework), discusses the theoretical framework of my research. The status of disaster knowledge in AJK, disaster losses and their uneven distribution in the developing and the developed world is discussed in the outset. It is explained that there is a relationship between disasters and vulnerability; and development has role in determining disaster vulnerability. Disasters can provide a window of opportunity to set the past mistakes right and address disaster vulnerability. I will explain the theoretical approach that I have adopted for my research. At the end I will discuss the importance of housing reconstruction in post disaster situations and different housing reconstruction approaches being practised in the world.

Chapter 4 (Research Methodology), puts forth my research methodology. It outlines my research design, data collection and analysis methods, research timeline, and geographical details of the areas where the fieldwork was conducted. I have adopted a mixed methods approach which combines the qualitative and quantitative methods for data collection. I will explain how this approach will be used for the purposes of *triangulation*, *complementarity*, *initiation*, *development*, and *expansion* through the use of concurrent nested design.

Chapter 5 (Vulnerability of the Housing Stock in the Study Area), this chapter develops the argument outlined in Chapter 3, that disasters are not products or outcomes of hazard only, but a combination of hazard and vulnerability; it is the vulnerability of the people which determines the level of loss and turns a hazard into a disaster. In this chapter I will present my findings on the pre-earthquake housing stock in the study area, the prevalent construction typologies, the reasons for adopting these typologies, and the reasons for wide-spread destruction of the housing stock. I will also explain the role of the development policies of successive governments in AJK in laying the foundation of disaster vulnerability in the study area. The findings presented in this chapter are derived from academic literature, secondary data (mainly of the ERRA and the SERRA), primary data (both qualitative and quantitative) collected during my two fieldwork episodes, and my personal experience of working in these areas for more than a decade.

Chapter 6 (Post-2005 Earthquake Housing Reconstruction in AJK), this chapter deals with the housing reconstruction programme which was started by the Government of Pakistan in 2006, in the aftermath of 2005 earthquake. I have explored the nature of the vulnerability of the built environment in AJK at the time of the earthquake and the level of damage caused by the earthquake; the progress of the housing reconstruction programme in three contexts: the geographical context, which looks into the progress in rural and urban settings in two Districts; the economic context, in which I will investigate the progress across different income groups in the study area; and, the social context, which mainly focuses on gender.

Chapter 7 (Impact of the Housing Reconstruction Programme), discusses the impact of the housing reconstruction programme in the study area. The first impact that I will evaluate is the sustainability of the seismic resistant construction in rural and urban areas post housing reconstruction programme. The second is the status of vulnerability of the housing stock in the study area after the completion of the housing reconstruction programme. The third is the impact of the housing reconstruction programme on the family structure and landownership pattern in the study area. Due to limited availability of the academic literature, I have relied mainly on grey literature, my qualitative data (semi-structured interviews and focus group discussions) collected during fieldwork, my personal experience of working in the study area after the earthquake, and my observations made during fieldwork.

Chapter 8 (Sharing the Findings with Respondents), is the discussion chapter of the thesis. It is based on my feedback to the respondents engaged in my research during my first fieldwork. This fieldwork was undertaken during my second fieldwork in order to share the findings of the first fieldwork. I will explain how people feel about these findings and how these findings fit into the literature. I also present the Lessons Learnt and Recommendations in this chapter, which were drawn from the qualitative data (mainly interviews and focus groups) collected during two fieldworks.

Chapter 9 (Conclusion), this chapter wraps up the thesis. The physical context, theoretical basis and empirical findings of the study will be briefly summed up. Limitations of the study and challenges faced during this research will be discussed here. I will also elaborate the contribution of the present study into the existing body of knowledge and will make suggestions for future research.

CHAPTER 2: THE KASHMIR EARTHQUAKE 2005

2.1. Introduction

This chapter describes the 8th October 2005 earthquake in Kashmir, and ensuing events. I have described how I experienced the earthquake as a citizen and as a government official in the area. Then I have given a detailed account of rescue and relief activities. In the later sections I have briefly explained how reconstruction and rehabilitation activities were carried out once the relief phase was over. I have also given a detailed account of the housing reconstruction programme, due to its importance for my study.

2.2. The Earthquake

It was a fine autumn morning in Muzaffarabad on 8th October 2005. I was in the sitting room of my house along with my eight day old daughter when I heard a loud bang, like loud thunder, and saw the roof of the room being ripped apart from the walls. Unwittingly I picked my daughter from the sofa, hid her under my chest and started running out of the house without thinking about anything else. It was like running for ages, crossing three rooms. I could see the walls and roof falling on us but I continued running. When I reached the kitchen, the outer walls of the kitchen had fallen and the room was full of debris. My chef had huddled himself in a corner; frozen like a statue. There was no door or window anymore except for a small hole in the debris through which I slid out my daughter and then dug rubble with my bare hands to make room for myself to crawl out. I asked my chef to follow me. Once out of the debris I put my daughter onto the ground and turned around to look for my family, there was no house but only a huge heap of debris. There was no way that I could enter into that heap; so I ran out of the lawn, bare footed, and took a round of the street about 300 meters long and reached the backyard of the house. Luckily I found my wife and two kids (aged 3 and 5) safely standing in the backyard. They had crept through a hole where there used to be an air conditioner, which was now lying a few yards away.

Until that time I had no idea what had happened. I thought something had happened to our house only but when I came to my senses I could see dust and heaps of debris everywhere. After gathering my family in a safe corner of the lawn, I walked around in the streets and found out that all the houses had fallen. Being a government colony, I knew most of the people there. Most of the houses had at least one or two people trapped under the debris. It was only then that I could realize that something terrible had happened. I took my car and drove around in the city. Most of the roads were blocked due to fallen buildings. There was destruction everywhere, people were running around, parents were wailing and frantically searching for their missing children. The wireless in my car was relaying messages of destruction from all over the district. Then I realized that an earthquake had hit us.

It was our first experience of a major earthquake. The magnitude of the earthquake was $M_{w\,=}7.6$ and the epicentre was 11 km north of Muzaffarabad city (*Figure 2.1*). This earthquake was associated with the rupture of the Main Boundary Thrust (MBT) in the Hazara Kashmir Syntaxis (HKS) (Avouac *et al*. 2006; Mona Lisa *et al*. 2008). It was thus far the deadliest earthquake in the history of Pakistan. Aftershocks continued many weeks after the main event and more than 1,000 aftershocks of up to $M_{w\,=}6$ were recorded (ADB 2011). These aftershocks caused many more buildings to collapse in the area.

2.2.1. Search & Rescue

We never expected anything like this earthquake; in fact we had no knowledge of the seismic hazard in the area, so we were not prepared for it. There was no rescue system in the country. Despite facing environmental disasters repeatedly, the only disaster management mechanism in the country was the West Pakistan National Calamities Act of 1958 (NDMA 2011). This law provided a legal basis to authorities to maintain and restore law and order in areas affected by calamities and provide relief against such calamities. An Emergency Relief Cell existed within the Cabinet Division at the federal level with similar institutional arrangements at the provincial level in the form of Relief Commissioners (*ibid*). However, this arrangement was meant to provide relief goods and some cash in case of a natural calamity; there was no concept of disaster mitigation or disaster management, or even search and rescue.

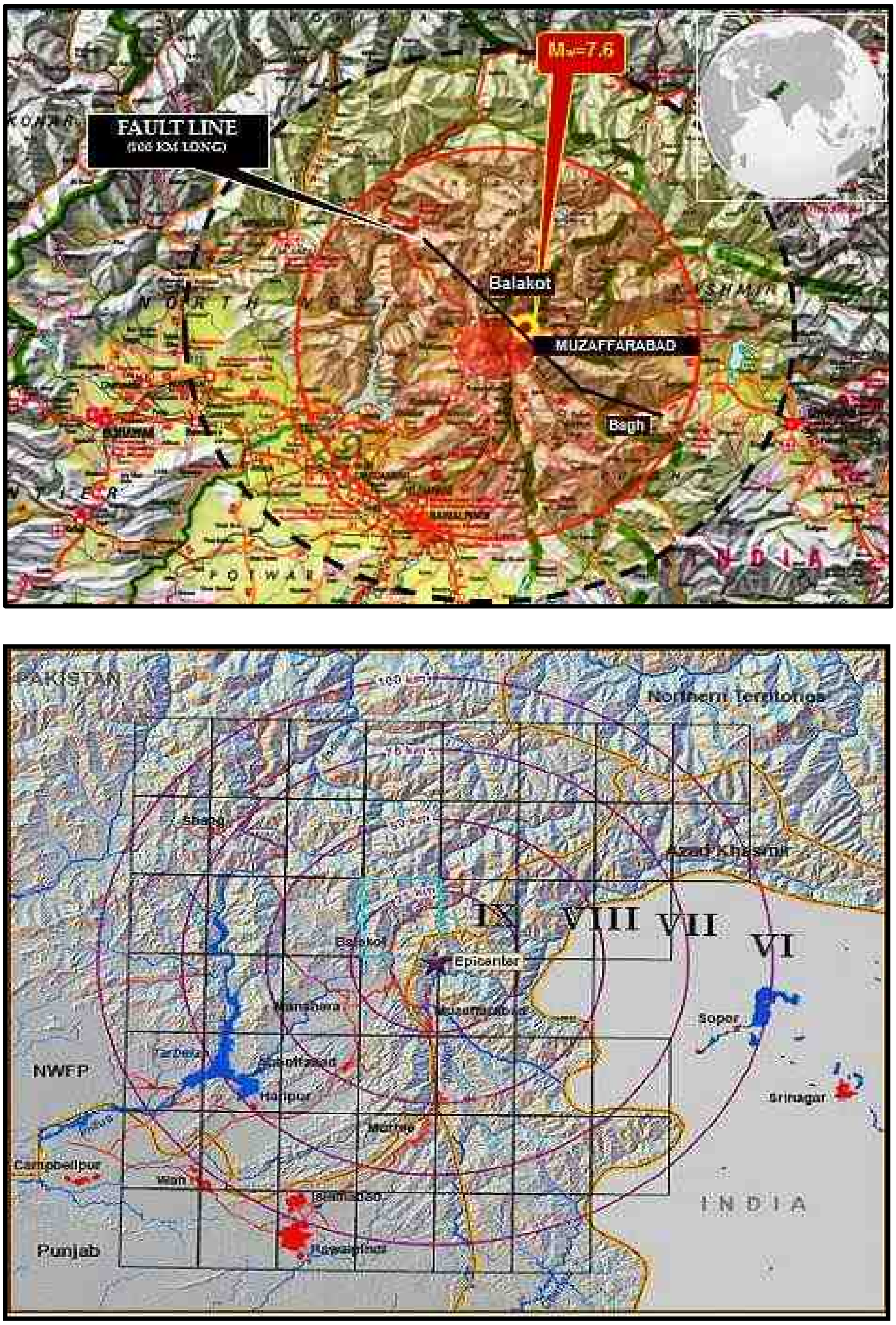


Figure 2.1 2005 earthquake location and intensity maps. (Source: SERRA 2015)

So it was with this capacity that we had to deal with the biggest earthquake in the history of the country. The main hospital of the city was destroyed and the second was partially damaged but inaccessible due to landslides. As happens in emergencies in countries like ours, I decided to seek help from the Army and went to one of the nearby Brigade Headquarters. The scene there was not much different from elsewhere in the city; most of the buildings were destroyed, some of the staff were buried under the rubble, and there was no communication with the rest of the country. There wasn't much that we could do during rest of the day to save lives. It was in the afternoon that the Army restored its communications and some sort of activity started, but there was no formally organized response; people mostly tried to manage things themselves.

The official response was limited to very little medical aid, one or two bulldozers trying to cope with the frantic demand of digging out the injured and the dead, and some police and local administration trying to solace the people. Armed forces helicopters started coming the next day with medical aid and troops; they took the seriously injured on their way back to Islamabad. Rescue teams from Turkey were the first to reach Muzaffarabad on the third day of the earthquake. The government of Pakistan started one of the biggest rescue and relief operations in history of the country with the help of international community.

Figure 2.2 Shifting the injured from Muzaffarabad to Islamabad (Source: ERRA 2015)

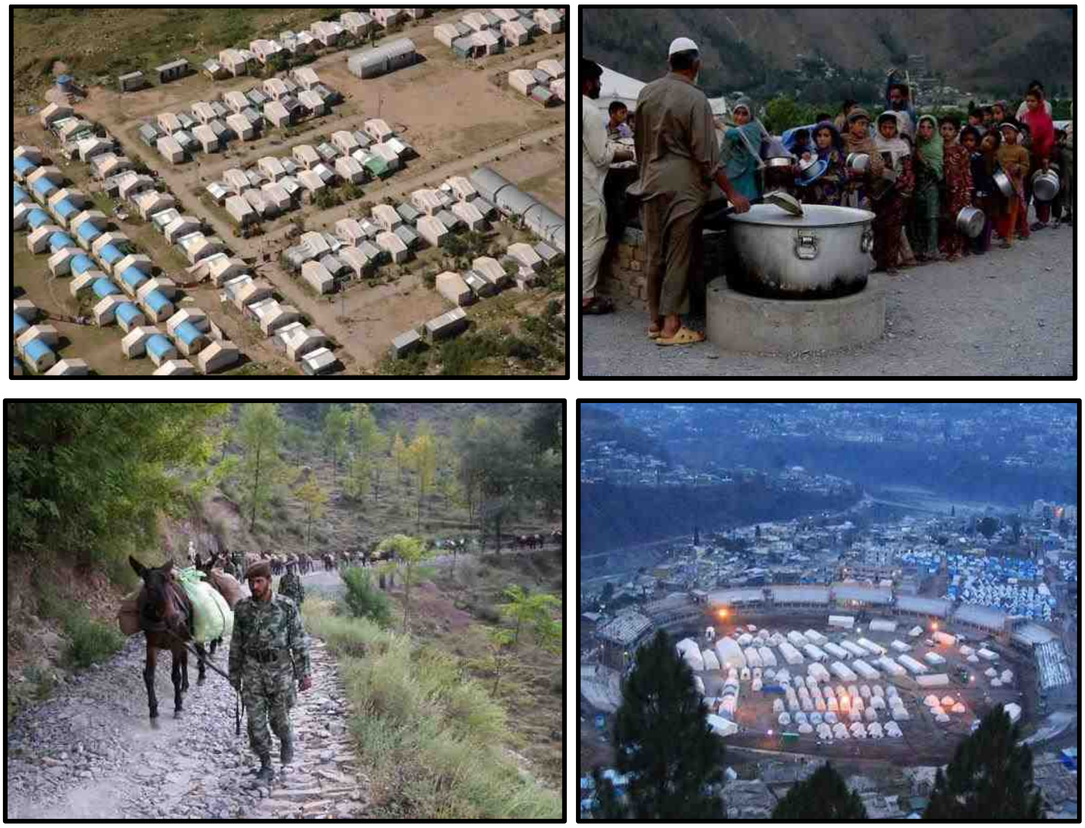


Figure 2.3 (Clockwise from top left): an IDP camp, distribution of cooked food, taking relief goods to far-off places, ICRC field hospital in Muzaffarabad. (Source: SERRA 2015)

125 helicopters made more than 5,000 sorties in the earthquake areas over the next few weeks carrying all sorts of relief goods and the injured. I used to go to the helipad before dawn every day and spend the whole day in organizing the relief activities until the evening, attending meetings there until very late in the evening and then return to my makeshift office to work till two or three in the night. Within a few days we were able to open main roads and restore electricity, water, and telephone in Muzaffarabad city and adjoining areas. Dozens of medical camps, tent villages, and relief camps were set up all over the affected areas and elsewhere in Pakistan.

2.2.2. Earthquake Damages

Within days of the earthquake the authorities started the damage assessment exercise to determine the losses and plan for the reconstruction and rehabilitation activities. I still remember that the government gave me 80,000 rupees (US$ 1300 approx.) to conduct the survey. I gave 1,000 rupees (US$ 16) to each *Patwari* (there were 80 *Patwaris* in my district) and sent them for damage assessment. This 1,000 rupees amount was not enough for even one time meal at that time. Most of these *Patwaris* were themselves severely affected by the earthquake; almost all had their houses damaged and most had family members dead or injured. These people worked selflessly in the most miserable conditions for the next ten days travelling on foot to far flung hilly areas in bitter cold without any provision of food and shelter. We had no computers so all compilation was done manually.

A similar damage assessment was conducted in all earthquake affected areas. This data collection exercise was supervised by a committee comprising of representatives of the Asian Development Bank (ADB), the World Bank, governments of Pakistan, North West Frontier Province (NWFP) and Azad Jammu & Kashmir (AJ&K). A Damage and Needs Assessment report was prepared by the Asian Development Bank and the World Bank in consultation with many other national and international organizations (e.g. the EU, DFID, GTZ, KfW, JBIC, JICA, USAID, WHO, FAO, UNICEF, UNDP) to estimate the damage and reconstruction cost of the earthquake (ADB 2005). All planning for the future reconstruction and rehabilitation was to be based on this report.

The damage reports showed that the earthquake had caused widespread and massive damage in AJK and adjoining areas of the then North West Frontier Province (NWFP). Approximately 30,000 km^2 (roughly the size of Belgium) was impacted by the earthquake. More than 85,000 people were killed and 128,000 were injured (ERRA 2011$_b$). Over 600,000 houses were damaged and 2.8 million people were rendered homeless. Thousands of public and private buildings were also destroyed (*ibid*). Livelihoods of the people, especially the poor, were also severely impacted as businesses and agriculture were destroyed, livestock were killed, and the employment was lost. The damage was estimated to be over US$ 5 billion ((*ibid*)). Private housing suffered damage worth approximately PKR 68,438 million (US$ 1.2 billion) (ADB 2005). It is estimated that majority of deaths occurred due to the immediate collapse of poorly constructed buildings (*Figure 2.4*). Almost 80% of all the buildings which collapsed were *kacha* houses in rural areas. These buildings were constructed without any seismic resistant specifications (ERRA 2011_b). The earthquake paralysed the whole government machinery in the affected areas. Many government employees and their families were either killed or injured and their houses were destroyed. Almost all government buildings and communication systems were destroyed. It was not possible to have any sort of contact with most of the government employees for the initial few days after the earthquake which seriously affected the search and rescue activities.

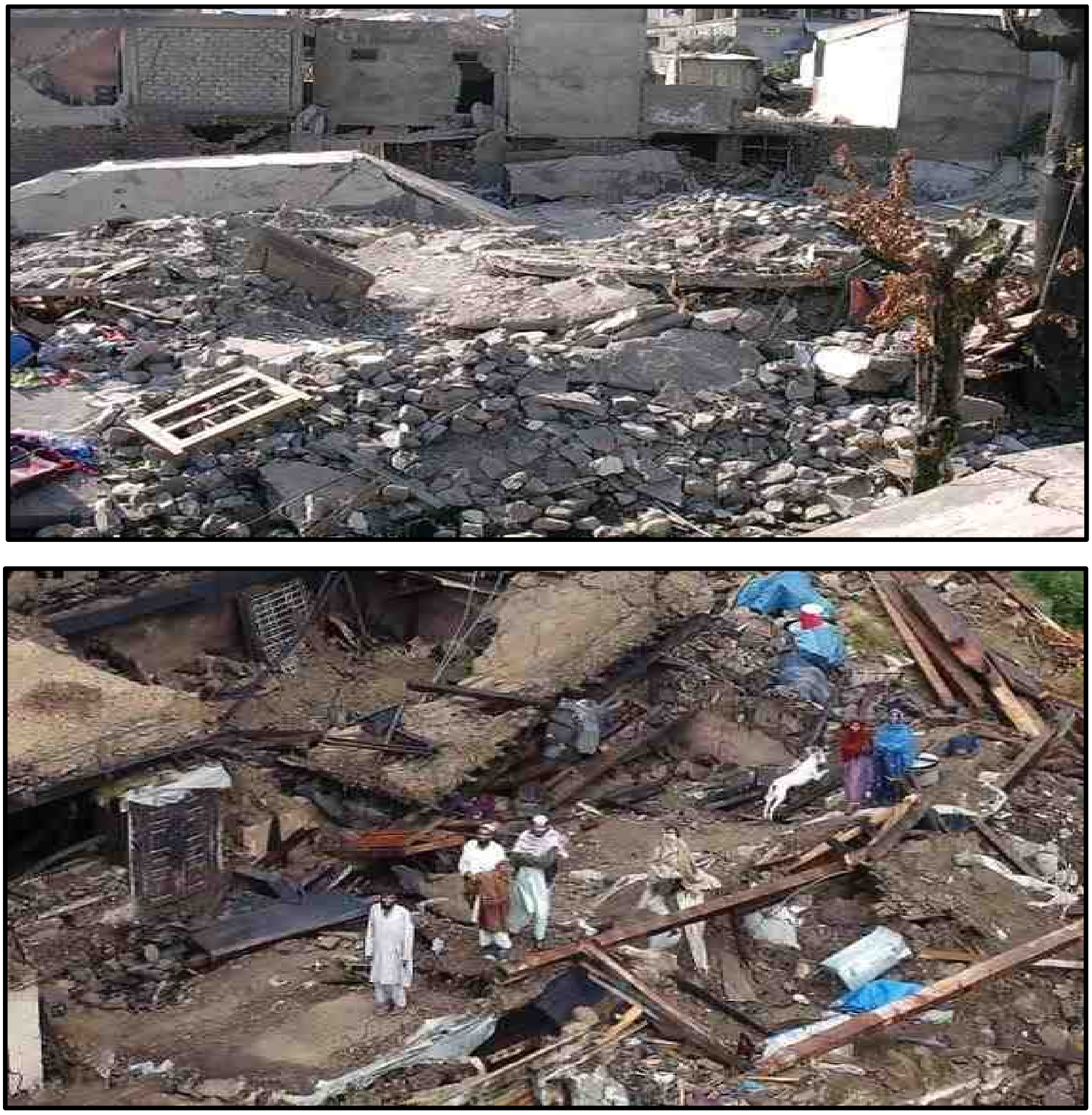


Figure 2.4 Destroyed towns and villages. (Source: SERRA 2015)

2.2.3. Damage in AJK

The earthquake caused extensive damage and impacted almost half of AJK (*Figure 2.5*).

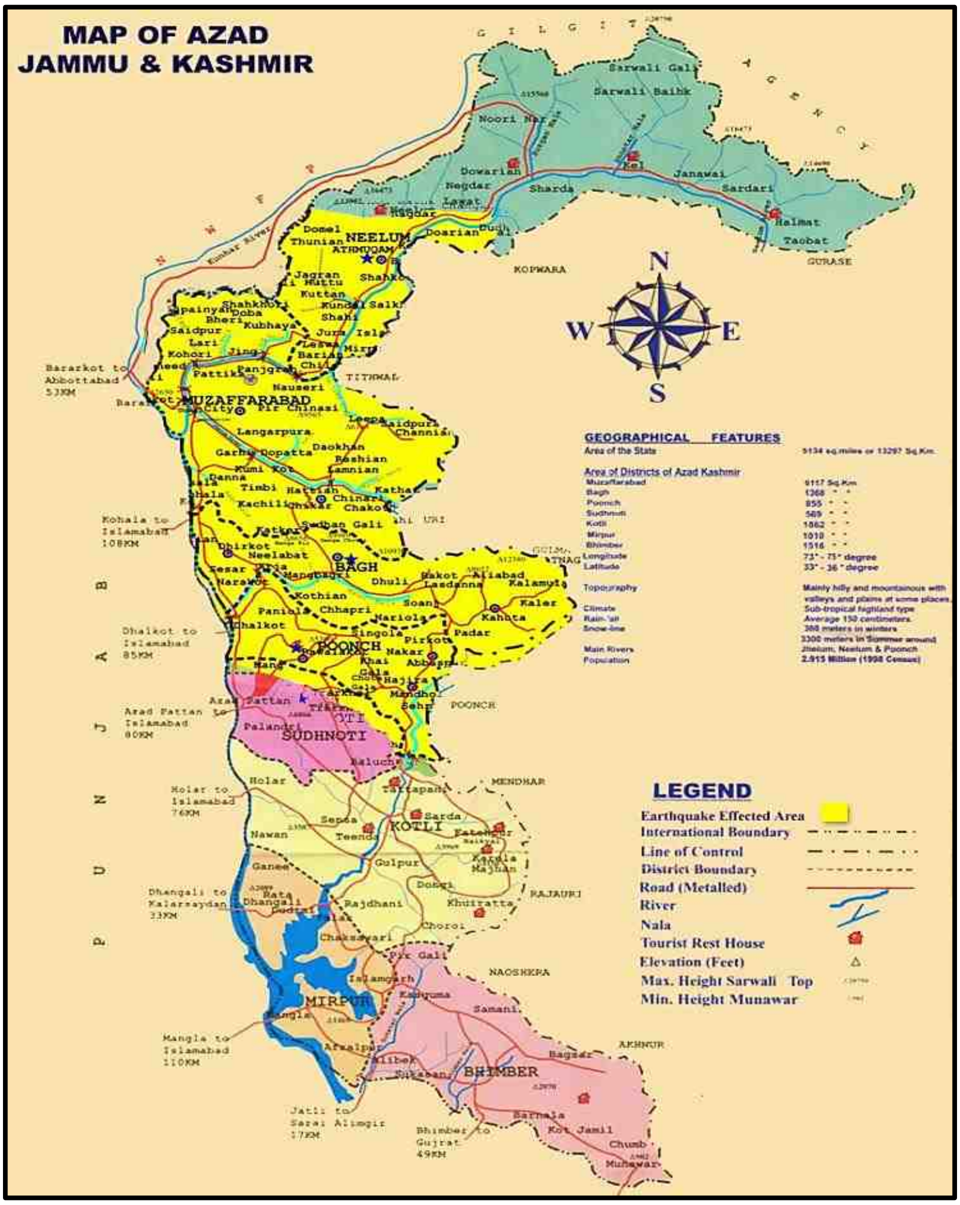


Figure 2.5 Map of Azad Jammu & Kashmir; yellow colour shows earthquake affected area. (Source: SERRA 2015)

The number of deaths, injured, and other damages in AJK was the highest in the country (*Table 2.1*). Bagh and Muzaffarabad districts were the worst hit where maximum causalities occurred and the most buildings collapsed. The death toll in District Muzaffarabad was 33,724; more than 20,000 were injured and 125,000 houses (98% of the total housing stock in the district) were damaged (ERRA 2007$_a$; NDMA 2012). 8,157 people were killed; more than 6,000 were injured and more than 65,000 (99.7 % of the housing stock) houses were damaged in District Bagh (*ibid*).

Table 2.1 Losses in AJK due to 2005 earthquake.

Affected area	**7000 Sq. Km (Total area 13297 Sq. Km)**
Population affected	1.80 million (Total population 3.5 million)
Villages affected	977 (Total villages 1646)
Houses Damaged	314,474
Deaths	46,570
Injured	33,136
Estimated Losses in Private Sector: *(Private Housing: PKR. 50.000 billion Economic Assets: PKR.10.875 billion)*	PKR. 60.875 billion
Estimated Damages in Public Sector (See Annex-2 for detail of damages)	PKR. 64.328 billion
Total Losses	PKR. 125.203 billion

(*Source: developed by the author based on the SERRA data)*

2.3. Post-earthquake Reconstruction and Rehabilitation

The Government of Pakistan quickly realised that the task of reconstruction and rehabilitation of the earthquake affected areas was immense and beyond the capacity of the disaster impacted provincial governments. The Earthquake Reconstruction & Rehabilitation Authority (ERRA) was created at the federal level on 24th October 2005 (only 16 days after the earthquake) to lead the task of post-earthquake reconstruction in the affected areas. The purpose was to *'bring all activities, relevant to post disaster damage assessment, reconstruction and rehabilitation in affected areas under one umbrella'* (ERRA 2011, p. 8). It was the first organization of its kind in the history of Pakistan; no such institutional arrangement was made in case of previous disasters in the country. The role of the ERRA was coordination, planning, monitoring & evaluation, and financial management of the reconstruction work (ERRA 2011, p.8). In order to involve the governments of earthquake affected areas into the reconstruction and rehabilitation work, the Government of Pakistan decided to establish institutional arrangements in those areas as well. The State Earthquake Reconstruction & Rehabilitation Agency (SERRA) was established in AJK, the Provincial Reconstruction & Rehabilitation Agency (PERRA) was established for the NWFP, and District Reconstruction Unit (DRU) were established in 9 earthquake affected districts to undertake the task of reconstruction (*Figure 2.5*). The ERRA very quickly started working on the formulation of reconstruction and rehabilitation policy. The ERRA divided the whole reconstruction work into twelve sectors, namely: (i) Education, (ii) Health, (iii) Livelihood, (iv) Transport & Communication, (v) Water Supply and Sanitation, (vi) Power Generation/Electricity, (vii) Social Protection/Vulnerable Groups, (viii) Industries & Tourism, (ix) Governance, (x) Environment, (xi) Telecommunication, and (xii) Housing (ADB 2011, 2012). The reconstruction work was started in 2006. I will confine myself to the housing reconstruction programme only in this research.

2.4. Housing Reconstruction Programme

The housing sector had suffered the biggest damage in the earthquake. Almost 80% of the housing stock in the earthquake affected areas was damaged leaving almost 3 million people homeless (World Bank 2011). One of the biggest challenges after the earthquake was that millions of shelter-less people were scattered over thousands of square kilometres (Cheema 2006). In these areas winter sets in early November, especially in high mountains, so the situation was getting worse day by day. The government and the humanitarian agencies distributed hundreds of thousands of tents but later on it became clear that only 20% of tents could provide protection against winter and snow (Qazi 2008). Different solutions such as provision of heating equipment and insulation material were considered to provide the affected people protection from elements but both these options were found to be impracticable due to safety issues, using heating equipment in tents and unavailability of large quantities of insulation material. Then the authorities came up with the solution of ‘transitional’ housing. The affected people were asked to salvage material from their damaged houses and construct shelters for themselves. Each house owner was given 25,000 rupees and CGI sheets to help them in construction. This strategy was successfully implemented and the affected people were saved from the difficulties of harsh winters (ERRA 2011; Qazi 2008; UN-Habitat 2011). I used to fly frequently in the district and noticed the changes myself; soon after the earthquake I could see miserable scenes of debris everywhere instead of houses, then tents started to pop up from the first week, after two months or so we could see people carrying CGI sheets on their backs and bright roofs of shelters started to come up on high mountains. It was such a relief and joy to see.

Naturally housing reconstruction became the top most priority of the government. Out of the ERRA's twelve sectors, the housing reconstruction was the first sector to start working in 2006. It became the flagship project of the post-earthquake reconstruction programme. It was the single largest component of the ERRA's portfolio. Reconstruction of more than 462,000 destroyed houses and repair of 100,000 damaged houses was an immense challenge. According to the ERRA figures, 96% of the destroyed houses had been reconstructed by October 2013. The ERRA takes pride in this achievement and considers it a success story in Pakistan and beyond. Pakistan was awarded the UN Sasakawa Award in 2011 for excellence in housing sector (ERRA 2011).

In this research I will evaluate the housing reconstruction programme. I will look into the housing reconstruction in AJK only.

2.4.1. Housing Reconstruction Policy

Simultaneously with 'transitional' housing, the ERRA had started a consultation process to formulate the housing reconstruction policy. The consultation process was jointly led by the UN-HABITAT and the ERRA. More than 80 national and international organizations and the Government of AJK and the Government of NWFP participated in the process (ADB 2011). I also participated in a 2-day consultative workshop in Islamabad as Deputy Commissioner in February 2006. As a result of this consultative process, the Owner-driven housing reconstruction approach was adopted to *'provide* *financial and technical assistance to affected home owners in AJK and NWFP, in reconstructing or retrofitting their damaged houses, using a home-owner driven, but assisted and inspected construction regime'* (ERRA 2006, p. 4).

The guiding principles for housing reconstruction were (ERRA 2006, p. 14):

- Seismic resistant reconstruction;
- Rebuild in situ: wherever possible encourage households to rebuild on their original plot of land;
- Owner-driven approach - homeowners to manage the rebuilding of their houses by hiring labour and/or use their own labour;
- Rebuild with familiar methods and easily accessible materials- earthquake resistant techniques to be introduced in the traditional and prevalent construction practices;
- Relocation of settlements only when necessary to minimize exposure to hazards;
- Strategic and limited urban planning;
- Uniform financial assistance package;
- Full spatial coverage of the damaged houses;
- Complement housing reconstruction with livelihoods and social and physical services support.

These guiding principles were applicable to both rural and urban areas; however their interpretation and implementation varied accordingly.

2.4.1.1. Why Owner Driven Approach?

The owner-driven housing reconstruction approach was never practiced before in Pakistan after a disaster. This approach was not only new to Pakistan but also practised more widely for the first time. The Owner-driven approach was partially adopted in Gujarat (India) after 2001 earthquake but it was for the first time in Pakistan that this approach was adopted at a massive scale. Certain factors helped in taking up this approach.

According to Qazi (2008) it was due to the success of the transitional housing strategy, the overwhelming large number of damaged houses and the advocacy of the humanitarian agencies that the Government of Pakistan opted for the Owner-driven housing reconstruction approach. The success of the transitional housing proved that the affected people were not merely the victims of a tragedy but they were capable and resilient enough to become principle actors in reconstruction, if technical guidance was provided. In a way the successful implementation of transitional housing strategy laid the foundation for Owner-driven housing reconstruction. According to Schacher (2008: no pagination), the Owner-driven reconstruction approach was adopted to ensure quick and cost-effective reconstruction of houses by using the inherent potential of the affected people. The concept of *'Build Back Better'* was central in this approach to promote seismic resistant building techniques and safer houses for communities (*ibid*). Hassan (2005, cited in Leersum & Arora 2011: p. 255-256) observed that the scale of the disaster was too large for any other housing reconstruction approach such as contractor-driven approach or to build model villages or to construct prefabricated houses. According to Davis (2010_a) international organizations such as UN-Habitat and the World Bank were the main proponents of the owner-driven approach in Pakistan and elsewhere in the world.

While explaining the reason behind adopting the owner-driven reconstruction policy, General Nadeem Ahmad, the founding Deputy Chairman of the ERRA, told me that the 2005 earthquake was an eye-opener for all because no one had seen such a big disaster in Pakistan (personal communication). He suggested that luckily the leadership of that time was very dynamic and visionary and accepted the proposal to construct seismically resistant houses because the whole area was full of fault lines and if seismically unsafe houses were constructed, these houses were bound to collapse again in case of next earthquake (*ibid*).

The Asian Development Bank, one of the main financers of this programme, was of the opinion that the local conditions dictated the adoption of ODR in Pakistan (personal communication). Four factors were basic in deciding in favour of ODR. One was the recent international experience of post-disaster housing reconstruction; the donor-driven post-2004 tsunami housing reconstruction programme was progressing at a very slow pace in Indonesia and people were not very happy with the newly constructed houses. The second was the quality issue i.e. how to ensure good quality housing if housing reconstruction was given to the community or contractors. The third was that outsourcing to the contractors was not cost effective due to the scattered population. The fourth was the attitude and mind-set of the affected people, who wanted to return to ancestral places.

A former Programme Manager (Housing) at the ERRA was of the opinion that though the World Bank was the main '*advocate'* of this approach apart from other donors, the internal capacity of the provincial governments was the main reason for adopting the ODR approach because their capacity was practically non-existent due to the earthquake (personal communication). The provincial governments would have found it extremely difficult to implement community-driven or contractor-driven approach. The World Bank also verified that they *'took the lead'* in adopting this approach because they had *'some experience of housing in Gujarat'* (personal communication).

So it was the recommendation of the donors, the willingness of the government, the immense volume of the work, geographical and social realities of the affected areas, and the limited capacity of the contractors and the provincial governments that the Owner-driven housing reconstruction approach was adopted in Pakistan. The post-earthquake housing reconstruction policy consisted of two strategies; Rural Housing Reconstruction Strategy and Urban Housing Reconstruction Strategy.

2.5. Rural Housing Reconstruction Strategy

The 'Rural Housing Reconstruction Strategy of Earthquake Hit Districts in NWFP and AJK' was announced in March 2006. The objective of this policy was to *'ensure that an estimated 400,000 houses that were either destroyed* *or damaged, will be rebuilt by using earthquake resistant building techniques, through grant assistance from the Government to eligible households'* (ERRA 2006, p. 3).

Rural areas make up 82% of AJK (P&DD 2006) so the rural housing strategy affects the biggest part of the population. All areas, regardless of their size, were considered rural areas and their rebuilding came under ERRA's rural program except for urban areas of Muzaffarabad, Bagh and Rawalakot in AJK (which were included in urban housing strategy). Many towns such as Garhi Dopatta, Naseerabad, Hattianbala, and Dhirkot remained part of the rural housing programme.

The rural housing reconstruction strategy had three main components: (a) cash grants for reconstruction or retrofitting; (b) technical assistance; and, (c) capacity-building of all affected stakeholders (ERRA 2006).

(a) Cash Grants

The government announced a uniform financial assistance package regardless of the type of construction and size of the building. There used to be different financial assistance in case of *kacha* (non-permanent or mud houses) and *pukka (*permanent*)* construction in the past (See Annex-1) but this distinction was not observed in case of 2005 earthquake and uniform financial assistance was given for both *kacha* (non-permanent) and *pukka (permanent)* houses (*Table 2.2*). The financial assistance package for completely damaged house was calculated on the basis of each homeowner being able to build a "core house" of between 250 and 400 sq. ft. depending on their choice of structural solution.

The homeowners were expected to use their own labour and recycle the material of the damaged house to minimize the cost of construction. Since joint family system was common in these areas, cash grant was initially given on the basis of housing units; not households i.e. one house one grant (ERRA 2006). However, this policy was changed later and the grant was given to all those in a house who could prove themselves to be an independent family, though living in the same building.

The housing cash grant was proposed to be paid in instalments through bank accounts i.e. crediting money into the house owner's bank account directly. This step was taken to eliminate corruption and bribery on the part of government officials and save the affected people from wasting their time by coming to government offices. However, the problem was that very few people had bank accounts in these areas due to poverty and illiteracy, so the government's decision to transfer the housing cash grant into the beneficiary bank account created problems. To remove this bottleneck, the government instructed the banks to open accounts on priority basis without going into much formality. Service charges of the banks were paid by the ERRA. Banks were also directed not to insist upon the production of Computerized National Identity Cards for the opening of Bank accounts. One window operation was also launched at Union Council / Tehsil / District level by the National Database & Registration Authority (NADRA) to issue Computerized National Identity Card to the applicants on fast-track basis without the house owner going from one office to the other.

Table 2.2 Housing cash grant package.

Nature of Damage	Amount
Completely Damaged	PKR 175,000 (US$ 2900 approx.)
Partially Damaged	PKR 75,000 (US$ 1260 approx.)
Negligibly Damaged	PKR 25,000 (US$ 420 approx.)

(Source: Developed by the author from ERRA Housing Strategy 2006)

(b) Technical Assistance

Poor quality of construction was one of the major causes of damage to housing stock in the earthquake affected areas (Husain 2008; Halvorson & Hamilton 2010; Leersum & Arora 2011; Kazmi *et al*. 2012; Ozerdem 2006). It was necessary to build new houses according to seismic resistant standards to avoid any similar situation in future. Keeping in mind the poor technical capabilities of the people and the provincial governments, technical assistance was proposed in the housing strategy for these stakeholders in following areas (ERRA 2006, p. 14-28):

- *Hazard risk mapping:* Since there was no hazard mapping in the study area before the earthquake, the strategy proposed hazard and risk mapping to identify areas susceptible to future environmental disasters such as earthquakes, landslides and erosion;
- *Damage and eligibility assessment:* A comprehensive exercise was proposed to categorize the extent of damage to each house, preparation and verification of lists of house owners eligible for housing cash grant, and estimate the construction material requirements (Annex-5);
- *Seismic-resistant housing solutions*: Since there was no previous experience of seismic resistant construction in the earthquake affected areas, it was proposed that the house owners will be provided seismic resistant construction drawings, fabrication drawings, illustrated construction manuals and flyers, and onsite technical guidance by AITs (Annex-9a, 9b, 9c);
- *Building materials hubs* were to be set up in different areas to provide good quality construction material at competitive rates;
- *Land issues*: It was proposed that the relocation of the affected population will be avoided as much as possible, and will only be made in unavoidable circumstances; on voluntary basis and in consultation with the affected communities only. A policy for land acquisition was also developed. Protection of the rights of the vulnerable groups, especially women, was given special attention.

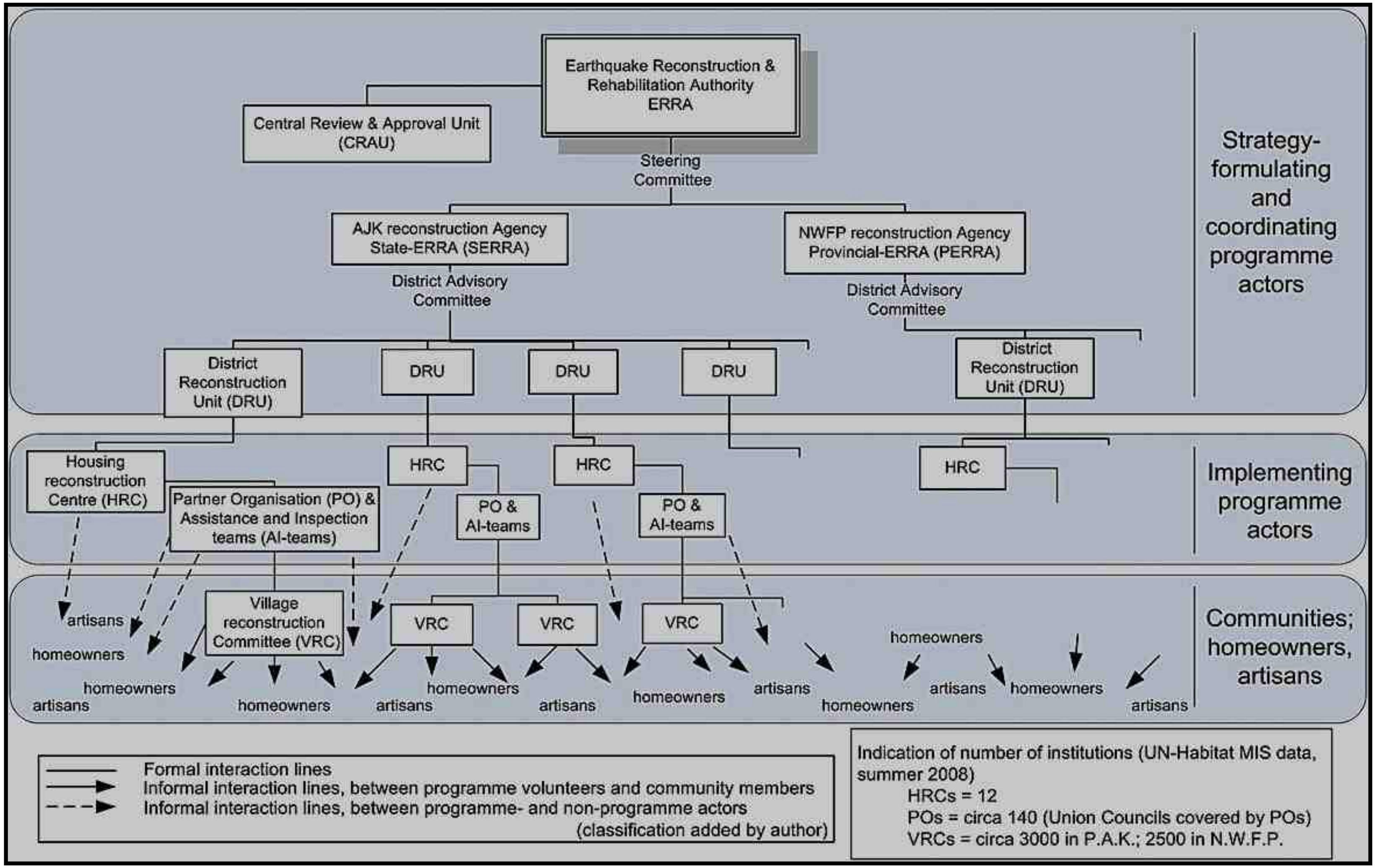
(c) Capacity Building

The strategy proposed capacity building of the local authorities and Partner Organisations in following areas:

- *ERRA policies and procedures*: training was proposed to ensure thorough understanding and optimum compliance;
- *Social mobilisation*: training in the preparation of village profiles, establishment of Community Housing Reconstruction Committees, procurement sub-committees, and community monitoring (Annex-11).
- *Environmental degradation:* The massive reconstruction activity was expected to generate negative environmental impacts. Training in these issues was proposed to reduce environmental degradation;
- *Housing reconstruction training*: Simple guidance at village level on incorporating earthquake resistant reconstruction techniques and materials into local housing types and use of seismic resistant housing designs;
- *Skills training*: Training for masons, carpenters, metal workers, plumbers and electricians;
- *Compliance training*: to government officials and Partner Organisations to enable them to verify compliance status;
- *Conventional designs* like *Dhajji-dewari* and *Bahttar* were allowed as approved designs because these traditional techniques had performed relatively better in the earthquake (Mumtaz *et al*. 2008 and Stephenson *et al*. 2008) (Annex-8a, 8b).

2.5.1. Institutional Framework

The strategy proposed that the housing reconstruction would be a decentralized activity. The ERRA was responsible for setting standards, provision of design options and construction guidelines, development of criteria for Partner Organization selection, construction related skills training, awareness campaign, and overall coordination and monitoring of the reconstruction process. Figure 2.5 shows the institutional framework for rural housing reconstruction. The ERRA, SERRA, and DRU are strategy formulating and coordinating bodies; Housing Reconstruction Centre (HRC), Partner Organization (PO), and Assistance & Inspection Team (AIT) are the implementing bodies; and Village Reconstruction Committee (VRC), homeowners, and artisans are to actually undertake the reconstruction work.


Earthquake Reconstruction & Rehabilitation Authority ERRA
Central Review & Approval Unit (CRAU)
Steering Committee
AJK reconstruction Agency State-ERRA (SERRA)
NWFP reconstruction Agency Provincial-ERRA (PERRA)
District Advisory Committee
District Advisory Committee
District Reconstruction Unit (DRU)
DRU
DRU
DRU
District Reconstruction Unit (DRU)
Strategy-formulating and coordinating programme actors
Housing reconstruction Centre (HRC)
Partner Organisation (PO) & Assistance and Inspection teams (AI-teams)
HRC
PO & AI-teams
HRC
PO & AI-teams
HRC
Implementing programme actors
Village reconstruction Committee (VRC)
VRC
VRC
VRC
artisans
homeowners
homeowners
artisans
homeowners
artisans
homeowners
artisans
homeowners
artisans
homeowners
homeowners
artisans
homeowners
artisans
Communities; homeowners, artisans
Formal interaction lines
Informal interaction lines, between programme volunteers and community members
Informal interaction lines, between programme- and non-programme actors
(classification added by author)
Indication of number of institutions (UN-Habitat MIS data, summer 2008)
HRCs = 12
POs = circa 140 (Union Councils covered by POs)
VRCs = circa 3000 in P.A.K.; 2500 in N.W.F.P.

8

Considering the limited capacity of the government machinery in the earthquake areas to cope with the unprecedented scale of reconstruction the ERRA decided to engage reputable Partner Organizations (POs)/NGOs to support the implementation of the Owner-driven housing reconstruction program. Where NGOs were not available, the Pakistan Army's Corps of Engineers was employed as Partner Organization. The task of the POs was to provide guidance to the affected communities in implementing the owner-driven housing reconstruction programme; train engineers and craftsmen; oversee reconstruction/restoration activities to assure quality and seismic resistant construction; ensure compliance with social and environmental risk mitigating measures; and undertake detailed damage and eligibility assessment survey in order to: (a) categorize the level of damage to each housing unit, and (b) establish lists of eligible beneficiaries. The POs were also required to establish field offices for supporting the assistance, inspection, and training activities in a minimum of one or more Union Councils. The POs reported to the Housing Coordinators (HC) of the District Reconstruction Units (ERRA 2006, p. 24-25).

The POs were required to constitute three-member Assistance and Inspection Teams (AITs) comprising of a government officer, a social organizer, and an engineer. These teams were trained in assessment techniques and criteria in order to ensure uniform compliance of construction standards across all affected areas. A final list of beneficiaries was to be determined by the AITs through a house to house assessment of damage. AITs were required to sign a Memorandum of Understanding (MoU) with each homeowner eligible for the financial assistance package (Annex-12). The purpose of the MoU was to ensure agreement on the part of the homeowner to rebuild according to earthquake resistant standards. These teams were to visit each under-construction house at three different stages (i.e. foundation, plinth, and lintel levels) to ensure compliance with construction standards and recommend the house for next instalment of the housing cash grant. The payment of instalments was made directly into the bank account of the house owner.

There were many donors who wanted to adopt a whole village for reconstruction. In order to maintain the uniformity of construction, donors were required to adhere to the ERRA approved specifications in the reconstruction of villages of their choice. It was decided that to retain the identity of the earthquake affected areas no village will be renamed to acknowledge the contribution of the donor.

2.5.2. Skills and Compliance Training

The ERRA estimated that the proposed housing reconstruction programme will involve an approximate ten-fold increase in pre-earthquake housing activity in the affected districts over a 3-year period (ERRA 2006). It was also estimated that about 60,000 skilled and 80,000 semiskilled/unskilled workforce would be required. About 20% of the workforce requirement was estimated to be met by the skilled construction work force that was already available in the country and the remaining 80% of the required workforce will have to be trained from scratch (*ibid*). The housing reconstruction strategy provides for earthquake resistant construction training to both the already trained workforce and the new one as well.

2.5.3. Inspection and Compliance

In order to ensure that the homeowners completed the construction of their houses soon enough according to government’s seismic resistant construction solutions, the POs were required to inform the relevant government appointed Compliance Officer upon completion of each building stage to verify the building for the timely disbursement of next instalment of cash grant. In case of non-compliance the homeowner was suggested corrective measures to make the building compliant with ERRA specifications.

2.5.4. Grievance Redressal Mechanism

The immense volume of work and previously unfamiliar housing reconstruction strategy was bound to cause certain implementation issues. A grievance redressal mechanism was proposed in the strategy to address issues like incorrect eligibility/housing damage assessment, incorrect amount of payment, lack of payment despite eligibility, payment delays, and land and property related disputes.

2.5.5. Monitoring & Evaluation

A comprehensive multi-layered Monitoring & Evaluation system was provided in the strategy to ensure timely completion of housing reconstruction. POs were responsible for the monitoring and evaluation of progress in their Union Councils. The Housing Reconstruction Centres were responsible for monitoring and evaluation of the POs delivery of training. The District Reconstruction Units were required to carry out periodic spot checks to monitor progress and compliance. The ERRA also had separate staff for this purpose. The criteria for Monitoring & Evaluation were:

- Amount of restoration/reconstruction grants disbursed;
- Number of houses reconstructed/restored to earthquake resistant standards;
- Number of craftsmen trained in key trades (masons and carpenters); and
- Percentage of complaints redressed.

2.6. Urban Housing Reconstruction Strategy

Though the guiding principles of the rural housing reconstruction policy were applicable to both rural and urban areas, their interpretation and implementation could vary according to geographical setting i.e. rural/urban (ERRA 2006). The Urban Development Strategy came out in August, 2007. Housing reconstruction in urban areas was made part of the Urban Development Strategy due to following reasons:

(a) Housing reconstruction in urban areas requires phasing with other activities of the Master Plan such as widening of roads and streets and construction of utility services;

(b) Housing reconstruction in urban areas requires planning and coordination to a much higher degree than in rural areas due to Seismic Microzonation to identify the seismic hazard in different parts of urban areas, preparation of building codes, public health and safety requirements; and

(c) Longer timeframes for completing tasks, higher costs, and more complex activities in urban environments as compared to rural areas.

The urban housing reconstruction policy had three objectives: reconstruction of 28,000 urban houses according to new disaster resistant building codes approved by the respective State/Provincial governments; equitable land/monetary compensation in case of relocation; and minimum possible relocation of urban areas residents (ERRA 2006, p. 29).

2.6.1. Principles of the Urban Housing Strategy

The urban housing reconstruction strategy has following basic principles:

- Stakeholder consultation during planning, strategy formulation, and implementation at all levels;
- Decentralized decision-making;
- Transparency and accountability in decision-making, implementation, and enforcement;
- Minimum and rationalized relocation of residential areas;
- Payment of compensation in case of relocation/possession of private property;
- Increase homeownership opportunities, promote decent affordable housing, encourage pro-poor focus by providing house ownership opportunities to the poor segments of the society;
- Urban housing reconstruction to be synchronized with Town Planning & Urban Development;
- Urban residential areas to be fully functional & integrated part of the broader town plan;
- Reconstruction according to new seismic sensitive building codes;
- Emergency preparedness;
- Facilitate residents, government machinery, and other organs of the community to resume normal activity and participate in the reconstruction process;
- Educate stakeholders about causes of damage to housing stock and how to reduce vulnerability through disaster resistant rebuilding;
- Better coordination to avoid duplication.

These principles were to be achieved through following measures:

- Owner-driven housing reconstruction;

- Approval of construction designs by the municipal authorities to ensure compliance with new seismic resistant building codes;
- In situ rebuilding to minimize population relocation;
- Construction of *Kacha* houses not to be allowed in urban areas;
- Slum areas to be converted into low-income residential areas through re-planning and financial incentives; and
- Uniform housing cash grant.

The amount of the Housing Cash Grant was similar in both rural and urban areas. However, the disbursement method was slightly different in urban areas. Unlike rural areas, the 3rd and 4th instalments were paid simultaneously in urban areas after obtaining an affidavit from the homeowner that the construction drawing will be approved by the relevant municipal body in accordance with seismic resistant building codes and the Development Authorities will ensure compliance with the approved plans and codes whenever the homeowner does the construction in future. Like rural areas, the housing cash grant was transferred directly into the bank account of the house owner to ensure transparency (ERRA 2006).

2.6.2. Institutional Framework

The institutional framework for housing reconstruction was also different in urban areas. The top tier of the institutional framework was the same in urban and rural areas (Figure 2.5) i.e. the role of the ERRA, SERRA, and DRUs. The remaining two tiers were different i.e. there was no role of HRCs and POs in the middle tier and there were no VRCs in the bottom tier (Figure 2.5). The role of the AITs in the middle tier was also different in urban areas and limited to:

- Door-to-door assessment and compilation of lists of damaged houses;
- Door-to-door reassessment of incomplete/inaccurate assessment forms;
- Reassessment of forms that are subject to a formal grievance; and
- Guidance to house owners to open bank accounts.

Unlike rural areas, the AITs in urban areas did not sign MoU with homeowners and did not visit each under-construction house at three different stages (foundation, plinth, and lintel levels) to ensure compliance with construction standards and recommend the house for next instalment of housing cash grant. This role was to be performed by the municipal bodies and consultants in urban areas i.e. the construction drawings were to be prepared by the architect, the municipal body were to issue planning permission, and the consultant were to supervise the construction and give completion certificate. The ERRA provided financial and technical resources to municipal bodies to enhance their capacity to deal with the increased load of work quickly and efficiently. Technical assistance was provided for hazard risk mapping, damage and eligibility assessment, disaster-resistant building codes, facilitating the building materials markets, and land and property-related issues.

2.6.3. Medium Term Housing

Muzaffarabad, Bagh, and Rawalakot towns had developed without any town planning. Since these towns were mostly destroyed by the 2005 earthquake, it was thought an opportune moment by the authorities to do Master Planning of these towns for the purposes of reconstruction and future planning. Preparation of Land Use Plans (Annex-6) and Seismic Hazard Microzonation Plans were required to be done before the preparation of the Master Plans. These activities were expected to take at least 2 to 3 years before housing reconstruction activity could start. People needed a medium term housing solution during this period. So the urban development policy proposes the construction of *'Medium term urban areas'* to *'serve as intermediary step between livelihoods of evacuation areas and permanent rehabilitated residential areas'* (ERRA 2006, p. 44). Provision of pre-fabricated two-room houses was one of the components of this initiative. These houses were meant for:

(a) People affected by the 'Red zone' (areas on fault lines or on hazardous lands);

(b) Population affected due to implementation of Master Plan;

(c) Landless people; and

(d) Extremely vulnerable families.

It was for the first time in the history of Pakistan that post-disaster housing reconstruction was done according to a well-planned policy which was formulated through the involvement of many international, national, and local stakeholders. The implementation of this policy and its impact on the earthquake affected areas will be discussed in the later chapters of this thesis.

CHAPTER 3: THEORETICAL FRAMEWORK

3.1. Introduction

In this chapter I discuss the theoretical framework of my research. Section 3.2 discusses the status of disaster knowledge in AJK. Section 3.3 is about disasters; definitions, disaster losses and their uneven distribution in the developing and the developed world, and disaster management approaches. Section 3.4 discusses the relationship between disasters and vulnerability. In section 3.5, I discuss the relationship between disasters and development and how development itself can lead to disaster vulnerability. In section 3.6, I describe the theoretical approach that I have adopted for my research. Section 3.7 discusses how disasters prove a window of opportunity of opportunity to set the past mistakes right and address disaster vulnerability. In section 3.8, I have discussed post-disaster housing reconstruction and different approaches that are currently in use around the world.

3.2. Disaster Knowledge in AJK

Before the 2005 Kashmir earthquake hardly anyone was familiar with the term ‘disaster’ in AJK. ‘Hazard’, ‘disaster’, ‘resilience’, ‘reconstruction’, ‘disaster management’ and other similar words were heard for the first time, even by the educated people, when foreigners, especially Westerners from developed countries, came to AJK soon after the earthquake. These terminologies remained buzz words for some time; without most local people knowing their meaning. Even today most of the people, even those working in the Disaster Management Agency, interpret ‘risk’, ‘hazard’, and ‘disaster’ to mean similar things. ‘Vulnerability’, ‘disaster mitigation’ and ‘sustainable development’ are still viewed as vague terms and the relationship between development and disaster vulnerability is irrelevant for development planners and disaster management professionals. Since there was no knowledge of the seismic hazard in the area until the earthquake struck in 2005, there was no risk framing at any level. After the earthquake, people took fatalistic (Balamir 2001) and divine-retributionist views of the event and attributed it to the punishment of their sins. Posters and graffiti appeared in Muzaffarabad and elsewhere immediately after the earthquake warning people that the earthquake was a punishment by Allah for their sins and they should repent as soon as possible. This view is still held by many people. Bode (1977) has also noticed the divine wrath explanation of 1970 earthquake in Peruvian Andes.

In order to understand the 2005 earthquake without society's fatalist and devine-retributionst lenses, it is important to discuss this phenomenon in the light of wider academic debates because there is a growing body of research addressing different approaches to the issues of disaster management, disaster preparedness and post-disaster recovery (see, for example, Alexander 2006; Amendola *et al*. 2008; Bankoff *et al*. 2004; Bell 1999; Berke 1995; Bilham 2009, 2013; Blaikie *et al*. 1994; Bosher *et al*. 2007; Canon *et al*. 2003; Collins 2009; Comfort *et al*. 1999; Cutter 1996; Gilbert 1998; Henderson 2004; Lewis 1999; Mohapatra *et al*. 2009; Quarantelli 1977, 1998; Rosenthal 1998; Stromberg 2007; Wisner *et al*. 2004). The International Decade for Natural Disaster Reduction (IDNDR, 1990-1999) presented a major conceptual shift in the way disaster management has been conducted, namely from disaster response to disaster risk reduction (UN, 2004). Community participation has become a recognised element of successful disaster risk reduction policy and practice (Lyons *et al*. 2010). As a result, disaster response is suggested to need to look at disasters in the context of peoples' vulnerability by recognising their existing capacities, addressing the root causes of vulnerability and embracing community participation. The concept of vulnerability is very important in disaster management (see, for example, Blaikie *et al*. 1994; Bosher *et al*. 2007; Collins 2009; Cutter 1996; Wisner *et al*. 2004).

Following this, the focus of my research is the core theme of vulnerability, especially the relationship between development and vulnerability and the role of post-disaster reconstruction in addressing vulnerability.

3.3. Understanding Disasters

There are many different definitions of disaster; for example according to Stromberg (2007, p. 201) '[a]n event qualifies as a disaster in the CRED database if at least one of the following criteria is fulfilled: 10 or more people are reported killed; 100 or more people are reported affected, injured, and/or homeless; the government declares a state of emergency; or the government requests international assistance'. The United Nations defines disaster as "an event or series of events which gives rise to casualties and/or damage or loss of property, infrastructure, essential services or means of livelihood on a scale which is beyond the normal capacity of the affected community's ability to cope without aid" (Kent 1994, p. 12).

There is also a lot of debate in disaster literature towards understanding and interpretation of disasters. This debate is very important due to the reason that it leads to important policy implications regarding disaster management because disaster management policies are determined by the type of disaster approach adopted by a particular society. For example, if Gilbert's (1998) "Pattern of war approach" is acceptable in a society, it will formulate policies which rely on technological fixes; if, on the other hand, Collins' (2009) "disaster and development approach" is acceptable then such policies will be formulated which reduce the vulnerability of the population at risk and increase their resilience.

3.3.1. Disaster Losses

Natural disasters are causing ever increasing economic and human losses due to multiple factors such as growing population, economic and infrastructure development, and growing vulnerability of the people (Alexander 2006; Amaratunga & Haigh 2010; Aysan & Davis 2013; Berke 1995; Bilham 2009, 2013; Collins 2009; Davis 2014; Ginige & Amaratunga 2009; O'Keefe *et al*. 1976; O'Keefe & Westgate 1977; Seneviratne & Amaratunga 2009; Stromberg 2007; Thurairajah & Amaratunga 2009). Environmental disasters cost on average US$ 50 billion every year to the global economy (Amendola *et al*. 2008; Bell 1999). During 1980–2004 disasters are estimated to have caused around US $1 trillion of direct economic damage at the global level (Stromberg 2007). According to the UN (UNISDR 2013) around 1.1 million people were killed, more than 2 billion people were affected and damage of more than US$ 1 trillion was caused by disasters during 2000-2011 (Figure 3.1).

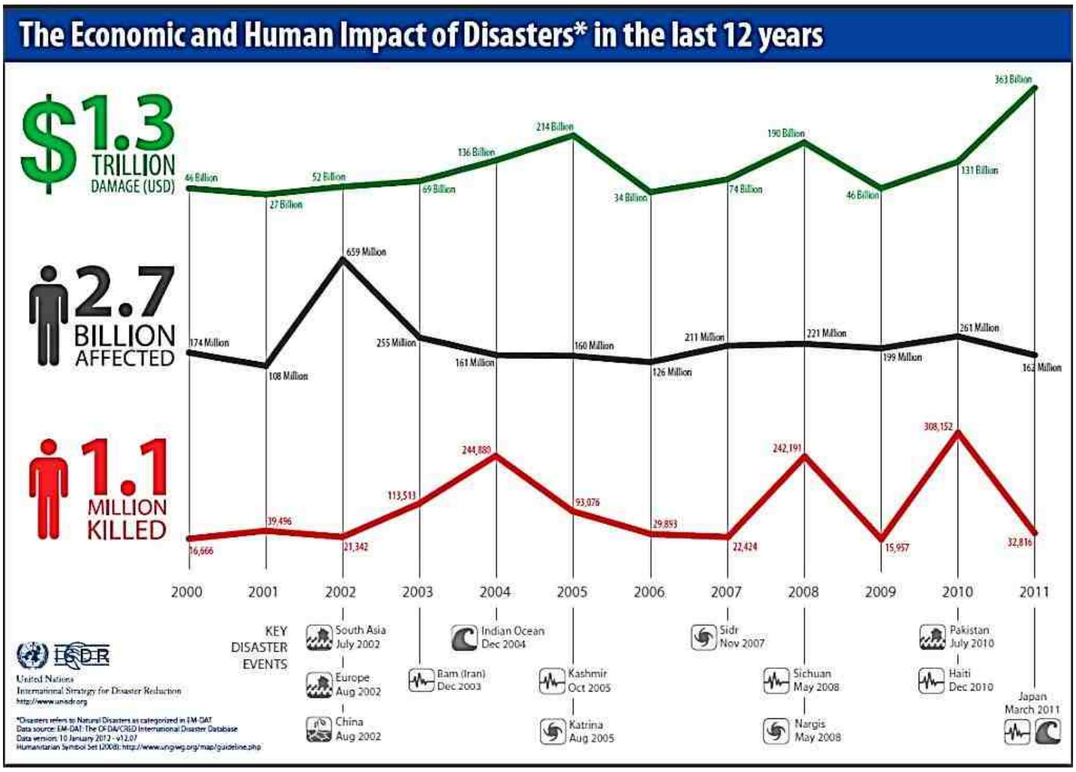


Figure 3.1 Global disaster losses. (UNISDR 2013: no pagination)

3.3.2. Uneven Distribution of Disaster Losses

Though disasters hit nations across the world, the effects of these disasters are unevenly distributed among different nations (Ambraseyes & Bilham 2011; Birkmann 2005; Bosher & Dainty 2011; Cannon 1994; Carter 2008; Cavallo & Noy 2010; Clarke & Munasinghe 1994; Dynes 2002; Frierra *et al*. 2001; Gilbert 2001; Linnerooth-Bayer *et al*. 2005; Loh 2005; Kellenberg & Mobarak (2008); Macabuag 2009: Moe & Pathranarakul 2006; Pandey *et al*. 2008; Quarantelli 2003; Spence & So 2009; Toya & Skidmore 2007). In developed societies, hazards can cause great damage to property with associated high economic costs but commonly accrue a lower loss of life; whereas in the less-developed world there is commonly greater loss of life relative to economic losses (Aherns & Rudolf 2006; Bell 1999; Bhavani 2006; Bilham 2009; Bilham 2012; Birkmann 2006; Buttenheim 2009; Cavallo & Noy 2010; DMTP 1997; Enarson & Morrow 1998a, 1998b; Ferreira *et al*. 2011; Hussein, cited in O’Keefe & Westgate 1977, p. 25-26; Henderson 2004; Kirkby *et al*. 1997; Mohapatra 2009; O’Keefe *et al*. 1976; Stroemberg 2007).

For example, more than 227,000 people were killed and US$ 10 billion economic losses were inflicted by the 2004 Indian Ocean Tsunami caused by a Mw=9.1 earthquake; whereas the 2011 Mw=9.0 Tohoku earthquake and resulting Tsunami killed 20,000 people and caused US$ 200–300 billion economic losses in Japan (ADB 2005a; USGS 2013). Table 3.1 shows the distribution of losses between the developed and developing countries. It is evident from the table that the number of people killed in disasters is far higher in developing countries than the developed countries, despite the fact that all other variables are almost the same except for per capita GDP.

Table 3.1 Comparing Disaster Losses in High- and Low-Income Countries.

(Adapted from Stromberg 2007, p. 206)

Country income category	Number of disasters	Population (million)	Exposed pop. (million)	Killed in disasters	GDP per Capita (US$)
High-income	1,476	828	440	75,425	23,021
Low-income	1,533	869	496	907,810	1,345

“*Note:* The 2nd and the 5th columns contain the numbers of natural disasters and number killed, respectively, over the period 1980–2004. The other columns contain characteristics in 1996. “Exposed pop.” is the population share in each country that live in areas in the top three deciles of risk exposure to volcanic activity, earthquakes, storms, floods, landslides, or droughts—multiplied by the population in the country and summed over the countries in the income group. The “Democracy index” is the population-weighted average POLITY IV Democracy index.” (Strömberg 2007: p. 206)

This trend of an uneven distribution of losses is expected to continue into the future and disaster losses will continue to rise in the developing countries in the next century (Bilham 1988, p. 2012). The uneven distribution of disaster losses between the developed and the developing countries is nowhere more evident than in the case of earthquakes. According to Bilham (2009) similar sized earthquakes cause more fatalities in developing countries than in the developed nations; for example the 1992 Mw=7.3 Landers earthquake in California resulted in 1 death; whereas the 2005 Kashmir Mw=7.6 earthquake killed more than 83,000 people. Bilham (2009) further observes that earthquakes cost more in developed countries in terms of financial losses. For example, the Kashmir 2005 earthquake caused US$ 2 billion in losses (Bilham 2009); while the 2011 Tohoku earthquake caused US$ 225 billion of direct losses (Capdevila *et al*. 2014). Figure 3.2 highlights this uneven distribution of losses for some of the major earthquakes in the world.

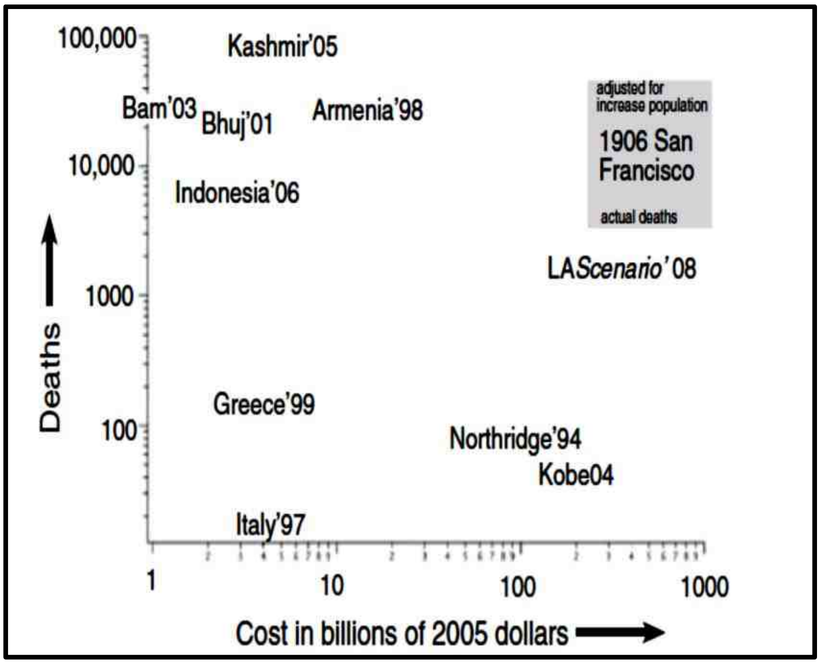


Figure 3.2 Distribution of earthquake losses from 1906-2006. (Bilham 2009, p. 882)

However, authors such as Varley (1994) disagree with the simplistic interpretation of lesser economic losses in the developing world and suggest that this perspective is based on the crude and ill-informed view of the value of the property in developing countries because homes, cattle and other household belongings when converted into the western equivalent currencies may not have that much value in economic terms, but are valued a great deal more to those living in the developing countries.

Even in economic terms, the developing countries suffer more drastic economic impacts than developed countries. For example, between 1970-2001 disasters caused US $955 billion in economic losses worldwide but on a per capita basis, the losses were 20 times larger in developing countries than in industrialized nations (Bendimerad 2001; Yang 2005, cited in Kellenberg & Mobarak 2008, p.778-789). According to Qurentelli (2003) the economic costs of disasters often exceed 3%-4% of the GDP in the case of poor countries (in some East African countries the cost even exceeds 20%);

whereas in the developed countries these losses hardly figure, for example the 1992 Hurricane Andrew was the costliest disaster in the US history but US$ 24 billion losses were negligible in the country's US$ 6 trillion economy.

3.3.3. Disaster Approaches

The uneven distribution of disaster losses between the developed and the developing world leads us to the understanding that the physical magnitude of the disaster event is not the only determinant of disaster losses. The degree of destruction is as much a function of the physical context in which the event happens as the nature of the hazard itself i.e. the vulnerability of people also determines the degree of loss apart from the physical magnitude of the event (Cuny 1983). The uneven distribution of losses not only poses serious challenges for post disaster recovery and reconstruction efforts, but also leads to conceptual debates on understanding disasters. Gilbert (1998) identifies three approaches/paradigms for understanding disasters. The ***first*** paradigm is the "Pattern of war approach" which developed as a result of two world wars. Here disaster is considered as a duplication of war in which the hazard is taken as an external agent affecting the human communities who have to defend/react to this aggression. The causes of disaster are sought outwardly, in nature, not within society. This approach can be categorized as an "agent-specific" approach and resembles the Realist theory of risk which treats risk as an objective set of phenomenon in the physical world. Kreps (1998), Oliver-Smith (1998), and Stallings (1998) all suggest an agent focused approach towards understanding disasters in which the physical agency is important in defining a disaster.

The ***second*** paradigm is the "Disaster as social vulnerability" approach in which the disaster in not seen as a reaction to an external agent but as a social consequence, whereby the vulnerabilities of a society convert a hazard into a disaster (Clarke & Munasinghe 1994). This approach can be categorized as "social construction of disaster", the social constructionist theory of risk which does not accept a risk simply as a phenomenon that can be isolated from its social, cultural and historical contexts (Lupton 1999). According to Bosher *et al*. (2007, p.4) different people and different communities have different levels of vulnerability so the 'outcome of a disaster is shaped both by the physical nature of the hazard and the vulnerability of people who are involved'. Since disasters are not simple physical occurrences but are entwined within human societies which have their own complexities and peculiarities, disaster research should be based on the analysis of communities and not on external physical agents alone (Aldrich 2010; Alexander 1997, 2012; Attiri *et al*. [no date]; Bosher *et al*. 2007; Canon *et al*. 2003; Collins 2009; Comfort *et al*. 1999; Cutter *et al*. 2000; Gilbert 1998; Henderson 2004; Hilhorst & Bankoff 2004; Lewis 1999; Malalgoda *et al*. 2014; Mohapatra *et al*. 2009; Quarantelli 1977, 1998; Rosenthal 1998; Stroemberg 2007; Yumarnia *et al*. 2014). Coburn *et al*. (1994) and Mileti (1999) distinguish three contributing factors to a disaster: the triggering hazard event (such as an earthquake or flood); the population exposed to the event; and the vulnerability of that population (Stroemberg 2007). This concept of human contribution to disasters is not entirely new; while writing about the 1755 Lisbon earthquake, Stroemberg (2007, p. 199) highlights that Rousseau noted that 'while the earthquake was an act of nature, previous acts of men, like housing construction and urban residence patterns, set the stage for the high death toll'.

The ***third*** paradigm is the "disaster as uncertainty" approach in which disasters are seen as crises that develop within a society and these crises are the result of uncertainty. This uncertainty occurs in three ways: firstly, when a society is unable to define the causes and effects of a danger. Secondly, the uncertainty is the result of growing complexity in modern society. Thirdly, a society's inability to define and understand a crisis situation through ordinary mental frameworks.

An approach developed by Blaikie *et al*. (1994) attempts to reconcile these differences by combining hazard and vulnerability. This approach not only looks at the physical aspects of a natural hazard, but also at the vulnerability of the people to a hazard and their capacity to mitigate the effects of that hazard. Blaikie *et al*'s. (1994) 'Pressure and Release' model of hazards proposes that hazards represent one pressure and the characteristic of vulnerability (the physical phenomenon) and the other pressure comes from local geography and social stratification which cumulate into the progression of vulnerability (the social phenomenon). These two pressures (i.e. the physical and the social phenomena) ultimately culminate into disasters. Cannon (1994), Collins (2009) and Nigg (1995) have further developed this approach by arguing that natural hazards should not be looked at as 'natural' disasters and that we should differentiate between *hazard* and *disaster* because hazards are natural, while disasters are not. Besides the magnitude of the event, it is the condition of the people (i.e. their vulnerability) which turns a hazard into a disaster (Oliver-Smith 1996).

3.4. Disasters and Vulnerability

The concept of vulnerability is central in understanding disasters and their mitigation (Cutter 1996; Manandhar & McEntire, 2014). According to Adger (2006, p. 268) the concept of vulnerability is a powerful analytical tool for describing the 'states of susceptibility to harm, powerlessness, and marginality of physical and social systems and for guiding normative analysis of actions to enhance well-being through reduction of risk'. Despite being such a powerful and important tool, vulnerability is a much contested concept within the disaster literature (Cutter 1996; Cutter & Finch 2008; Cutter *et al*. 2003, 2008; Kulatunga *et al*. 2014). There are many, sometimes conflicting, definitions of vulnerability. For example, Cutter (1996) has noted down 18 different definitions of vulnerability in her article. These discrepancies or variations are due to epistemological reasons, methodological practices, and according to the type of disaster (*ibid*). UNISDR define vulnerability as '[T]he conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards' (HFA 2007, p.1). According to Blaikie *et al*. (1994, p. 11) vulnerability is 'the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, and recover from the impact of a natural disaster'. Cutter (1996, p. 532) defines vulnerability as "the likelihood that an individual or group will be exposed to and adversely affected by a hazard". Cannon (1994) and Cannon *et al*. (2003) are of the view that vulnerability not only describes the likelihood of being killed or injured by a hazard, but also that different people, who are at different levels of preparedness, embody different degrees of resilience and have different capacities to cope with or recover from disaster. According to Brown *et al*. (2008) and Buttenheim (2009) disasters are more destructive to vulnerable populations particularly.

The concept of vulnerability has been in use in disaster research as a diagnostic tool since the 1970s (Hewitt 1983, cited in Alexander 2012, p. 50) and many experts such as Alexander, Blaikie, Collins, Cutter, Kasperson *et al*., McEntire, O'Keefe *et al*. and Wisner have worked on the concept of vulnerability and its relationship with disasters. Neumayer & Plumper (2007) and O'Keefe *et al*. (1976), cited in Bosher & Dainty (2011, p. 3), argued long ago that the term 'natural disaster' was a 'misnomer' and 'many disasters result from the combination of natural hazards and social and human vulnerability'. Cutter (2006), cited in Oven (2009, p. 26), has identified three themes in vulnerability research: vulnerability as risk/hazard, vulnerability as social response, and vulnerability of places.

• ***Vulnerability as risk/hazard***

This theme focuses on the spatial distribution of certain hazardous conditions, the occupancy of these hazardous places by people, and the degree of loss associated with a particular event likely to impact people occupying these places (Ambraseys & Bilham 2011; Anderson 2000, cited in Oven 2009, p. 26; Burton *et al.* 1993; Kellenberg & Mobarak 2008; Oliver-Smith 1998).

• ***Vulnerability as Social Response***

Mainly worked upon by researchers such as Hewitt (1995) and Wisner *et al.* (2004), this theme highlights the social construction of vulnerability and its root causes; it focuses on those factors which make people vulnerable to disasters and the coping capacity and resilience of the exposed population, and how people anticipate, resist, and recover from disasters (Attiri *et al*. [no date]; Oliver-Smith 1998; Oven 2009; Shrestha & Dixit 2008; Wisner 1998).

• ***Vulnerability of Places***

In this theme, vulnerability is conceived not only as a physical risk from a hazard but as a social response within a particular geographic domain (Turner *et al*. 2003; Cutter 1996, cited in Oven 2009, p. 26; *Cutter et al*.

2000; Bosher *et al*. 2007; Roosli & O'Keefe 2011). The combination and interaction of the social vulnerability and biophysical vulnerability creates the vulnerability of places (Cutter 1996, Cutter *et al*. 2000, 2003, 2008; Cutter & Finch 2008). Figure 3.3 lays out the vulnerability of places model which explains how various elements that constitute vulnerability interact with each other to produce the vulnerability of specific places and the people who occupy these places.

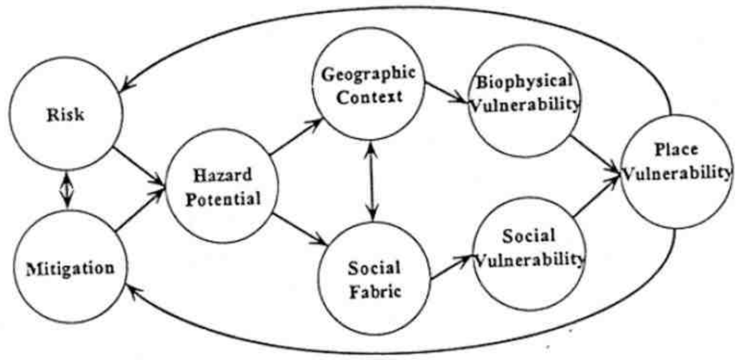


Figure 3.3 The hazards of place model of vulnerability. (Cutter 1996, p. 536)

As there is a lot of variation in the definition of vulnerability, there is also bifurcation in disaster literature about causes of vulnerability (Cutter 1996). However, most of the studies take a 'political-economic' perspective which looks into the role of political and economic conditions in shaping the social capabilities to cope with a disaster (*ibid*). A number of conceptual models were developed in later years to understand vulnerability and its causes (Oven 2009). The 'Pressure and Release' or PAR model developed by Blaikie *et al*. (1994) and Wisner *et al*. (2004) is one such model. According to the 'Pressure and Release' model a disaster is the product of two opposite forces i.e. the forces generating vulnerability and the physical exposure to hazard (Twigg 2001, cited in Oven 2009, pp. 28). Figure 3.4 explains the PAR model in which vulnerability progresses at three main levels: Root Causes, Dynamic Pressures, and Unsafe Conditions. The *root causes* of the vulnerability can be traced back to the economic and political systems which determine peoples' level of access to power and resources within a society (Oven 2009, pp. 28-29). These root causes lead to *dynamic pressures* which include lack of local institutional capacity, demographic and environmental pressures and reduced soil productivity (*ibid*).

The Pressure and Release (PAR) model is a framework for analysing how natural hazards turn into disasters when they affect vulnerable people. According to Wisner (2004) vulnerability is rooted in social processes and underlying causes which may be quite remote from the disaster event itself. Hence the PAR model attempts to assess the progression of vulnerability in order to understand the root causes of a disaster. In this model the Pressure side focuses on those practices which generate the vulnerability and natural hazard event, while the Release side focuses on the reduction of the disaster to relieve the pressure and reduce vulnerability. However, according to Wisner (2005) the use of taxonomies of vulnerable groups such as women, children, the elderly, and people with disabilities is not without problems. Although vulnerable groups may often have special needs, the taxonomic approach fails in that it produces too many 'false positives' (Fordham 1998; Morrow 1999). For example not all women are equally vulnerable. Communities (even individuals in a household) will vary in knowledge, skills, and rights to resources according to age, gender, social and cultural traditions. Levine (2004) proposed that vulnerability should not therefore be seen as a 'group' characteristic since this deprives individuals of exercising their autonomy. This is an important consideration in terms of resource allocation (an important factor in disaster vulnerability) because it could mean that resources are misdirected towards people who are regarded as vulnerable when they are actually not, whilst really vulnerable people are ignored. Wisner et al., (2004, p. 15) suggest that there is a movement away from the use of simple taxonomies or checklists of 'vulnerable groups' to a concern with " vulnerable situations" which people move into and out of over time. The PAR model enables us to fully understand these vulnerable situations with a more contextual approach for assessing vulnerability; it focuses on understanding the processes that contribute to vulnerability production and social capacity building.

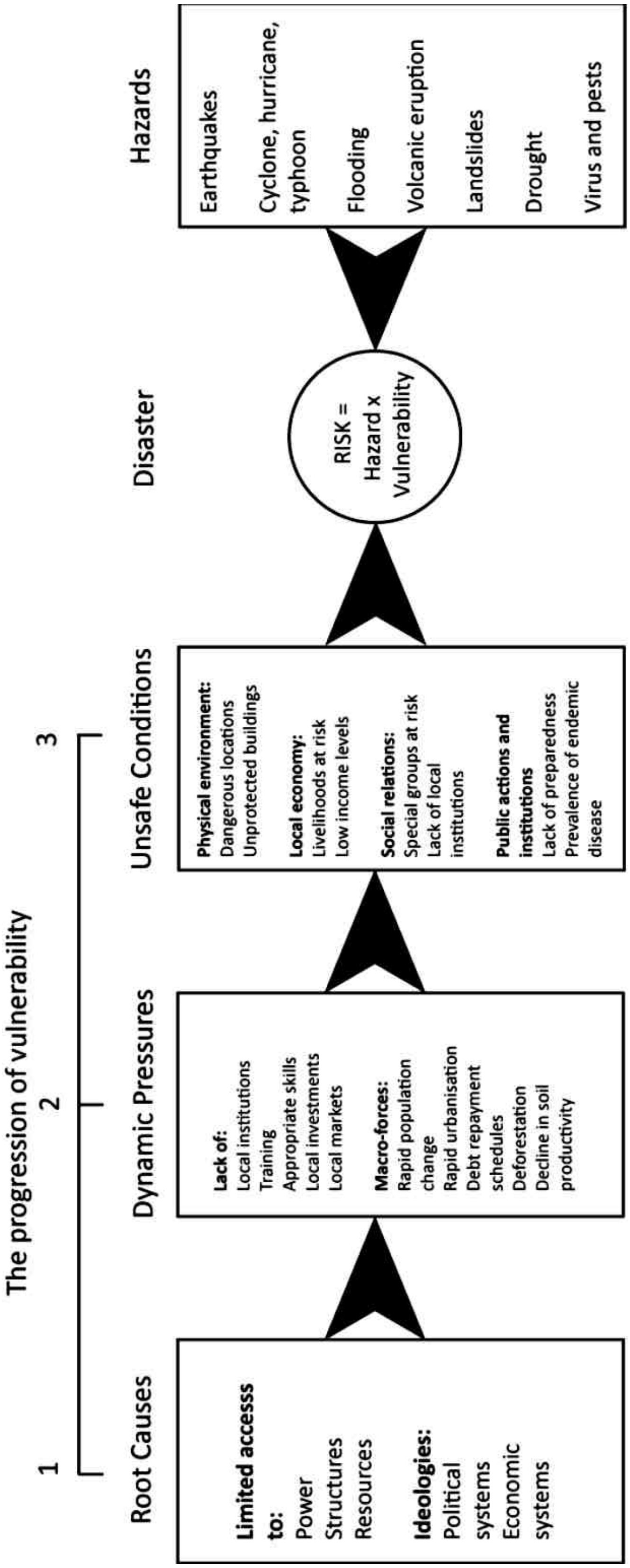


Figure 3.4 Pressure and Release (PAR) model: the progression of vulnerability.
(Wisner *et al.* 2004, p. 51)

These effects of combinations of particular indicator values compared with other combinations tend not be explored. We therefore need to know how vulnerabilities are compounded to create the most vulnerable (Wisner, 1993). There is a need to look more at the relationships between specific variables and social groups. One important question is whether there is truly a difference between social and economic vulnerability? Only parts of the PAR model will be relevant in each situation. Wisner et al., (2004) review both negative and positive examples of efforts to reduce vulnerability in various less developed countries in relation to floods and coastal storms, earthquakes and volcanos through the application of the PAR model. The root causes and dynamic pressures progress into *unsafe conditions* which include precarious physical environment, weak local economy, weak social structures, and ineffective public institutions. The level of vulnerability determines the level of exposure/disaster to a particular hazard.

It can, therefore, be argued that a disaster is not a purely geophysical phenomenon but a combination of geophysical and social factors and can be summarized by the risk equation (Wisner *et al*. 2003, p. 45):

Disaster = hazard x vulnerability

Where hazard is a physical phenomenon and vulnerability is a social phenomenon. Vulnerability can be associated with poverty and development and ultimately linked with disaster mitigation (Ahrens & Rudolf 2006; Bosher & Dainty 2011; Clarke & Munasinghe 1994; Collins 2009). Abidi *et al*. (2011) and Schilderman (2010) find an inverse relationship between vulnerability and capacity and suggest that vulnerability may be reduced by increasing the capacity of the community. According to Sandoval & Boano (2014), PAR model is based on the pseudo-equation ‘DR = H x V’ (Disaster-Risk equals Hazards multiplied by Vulnerability) to explain vulnerability and its progression as an important factor in causing disasters. The PAR model assumes that societies might have little control over natural hazards but societies can really fight against disaster impacts and work towards disaster risk reduction by addressing vulnerability and its progression. The progression of vulnerability is organised from root causes, dynamic pressures to unsafe conditions. The root causes of disasters may be understood as “an interrelated set of widespread and general processes within a society and the world economy” (Wisner *et al.,* 2004, p.52); examples may include political regimes or economic crises, among others. On the other hand, root causes may trigger dynamic pressures such as lack of prevention and preparedness. Similarly, dynamic pressures may generate particular unsafe conditions such as people living in hazardous locations or in unsafe and poor quality buildings (Sandoval & Boano, 2014). Wisner et al. (2004, p.6) suggest that though hazards are also very important element of disasters, these are mere “triggers” of disasters and not their root causes. Other crucial circumstances such as where people live, their levels of preparedness, hazard protection, hazard information, education, economic conditions and health are some of the important determinants of the impacts of a hazardous event. However, these circumstances have nothing to do with nature as such; they are produced by social, economic and political factors (Sandoval & Boano, 2014). Hence, disasters are a socially constructed phenomenon; and vulnerability is also a phenomenon governed by socio-economic and political processes.

Basically, vulnerability is a main factor in the causation of disasters due to the reason that it will define the level of impact of a hazardous event. On the other hand, although unsafe conditions are evident at minor geographical scales (Pelling, 2003, cited in Sandoval & Boano, 2014), root causes and dynamic pressures are nested at major scales; both spatially and temporally. From root causes to unsafe conditions, vulnerability progresses at different spatial levels depending on the characteristics and circumstances of particular socio-economic and political processes involved in its progression.

The PAR model presents a logic chain of explanation where the progression of the local-evident vulnerability is devised to explain the causation of disasters by natural events. However, this logic is embedded to and only works under the political economy perspective of national or global systems. In other words, the multi-scalar perspective of the PAR model can only be supported when a local community participate of and is influenced by a larger system –e.g. national State and/or global economy–. In addition, other question arise for further analysis: if vulnerability and risk may be understood as the result of particular socio-economic and political processes which, in turn, are geographically scaled, do vulnerability and risk play a role in the social production of specific geographical scales? In other words, it may be possible that vulnerability and risk can be influenced by geographical scales configurations and, in turn, vulnerability and risk may influence these scalar configurations (Sandoval & Boano, 2014)

Vulnerability has been argued to be a result of poverty and is closely linked with livelihoods, class, gender, and ethnicity (Bhavani 2006; Cannon 1994; Clarke & Munasinghe 1994; Cutter *et al*. 2000, 2003; Cutter & Finch 2008; DMTP 1997; Elliott & Pais 2006; Hilhorst & Bankoff 2004; Manyena *et al*. 2011). For example poor people are more likely to have substandard construction in vulnerable locations which prove fatal in case of seismic activity (Bilham & Gaur 2013). According to Bosher *et al*. (2007) fatalities due to seismic activity are widely prevalent in the developing countries due to faulty construction, whereas developed countries have greatly minimised these fatalities due to standardised construction practices and higher construction standards. People are likely to be less vulnerable when their livelihoods are adequate and sustainable; thus it is most often the poor or most marginalized who are disproportionately affected by a disaster (Ahrens & Rudolph 2006; Albala-Bertrand 1999; Ambraseys & Bilham 2011; Attiri *et al*. [no date]; Canon *et al*. 2003; Chandrasekhar 2010; Clarke & Munasinghe 1994; Cutter 2006; Cutter & Emrich 2006; Cutter & Finch 2008; Cutter *et al*. 2000, 2003; DMTP 1997; Gangapati *et al*. 2012; Gupta & Sharma 2006; Henderson 2004; Mohapatra *et al*. 2009; Neumayer & Plumper 2007; Nigg 1995; Schilderman 1993; Shrestha & Dixit 2008; Stroemberg 2007; Toya & Skidmore 2007; Wisner 2009; Yohe *et al*. 2002). Cutter (2006) has excellently evaluated the class and race factors in creating flood vulnerability in New Orleans which ultimately culminated in the catastrophe of Hurricane Katrina. Collins (2009), while explaining the relationship between poverty and vulnerability, has considered many factors such as poverty, environmental factors, marginalization, and conflict etc. (Figure 3.5). According to Collins (2009, p. 74), since poor people frequently live and work in environmentally poor locations, they lack income and have little or no access to ‘basic technology’ and ‘basic rights’ so they stay poor. Consequently, in order to survive they tend to exploit natural resources in unsustainable manner. These poor people are forced into a cycle where they 'compromise' their investments in basic amenities such as health, education and general wellbeing to name a few (*ibid*). As a consequence, this 'impoverished environment' aggravates poverty; however, poverty impacts people according to the level of their vulnerability. In this way the cycle not only perpetuates itself, but also 'progressively increases the gap between the rich and the poor, or between the poor and poorest of the poor' (*ibid*).

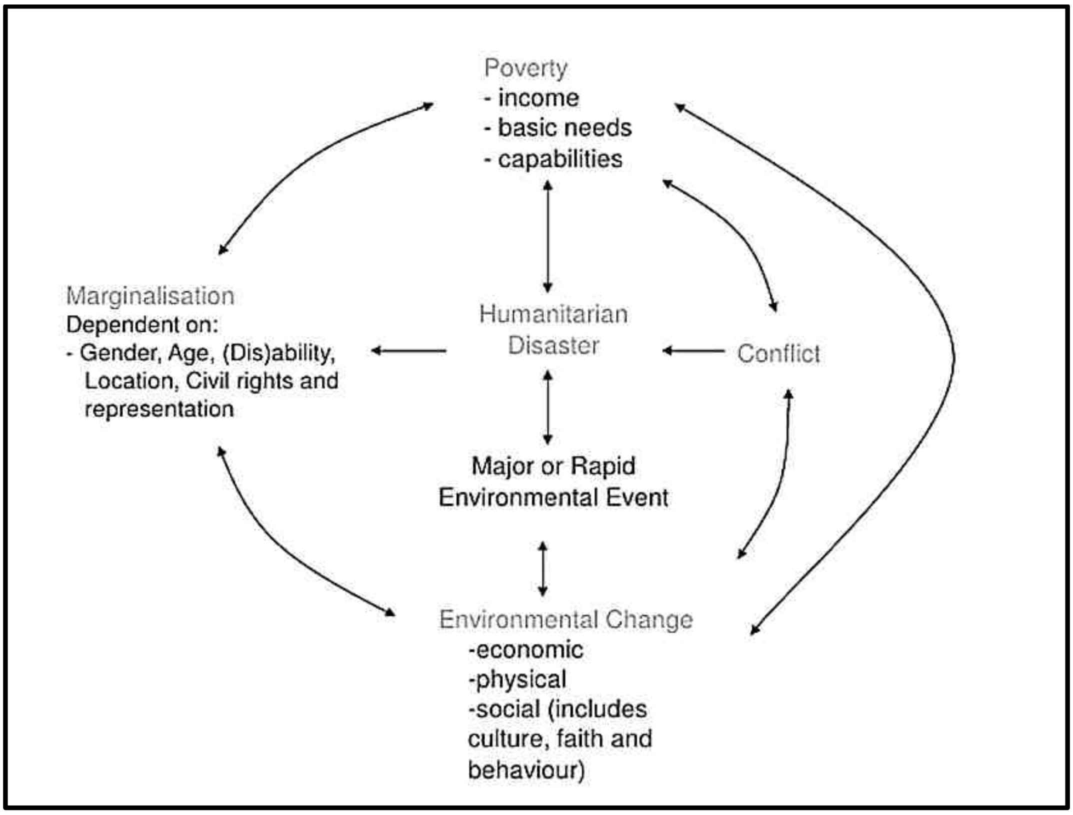


Figure 3.5 An integrated poverty and environment view of humanitarian disasters. (Collins 2009, p. 73)

Poverty, at individual and national levels, not only creates disaster vulnerability; it affects disasters losses also, especially life losses. Figure 3.6 shows the distribution of deaths per 100,000 population according to per capita GDP. It is evident from the graph that there is a negative relationship between GDP and life losses i.e. with increasing GDP the number of deaths decreases or vice versa.

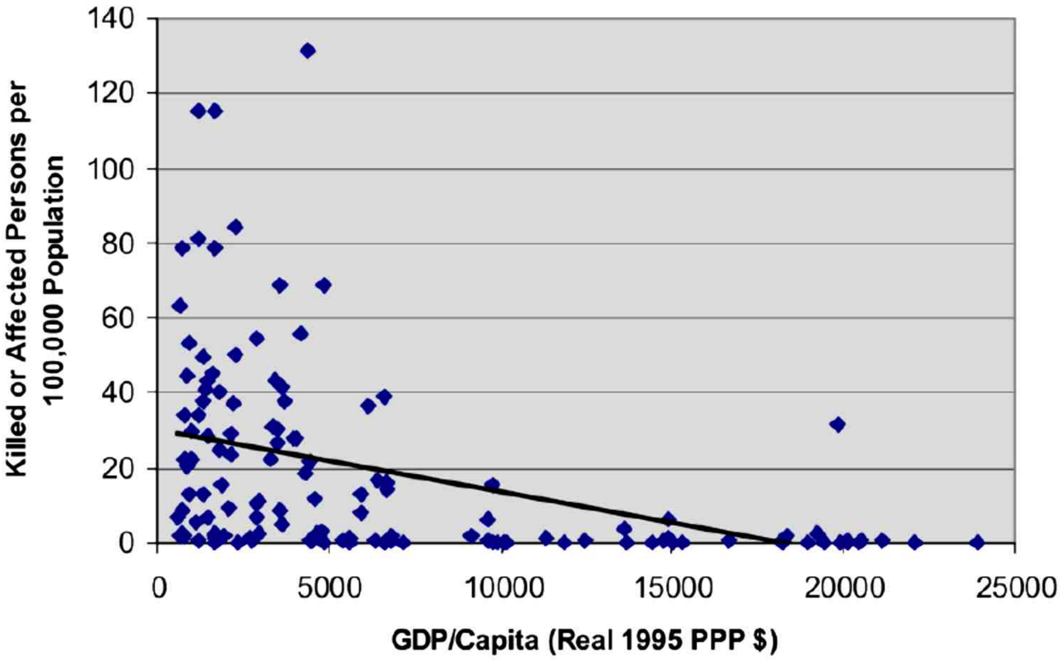


Figure 3.6 Distribution of life losses per 100,000 population according to GDP/Capita. (Kellenberg & Mobarak 2008, p. 791)

3.5. Development and Disasters – a complex relationship

The concept of relationship between development and disasters is relevantly new. Cuny (1983) and Cutter (1996) are the earliest researchers to work on this approach. McEntire (2004) observes that the relationship between disasters and development is highly complex and divides this relationship into two broad categories. One is the radical theory in Marxian tradition represented by Kenneth Hewitt (1983). This theory asserts that poverty is the major cause of disasters: poor people are more likely to live in hazardous areas, less capable of taking disaster mitigation measures such as insurance, and generally have lesser access to better health and education facilities. This theory suggests restructuring of social, political and economic relations to reduce vulnerability (*ibid*). According to Collins (2009, p. 252) 'to reduce poverty is to reduce disaster'.

The other theory is the cultural or institutional theory influenced by Weber and mainly represented by Dennis Mileti (1999). According to this theory, culture is the main determining factor of disasters i.e. people generally show apathy to disaster issues; the importance of mitigation measures is ignored by individuals, businesses, and governments; risky development options, insufficient knowledge of hazards and weak government policies and institutions make people vulnerable to disasters (*ibid*). The solution is changes in the beliefs and behaviours of the society and increased rationalization and bureaucratization as a means to reduce the effects of hazards (*ibid*).

McEntire (2004) points out shortcomings in both these approaches and suggests a third approach which synthesises the strengths of both the approaches outlined above. Blaikie *et al*. (1994), Burton *et al*. (1993), Geis (2000), McEntire (2004), McEntire *et al*. (2002) and Weichselgartner (2001), among many others, have worked on this approach (*ibid*). The theme that emerges from this approach is that if people are to be resilient to disasters, their vulnerability must be reduced. Development process can increase *or* decrease disaster vulnerability (Bari 1998; Birkmann 2006; Brooks *et al*. 2005; Clarke & Munasinghe 1994; Delaney & Shrader 2000; McEntire 2004; O'Keefe *et al*. 1976; Schilderman 1993; Toya and Skidmore 2007; White *et al*. 2005). Collins (2009, p.14) terms this approach as the "disaster and development approach", which considers a disaster not only as a natural phenomenon but also as a function of development. This concept emphasizes that a disaster can be seen either as the consequence of there being insufficient development to avoid a human crisis or, alternatively, the development process can itself enhance human exposure to disasters (Ahrens & Rudolph 2006; Amaratunga *et al*. 2014; Bosher & Dainty 2011; Bremer 2003; Clarke & Munasinghe 1994; DMTP 1997; Gilbert 2001; Hannan 2002; Hilhorst & Bankoff 2004; Manandhar & McEntire 2014; McEntire 2004; Mohapatra *et al*. 2009; Palliyaguru *et al*. 2009; Pelling & Dill 2010; Schilderman 1993; Seneviratne & Amaratunga 2009; UNISDR 2002).

According to Majova (2010) Collins' concept of disaster and development is taken in the context where development can have either positive or negative impact on disasters, or where stage and quality of development determine whether or not certain negative events become disaster. Disasters are understood from the functional perspective of being a consequence of insufficient development of protection against vulnerability and insufficient adaptation to new conditions in times of crisis. There is still gap between the goal of reducing vulnerability and its achievement despite growing importance of sustainable development. 'Disaster and development' approach emphasises the importance of risk assessment and its reduction in development activities. As explained by Collins (2009, p. 14) 'disaster occurs through exposure to an adverse hazard; in the 'wrong place' at the 'wrong time' with inadequate forms of protection. The rationale hence is that in as much as an earthquake, tsunami, hurricane or flood might be part of nature, the process of human development has not adapted sufficiently to avoid crisis.'

According to Ozerdam (2003), cited in Pyles and Cross (2008, p. 387) 'complex disasters are often the result of unresolved development challenges'. Cannon *et al*. (2003) suggest that the aim of the development work should be to protect and reinforce livelihoods of the people in such a way that they are more resilient to hazards and better protected from them. While explaining the disproportionate impacts of disasters on developing countries, a World Bank study (Gilbert 2001) identifies the lack of development to be the main reason for higher disaster losses. This study observes that the lack of development not only results in poor quality construction due to lack of building control and land registration processes but also displaces the governments' development priorities from disaster mitigation to other sectors. Disaster mitigation is linked with sustainable and equitable development which ultimately stems from good governance (Ahrens & Rudolf 2006; Avellaneda 2009; Gupta *et al*. 1998; Seneviratne & Amaratunga 2009). According to Manandhar & McEntire (2014, p. 22) disasters and development have contradictory connotations – death, destruction, psychological trauma, disruption of social networks, loss of livelihoods, disruption of the development process, and impacts on economy are some of the outcomes of disasters; whereas 'economic prosperity, technological advancement, poverty reduction, modern amenities, education, freedom, and perhaps even equality' are equated with development. Abidi *et al*. (2011) and Ahmad *et al*. (2011) find an inverse relationship between vulnerability and capacity i.e. vulnerability may be reduced by increasing the capacity of a community and they argue that this approach should be made part of the normal development process of a society.

The Disaster Management Training Programme (DMTP) (1994, 1997), McEntire (2004), and Fordham (2007) cited in Manandhar & McEntire (2014, p. 22) identify four ways in which disaster and development support and conflict each other: development increases vulnerability to disasters, development reduces vulnerability to disasters, disasters set back development, and disasters provide development opportunities. Figure 3.6 shows different orientations with which the relationship between development and disaster vulnerability may be explained. The field is divided into "positive" and "negative" aspects of development/disaster. On the right side of the diagram is the positive realm and to the left is the negative realm. Development can have both positive as well as negative impacts i.e. on the positive side the development can reduce vulnerability whereas on the negative side it can increase vulnerability. Similarly disaster can also have both positive and negative aspects; on the positive side the disaster can provide development opportunities whereas on the negative side it can set back development. However, Albala-Bertrand does not agree with the notion that disasters set back development, and says '[D]isasters are primarily a problem of development, not essentially a problem for development' (Dynes 2002, p. 39).

According to DMTP (1997) regular development programmes can incorporate a wide range of disaster mitigation measures to reduce disaster vulnerability. For example strengthening of urban utility systems, transport infrastructure, and industrial support; incorporation of hazard resistant building techniques and use of building codes in the construction culture of the country; investments in improvement of working and resource base of public administration institutions; improvement in forestry and agriculture practices, and improvement and diversification of livelihoods of the people are some of the mitigation measures that can reduce disaster vulnerability to great extent (*ibid*).

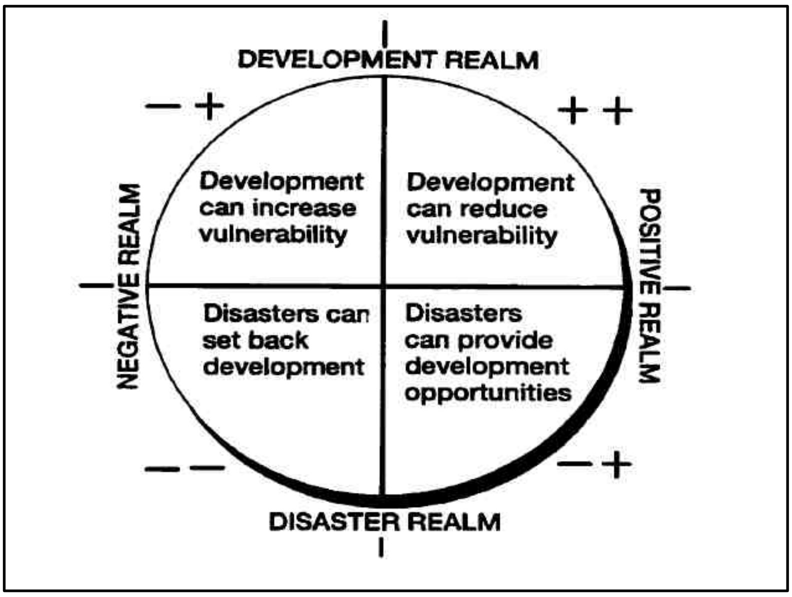


Figure 3.7 Disaster-Development relationship. (DMTP 1997, p. 12)

However, poorly planned development interventions may offset the benefits of development investments and can become a source of risk (DMTP 1997; Hannan 2002; McEntire 2004, cited in Manandhar & McEntire 2014, p. 22; O'Brien *et al.* 2006; Palliyaguru *et al*. 2009). For example, the use of low quality construction materials and poor building techniques during development may increase vulnerability to disasters. Similarly development may induce population growth, rapid and unplanned urbanization, and environmental degradation due to infrastructure development and industrialization which might create new disaster vulnerabilities (Alexander 2006; Bouwer *et al*. 2007; Canon 1994; Clarke & Munasinghe 1994; Collins 2009, cited in Manandhar & McEntire 2014, p. 22; Kellenberg & Mobarak 2008; Palliyaguru *et al*. 2009). Collins (2009) also highlights the inadvertent and negative impacts of development 'such as mass displacement through industrialization, the demand for energy, economic boom and bust, erosion of livelihoods, development induced conflicts, environmental degradation and social economic collapse that causes vulnerability to hazards' (p. 29). While challenging the mainstream view that economic development and disaster vulnerability have a positive relationship, Kellenberg & Mobarak (2008) propose that although this notion is generally correct for the majority of countries, in the case of very low levels of income this relationship may be negative i.e. economic development may increase disaster vulnerability by changing the micro behaviour of the people in such a way that it increases the aggregate exposure to disasters. Ahrens & Rudolf 2006 and McEntire *et al*. (2002, p. 271) are also of the view that the relationship between sustainable development and sustainable hazards mitigation is not too clear and it is not clear whether “sustainable development addresses all of the variables related to disaster”.

Realising this weakness, McEntire *et al*. (2002, p. 271) have proposed the concept of "invulnerable development" by which they mean “development pursued in such a manner as to address vulnerabilities” by altering the cultural attitudes about disasters; linking development practices to vulnerability reduction; and building of emergency management institutions. This approach goes beyond the sustainable development approach. Collins (2009, p. 8) have suggested that ‘disaster management should be linked with sustainable development.’ Overall it suggests that development should not be devoid of risk of future disasters and should not result in causing vulnerability to disasters. As development is on the main item on the agenda of modern day governments, especially in the developing countries which still have to go a long way on the road of development, governments need to make ‘real development choices’ mainly ‘in terms of disaster protection, including the chance to shape human behaviour and the institution that govern’ (*ibid*, p. 15).

3.6. Disasters as a Window of Opportunity

Though disasters are devastating events which disrupt life and cause human and financial losses, they also provide a "window of opportunity" (Alexander & Davis 201; Chang 1984; Enarson 2001, p.1; Manandhar & McEntire 2014; Thurairajah & Amaratunga 2009) to learn from past mistakes, and to attempt to set things right. According to Birkmann (2006) disasters have a positive side by revealing the vulnerabilities of a society they provide the opportunity to reduce them. Abidi (2011), Asgray *et al*. (2006); Broadbent & Broadbent (2006); Cavallo & Noy (2009), Cuny (1983), DMTP (1997), Gupta & Sharma (2008); Hannan 2002; Mahdi & Mahdi (2013); Manandhar & McEntire (2014), Mohapatra *et al*. (2009), and Nigg & Tierney (1993) observe that post-disaster development can provide opportunities to learn from mistakes, enhance the internal strengths of the communities, prepare them for future disasters, improve their adaptive capacity and even in certain cases economic development. Disasters are mostly followed by an influx of foreign and domestic resources which might help in tackling the long standing weaknesses, such as low-income housing and access to land (Schilderman 2010).

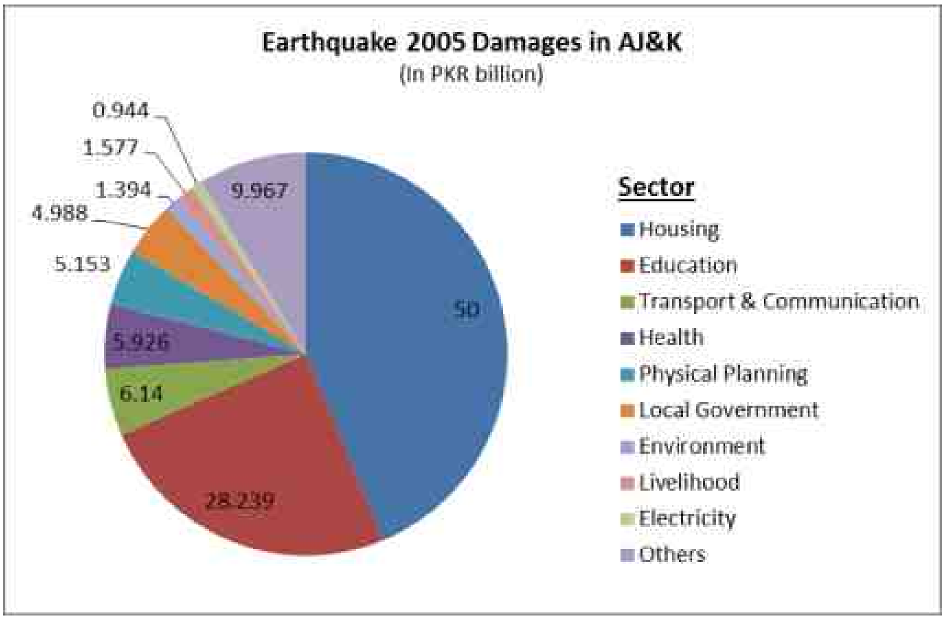
Reconstruction after disasters is important for national governments and humanitarian organizations alike. It not only has humanitarian ambitions, but economic, political and social aspects as well and can provide an opportunity to make amends for past mistakes and reduce vulnerability of the population at risk (Abidi *et al*. 2011; Albala-Bertrand 1993; Archer *et al*. 2011; Bassard *et al*. 2012; Berke *et al*. 2006; Brassard & Raffin 2012; DMTP 1997; Guarnacci 2012; Hallegatte & Duma 2008). Post-disaster reconstruction is the most direct and effective medium for reducing vulnerability of the population at risk (Abidi *et al*. 2011; Archer & Boonyabancha 2011; Bassard *et al*. 2015; Berke *et al*. 1993). The element of mitigation is very important in reducing vulnerability. Both structural or technical and non-structural or regulatory measures can be taken during the reconstruction phase to incorporate the element of mitigation (Bell 1999). By using the concept of "Build Back Better", post-disaster reconstruction can be used to create safer, sustainable and resilient communities (Mannakkara 2013, p.315). According to Manandhar & McEntire (2014) many communities switch over to better construction practices and building techniques after a disaster. A city that was completely destroyed by a disaster (for example Muzaffarabad, Bagh, and Balakot cities in Pakistan after the 2005 earthquake) may find it a golden opportunity to adopt better urban planning strategies to reduce future disaster vulnerability (*ibid*). Researchers such as Loh (2005) and Mohapatra *et al*. (2009) see post-disaster reconstruction as a development opportunity in lesser developed nations; though a lack of funds might prove a hindrance to better development initiatives in poor countries (Cavallo & Noy 2010; Manandhar & McEntire, 2014).

However Berke & Campanella (2006) and Enarson (2001, p. 1) warn that the window of opportunity quickly shuts in a rush to return to "normalcy" after a major disaster and suggests that there should be long-term planning to address all those socio-economic, political and gender arrangements which initially made people vulnerable to disasters (this is exactly what happened in case of Pakistan in later disasters after the 2005 earthquake). Nigg & Tierney (1993) and Boano & Hunter (2010) warn that in some cases disasters could provide an opportunity for dominant groups or classes in a society to retain or even expand their control over resources. As a solution Manandhar & McEntire (2014) suggest that a new kind of development paradigm is needed to address these issues; a development which not only caters for poverty reduction, economic development, and sustainability but is also sensitive to future disasters and aims to reduce disaster vulnerability of the people.

3.7. Post-disaster Housing Reconstruction

Housing is one of the most important issues for millions of people worldwide. For most of the people, a house is the most valuable and biggest asset (Schilderman 2010); this is especially true in poor developing countries where there are no mortgage and other financial support systems in the housing sector and most people spend a lifetime's income on housing. Unfortunately this prized possession becomes the usual target of disasters such as floods, earthquake, and landslides. Housing damage is the single greatest component of all losses (lives, livelihoods, economic and infrastructure) in the aftermath of disasters (Cuny 1983; Barenstein & Pittet 2007; Comerio 1997; Kumar *et al*. 2014). Globally, approximately 97% of those made homeless by disasters are from developing countries (Gilbert 2001). Figure 3.7 shows losses to the housing sector in Kashmir caused by the 8th October 2005 earthquake. Both of these figures show that the damage to the housing sector (both in monetary and numerical terms), is overwhelming as compared to other sectors.

It has also been established that building collapse (mostly residential buildings) is the biggest cause of casualties (Alexander 2012; Aysan & Davis 2013; Comerio 1997; Nigg (1995); Pandey *et al*. 2008; Spence & So 2009). According to Bilham (2009) building collapse is responsible for most of the fatalities in earthquakes, especially from residential buildings in developing countries.



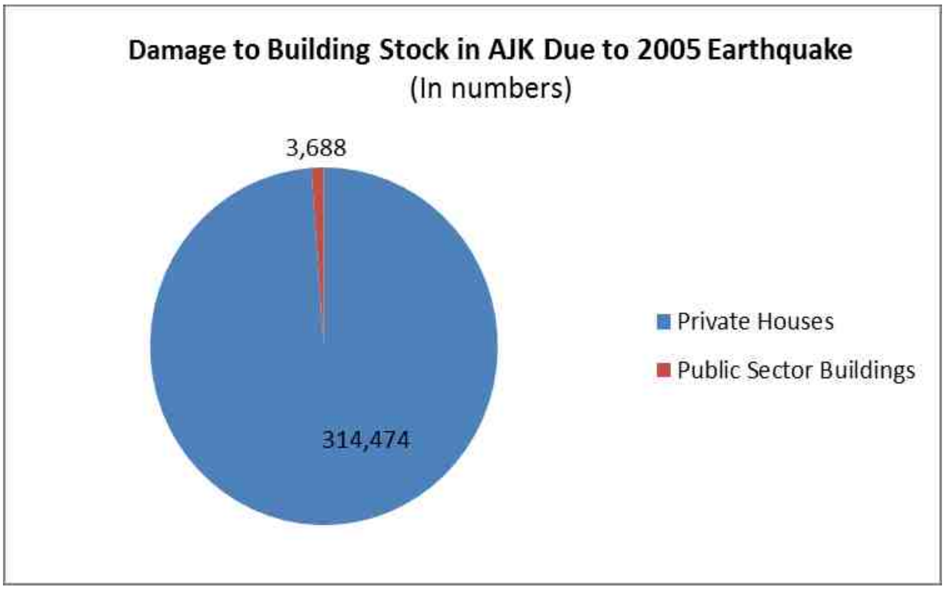


Figure 3.8 Damage to housing sector due to 2005 earthquake in Azad Jammu & Kashmir. (Based on the SERRA data)

Housing damage gives rise to many other social and developmental issues such as land tenure, ownership, urbanization, inheritance, land-use planning, livelihoods, construction technologies, business opportunities and job skills (Cuny 1983). Similarly, political issues like securing electoral constituencies, gratification of political allies and victimization of political opponents; and, cultural issues like disruption and redefinition of traditional social networks due to displacement, formation of new social hierarchies and gatekeeping by social elite, become all too evident in post-disaster situations (*ibid*).

According to Nigg (1995) housing losses can have devastating effects on post disaster recovery.

Housing is also critical in disaster situations as a matter of human rights. The right to housing is interrelated more widely, including protection from forced evictions and the right of all persons to be protected against arbitrary displacement to locations distant from their homes or habitual places of residence (Barber 2008). There is a growing understanding that while providing this right (whether via temporary shelters or in permanent housing) priority should be given to original sites (The Sphere 2011), as this territorial unit is both a physical as well as a symbolic phenomenon (Boano & Hunter 2010). People have material as well as emotional attachments with their places of permanent abode. Thus the right to housing thereby implies the right to the place where the family had lived prior to the disaster (Audefroy 2010). If the disaster affected people are given shelter away from their original homesteads (as usually happens in post-disaster situations), the individual or the community must change the physical and symbolic points of reference, which can result in organizational and social problems (*ibid*).

Housing is important with respect to vulnerability point of view as well. Post-disaster housing reconstruction can address pre-disaster vulnerability by introducing safe construction techniques, new and improved building control mechanisms, and hazard sensitive land use planning (Schilderman 2010).

3.7.1. Housing Reconstruction Approaches

Due to the scale of post-disaster reconstruction and the implicit associated importance as discussed above, housing is one of the most important focus areas in most post-disaster reconstruction efforts (Davis 1978; Gangapati *et al*. 2012; Roosli & O'Keefe 2011). According to Audefroy (2010) post-disaster housing is a very peculiar case in the sense that it refers not only to those people who have both been through traumatic phases of a disaster, but to those also who have lost their most important asset. Moreover, people are usually uprooted and displaced by large disasters triggering important changes in property rights, social structures and livelihoods (Bhavani 2006; Deng 2010). Housing reconstruction plays a very important role in restoring normality to the communities uprooted by disasters. This necessitates that housing reconstruction should start as quickly as possible to minimize the period of emergency housing.

The complexity of disaster situations and the different nature of vulnerability lead to the need to design housing reconstruction programmes according to the specific situation of the affected community (Audefroy 2010; Bhavani 2006; Gangapati *et al*. 2012) because one approach does not fit all societies. It is for this reason that over a period of time different housing reconstruction approaches have been adopted after various disasters. These approaches can be broadly divided into four categories (Chang *et al*. 2010; Jha & Duyne 2010; Maly & Shiozaki 2012):

3.7.1.1. Unconditional Cash Approach

Under this approach the government gives a financial assistance package without any technical support or conditionality. Most developed countries, especially the USA, adopt this approach. In the USA the government tends to take a less active and indirect role in post disaster housing recovery, which is mainly limited to supporting the poorest families via grants and low interest rate loans through the so-called ‘safety nets’ system of the Federal Disaster Management Agency (FEMA). Otherwise households mainly draw on their own resources, insurance, and private capital to finance the reconstruction of homes (Kondo 2008; Lu *et al*. 2007; McCarthy 2008). This approach has been criticised, by writers including Dunford & Li (2011); James *et al*. (2006); Rodney *et al*. (2011) pointing to many problems in the ‘post-Katrina reconstruction’ programme, including racially discriminatory policies and practices that contributed to the disparity in the African Americans’ return to New Orleans.

3.7.1.2. Community/Donor-driven Reconstruction

In this approach, community organizations are actively involved in decision making, design and construction management. Financial and/or material assistance is not given to the affected people directly, but is channelled through community organizations. Post-2004 tsunami reconstruction in Aceh is one such example where humanitarian organisations used a variety of different construction approaches that were broadly divided into two categories: ‘community built’ and ‘contractor-built’ (Daly & Brassard 2011). This approach faced many problems such as slow pace of construction, poor quality construction, and suitability of the reconstructed houses (Rand *et al*. 2011).

3.7.1.3. Agency-driven Reconstruction

Here contractors are hired for the construction of houses and the construction is managed by either governmental or dedicated non-governmental agencies. The government driven housing reconstruction in Kobe, Japan after the 1995 earthquake is one such example of this type of intervention. Due to minimal participation of beneficiaries, this top-down approach led to many problems for Kobe residents, such as the housing being located far from residents’ former neighbourhoods making it difficult for them to recover their daily lives; the housing being limited to the elderly and low-income groups; and construction taking a long time (Maly *et al*. 2012).

3.7.1.4. Owner-driven Reconstruction (ODR)

This final approach is relatively new and was first practiced in Gujarat, India after the earthquake of 2001 (Abidi *et al*. 2011; Twigg 2006). Under this approach the government gives conditional financial assistance (usually at different stages of construction) accompanied by regulations and technical support to ensure better housing reconstruction. ODR has been practised with some variations, in India after the 2001 Gujarat earthquake, in Iran after the 2003 Bam earthquake, and in Pakistan after the 2005 earthquake (SIDA 2008). In Gujarat, more than 200,000 houses were rebuilt and about one million were repaired (Jha *et al*. 2010; World Bank 2002), with 80% through ODR and the remaining 20% through a Public Private Partnership approach (Barenstein & Iyengar 2008; GSDMA 2002; Twigg 2006). In the case of Bam, the private housing reconstruction was the responsibility of the Housing Foundation of Islamic Revolution (*HFIR*) which adopted a bottom-up community based approach for the purpose of housing reconstruction (Fallahi 2007; Gharaati 2006; UN 2004). The home owners were provided with various construction methods, construction material and technology options. As compared to past approaches, people had more input in the decision making process (Ghafory-Ashtiany & Hosseini 2008; Gharaati 2006; Omidwar *et al*. 2011). In China, the government adopted the ODR approach after the Wenchuan earthquake in 2008. Owners were given a 16,000-21,000 RMB (approx. US$ 2300-3000) subsidy and interest free loans (Audefroy 2011; Ge *et al*. 2010) to construct their homes.

In Pakistan, after the earthquake of 2005, the Government of Pakistan started the private housing reconstruction programme as part of the overall reconstruction and rehabilitation programme by establishing the Earthquake Reconstruction & Rehabilitation Authority (ERRA). A Housing Reconstruction Policy was formulated by the ERRA in consultation with UN-HABITAT and more than 80 international and national organizations (ADB 2011). The 'Owner Driven' approach was incorporated in most of the guiding principles such as utilizing local knowledge and capacities, restoration of livelihoods of the affected people and the use of local construction materials (Qazi 2008).

Three main components of this policy were: (a) cash grants for reconstruction or retrofitting; (b) technical assistance; and, (c) capacity building of all affected stakeholders (ERRA 2006). Owners were expected to use their own labour and/or hire labour as well as recycle building materials as far as possible from the debris of their damaged homes (ERRA 2006; Qasim *et al*. 2010; Shah 2012). By September 2012, a total of 419,624 (96.14 % of the ERRA's portfolio) houses had been declared as reconstructed/repaired (www.erra.pk/). According to Abidi (2011) this approach has several advantages such as lower administrative cost, higher social adaptability and acceptability, speedy and good quality reconstruction, and the introduction of new and improved construction techniques into the local construction culture.

However, Schilderman & Lyons (2011) have noticed some weaknesses in the owner-driven approach such as being top-down and exclusionary, ignoring those people who do not have land titles, and not addressing the vulnerabilities of the people.

3.8. Summary

In this chapter I have discussed the theoretical framework of my research. Disasters, vulnerability, and development come out as central themes in this chapter. I have discussed that disaster losses (both human and economic) are increasing with the passage of time due to growing population, infrastructure development, and growing vulnerability of the people. However, these losses are unevenly distributed between the developed and the developing countries. In the developed world there is lesser loss of life and more economic losses; whereas in the developing countries the life losses are exceptionally high and the economic losses are lower as compared to developed countries.

This uneven distribution of losses between the developed and the developing countries leads to the understanding that the physical magnitude of the disaster event is not the only determinant of disaster losses; the degree of loss is more dependent on the physical context in which the event happens (Cuny 1983). I also discussed the conceptual debate that ensues from this uneven distribution of disaster losses. Gilbert's (1998) three paradigms were discussed as an example of this debate.

The concept of vulnerability is central in understanding disasters. Cutter (2006) has identified three themes in vulnerability research: vulnerability as risk/hazard, vulnerability as social response, and vulnerability of places. The "Pressure and Release" model developed by Blaikie *et al*. (1994) looks at hazard as a physical phenomenon and vulnerability as a social phenomenon which ultimately culminates into disaster. The relationship between development and disaster vulnerability is highly complex. McEntire (2004) divides this relationship into two broad categories: the radical theory (Hewitt 1983) asserts that poverty is the main cause of disasters and restructuring of social, political, and economic relations can reduce vulnerability; the cultural theory (Mileti 1999) looks at culture as main determining factor of disasters and the solution is changes in beliefs and behaviours of the society. McEntire (2004) puts forward a third approach which combines the benefits of these two approaches. The central theme of this approach is that if people are to be made resilient to disasters, their vulnerability must be reduced.

Development plays an important role in disaster vulnerability in two ways; development can reduce vulnerability and development can increase vulnerability (DMTP 1997). Collins (2009, p.14) terms this approach as “disaster and development approach”, which considers a disaster not only as a natural phenomenon but also as a function of development. This concept emphasizes that a natural disaster can be seen either as the consequence of there being insufficient development to avoid a human crisis or, alternatively, the development process can itself enhance human exposure to disasters.

For the purpose of my research, I have relied on the ‘Pressure and Release’ or PAR model developed by Blaikie *et al*. (1994), further developed by Wisner *et al*. (2004) and Collins (2009) “disaster and development approach”. By using these approaches I will try to find out how the development policies of the Government of AJK made its people vulnerable to seismic hazard.

I have also discussed how disasters can work as a window of opportunity to reduce past vulnerabilities and what the importance of housing in post-disaster reconstruction is. Four mainstream housing reconstruction approaches (i.e. Unconditional cash grant approach, Community-driven reconstruction, Agency-driven reconstruction, and Owner-driven reconstruction) were also discussed.

CHAPTER 4: RESEARCH METHODOLOGY

4.1. Introduction

This chapter presents my research methodology. The motivation for undertaking this research project is outlined in section 4.2. Methodological tools are discussed in section 4.3 and section 4.4 discusses data collection methods. In section 4.5, I present different methodological tools employed during fieldwork. Section 4.6 outlines the research timeline. In section 4.7, I have discussed the methods used for analysis of the data collected during fieldwork; section 4.7.1 describes quantitative data analysis and section 4.7.2 describes qualitative data analysis. Section 4.8 discusses geographical context of the research. Section 4.9 discusses my positionality vis-à-vis research. Finally, section 4.10 concludes with a brief summary of the chapter.

4.2. Why Undertake a PhD?

This is the question that I have to frequently face since the day I decided to do PhD. The reason for people asking this question is my professional background. I am a civil servant by profession. Being a legacy of the British Raj in the Subcontinent, the civil service is considered to be the most prestigious career and ultimate dream of millions in Pakistan (Sohail 1990, 2007; Kalia 2013; Shafqat 1999; Tanwir & Fennell 2010). After working in the AJK civil service for more than two decades I was at the peak of my career when I decided to do this PhD; I was working as Secretary to the Government of AJK at that time. This position brings many perks with it; good salary, official chauffer driven car/s, official residential accommodation, servants, personal staff, immense influence and connections, and a general feeling of authority in the society. All these things are necessary tools for survival in a socially highly stratified and developing post-colonial society (Hafeez 1985; Mohmand & Gazdar 2007; UK Essays 2013). So leaving such an ideal career for doing PhD when, in the words of a colleague of mine, I still had thirteen years to "enjoy the secretary-ship" was an incomprehensible decision for many. Most of them had found my decision of joining the reconstruction programme instead of continuing as Deputy Commissioner a crazy decision as well. My colleagues were equally confused and unhappy with my decision and tried to convince me not to pursue PhD; one of them even asked me if I had calculated the “payback” period in financial terms because according to him it was too late for me to do PhD. I was 47 at that time and had thirteen years to retire from service. My colleagues continually tried to persuade me to leave my PhD project and resume my job and each time I had to request them to spare me for a few more months. I am one of those lucky people who have a big circle of sincere friends. Only one or two understood my decision, the rest are still unhappy and use various tactics (including emotional blackmailing) to bring me back to “normal life”. But perhaps the most difficult thing was to convince my family and leave them behind for a few years; my kids were growing and needed me the most, my wife found it extremely difficult to survive on her own due to particular socio-cultural makeup of the society, and then my in-laws and extended family. I must admit that throughout this period, I had been under tremendous pressure due to my decision, especially when the PhD degree will have no direct bearing on my further promotion in the job or increase in salary, in fact it deprived us of many facilities.

So the question is why do a PhD at all then?

The answer was simple for me; I did not want to keep my knowledge of the post-earthquake recovery programme to myself. I have a very strong emotional association with AJK and the 2005 earthquake. I was born and bred in AJK and studied there until I graduated from university. After completing my postgraduate studies I joined the civil service of AJK in 1991. I was working as Deputy Commissioner of Muzaffarabad District at the time of the earthquake and saw all the devastation with my own eyes, probably more than anybody else. The Deputy Commissioner is the administrative head of the District, so I remained actively involved in the search and rescue and relief operation until June 2006 and then I joined the reconstruction programme as Programme Manager of the District Reconstruction Unit Muzaffarabad. After working in the District Reconstruction Unit for two and a half years, I joined the Asian Development Bank funded Earthquake Emergency Assistance Project (EEAP) as Project Coordinator. After successfully completing this project I was promoted to Director General and Secretary of the State Reconstruction and Rehabilitation Agency (SERRA), where I worked for more than a year. It is from this position that I started my PhD research. During these six years I had been directly and actively involved in the post-earthquake recovery and got first-hand knowledge of many things. I was also conscious of the fact that once the reconstruction programme was over and the reconstruction organization was wound up, the immense knowledge and experience will fizzle out quickly enough. I knew from my experience of the civil service that government offices were excellent graveyards of data and numerous outstanding people.

Research on the housing reconstruction programme was extremely limited and consisted of reports prepared by different organizations involved in the reconstruction programme. I, therefore, wanted to document this experience for the benefit of others. The level of in-depth study required for the type of research work that I wanted to produce was only possible through a PhD project. Moreover I not only wanted enough time to conduct such an in-depth study, which was not possible to do while continuing with job, I also wanted to "step back" and "step away" from the post-earthquake recovery theatre and have a critical and objective look at whatever has been done. As one of my predecessors in the SERRA and my long-time friend rightly observed; *"till the time we were inside the earthquake reconstruction programme we believed that it was the best we could do. The moment you come out of there and take a step or two back or sideways and then look at it [the reconstruction] … looking twenty years down the road then you see that there were so many things that needed to be done…"*. The reason of stepping back was that while being in the government service at the higher level we generally look at things at the macro level (about policies and their implementation), we are more interested in figures. Thus we mostly remain oblivious to micro level details. It was during my fieldwork that I fully realised this. It was my interaction with individuals as a researcher that I realised that things could be seen and understood differently by those who are the recipients of policies.

The experience of the earthquake changed my thinking and gave me the courage and motivation to break from the norm and do something different, hopefully beneficial for others (Blaikie 2012). I do not claim that the knowledge that I have produced is comprehensive, objective, and complete. Being aware of my positionality and ensuing 'absences and fallibilities' (Rose 1997, p. 305) I admit that the knowledge produced as a result of my research is 'only partial and situated, and versions of the overall reality (Robinson 2014, p. 69). I must also admit that my research has impacted me a lot as well, if not as much as the earthquake itself. As highlighted by Whatmore (2003), cited in Robinson (2014, p. 69), the process of data collection and the data analysis has 'changed and affected' me.

For the purpose of my research, I loosely follow the 'Pressure and Release' or PAR model developed by Blaikie *et al*. (1994), and further developed by Wisner *et al*. (2004) and Collins (2009) "disaster and development approach". Following this theoretical approach, I will try to find out how different types of vulnerability progressed into a state of disaster vulnerability which left the people of AJK exposed to seismic hazard which ultimately culminated into the devastating earthquake of the 8th October 2005 and what role the development policies of the Government of AJK played in generating those conditions which set the process of vulnerability into motion, but also perpetuated it.

Like Robinson (2014, p. 70) I have conducted an ethnographic research as an 'insider' but I don't rely 'substantially or partially' on "participant observation" only (Atkinson & Hammersley, 1994, p. 248; Herbert 2000; Mullings 1999). I also involve data collection through survey questionnaires, interviews, and focus groups. The subject of positionality is widely discussed in the literature (see, for example, Barry *et al*. 1999; Baxter & Eyles 1997; Borbasi *et al*. 2005; England 1994; Ganga & Scott 2006; Finlay 2002; Herbert 2000; Huisman 2008; Macbeth 2001; Mauthner & Doucet 2003; Mullings 1999; Nazarea 1999; Reinhart & Reuland 1993; Rose 1997; Sidaway 2000; Sultana 2007; Whiting 2008). Reflexivity is defined as 'self-critical sympathetic introspection and the self-conscious *analytical* scrutiny of the self as researcher' and is critical in conducting fieldwork (England 1994, p. 244).

Reflexivity, positionality, and power relations in the fieldwork are contested concepts in geography, especially amongst feminist geographers (Sultana 2007). On one side are those who support a positivist, masculinist, and objective approach to research (see, for example, Bourdieu & Wacquant 1988; Delaney 1988; Mascia-Lees *et al.* 1989; Pratt 1986) and on the other are those who have debated the possibility of reflexive research (see, for example, Alvesson & Skoldber 2000; England 1994; Hertz 1997; Hughes 2006, 2012; Katz 1994; Mauthner & Doucet 2003; Mountz 2002; Nagar 2002; Radcliffe 1994; Raju *et al*. 2002; Robinson 2014; Rose 1997; Sidaway 2000; Staeheli & Nagar 2002; Sultana 2007; Wolf 1996).

Instead of taking a 'masculinist scientific stance which has spuriously claimed a cool, calm and collected detachment for the heroic fieldworker' (Crang & Cook 1995, p. 8) and mentioning my relationship with my research as a 'detached researcher… [in] the introductions, footnotes, and appendices' (*ibid*) in my thesis I rather adopt the approach which supports the 'fact that both researcher and the researched are equally positioned, interconnected and involved in the changing social and cultural relationships under study (*ibid*). According to Finlay (2002) and Sultana (2007, p. 376) reflexivity 'involves reflection on self, process, and representation, and critically examining power relations and politics in the research process, and researcher accountability in data collection and interpretation'.

Though reflexivity has been blamed of being "mere navel gazing," and even "narcissistic and egoistic", (Okley 1994, cited in England 1994, p. 244), I take Sultana's (2007, p. 376) view that 'being reflexive about one's own positionality is not to self-indulge but to reflect on how one is inserted in grids of power relations and how that influences methods, interpretations, and knowledge production'. While being conscious of Finlay's (2002, p. 209) warning that the 'process of engaging in reflexivity is full of muddy ambiguity and multiple trails' and the limitations that it poses (see, for example, Bourdieu & Wacquant 1992; Delyser 2001; Finlay 2002; Ganga & Scott

2006; LaBaree 2000; Robison 2014), I take my positionality as my biggest strength (Abu-Lughod 1988 and Hill-Collins 1990 cited in, Mullings 1999, p. 3; Robinson 2014). Being a ‘part of the setting, context, and social phenomenon being studied’ (Barry *et al*. 1999, p. 30), my experience and my research complement each other and form two integral parts of my project. I will refer back and forth to my positionality in this chapter and elsewhere in the thesis to explain how it situates the knowledge that I am trying to produce (Gilbert 1994; Hertz 1997; Katz 1994; Kobayashi 1994; McDowell 1992; Robinson 2014; Rose 1997; Sultana 2007; Whatmore 2003).

4.3. Research Methodology

Research methodology provides us the ‘road maps’ to conduct our research (Creswell *et al*. 2003, p.159). Kothar (2006, p.8) describes research methodology as a “way to systematically solve the research problem…it may be understood as a science of studying how research is done scientifically”.

My research aims to show not only the empirical evidence of the housing reconstruction programme – such as how many houses have been built, the completion ratio, what are the trends in progress in different areas and in different communities – but also to identify and analyse those socio-cultural, political, policy, and organizational factors which lead to this performance. All this information could not be gathered through a single research method, so a mixed methods approach was more appropriate for my research. Creswell *et al*. (2003, p. 163) define the mixed methods as a “procedure for collecting, analysing, and reporting research such as that found in the time-honoured designs of quantitative experiments and surveys and in the qualitative approaches of ethnographies, grounded theory studies, and case studies”. Johnson & Onwuegbuzie (2004, p. 17) define mixed methods research as “a class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study”.

The purpose of using the mixed methods approach is to make maximum use of the strengths of both qualitative and quantitative methods and to neutralize or minimise the weaknesses of each. The inadequacy of a mono-method (relying on either qualitative or quantitative methods) approach and the need for a third approach is well reported in literature. For example, Bazeley (2006); Bryman (1984); Creswell (1994); Creswell *et al*. (2003); Glaser & Strauss (2009); Greene *et al*. (1989); Jick (1979); Johnson & Onwuegbuzie (2004); Johnson *et al*. (2007); Law (2004); Onwuegbuzie (2002); Tashakkori & Teddlie (1998); and Tashakkori & Teddlie (2003) emphasise combining the advantages of both quantitative and qualitative methods into a third, mixed methods approach. These methods can be mixed in many different ways. Figure 4.1 depicts the mixed-methods design matrix.

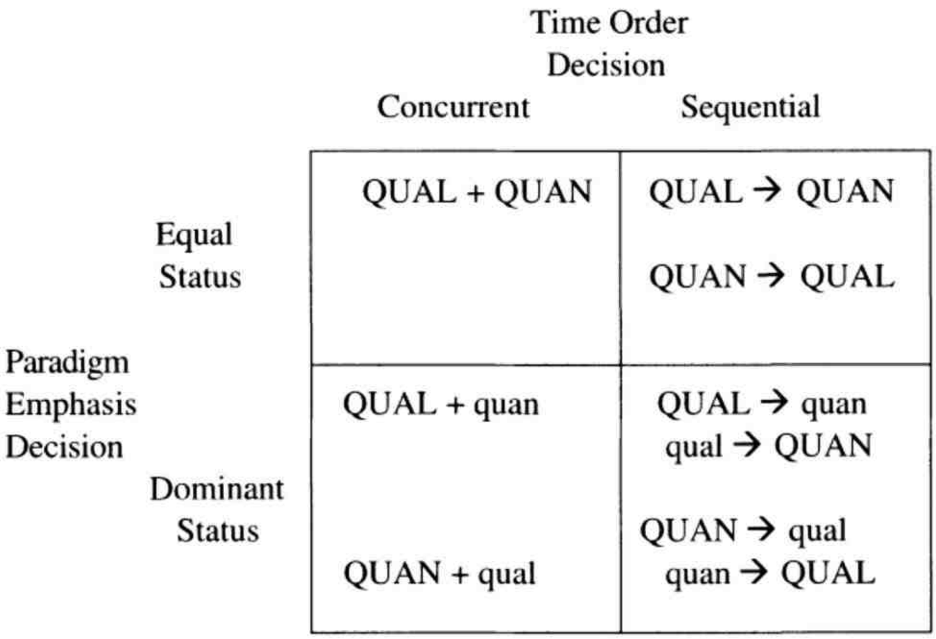


Figure 4.1 Mixed-method design matrix with mixed-method research shown in four cells ("qual" stands for qualitative, "quan" stands for quantitative, "+" stands for concurrent activity, and "→" stands for sequential activity whereas high priority or weight of the research method is shown by the capital letters, and lower priority or weight of the research method is shown by the lower case letters). (Johnson & Onwuegbuzie 2004, p. 22)

4.4. Methodological Tools

My research is of ethnographic nature (Section 4.2 & 4.9). Being aware of the criticism on ethnographic research (see, for example, Rengert 1997, cited in Herbert 2000, p. 558; Thrift 2000, cited in Latham 2003, p. 1993) I have designed my research project to address the shortcomings associated with this type of research. For example, I don't rely on participant observation only, but have collected both qualitative and quantitative data (Herbert 2000;

Jackson 1983) in the shape of survey questionnaires, semi-structured interviews, and focus groups. The sample size is also large: 200 survey questionnaires, 36 key informant interviews, 55 house owner interviews, 4 focus groups, and 2 life stories. Instead of doing data interpretation subjectively, I went back to my respondents to share data results with them and get their feedback on the results. I have used the mixed methods research approach for the purposes of triangulation, complementarity, initiation, development, and expansion (Greene *et al*. 1989). Figurer 4.2 (based on Greene *et al*., 1989; Johnson & Onwuegbuzie 2004; Olsen 2004) explains how these purposes fit in my research.

Contribution of Mixed Methods	Explanation	Example
i) Triangulation	Mixing or convergence of different data types for validation of results in the same study.	Convergence of quantitative data (progress reports of ERRA and survey questionnaires) and qualitative data (interviews, focus group discussions and life stories) can explain / validate the performance of the ODR in the study area.
ii) Complementarity	Seeking clarification or illustrating or collaboration of results for one method by using the results of another method.	Survey questionnaire reveals that rural populations faced greater problems than urban inhabitants; these problems are illuminated through interviews.
iii) Initiation	Seeking contradictions and oxymorons through research that might lead to the reframing of the research questions.	Research might show that better housing reconstruction performance in a particular community was due to the outside support (e.g. material support by NGOs) rather than social capital; the research questions might by reframed then.
iv) Development	Using the results of one method to inform the other method.	Quantitative data of the Reconstruction Agency shows relatively lower level of housing construction in a particular locality; reasons are illuminated through interviews and focus group discussions.
v) Expansion	Expanding the scope of research by using different methods of enquiry.	The use of quantitative methods (official data, survey questionnaires) and qualitative data (interviews, focus group discussions, life stories) will expand the scope of my research by taking it out of the tight categories of physical or human geography.

Figure 4.2 Uses of Mixed Methods Approach of Research

Concurrent Nested Design might also be used instead of triangulation. Creswell *et al*. (2003) explain Concurrent Nested Design as a data collection phase in which both qualitative and quantitative methods of data collection are used simultaneously. One data collection method (having lesser priority) is nested in the other predominant method (Figure 4.3). This method enables the researcher to collect both types of data during the data collection phase and these can be mixed during the analysis. This not only makes the data collection exercise more flexible, but the researcher can have a broader and more comprehensive perspective of the project at this stage. My research falls into Design 2 category; it is predominantly a qualitative study, having quantitative method nested within i.e. one quantitative method (survey questionnaire) is nested in four qualitative methods (key informant interviews, house owner interviews, focus groups, and life stories).

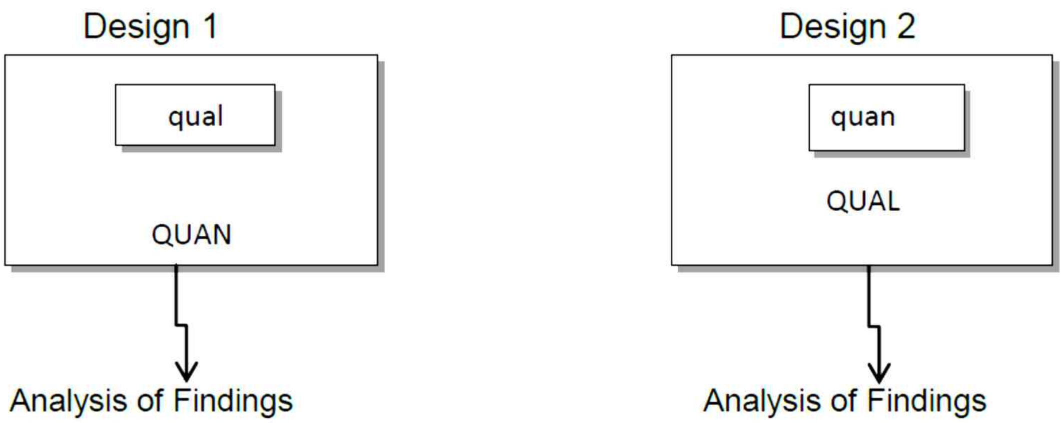


Figure 4.3 Nested Design Model. (Source: Creswell *et al*. 2003, p. 181)

4.5. Data Collection Methods

Figure 4.4 explains my research methodology. It explains the data required and the method employed for each research question. Figure 4.5 explains the methodological tools and their sequence during field work within this framework.

Research Question	Data/information needed	Method
RQ1. What is the importance of housing reconstruction in post-disaster recovery, and which housing reconstruction approaches are being practised more widely in the aftermath of disasters?	• Background knowledge of wider academic debates around issues like: risk, hazard, disaster, vulnerability, reconstruction approaches, social capital, and governmentality.	• Books, journal articles, grey literature.
RQ2. What led the Government of Pakistan to adopt the Owner Driven Reconstruction (ODR) approach for post-earthquake reconstruction after the 2005 earthquake and has this approach been adopted in subsequent national disasters?	• Policy analysis of the Government of Pakistan's response to different disaster situations and post disaster reconstruction approaches, especially after the 2005 earthquake.	• Grey literature • Key informant interviews
RQ3. How successfully has this policy been implemented and is the characterization of the owner-driven approach as successful in the geography, economics and social contexts)?	• Quantitative data on progress of housing reconstruction • Qualitative evaluation of the socio-economic impacts of the ODR programme	• Analysis of secondary data • Analysis of primary data • Surveys Questionnaires • Key informant interviews • Semi-structured interviews • Focus group discussions • Life stories
RQ4. After the completion of the housing reconstruction programme: 4.1 To what extent the seismic-resistant construction techniques are sustainable in the study area, especially in rural areas? 4.2 How far the ODR has been able to reduce / address the vulnerability issues in the study area? **4.3** To what extent has the implementation of the ODR re-worked family and household structures and patterns of land ownership?	• Qualitative evaluation of the socio-economic impacts of the ODR programme	• Books, journal articles, grey literature • Analysis of the secondary data • Key informant interviews • Focus group discussions • Semi-structured Interviews
RQ5. What lessons can be learnt from Pakistan experience and what are the recommendations for transferability / replication of this approach in case of future disaster events?		• Books, journal articles, grey literature • Key informant interviews • Focus group discussions

Figure 4.4 Research methodology.

4.6. Methodological Tools for Data Collection

Field data collection was undertaken in six steps which are illustrated in Figure 4.5. These steps are discussed in detail in later sections.

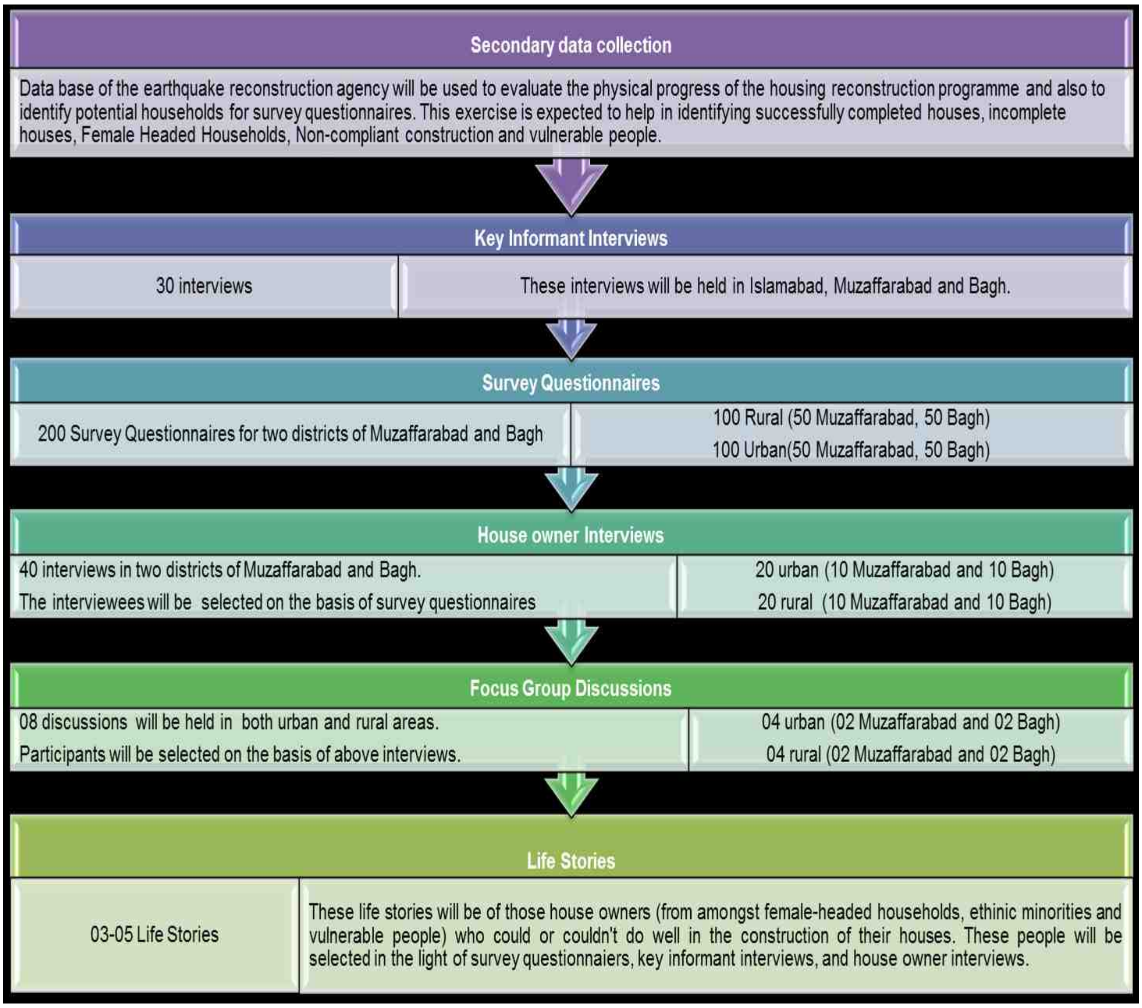


Figure 4.5 Methodological tools for my fieldwork including sample design and numbers.

4.6.1. Secondary Data Collection

The purpose of this activity was to collect the quantitative data from reconstruction organizations and other government departments to provide a foundation for further data collection. Data from the SERRA were used for two reasons. First, I wanted to verify the claim of the government that the housing reconstruction programme was a huge success and more than 96% houses have been reconstructed by October 2013 (ERRA 2013) and only data of the SERRA could provide details of the progress of the housing reconstruction in the study area. The second reason was that as an “insider” I knew that these data could provide a strong basis for the next steps of my research including quantitative data collection from the field, triangulation, and analysis. Analysis of the official data provided trends and anomalies of the housing reconstruction and enabled households for further data collection to be identified. Some of my research questions also necessitated that I analyse the SEERA data first. For example, the female-headed households (to address research question 3) could be more easily and reliably identified using the data of the SERRA to target field work. The SERRA, especially the Housing Section, was extremely cooperative and efficient in providing data. The data of more than 257,000 households were analysed in the case of rural areas, and 16,471 households in urban areas. These data were provided mainly in electronic format and could be analysed in different categories. For example rural/urban, female headed households, fully and partially damaged houses, disbursement of housing cash grant according to instalments etc. However, I had to face difficulty in case of village-wise detail because in many cases the same village was entered in the data with different spellings at different places. For example *"ALI SUJAL SHARKEE"*, *"ALI SOJAL SHARQI"*, and *"E ALI SOJAL"* are different spellings of the same village in these data. It was due to my personal knowledge of the area and great help of the SERRA staff that we sorted out these anomalies.

Acquiring data from the Revenue Department and the Census Department was an arduous exercise. Unlike the SERRA, the data in the Revenue Department was not in electronic format but in hard copies in different files in different offices. These files were kept in a careless manner and within a few years most of these files had become tattered. The Census Department was asked for a copy of the census report conducted in 1998 for population and houses in the study area but I was told that it was a classified document and could not be given to anybody except the relevant government departments. I am still unable to understand what was so secret in that document.

4.6.2. Key Informant Interviews

Semi-structured interviews with key informants were the second step of data collection. USAID (2013, p. 2) identified four situations where key informant interviews can be useful:

1. When qualitative, descriptive information is sufficient for decision-making.
2. When there is a need to understand motivation, behaviour, and perspectives of our customers and partners.
3. When a main purpose is to generate recommendations.
4. When quantitative data collected through other methods needs to be interpreted.

Key informants for my interviews were those people who had 'first-hand knowledge' of the subject (USAID 1996, p. 1) and hence fulfilled the above conditions. They had remained closely attached with post-2005 earthquake housing reconstruction programme at policy making, implementation, monitoring or other relevant roles. They belonged to the ERRA, the SERRA, the Government of AJK, local government, civil society, international organizations, business, and multilaterals (Annex-3). Their knowledge is of the utmost importance for my research because only these people know how the housing reconstruction policy was framed and implemented, what issues came up during implementation and how these issues were addressed, the impacts of this programme, and also what were the lessons learnt and recommendations for the future.

The interviews were conducted with key informants of various backgrounds during August 2013 and January 2014; however a few interviews were conducted during February-May 2014 with those key informants who were later added in the list after going through the data collected till that time. The interviewees were either given a printed brief of my research project or were orally briefed. Their express consent was sought using a consent form before the start of the interview and it was also explained that they had the option to remain anonymous (Whiting 2008), the information was confidential and they had the option to withdraw their consent at any time. However, it was not possible to get written consent from everybody so their oral consent was sought expressly. All respondents except one had no objection in revealing their identity in the report. The interviews were held either at the place of the interviewee (office or home) or at a neutral location. Two interviews were held at my home at the wish of the interviewees because they knew me very well and there was no chance of them being influenced by this location (Sin 2003). The interviews were audio recorded and notes were also taken (Whiting 2008). One respondent refused audio recording of the interview and was very concerned about the use of the interview in my research, so assurance was given that their remarks will be shared with them in exact words before incorporating into the thesis.

According to Mullings (1999, p. 339) and Sabot (1999, p. 329) the interviewee, especially the local elite, has the power to decide how much knowledge to give to the researcher. In my case most of the respondents expressed their opinions readily, candidly, and confidently; may be due to my being an "insider". However some respondents requested that some of their remarks be treated as "off the record"; these remarks will not become part of the thesis.

4.6.3. Household Survey

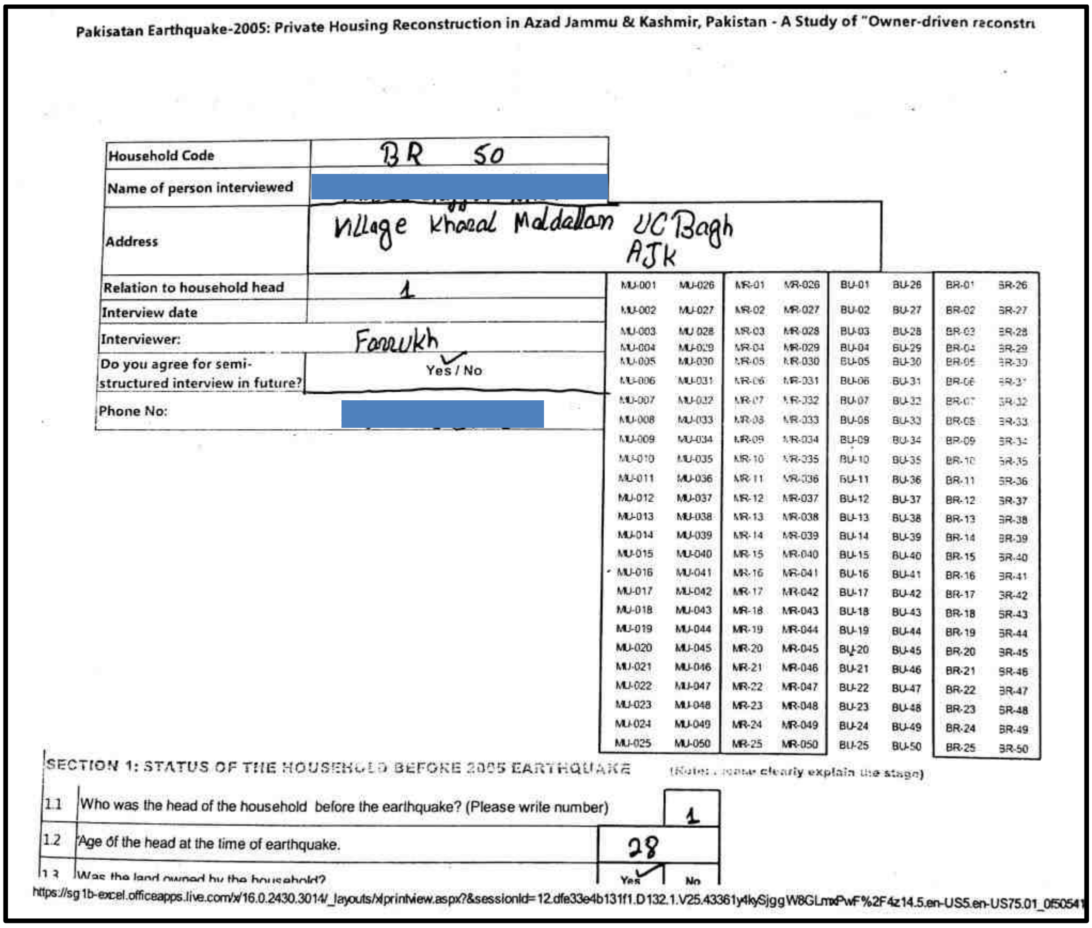
According to Kitchenham & Pfleeger (2002, p.19) appropriate size is a major issue of concern when sampling. They brought forward two reasons as to why sample size was of importance: '[F]irst, an inadequate sample size may lead to results that are not significant statistically. In other words, if the sample size is not big enough, we cannot come to a reasonable conclusion, and we cannot generalize to the target population' (*ibid*, p. 19).

Keeping this in mind, a sample size of 200 households was appropriate for my research. This sample size was chosen for two reasons. One, keeping in mind the difficult terrain of the study area, this sample size was manageable. A bigger sample size would have been difficult for me to manage physically and costly in terms of time and financial resources. Two, it is a decent sample size and can provide reliable results which could be generalized to the target population whilst retaining statistical significance for subgroups of the sample (e.g. data split by gender). The later interactions with different respondents during my second fieldwork proved this whereupon almost all respondents agreed with the results and findings of the survey and found them reliable (please refer to Section 8.2, 8.2.1, 8.2.2 and 8.2.3 for detailed discussion).

These households were identified for collection of quantitative data through the SERRA housing reconstruction data. The survey was conducted during January-February 2014 in Bagh and Muzaffarabad cities in urban areas and in UC Danna and UC Salmia in rural Muzaffarabad and UC Islamnager and UC Jaglari in rural Bagh. The survey was conducted through research assistants. The survey was conducted for those houses which were categorised as reconstructed in the SERRA data. The purpose of the research was clearly outlined in the native language of the households, their right not to participate in the survey or withdraw from it at any time, anonymity and that no one except the researcher will have access to the survey data (Annex-4). Mostly these surveys were conducted in the presence of other members of the household who were free to seek clarification from the research assistant or express their opinion so the respondents felt more confident (Figure 4.6).

Figure 4.6 My research assistant doing quantitative data collection.

The survey questionnaire was in English but the research assistants were also given an Urdu translation as well and they asked questions in Urdu or the local language but filled the forms in English (Figure 4.7).



Pakisatan Earthquake-2005: Private Housing Reconstruction in Azad Jammu & Kashmir, Pakistan - A Study of "Owner-driven reconstr

Household Code	BR 50
Name of person interviewed	[redacted]
Address	Village Khaoal Maldallan UC Bagh AJK
Relation to household head	1
Interview date	
Interviewer:	Farrukh
Do you agree for semi-structured interview in future?	Yes / No
Phone No:	[redacted]

MU-001	MU-026	MR-01	MR-026	BU-01	BU-26	BR-01	BR-26
MU-002	MU-027	MR-02	MR-027	BU-02	BU-27	BR-02	BR-27
MU-003	MU-028	MR-03	MR-028	BU-03	BU-28	BR-03	BR-28
MU-004	MU-029	MR-04	MR-029	BU-04	BU-29	BR-04	BR-29
MU-005	MU-030	MR-05	MR-030	BU-05	BU-30	BR-05	BR-30
MU-006	MU-031	MR-06	MR-031	BU-06	BU-31	BR-06	BR-31
MU-007	MU-032	MR-07	MR-032	BU-07	BU-32	BR-07	BR-32
MU-008	MU-033	MR-08	MR-033	BU-08	BU-33	BR-08	BR-33
MU-009	MU-034	MR-09	MR-034	BU-09	BU-34	BR-09	BR-34
MU-010	MU-035	MR-10	MR-035	BU-10	BU-35	BR-10	BR-35
MU-011	MU-036	MR-11	MR-036	BU-11	BU-36	BR-11	BR-36
MU-012	MU-037	MR-12	MR-037	BU-12	BU-37	BR-12	BR-37
MU-013	MU-038	MR-13	MR-038	BU-13	BU-38	BR-13	BR-38
MU-014	MU-039	MR-14	MR-039	BU-14	BU-39	BR-14	BR-39
MU-015	MU-040	MR-15	MR-040	BU-15	BU-40	BR-15	BR-40
MU-016	MU-041	MR-16	MR-041	BU-16	BU-41	BR-16	BR-41
MU-017	MU-042	MR-17	MR-042	BU-17	BU-42	BR-17	BR-42
MU-018	MU-043	MR-18	MR-043	BU-18	BU-43	BR-18	BR-43
MU-019	MU-044	MR-19	MR-044	BU-19	BU-44	BR-19	BR-44
MU-020	MU-045	MR-20	MR-045	BU-20	BU-45	BR-20	BR-45
MU-021	MU-046	MR-21	MR-046	BU-21	BU-46	BR-21	BR-46
MU-022	MU-047	MR-22	MR-047	BU-22	BU-47	BR-22	BR-47
MU-023	MU-048	MR-23	MR-048	BU-23	BU-48	BR-23	BR-48
MU-024	MU-049	MR-24	MR-049	BU-24	BU-49	BR-24	BR-49
MU-025	MU-050	MR-25	MR-050	BU-25	BU-50	BR-25	BR-50

SECTION 1: STATUS OF THE HOUSEHOLD BEFORE 2005 EARTHQUAKE (Note: please clearly explain the stage)

1.1	Who was the head of the household before the earthquake? (Please write number)		1
1.2	Age of the head at the time of earthquake.	28	
1.3	Was the land owned by the household?	Yes	No

https://sg1b-excel.officeapps.live.com/x/16.0.2430.3014/_layouts/xlprintview.aspx?&sessionId=12.dfe33e4b131f1.D132.1.V25.43361y4kySjggW8GLmxPwF%2F4z14.5.en-US5.en-US75.01_0f0541

Figure 4.7 Image of a completed questionnaire.

I am confident that not much information was lost due to language and involvement of the research assistants because I had designed the survey questionnaire to be simple and straight forward requiring short answers (Annex-13). I had left more detailed questions for semi-structured interviews that I conducted myself. My research assistants were educated and had experience of undertaking similar activities with other national and international organizations. I also conducted a pilot survey before launching the actual data collection exercise and I was satisfied with the level of their work. The respondents came from almost every age group and financial background (Table 4.1, 4.2). The mean age is 47 years and minimum and maximum age is 20 years and 80 years respectively. It was also ensured that women should have representation in the survey. The SERRA data were used to identify the female-headed households and 21% (N=42) women were surveyed.

Table 4.1 Age profile of the respondents.

		Age
	Valid	200
	Missing	0
Mean		47.07
Minimum		20
Maximum		80

Table 4.2 Financial profile of the respondents.

	Frequency	**Percent**
Very Poor	35	17.5
Poor	80	40.0
Moderate but unstable	53	26.5
Moderate and stable	29	14.5
Strong	1	.5
Well off	2	1.0
Total	**200**	**100.0**

Each survey form was given a code number to ensure anonymity during processing and data analysis (Table 4.3). These numbers were allocated randomly according to geographical location at the time of survey. GPS coordinates of each surveyed house were taken and these coordinates were mapped on *Google Earth* for identification and future reference (Figure 4.8, 4.9, 4.10, 4.11).

Table 4.3 Survey questionnaire codes.

Location	Code
Bagh rural (Figure 4.9)	BR-1 to BR-50
Bagh urban (Figure 4.10)	BU-1 to BU-50
Muzaffarabad rural (Figure 4.11)	MR-1 to MR-50
Muzaffarabad urban (Figure 4.12)	MU-1 to MU-50

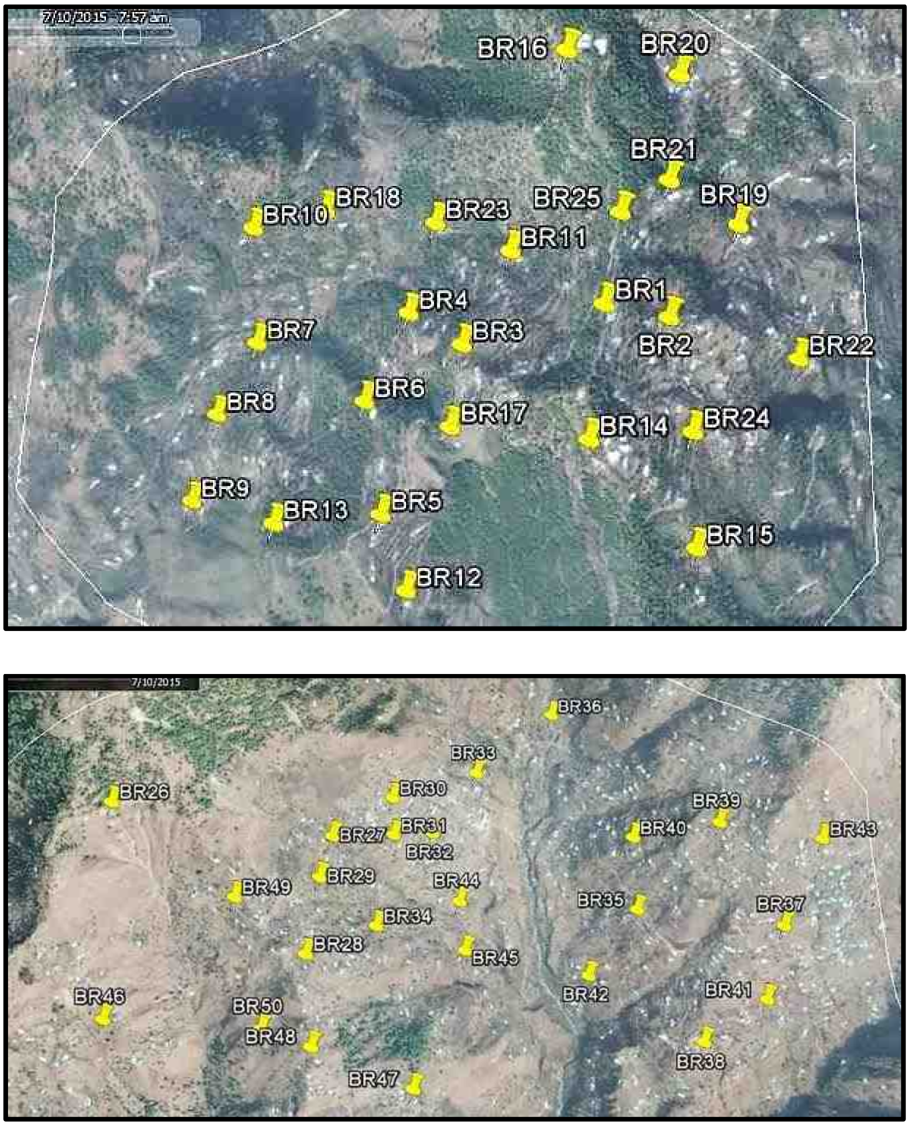


Figure 4.8 Location of respondents for survey questionnaires in UC Jaglari (above) and UC Islamnager (below).

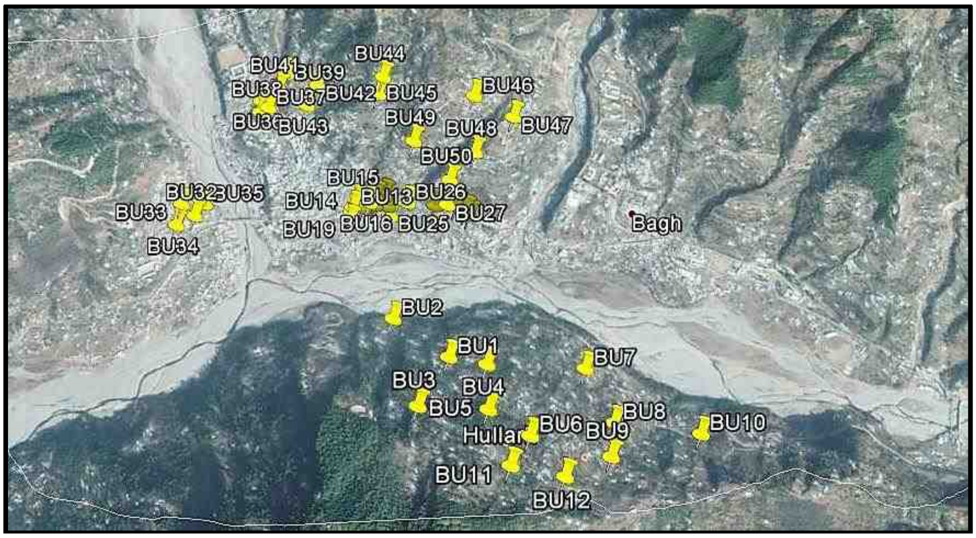


Figure 4.9 Location of respondents for survey questionnaires in Bagh urban.

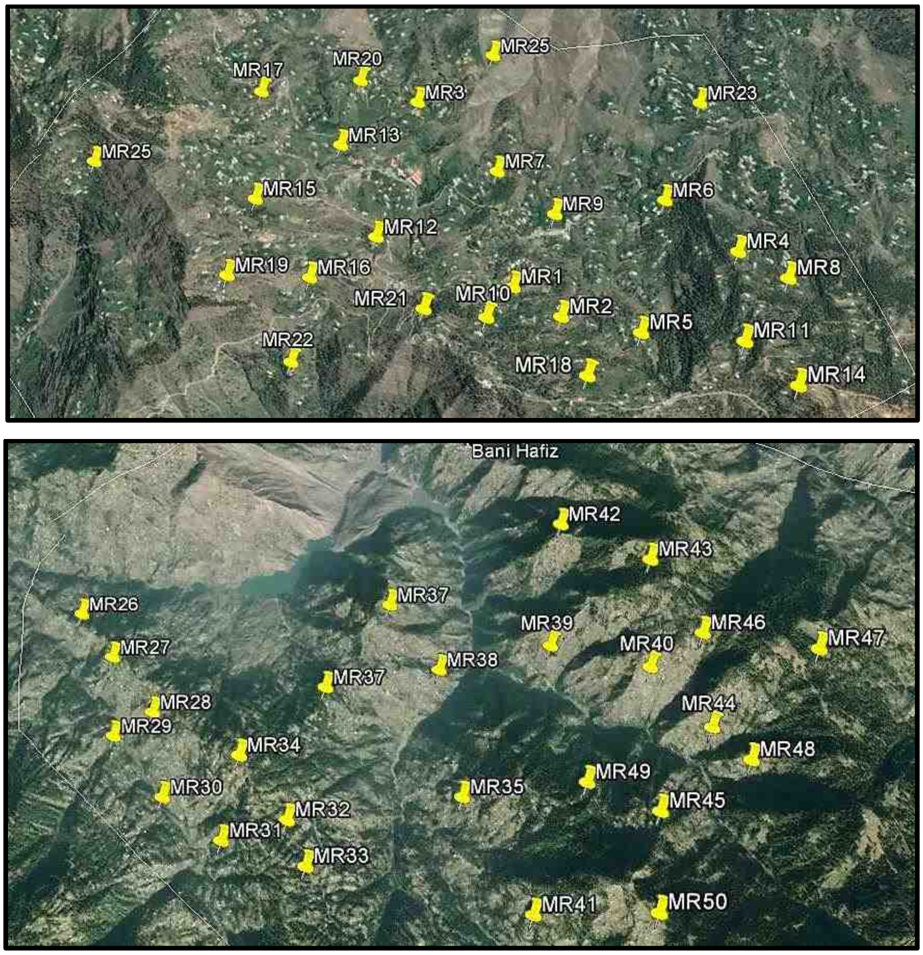


Figure 4.10 Location of respondents for survey questionnaires in UC Danna (above) and UC Salmia (below).

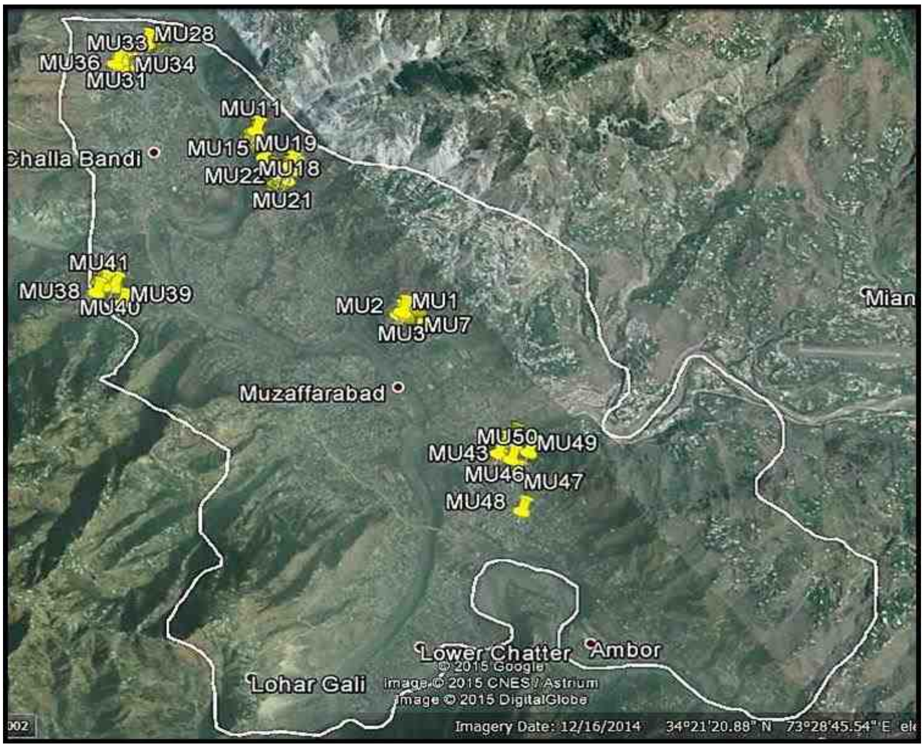


Figure 4.11 Location of respondents for survey questionnaires in Muzaffarabad urban.

4.6.4. House Owner Interviews

Interviews are one of the most commonly used data collection tools (Whiting 2008). As observed by DeLyser & Sui (2014, p. 295) interviews are a 'vital and vibrant research method'. Interviews reflect 'the actors' understanding of their worlds (Robinson 2014, p. 42) and enable 'networks of relationships and ideas to be presented and qualified' (Hoggart *et al*. 2002, p. 205 cited in Robinson 2014, p. 42). Knowledge is coproduced through interaction between the researcher and the interviewee (Herod 1999).

Interviews are of immense importance in my research and form an integral part of my quest for finding answers to my research questions. Once the completed survey questionnaire forms were received from research assistants, each form was carefully examined and verified with the notes of the research assistants. Necessary details from survey questionnaires were entered into MS Excel to analyse. Respondents for semi-structured interviews were selected from this analysis. The purpose of these interviews was to know how the house owners, the most important actors of the reconstruction exercise, viewed the experience of housing reconstruction and to give voice to their side of the story which might have remained uncovered (Robinson 2014, p. 43). The nature and complexity of my research warranted that instead of just relying on 'numbers and statistics… [and] confidence limits and *p* values' (Robinson 2014, p. 42) I should interact more deeply with house owners so that I could bring out the complexities and nuances of their experience of the disaster. The respondents for these interviews were selected to represent a wide variety of backgrounds such as geographical location (rural/urban and as widely dispersed as possible), economics (very poor, poor, moderate but unstable, moderate and stable, strong, and well-off), social (gender, disability, ethnicity, class), and type of construction (constructed/not constructed/incomplete, *Dhajji-dewari* type of construction) to provide maximum information and 'increase the trustworthiness' of my findings (Robinson 2014, p. 48). In total 55 interviews were conducted between February and May 2014.

Being aware of the potential risks involved for the respondents (Barnes 1979; Lee & Renzetti 1993), all respondents were assigned codes to hide their identity (Table 4.4) and this was expressly explained to them.

Table 4.4 List of semi-structured interviews with house owners.

Location	**Interviews**
Bagh rural (11 interviews)	BR-1, BR-3, BR-10, BR-13, BR-20, BR-25, BR-32, BR-35, BR-50, R-1, R-2 (Two random interviews (R-1, R-2) were conducted with those house owners who were not part of the survey questionnaires).
Bagh urban (11 interviews)	BU-1, BU-5, BU-7, BU-14, BU-15, BU-18, BU-19, BU-22, BU-28, BU-34, BU-46
Muzaffarabad rural (13 interviews)	MR-3, MR-5, MR-11, MR-17, MR-21, MR-22, MR-32, MR-35, MR-37, MR-42, R-1, R-2, R-3 (3 interviews (R-1, R-2, R-3) with affected people of Lodhiabad village, they were not part of survey questionnaires).
Muzaffarabad urban (12 interviews)	MU-1, MU-7, MU-13, MU-14, MU-17, MU-19, MU-22, MU-24, MU-32, MU-35, MU-36, MU-47.
Landslides (8 interviews)	MRLS-1, MRLS-2, MRLS-3, MRLS-4, MRLS-5, MRLS-6, MULS-1, MULS-2.

I was also conscious of the importance of the place in which interviews were held (Sin 2003), so interviews were conducted either in the house/place of work of the respondent or a neutral location so that the interviewees felt confident and empowered (Anderson & Jones 2009; Elwood & Martin 2000; Riley 2010; Saunders & Moles 2013). Four interviews were conducted in the shops of the respondents (Figure 4.13) and two interviews were conducted in my car because the respondents were found on the road. However as opposed to Robinson (2014), who conducted most of his interviews with farmers in their kitchen, I couldn't get access to this area of peoples' homes due to cultural reasons. Bennett (2006) and Robinson (2014, p.58) note that most visitors to the farm sat at the kitchen table which was the centre of the farmhouse where 'farmers would meet sales representatives, farm inspectors, farm advisors and state vets, it is a place to do business and a place of power and authority for the farmer'.

In the case of AJK, although the kitchen is centre of the house in rural areas, strangers are not allowed into the kitchen; there is also no kitchen table and people sit on ground mats. Strangers or formal guests are received in the guest room/drawing room (called *baithek* in the local language) or any other room except the kitchen. Entering into the kitchen is tantamount to informality or closeness which is not expected from people other than close relatives. Apart from being a stranger, gender was the other reason of my non-access to the kitchen because only male members of the household or closer relatives have access to the kitchen.

Figure 4.12 Interviewing a lady outside her destroyed house (left) and a gentleman outside his shop. (Source: Author fieldwork)

I clearly explained in their own language the purpose of my research and their right not to participate in the interview or to withdraw from it at any time (during or afterwards). They were also assured of their anonymity. Their express consent was sought before the interview. Since generally people were wary of signing the consent form, express oral consent was considered sufficient. I kept the survey questionnaire forms, filled earlier by my research assistants, with me during interviews for reference. All interviews were audio recorded and notes were also taken (Whiting 2008). These interviews were either in Urdu language or in local dialects. Again my positionality as an insider was a great advantage because I could 'establish rapport and communicate' (Dowling 2010, cited in Robinson 2014, p. 71) with them and their expression of feelings was not clouded by an interpreter. Being the victim of the earthquake myself I could commiserate with what the interviewees wanted to say and what they meant to convey when they did not say anything or stopped short of saying something (Woods 2010, cited in Robinson 2014, p. 36). It was due to my experience of the earthquake as a victim and as a government functionary who worked extensively in the earthquake that I was not an interviewer who 'does not have enough background, enough knowledge, and enough sensitized imagination to catch the subtleties and complexities of what the interviewee is saying' (Dexter 2004, p. 28 cited in Robinson 2014, p. 65). I could relate with their tears, their silences, their pauses; and with their rare moments of joy. I cried countless times translating these interviews while sitting in my university thousands of miles away. It was a soul wrenching and emotionally traumatic experience, no less painful than the earthquake itself (Bennett 2004).

The duration of the interviews varied ranging from 20 minutes to about an hour. These interviews were usually an emotive experience for the interviewees and for me as well. These interviews were emotionally so draining that after one or two interviews I would feel mentally and physically exhausted. Two or three interviews were conducted per day. All the respondents were very kind and courteous and offered refreshments. I arranged tea or food for the interviews held at neutral locations. At least one member of the family and my research assistant remained present during interviews with female respondents.

4.6.5. Focus Groups

Focus groups are a technique of qualitative research increasingly used in social science, human geography, health, and medicine fields (Burgess *et al*. 1988; Cameron 2010; Gibbs 1997; Hopkins 2007; Kamberelis & Dimitriadis 2013; Kitzinger 1995; Morgan 1996; Morgan & Kruger 1993; Macnaghten & Myers 2007; Powell & Single 1996; Sarantakos 2012; Stewart & Shamdasani 2014). The biggest advantage of this technique is that it does not discriminate against those people who are not literate and encourages participation of those participants who might otherwise feel reluctant or marginalised (Kitzinger 1995; Morgan 1996; Morgan & Kruger 1993). Focus groups integrate 'pluralities of participants in the research endeavour' (Robinson 2014, p. 44) and are usually more interactive than personal interviews (Cameron 2010; Crang & Cook 1995). It can also be used in 'triangulation in multi-method research strategies' (Goss 1996, p. 113). According to Kitzinger (1994), cited in Robinson (2014, p. 44) and Skop (2006) a focus group provides a platform to participants for debate and collective voice to them. Therefore there is likelihood that it provides different data from the interviews on the same subject.

Initially I had planned eight focus groups (four urban and four rural) in both districts in order to elicit information that illustrates combined local perspectives (Krueger & Casey 2009). However later on, when the actual fieldwork started, keeping in mind the logistic issues (it was more convenient and quicker for the people of UC Jaglari, UC Islamnager, and UC Danna to come to the city than to gather somewhere in their own areas), availability of the participants and the usefulness of so many sessions it was decided to hold four sessions to make these sessions more productive. These sessions were conducted during March and April 2014. The participants were selected on the basis of key informant interviews and house owner interviews. The purpose of these discussions was to provide the participants with a forum where they could discuss the issues related to my research questions and build arguments especially around vulnerability, progress of the housing reconstruction, lessons learnt, and recommendations for future. Table 4.5 outlines the topics used to frame discussions.

The first focus group comprised of participants from rural and urban areas and was held in Bagh city in a local hotel (Figure 4.13). Ten participants, including two females, attended the event. They came from different backgrounds; all were house owners, five of them had either worked for or were still working for NGOs, one was a businessman, one was mason, and two were teachers; all belonged to different classes of society and from different *biradris* (clans). At the start of the meeting I gave a presentation about my research project. Later the participants were divided into three groups to do group work. Each group was given a separate topic to work on. All the participants participated in the group work enthusiastically and prepared good quality charts. Each group presented their work and discussion was held after each presentation. I was really impressed by the quality of group work.

Table 4.5 Topics for group work in focus group discussion sessions.

Topic 1	1. What factors made people vulnerable to cause so much damage? What is the state of vulnerability 8 years after the earthquake of 2005? 2. Recommendations to improve resilience and reduce vulnerability?
Topic 2	1. Evaluation of the 2005 housing reconstruction policy. 2. Which approach would have worked better and why: i. Cash Approach; ii. Agency Driven Reconstruction; OR iii. Owner Driven Reconstruction. 3. Sustainability of the earthquake resistant construction in the study area.
Topic 3	1. Lessons learnt from the post-2005 earthquake housing reconstruction? 2. Recommendations for future disaster situations.

The second focus group was held in Muzaffarabad city in a local guest house. The participants comprised of key informants and some professionals, all belonged to Muzaffarabad city (Figure 4.13). Seven participants, including a female PhD researcher, participated. Instead of dividing them into groups, the topics were discussed by all and a participant transferred the main points on the charts which he later presented to them for further discussion. This session was unique in the sense that the participants were not only key informants but many of them were house owners as well. So the discussion not only covered policy and practice issues, as with key informants, but also had the flavour of individual experiences as house owners.

The third focus group was held in a local guest house in Muzaffarabad city (Figure 4.13). The participants were house owners of rural UC Danna and urban areas. Ten people participated in the event. They belonged to different *biradris* (clans), different social status and economic backgrounds. They were divided into three groups for group work. They worked on their topics with great interest and produced some good quality charts and presented them before others.

The fourth focus group was held in UC Salmia (rural Muzaffarabad) in a local Basic Health Unit during off hours (Figure 4.13). Ten people (all male) participated in the event. They were from different *biradris* (clans) and different backgrounds; one was a local construction contractor, one was a small local businessman, one was a government official, one was a former employee of UN-Habitat, one was the Imam of a local mosque, and the rest were small farmers.

The participants preferred discussion in one group instead of working in different groups. The former employee of UN-Habitat took the responsibility to steer the discussion and make charts. He made a good presentation which was followed by detailed discussion. Though Morgan (1996) is of the opinion that a focus group is an excellent technique to encourage the marginalised; in socially stratified and developing societies there is a risk of elite capture as well (Bardhan & Mookherjee 2005; Crook 2003; Dasgupta &

Beard 2007; Hertz & Imber 1995; Iversen *et al*. 2006). I had to face this situation in case of UC Salmia focus group. A very articulate and domineering gentleman from a socially dominant clan, who was economically well-off and politically well-connected as well, tried to dominate the whole proceeding and would hardly let anybody speak. My experience of public service and the expertise of the gentleman from UN-Habitat came in handy and we very tactfully involved other participants in the discussion, without offending him.

All focus group sessions were audio and video recorded and notes were also made. The proceedings were mainly in Urdu and were then translated into English for use in data analysis software.

Figure 4.13 Focus group Bagh (top left), Muzaffarabad (top right), Muzaffarabad (bottom left), UC Salmia (bottom right). (Source: Author fieldwork)

4.6.6. Life Stories

Polkinghorne (1995, p. 6-7) observed that 'work with stories holds significant promise for qualitative researchers' and are suitable as a linguistic form in which human experience as lived can be expressed. I knew from my experience of working in the earthquake that there were countless stories that could help me in understanding the performance of the ODR policy at an individual level because life stories ‘express a kind of knowledge that uniquely describes human experience in which actions and happenings contribute positively and negatively to attaining goals and fulfilling purposes’ (Donald 1995, p. 8). Burner (1985), cited in Carter (1993, p. 6) and Carter (1993) observe that narrative or story explains the human intentions in the context of action and action is difficult and unpredictable because it is subject to multiple influences thus story ‘with its multiplicity of meanings, is a suitable form for expressing the knowledge that arises from action’. Through the use of life stories in my research I want to capture ‘the richness and the nuances’ of people’s experiences of the disaster and highlight the ‘complexity, specificity, and interconnectedness’ (Carter 1993, p. 6) of their lives with housing reconstruction.

I had planned to do three to five life stories with people who were able to reconstruct their houses very well, or those who could not do so for certain reasons. I wanted to see how particular circumstances defined their performance and how could these stories help towards lessons learnt and recommendations for future. Subsequently, I chose two people from the list of house owners surveyed earlier through survey questionnaires. The first was a lady from rural Bagh who, despite being a widow, not only reconstructed her house very well but also helped many people after the earthquake in relief and reconstruction activities. She represents those people, especially female-headed households, who are success stories of housing reconstruction programme. The second belonged to rural Bagh; he was a very poor man who couldn’t reconstruct his destroyed house because he did not get government grant. He represents those people who are not the success story of the housing reconstruction programme.

I have kept a separate notebook for my PhD project in which I have been noting important points about my project since I started my research (Lathman 2003; Oven 2009). I frequently noted my observations and important information in that notebook during my fieldwork/s. These notes were a great help.

4.7. Geographical Setting

My research is situated in two districts (Muzaffarabad and Bagh) of Azad Jammu & Kashmir. These districts were severely affected by the 2005 earthquake. I conducted my research in urban as well as rural areas of Muzaffarabad and Bagh districts. The reason for this is that after the earthquake the government formed two separate housing reconstruction strategies and implementation mechanisms for rural and urban areas. It was thus necessary to conduct this research in both urban as well as rural areas in order to comprehensively understand the dynamics of the housing reconstruction performance in the study area. Bagh and Muzaffarabad cities were selected as case studies for urban areas; in the case of rural areas, I had initially planned to conduct fieldwork in one Union Council in each district.

At the start of my fieldwork I had planned to conduct 200 survey questionnaires; 50% (N=100) survey questionnaires were to be conducted in urban areas (N=50 in Muzaffarabad city and N=50 in Bagh city) and 50% (N=100) were planned for rural areas (N=50 in rural Muzaffarabad and N=50 in rural Bagh) to explore the housing reconstruction progress in these areas. However during the analysis of the housing reconstruction data of the SERRA I observed that at the time of the disbursement of the first instalment of the housing subsidy in 2006 in rural areas there were many Union Councils where construction of a lot of houses had already started; whereas there were certain Union Councils where construction of very few houses had started.

This alludes to two important things; one is that there were certain areas which did not wait for the ERRA’s technical and financial assistance and started reconstruction of their houses which could mean that these houses might not be built according to seismic standards. The second is that different areas have different capacities. I thus thought it proper to collect data from both types of Union Councils so that important things are not missed. The geographical details of these areas are discussed in below sections. So I decided to collect data from two union councils of each district;

one which had higher percentage of the reconstructed houses, and the other which had lower percentage of the reconstructed houses.

4.7.1. District Muzaffarabad

The District of Muzaffarabad is surrounded by Neelum District in the north, Bagh and Rawalpindi districts in the south, Indian-administered Jammu and Kashmir in the east; and Mansehra and Abbottabad districts in the west. Though Muzaffarabad District was divided into two after the earthquake, for the purpose of this study I will consider the pre-earthquake status of the district (Figure 4.14).

The total area of Muzaffarabad district was 2,496 km^2 and the population was 770,000 at the time of 2005 earthquake (P&DD 2014). District Muzaffarabad is characterized by steep and rugged topography. Two main rivers, River Jhelum and River Neelam, flow through it. The climate of the district is sub-tropical highland type with 2.65° C mean minimum temperature for the month of January and 36.75° C mean maximum temperature for the month of June. The area receives maximum rainfall in monsoon season (from June to August) (Iqbal & Khan 2014). The demography of the district is mixed having Gujjar, Rajput, Awan, Abbasi, and Mughal as major tribes. Gojri, Kashmiri, and Pahari are major languages of the district. Like the rest of AJ&K the study area has a weak economic base. Most of the population (77%) lives in rural areas, where maize and rice are the major crops but due to small farm size (2.13 hectare per family) (P&DD 2010) farming does not provide a reliable source of income. Hence families augment their income by off-farm activities; mainly men working in towns and major cities (P&DD 2010). For the past few decades people have also started going to Middle Eastern countries for employment. Trading and public sector employment are the major sources of income in urban areas (ERRA 2007; P&DD 2010). Almost all the population is Muslim.

The epicentre of the 8th October 2005 earthquake was 11 km north of Muzaffarabad city. This earthquake is associated with the rupture of the Himalayan Frontal Thrust (HFT), which passes right through Muzaffarabad city parallel to Main Boundary Thrust (MBT) (Jouanne *et al*. 2011). More than

35,000 people died and more than 140,000 houses were damaged in the District due to the earthquake (SERRA 2014).

Figure 4.14 Map of Muzaffarabad District; circles show fieldwork areas: red circle Muzaffarabad city, black circle UC Danna, blue circle UC Salmia. (Source: P&DD 2015)

4.7.1.1. Muzaffarabad City

Muzaffarabad city is situated at the confluence of river Jhelum and river Neelum at (Lat. 34° 22’ and Long. 73° 31’ at 2,470 feet elevation) (Bates 1991). It is the capital of AJ&K. The population of the city is approximately 150,000. Most of the population is scattered in small pockets on hill slopes in an unplanned manner except for two small formally planned localities of Upper Chatter Housing Scheme and Lower Chatter Housing Scheme which remained largely unaffected by the earthquake of 2005. Muzaffarabad city was one of the worst affected areas in 2005 earthquake (Brown *et al*. 2008). More than 14,000 (96%) houses were damaged and more than 5000 people died in the earthquake (SERRA 2014). The worst hit areas were the old city, Chehlabandi, Plate area, Tariqabad, Sathera, Jalalabad, Makri, and many localities at steep slopes on the left bank of the river Neelum.

I conducted the quantitative survey in the worst hit areas of the old city, Chehla, Tariqabad, Sathera, Makri, and Rashidabad (Figure 4.11). Qualitative data was also collected from these areas through house owner interviews and focus group discussion.

4.7.1.2. Rural Muzaffarabad

Union Council Danna and Union Council Salmia were selected for fieldwork in rural Muzaffarabad. Union Council Danna - Lat.34° 8’ Long.73° 36’- is situated in the southeast of Muzaffarabad city at about 1900 meter elevation (Figure 4.14) (Bates 1991). A metalled road connects it with Muzaffarabad-Islamabad highway. *Agar Nala* (a big seasonal stream) flows at the bottom of it. Maize is the main crop. The area is dependent on rains for irrigation, however some patches of spring water irrigated rice fields can also be found. Some people work in the Middle East also. Khakha Rajput, Gujjar, Thakyal, and Mughal are the main tribes. More than 3,000 (85%) houses were damaged in this Union Council in the 2005 earthquake.

Union Council Salmia (Lat.34° 6’ Long.73° 43’; 2,600 m elevation) is located about 50 km in the southeast of Muzaffarabad city (Figure 4.14). The area is mainly forest having pleasant environment. A metalled road leads to this area from the historical Muzaffarabad-Srinagar road in Jhelum Valley. It is also connected with Bagh District through a dilapidated metalled road. The economic situation of the people is generally not very good. Maize is the main crop but due to small landholdings agriculture does not provide enough. Apples are also grown but mostly go waste due to poor marketing. Rajput, Kashmiri, and Gujjar are the main tribes. More than 4,500 (95%) houses were damaged in the 2005 earthquake. The Zilzal Lake (Hattianbala Lake) was formed in this area as a result of a massive landslide that occurred during the earthquake (Dunning *et al*. 2007).

4.7.2. District Bagh

The District of Bagh is surrounded by Muzaffarabad District in the north, Poonch district in the south, Indian-administered Jammu and Kashmir in the east; and Rawalpindi in the west. District Bagh is predominantly a mountainous area falling in the Lesser Himalaya zone (Pir-Panjal Range) having a general elevation of 1,500–2,500 m above sea level. Total area of the district is 770 km^2 and population is 364,000 (340,000 rural and 24,000 urban) (ERRA 2007; P&DD 2010). Bagh has a historical significance; it is commonly believed that the armed resistance against the *Dogra* regime of *Maharaja Hari Singh* started from this area in September 1947 which spread to other areas of the state quickly and ultimately led to the formation of an *Azad* (independent) government of Jammu and Kashmir on 24th October 1947, now known as Azad Government of the State of Jammu & Kashmir (AJ&K) (Ahmad 2003; Gillani 2007; Saraf 1977; Snedden 2013).

This area has a weak economic base; there is hardly any industry. Most of the population lives in rural areas. Like Muzaffarabad District maize and rice are the major crops. The relatively small urban population is mostly engaged in trading; foreign remittances are also a major source of income. Syed, Mughal, Gujjar, Rajput, Sudhan, Kashmiri, and Abbasi are the major tribes of this district. The earthquake of the 8th October 2005 killed more than 9,000 people and more than 90,000 houses were damaged / destroyed in the District of Bagh (ERRA 2007).

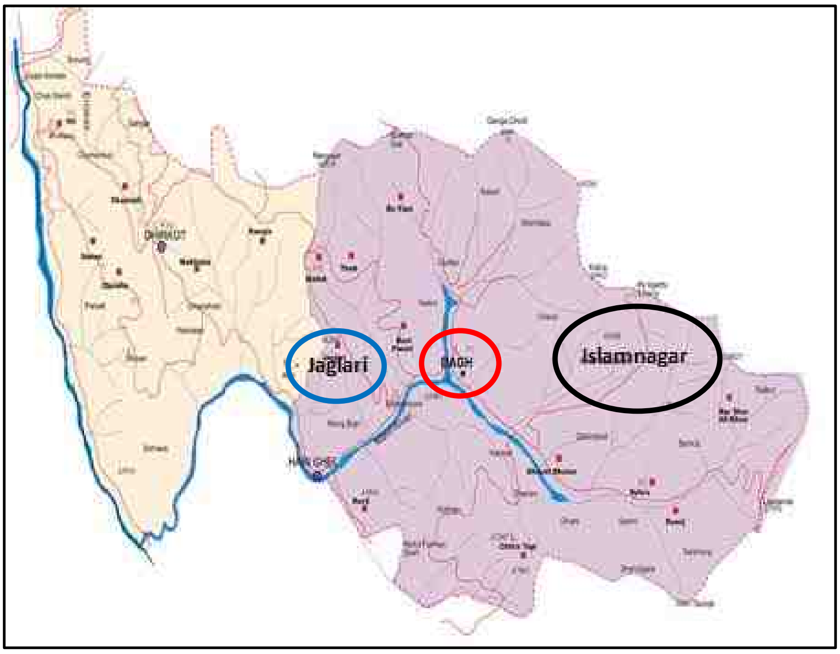


Figure 4.15 Map of Bagh District; circles show fieldwork areas: red circle Bagh city, blue circle UC Jaglari, black circle UC Islamnager. (Source: P&DD 2015)

4.7.2.1. Bagh city

Bagh city (Lat. 33° 58' and Long. 73° 46', at 1,100 m elevation) is the district headquarter of the District of Bagh (Figure 4.15). It is about 100 km from Muzaffarabad city. It is situated at the confluence of two major seasonal streams, *Nala Mahl* (which flows from east to west) and *Nala Malwani* (which flows from north to south) (Ahmad 2003). These streams become flooded during rains and have frequently caused damage to life and property in the past. Trading and public sector employment are the main sources of income. Bagh city was one of the three cities worst hit by the earthquake of 2005; Muzaffarabad and Balakot being the other two. More than 3,600 (84%) houses were damaged in the earthquake (SERRA 2014).

4.7.2.2. Rural Bagh

Two Union Councils were selected for fieldwork in rural Bagh. Union Council Jaglari (Lat. 33° 57' and Long. 73° 42'; 1,300 m elevation) is located in the southwest of Bagh city at about a 45 minute drive (Figure 4.15). A metalled road from the main Bagh-Kohala road leads to this area. This Union Council is economically much better than any in the district. Most of the people are engaged in business, mostly the bakery business throughout Pakistan and AJ&K. Many people work in the Middle East as well. Agriculture is not a big activity; however maize is grown by most of the households. Khakha, Narma, Maldyal (sub clans of Rajput clan) and Mughal are the major clans of the area. More than 3,200 (63%) houses were damaged by the earthquake in 2005 (SERRA 2014).

Union Council Islamnager (Lat. 33° 59' and Long. 73° 50'; 1,900 m elevation) is situated in the east of Bagh city at about one hour drive (Figure 4.15). A dilapidated metalled road connects this area with Bagh-Haveli road. The financial condition of the area is generally poor. People are mostly reliant on agriculture which does not provide enough due to very small landholdings. Abbasi, Maldyal Rajput, and Gujjar are the main clans. More than 2,900 (98%) houses were damaged in the 2005 earthquake (SERRA official data).

4.8. Data Analysis

Due to mixed methods nature of my research, I had collected quantitative as well as qualitative data, so I had to use separate data analysis methods for these data. Mauthner & Doucet (2003, p. 414) have highlighted the difficulties and practicalities involved in the data analysis of a reflexive study like mine and suggested that 'interpretation of data is a reflexive exercise through which meanings are made rather than found'. While doing data analysis, I am aware of these issues and do not take data analysis methods as 'a series of neutral, mechanical and decontextualized procedures that are applied to the data and that take place in a social vacuum' but as an exercise 'infused with the, sometimes different, assumptions of the researchers who use them, (*ibid,* p. 214-215).

4.8.1. Quantitative Data Analysis

I used SPSS, the most widely used data analysis tool (Miller & Acton 2009), for analysing my quantitative data. Relevant data of 200 survey questionnaires were entered into 36 different variables (Table 4.6). These variables were used for 7 data sets i.e. Aggregate, Rural, Urban, Bagh rural, Bagh urban, Muzaffarabad rural, and Muzaffarabad urban for analysis purposes.

As highlighted by McGuirk & O'Neill (2016, no pagination) '[T]he content of a questionnaire must relate to the broader research question as well as to your critical examination and understanding of relevant processes, concepts, and relationships.' As regards my research, the above mentioned variables were chosen with an aim to give me a bigger picture and understanding of the research topic. A considerable time was spent in designing these variables for my survey questionnaire. Results of the variable 1, 2, 3, 4, 5, 6, 7, 8, 15, 16, 23, 24, 25, 26, 30, 31, 33, 34, 35 and 36 were used in the research directly. Results of these variables were shared with different respondents and their feedback was incorporated in the study. As regards remaining variables, though the results of these variables were of great importance in understanding the dynamics of the housing reconstruction programme in AJK, these results were outside the scope of present study. Though results of these variables were not used in the present research directly, these variables helped me a lot in shaping my research.

Table 4.6 Variables selected from survey questionnaires for SPSS analysis

	Variable		Variable		Variable
1	Household ID	14	Toilet after EQ	27	No. of persons in the household
2	Gender	15	Pre-EQ Landownership	28	No. of persons killed in the household
3	Age	16	Post-EQ Landownership	29	No. of persons injured in the household
4	Source of Income	17	Satisfaction with new house	30	Was HCG enough
5	Pre-EQ HH Financial Status	18	Safety Perception with new house	31	Additional Money Spent
6	Post-EQ HH Financial Status	19	Reason of Perception	32	Location
7	Pre-EQ Family System	20	Satisfaction with relief work	33	Distance from Road (minutes)
8	Post-EQ Family System	21	Construction start date	34	Pre-EQ Household Status
9	Pre-EQ number of rooms	22	Construction Time	35	Post-EQ Household Status
10	Post-EQ number of rooms	23	Construction Status	36	Recommendation of ODR Approach in case of future disaster
11	Kitchen before EQ	24	Pre-EQ Construction Type		
12	Kitchen after EQ	25	Post-EQ Construction Type		
13	Toilet before EQ	26	Damage Reason		

4.8.2. Qualitative Data Analysis

Analysis of the qualitative data was a lengthy and tricky exercise and took a lot of time because almost all focus group discussions and all key informant interviews, except one, were in Urdu. On the other hand house owner interviews were either in Urdu or in local languages. Translation of these data into English was undertaken manually. One key informant interview, which was in English, could not be transcribed using some software due to accent issues so I had to transcribe it manually. These translations were coded and analysed using NVivo 10 qualitative data analysis software. Comparison of queries, similar comments, and quotations from interviews under similar question were analysed and synthesized through NVivo 10 coding.

The contents of focus groups were also translated into English and major themes were identified and coded (Pyles & Cross 2008) in NVivo 10.

4.9. Returning to the Field

Once I had analysed the qualitative and quantitative data and generated results, my supervisors and I thought it proper that I should go back to the study area and share these results with my respondents and get their feedback on my findings. Instead of making the data analysis and data interpretation a 'positivist' and 'neutral' exercise 'to simplify the complex processes of representing the 'voices' of respondents as though these voices speak on their own (Mauthner & Ducet 2003, p. 218) we thought it better to go back to my respondents and work with them in the analysis and interpretation of the data. A 12 week field trip was planned between February and April 2015. I travelled to Pakistan on 2nd February 2015. I had prepared a PowerPoint presentation based on the results of fieldwork data to present my work during this stint of fieldwork (Table 4.7).

Table 4.7 List of results which were shared with respondents during 2nd fieldwork.

Result	
1.	Pre-earthquake construction typology
2.	Union Council-wise housing damage pattern
3.	Reasons of damage to housing stock
4.	Reasons of faulty construction
5.	Progress in geographical context
6.	Progress in economic context
7.	Progress in social context
8.	Additional money spent on housing reconstruction
9.	Impact on Overall vulnerability
10.	Impact on built environment
11.	Safety perception with new house
12.	Satisfaction with new house
13.	Number of rooms in reconstructed houses
14.	Impact on family system and land ownership pattern
15.	Lessons learnt
16.	Recommendations

Since this two-phase interaction with respondents has not been planned in the start of the research because its need was felt later, at the completion of first phase, the question is whether any other interaction manner was appropriate other than the one that I adopted? One possibility was Delphi technique. According to McKenna (1994, p. 1221) 'the Delphi technique may be defined as a method used to obtain the most reliable consensus of opinion of a group of experts, by a series of intensive questionnaires interspersed with controlled feedback'.

While explaining the Delphi technique, McKenna (*ibid*) highlight that questionnaires are distributed to a panel of 'informed individuals' in a specific field of application in order to seek their opinion or judgement on a particular issue. When the response is received, the data are summarized and a new questionnaire is designed based solely on the results obtained from the first phase. This second questionnaire is returned to each subject and they are asked (in the light of the first rounds results), to reconsider their initial opinion and to once again return their responses to the researcher. Repeat rounds of this process are carried out until consensus of opinion, or a point of diminishing returns, has been reached.

The application of the Delphi approach was not suitable for my study due to following reasons:

- In the Delphi approach, questionnaires are sent to respondents through mail. This was not possible in my case because there are no postcodes, street names and house numbers in the study area. It is not possible to acquire postal address without actually going to every respondent. There is also no guarantee of respondents getting the mail. Sending mail from the UK and getting the reply back was not possible because Post Offices/Letter Boxes are not frequently available in the study area.
- My survey questionnaire was in English so considering the low literacy rate in the study area, it must not have been possible for every respondent to read and understand the questionnaire and fill it correctly. I was not aware of the literacy level of respondents because they were chosen randomly and no data about their literacy standard was available in the ERRA record.

- As mentioned earlier this research is an auto-ethnographic study in which the researcher and the researched shared their experiences which was only possible through face to face interaction between them in the form of interviews and focus groups. This research has been designed as mixed-methods approach in which only one part of the data (quantitative data) was to be collected through survey questionnaire. The remaining major quantitative data was to be collected through interviews, focus groups, and life stories.
- According to Hasson, Keeney & McKenna 2000, Hsu & Sandford (2007), Ludwig (1994), and Powell (2003) survey rounds are conducted in Delphi technique till the time consensus is reached. In the case of my study, I could afford only one feedback session in order to 'balance time, cost and possible participant fatigue' (Powell 2003, p. 378).
- In the case of Delphi technique, the questionnaire is in-depth 'usually unstructured and seeks an open response' (Powell 2003, p.378); whereas my survey questionnaire was structured and specific, aimed at drawing specific information. The type of information that I wanted was not possible to collect through the type of questionnaire used in the Delphi technique.
- Delphi technique is mainly used to build consensus (Hasson, Keeney & McKenna 2000, Yousuf 2007 and Woudenberg 1991). I did not want to build consensus, I just wanted the opinion of my respondents on the results of the first fieldwork data. I wanted to listen to their stories and their experiences of the earthquake and reconstruction which was not possible through Delphi technique.
- Conducting Delphi can be time consuming (Hsu & Sandford 2007).
- There is also a 'potential for low response rate' (Hsu & Sandford 2007, p. 5) in the Delphi technique which I couldn't afford in my study. As discussed in Section 9.5.7, at the very start of my fieldwork I expected that finding some respondents (especially Key Informants) would be a problem and I did face this problem and I had to physically chase them. It would have been very difficult for me to get response from such kind of respondents through Delphi technique.

- McKenna (1994, p. 1224) express concern regarding the use of ’experts‘, while emphasizing the possible benefits of ’non-experts’. Hsu & Sandford (2007) and McKenna (1994) also point out that perhaps a more important limitation was the poor response rate that characterizes the final rounds of most Delphi investigations.
- Sackman (1975) argue that although complete anonymity appears to be a generally held principle in most Delphi surveys, this can lead to a lack of accountability for the views expressed, while Goodman (1987, p. 731-732) maintained that it encourages hasty ill-considered judgements.

  Based on the above discussion, the manner in which the two phase interaction with respondents was conducted in my research seems to be more appropriate than Delphi technique.

Now coming back to my second stint of fieldwork, three focus group discussions were held in Bagh and Muzaffarabad districts. The first focus group was held in Bagh in a local hotel which was attended by 10 participants, seven of them had attended the focus discussion session during my previous visit in 2014 as well. The participants belonged to both urban and rural areas. The second was held in Muzaffarabad city in a local guest house. This session was arranged for key informants. The third focus group discussion was also held in the same guest house in Muzaffarabad for house owners of Muzaffarabad district. 11 participants from UC Danna, UC Salmia, and Muzaffarabad city attended the session. All these sessions proved very fruitful in terms of interest of the participants and the level of discussion.

I also made individual presentations to those important key informants for whom it was not possible to attend the focus group discussion sessions. 9 key informants were given presentation individually (Table 4.8). Three presentations were given in Islamabad and the rest in Muzaffarabad. These sessions lasted between 1-3 hours and generally high quality discussion and input was given by the key informants, sometimes leading to heated debate also. All the key informants were fascinated to see the results; finding them corroborative of their view point or revealing or sometimes controversial.

I gave a presentation to a house-owner in Bagh city also whom I had interviewed during my previous fieldwork. He is bed ridden due to paraplegic injury which he got in the earthquake. He runs a small NGO for the physically impaired people of the district. He was given presentation to know his views on the study results with the perspective of the vulnerable people.

Table 4.8 List of key informants given individual presentations on the survey results.

	Key informant
1.	Ex-Deputy Chairman, ERRA Islamabad
2.	Ex-Director Housing, ERRA Islamabad
3.	Asian Development Bank (Pakistan Country Office, Islamabad Mission)
4.	Ex-Director General, SERRA Muzaffarabad
5.	Director Social Protection/Donors & Sponsors, SERRA
6.	Member of AJK Legislative Assembly, Muzaffarabad
7.	Ex-Employee of UN-Habitat, Muzaffarabad
8.	Ex-Employee UN-Habitat, Muzaffarabad
9.	Architect in Muzaffarabad city

All these later focus group discussion sessions and individual presentations were audio and video recorded and notes were also taken. These proceedings were conducted in Urdu language so I had to translate them into English manually. Nvivo 10 software for qualitative data analysis was used to code and analyse these data.

4.10. Summary

This chapter has described my research methodology. I explained that this research is an ethnographic study as an insider for which I have adopted a mixed methods approach. The mixed methods approach combines the benefits and strengths of both quantitative and qualitative methods and minimises their weaknesses. I also explained how this approach will serve the purposes of triangulation, complementarity, initiation, development, and expansion through Concurrent Nested Design. Methodological tools for data collection consisted of collection of secondary data, key informant interviews, survey questionnaires, house owner interviews, focus group discussions, and life stories. I also briefly explained how these data were analysed. In the geographical settings section of this chapter I set out that my research is focused on districts of Muzaffarabad and Bagh in AJK. Both urban and rural areas are included in the study to investigate how the housing reconstruction programme performed in rural/urban settings. Muzaffarabad and Bagh cities in urban setting and UC Danna, UC Salmia, UC Jaglari, and UC Islamnager in rural setting were studied. Being an ethnographic study, I discussed the issue of positionality and how it impacts my research. Towards the end of the chapter concludes with the description of my second stint of fieldwork which was undertaken to give feedback to respondents of first fieldwork and get their input on it.

CHAPTER 5: VULNERABILITY OF THE HOUSING STOCK IN THE STUDY AREA

5.1. Introduction

This chapter develops the argument outlined in Chapter 2 that disasters are not the products or outcome of hazard only, but a combination of hazard and vulnerability; it is the vulnerability of the people which determines the level of loss and turns a hazard into a disaster. In this chapter I outline the pre-earthquake housing stock in the study area, the prevalent construction typology, the reasons for adopting these typologies, and the reasons for wide spread destruction of the housing stock. These characteristics integrate to affect the vulnerability, which the Government of AJK have attempted to manage through development policies. The results presented in Chapter 5 are derived from academic literature, secondary data (mainly of the ERRA and the SERRA), primary data (both qualitative and quantitative) collected during my two fieldwork episodes, and my personal experience of working in these areas for more than a decade.

5.2. Construction Typology before the Earthquake

Before the earthquake there was mixed construction typology in the study area. The nature of housing construction had been influenced by various factors such as climate, economics, availability of materials, and culture. In rural areas there were no building regulations or enforcement mechanisms operated by the government (Khan *et al*. 2011). In urban areas building codes did exist before the earthquake; however these codes did not consider the risk of seismic hazard. Moreover, these codes were rarely enforced for houses and private buildings (Halvorson & Hamilton 2010; Husain 2008; Naeem & Okazaki 2009; Rossetto & Pieris 2009) due to corruption and inefficiency.

The pre-earthquake housing stock in the affected areas can be broadly divided into four categories: *kacha* (meaning not permanent or not strong), *pukka* (meaning strong and permanent), *Dhajji-dewari,* and wood. Bloesch *et al.* (2005) and Rossetto & Pieris (2009) identified four types of building construction in the earthquake affected areas: unreinforced stone masonry, unreinforced concrete block masonry, unreinforced brick masonry and reinforced concrete frames. In my opinion these were actually different types of *pukka* construction which was more prevalent in urban areas. Table 5.1 shows the type of construction in the study area (Districts of Bagh and Muzaffarabad) before the earthquake. Overall the *pukka* construction was not prevalent; on average only 37% of houses were *pukka*, although this type of construction was more prevalent in urban areas (73%) than in rural areas (32%). The *kacha* type of construction was more prevalent in the study area (57% of houses were *kacha)*, however the ratio of *kacha* houses was more in rural areas (61%) compared to urban areas (23%). Wood and other types of construction were rare.

Table 5.1 Pre-earthquake construction typology.

Pre-EQ Housing Type									
Location/Type	Overall (%)			Muzaffarabad (%)			Bagh (%)		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
Pakka (Brick/Block/Stone)	37.11	32.98	73.95	35.98	29.48	78.39	38.25	36.48	68.35
Kacha	57.25	61.09	23.41	56.87	62.9	17.5	57.62	59.29	29.33
Wood	3.37	3.44	2.5	4.08	4.16	3.54	2.67	2.73	1.56
Other	2.26	2.22	0.66	3.07	3.45	0.57	1.45	1.49	0.76

(Source: developed by the author from ERRA 2007a, 2007b)

Most of the house owners I interviewed were of the opinion that the percentage of *kacha* houses was much higher (70%-80%) in rural areas before the earthquake. House owners of Union Council Jaglari (rural Bagh) reported that 80% of houses in their area were *kacha*, whereas house owners of Union Council Danna (rural Muzaffarabad) said that about 70% of houses were *kacha* in their area. Similar figures were reported by participants of the focus group discussions held in Union Council Salmia in rural Muzaffarabad; the percentage of *kacha* houses in their Union Council was much higher than other areas, about 85-90%.

In the following sub sections I discuss the construction typology and reasons for adopting this categorization.

5.2.1. Kacha Houses

The *Kacha* type of construction was more prevalent in rural areas as compared to *pukka* or wood construction. The reason is that *kacha* houses are easier to build (requiring no engineering or masonry skills), cheaper in cost, and provide better insulation against a harsh climate (Ali 2007). The *kacha* houses (called *kotha* in local language) were usually made of thick stone walls (mostly rounded stones) irregularly laid in mud, or dressed stone dry masonry walls with or without internal and external mud plaster. These houses usually had a mud roof with thick wood rafters, some of the rafters were almost entire trees roughly hewn and squared (Ali 2007; EEFIT 2008; Khan 2007). Cross beams were laid on these rafters and split wood was spread on the cross beams. This surface was further covered with pine needles and shrubs topped by about 30 cm thick earth (Figure 5.1).

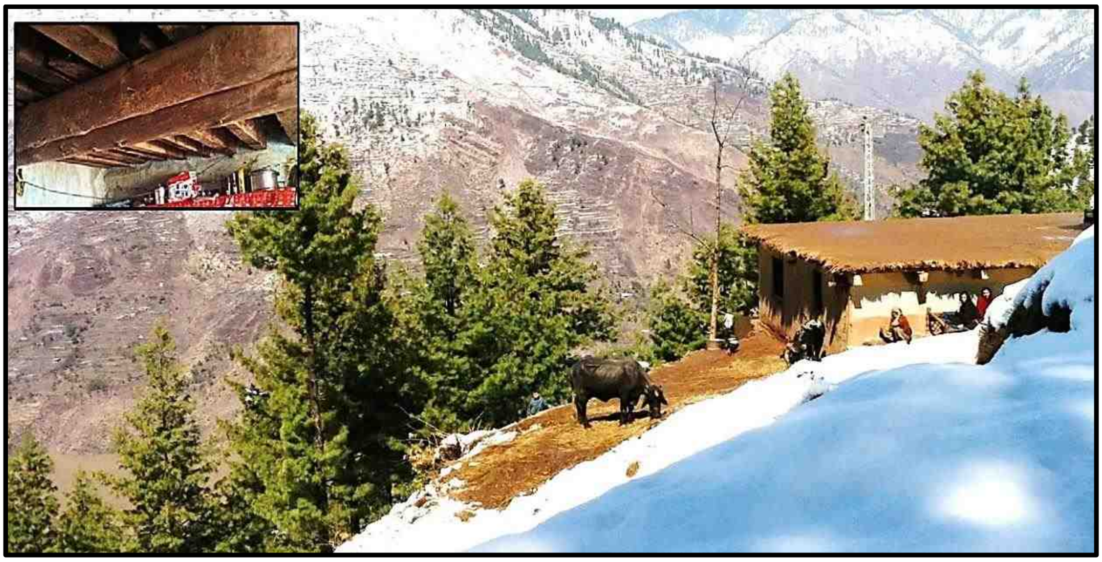


Figure 5.1 A rural kacha house in Salmia (Muzaffarabad), flat mud roof (saturated with water) and steep slope can be noticed (inset: whole tree trunks as roof beams).

(Source: Author fieldwork)

Corrugated Galvanised Iron (CGI) sheet roofs replaced mud roofs in later years, but this depended on the financial condition of the household. Figure 5.2 shows a diagram of a typical house in rural Muzaffarabad drawn by Key Informant-21 during interview. The typical house comprised of two rooms (A and C) at the front of the house, with a veranda (B) between them. There used to be a big wooden column in the middle of the veranda to support the roof, but this beam was never fixed into the ground and had no joint with the roof beams either. A bigger room (D) called *dalaan* was located at the back of the house, along with a room (E) for cattle, and some open space (F). The front two rooms were used for guests and by members of the household during summers. The *dalaan* was usually used in the winter season. It had entry through a door in the veranda (as shown in the drawing). It had a hearth for cooking and heating purposes. The whole family also slept in it because this room was warm due to the fire. The cattle room (E) was kept with the *dalaan* to provide much needed warmth to the cattle during winters. The cattle room could be approached from the *dalaan* through a door and also had a side door (as shown in the drawing) to take the cattle in and out and to throw their refuse into the adjacent fields. The veranda had a hearth which was used for cooking during summer.

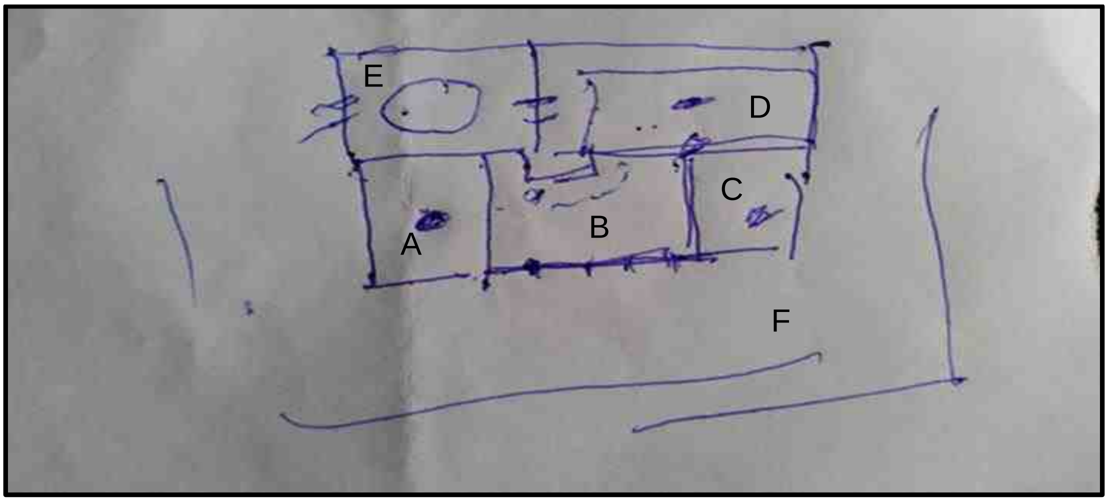


Figure 5.2 Drawing of a typical house in rural areas showing the plan of the house: (A) room, (B) veranda, (C) room, (D) dalaan, (E) cattle room, and (F) open space. (Source: Key Informant-21, alphabets have been added by myself for explanation reason)

Cost was one of the most important factors in determining the type of construction people opted for, hence the *kacha* houses because they were cheaper to build. All the required material such as stones, mud and wood is locally available within the immediate vicinity of the house and usually community labour is used to save labour cost (Bilham 2009; ERRI 2005; Khan 2007). My data of 100 survey questionnaires collected from four rural Union Councils shows that 83% (N=5) of ‘Very Poor’ and 67% (N=28) of ‘Poor’ households had *kacha* houses before the earthquake. Most of the *kacha* house owners, whom I interviewed, said that they had built the *kacha* house because they couldn't afford the higher cost of a *pukka* house. However, since the 1970s and 1980s, when remittances from Middle Eastern countries began and new construction materials and techniques were introduced, the *kacha* construction has been regarded as a sign of poverty and people wished and strived to have a *pukka* house in their life time.

Climate is the second most important factor that determines the type of construction. The study area has a harsh climate with a mean temperature of 35°C in summer and 3°C in winter (ERRA 2007a; 2007b). Due to its thermal effectiveness, the *kacha* construction provides good protection against this harsh climate (Bilham 2009; Khan 2007). *Kacha* construction thus became part of the construction culture of these areas; a large *kacha* room is sometimes added even with *pukka* houses in rural areas. People use it as a kitchen and prefer to spend much of their time in these kitchens in winters; they even sleep in them. Cattle sheds are also usually made of *kacha* construction. Since these areas are steep hills, most of the houses are built on terraced land, the rooftop of the cattle shed (called *gohaal* in local language) provides the household the much needed extra space in the shape of a courtyard (Figure 5.3).

Figure 5.3 A Pukka house in rural area with a kacha cattle shed or gohaal (yellow arrow) added with the house which serves as courtyard as well; notice shear fall in front of the cattle shed. (Source: Author fieldwork)

5.2.2. Pukka Houses

Pukka houses are a status symbol due to higher cost compared to *kacha* or *dhajji-dewari* construction*.* Different variations can be observed in this type of construction such as stone walls with RCC (Reinforced Concrete Cement) roof or CGI (Corrugated Galvanised Iron) sheet roof, concrete block walls with RCC roof or CGI sheets roof, and baked brick walls with RCC roof or CGI sheets roof. RCC roofs were more common in urban areas for three reasons: status, convenience, and space utilization. Compared to CGI sheet roofs, RCC roofs were considered *pukka* and thus people considered them a status symbol. CGI sheet roofs were not preferred in urban areas due to a shortage of cheaper wood for trusses, limited skilled carpenters and because such roofs need more maintenance than RCC roofs. Land is limited in urban areas; RCC roofs provided solution to this and are ideal for multi-storey construction (though these multi-storey buildings caused maximum damage in the earthquake because these buildings were of different heights and taller buildings fell on the shorter ones thus destroying them). Furthermore people used RCC rooftops as open spaces for sitting under the sun in winters, for cool air in hot summer evenings, and for putting up washing lines etc. (Figure 5.4).

Figure 5.4 Pukka houses in Muzaffarabad city; different heights are visible.
(Courtesy: Sheikh Ehsan)

The availability of cheaper local construction materials (stone, aggregate, and sand) also played an important role in determining the type of construction. For example, if stone was not locally available, concrete blocks were used because they were made with locally available sand and aggregate and thus were a cheaper option compared to expensive bricks transported from Rawalpindi, which could be as far as 200 km. The concrete blocks used to be unreinforced (Peiris *et al*. 2008). Due to improved road networks, low maintenance costs (Ali 2007) and improvement in incomes, the *pukka* type of construction had started to gain popularity both in rural and urban areas even before the earthquake. Figure 5.4 shows the typical housing typology found in urban areas throughout AJK. These houses are of irregular size and unequal height, ranging from single storey up to three storeys (Figure 5.4). In rural areas the *pukka* houses usually had CGI sheet roofs because they were cheaper since wood was locally available and it was easier and cheaper to carry CGI sheets from the roadside to the house at the top of the hill compared to cement, sand, and steel for a RCC roof. Hilly areas receive snowfall and the slanting CGI sheet roofs quickly clear away the snow in contrast to flat RCC roofs. In rural areas, these houses usually had a *kacha* kitchen and *kacha* cattle shed with them. Due to their higher cost of construction these houses are regarded as a status symbol. Chang *et al*. (2011, p. 202-203) have also noticed a preference for a 'modern' westernized house in Indonesia because it *'symbolizes solidity and social status'*.

Although these structures were called *pukka* they failed to perform well during the earthquake since these buildings were not usually constructed according to engineering specifications (Ali 2007). The structural performance of these houses is discussed in detail in section 5.4.2.3.

5.2.3. Timber Houses

Timber houses (called *larri* in local language) were traditionally found in the remote valleys of Neelum and Leepa in District Muzaffarabad and certain remote areas of District Bagh. Since these areas receive heavy snowfall, these houses comprise of multi storeys (Figure 5.5). The ground floor is used for keeping cattle and storing firewood and hay. The upper two storeys are used for living purposes. Timber is abundantly available in these areas so this type of construction is more prevalent compared to other types (Haseeb *et al*. 2011). "*The wood is used in foundations even. The house is laid on a raft of wooden planks and has strong joints with each other, so the whole house is tightly joined with each other and remains intact during earthquake"* (Key informant-21).

Figure 5.5 A timber house in Leepa Valley (above), a timber house (larri) in Neelum Valley (below).

(Courtesy: above picture Umair Shafiq, below picture Farrukh Qureshi).

Past seismic activity could be another reason for adopting this type of construction because these structures have excellent resilience against seismic shaking if joints are properly made (Haseeb *et al*. 2011). A participant of the focus group discussion in Salmia in rural Muzaffarabad (who has worked in the post-2005 earthquake housing reconstruction programme in the Leepa Valley) reported that many old people of the valley said that they heard from their great grandfathers that some short foreigners came to the valley after an earthquake and told us how to construct our houses. This story was confirmed by Key Informant-21 (who has very detailed knowledge of the valley) as well.

5.2.4. Dhajji-dewari

Dhajji-dewari is a local construction technique which has developed over the centuries in the mountainous areas of Kashmir (Figure 5.6). I have myself observed this type of construction in Neelum Valley during my job there in 1989 and 1995. It is a timber lacing type of masonry which has excellent seismic-resistant features (Szeliga *et al*. 2010). Timber and stone are used in this construction technique; the frame of the house is made with thick timber planks, timber studs are used to subdivide the infill, mostly of small stone pieces. This restricts the loss of masonry panels and resists the progressive destruction of the rest of the wall. These timber studs are closely spaced so that they provide protection against propagation of diagonal shear cracks within any single panel (EERI 2005, p. 7).

Figure 5.6 A *Dhajji-dewari* building in rural Muzaffarabad. (Source: Author fieldwork)

This type of construction is likely to have developed due to seismic activity in the areas in the past (Szeliga *et al*. 2010). These *'dhajji'* houses showed better seismic resistance during the 2005 earthquake (Craig 2010; Kanji 2006; Stephenson *et al*. 2008; UN-Habitat 2009). Dr Shahid Baig, Chairman of Geology Department, AJK University Muzaffarabad (Key Informant-22) also reported during his semi-structured interview that he had observed that *dhajji* houses suffered little damage whereas stone, brick, concrete block buildings suffered heavy damage due to the earthquake. However, with the passage of time this type of construction has given way to other types of construction such as *pukka* construction in urban areas and *pukka* and *kacha* construction in rural areas. This view was supported by key informants in the study area. Key Informant-17, who belongs to Muzaffarabad city and has long experience of heading the city's Development Authority and Municipal Corporation, reported that seismically resistant *dhajji* houses were found in Muzaffarabad city fifty or sixty years ago, but when remittances from the Gulf and Middle Eastern countries started in 1970s, people started to demolish these old *dhajji* houses.

5.3. Damage to Housing Stock in 2005 Earthquake

More than 318,162 buildings were destroyed by the earthquake. 99% (314,474) of these buildings were private houses and only 1% (3,688) were public sector buildings (ADB 2005; Khan 2013) (See, for example, Figure 3.7). Similarly in financial terms the housing sector suffered the biggest loss (43.75% of the PKR 114.28 billion total financial losses) followed by the Education sector (24.70%) (See, for example, Figure 3.8).

Figure 3.7 also highlights that the difference in the level of losses between the housing sector and other sectors is significant, demonstrating that the housing sector suffered the most damage in terms of financial losses. According to some estimates three-quarters of deaths in the 2005 earthquake occurred due to the collapse of houses (Khan 2013).

It came into my knowledge as Deputy Commissioner of Muzaffarabad District at the time of the earthquake that the damage to the building stock was not confined particularly to the vicinity of the epicentre, but was spread over a large area and majority of the building stock was destroyed even in far-off places. I travelled extensively in the area on the ground as well as in helicopters for about a year and observed massive destruction everywhere in my District. The damage assessment survey also confirmed huge losses in neighbouring Districts. In AJK 314,474 houses were damaged in 944 villages spread over an area of 7,000 km^2 (SERRA 2014). Most of the building stock in the study area (90% of the rural and 70% of the urban) was destroyed by the earthquake (ERRA 2007; Haseeb *et al*. 2011; Khan 2013).

During my first fieldwork, I thought it proper to have a more detailed insight into the trend of the damage in geographical terms i.e. whether some areas were more damaged than the others or not, and what were the reasons. I looked into the data of the Government of AJK for this purpose. The percentage of the destroyed houses in each Union Council was calculated because Union Council is the basic administrative unit of the local government system. These percentages were put into GIS to generate the damage map. The services of the Land Use Plan Unit of the Planning & Development Department, Government of AJK were utilized for the generation of this map because only they have the Union Council GIS maps of AJK. Figure 5.7 shows the level of destruction in all Union Councils of the earthquake affected Districts. This map doesn't present the exact picture of the damage though because in some Union Councils the level of damage shown is more than 100%. The reason for these unrealistic/inflated figures is that the authorities didn't know the exact number of houses in those areas at the time of the survey, so they projected the number of houses in 2005 on the basis of the 1998 census. Thus the number of damaged houses (based on door to door surveys) at certain places exceeds the total number of houses at the time of the earthquake. Nevertheless this map presents a reliable overall picture of the damage. A widespread high percentage of damage to housing stock can be noticed in this map; even in those union councils which were more than 100 km away from the epicentre, for example 100% damage in Naar Sher Ali Khan.

One main reason for this wide spread and extraordinarily high level of damage could be the vulnerability of the housing stock (Bilham 2005). Interestingly some Union Councils experienced very low damage, for example 30% in Leepa and 23% in Ashkot.

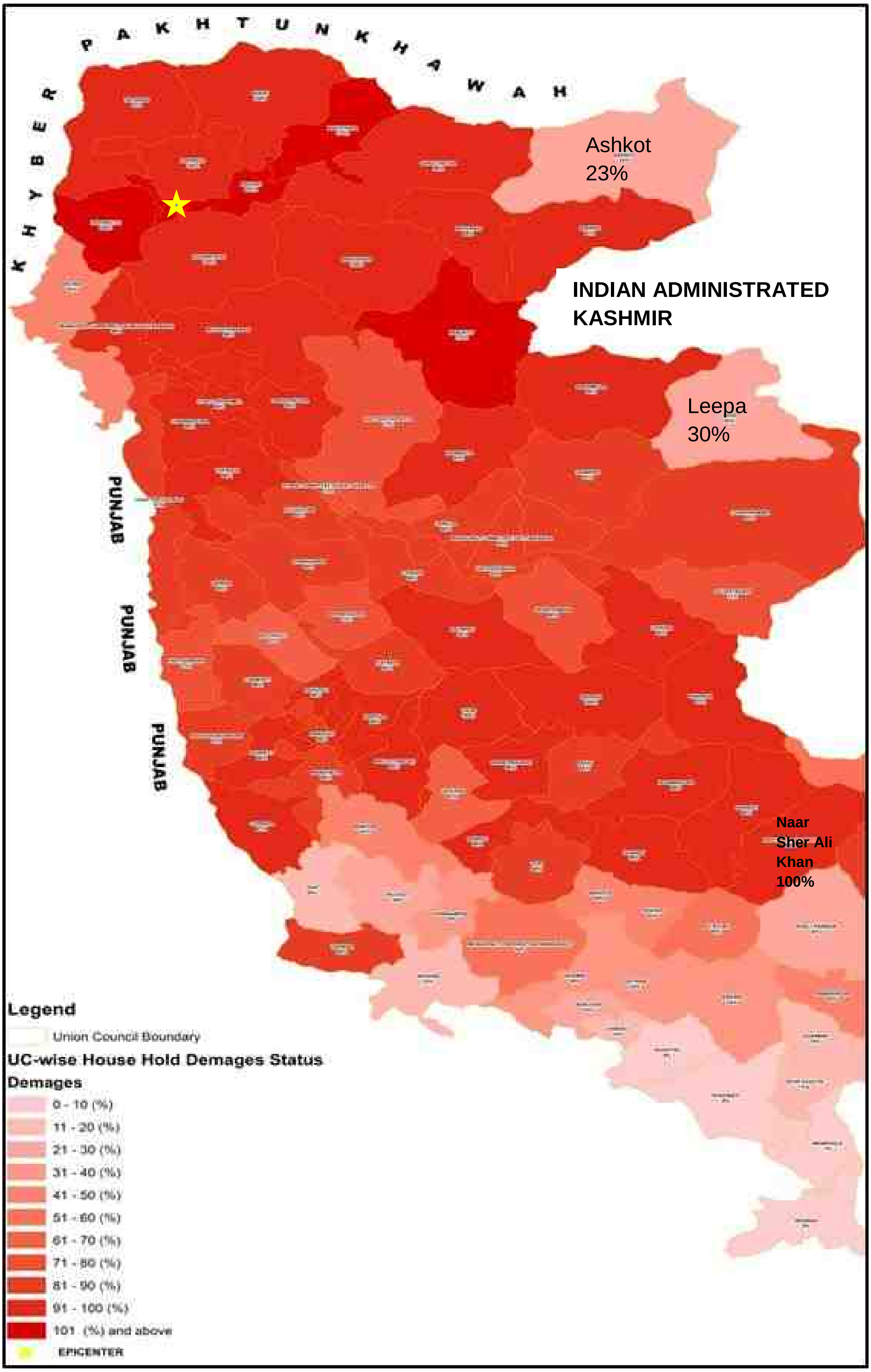


Figure 5.7 Spatial distribution of damage to housing stock in AJK. (Source: Author in collaboration with LUP Cell)

The above map was discussed with the participants of focus groups and key informants during second period of fieldwork. All the respondents agreed with the level of damage shown in the map and were of the opinion that the type and [poor] quality of construction were the main reasons for high and widespread damage in AJK. Most of the respondents agreed that the level of damage in Leepa Valley was far lower as compared to other areas. They thought this was due to the particular type of vernacular earthquake resistant construction *"the reason of low damage in Leepa is the particular type of construction there which is earthquake resistant"* (Key informant-21). The reasons of damage are discussed in detail in the following sections.

5.4. Reasons of Damage to Housing Stock

Many reasons contributed towards the widespread destruction. Halvorson & Hamilton (2010); Haseeb *et al*. (2011); and Husain (2008) suggest that rapid population growth, poverty, illiteracy, unplanned urbanization, changing building techniques, absence of building regulatory authority, poor physical infrastructure, environmental degradation, high population density, socio-political vulnerabilities and lack of disaster preparedness and mitigation contributed towards extraordinary losses. According to Ozerdem (2006) most of the vulnerabilities of Alexander's six-point typology of disaster vulnerability i.e. economic vulnerability, technological/technocratic vulnerability, residual vulnerability (if pre-earthquake unsafe buildings are not upgraded due lack of political will or lack of financial resources), newly generated vulnerabilities due to human migration, deliberate neglect of building codes and regulations and total vulnerability due to precarious life in general, were all found in the case of the Kashmir earthquake.

In my analysis I divide vulnerability into four categories: geological vulnerability, physical vulnerability, environmental vulnerability, and socio-economic vulnerability. My research suggests that the last three vulnerabilities i.e. physical vulnerability, environmental vulnerability, and socio-economic vulnerability were the direct product of the development paradigm/pattern of the country and the first vulnerability i.e. geological vulnerability could have been minimised with the right kind of development pattern.

5.4.1. Geological Vulnerability

Hazard is one of the two factors of disaster risk; vulnerability being the other (Risk = Hazard x vulnerability) (Wisner *et al*. 2004, p. 45). In my study, by geological vulnerability I mean the seismic hazard which was present in the study area due to it geology. The epicentre of the October 2005 earthquake was in Muzaffarabad District, about 11 km northwest of the Capital city of Muzaffarabad. It was the first major instrumentally recorded earthquake in this area. The magnitude of the earthquake was high (M_w= 7.6) at a relatively shallow depth of 11 Km (Avouac *et al*. 2006; USGS 2014). Shallow depth and close proximity to the epicentre were the main reasons of heavy damage to buildings (Pieris *et al*. 2008). According to Avouac *et al*. (2006, p. 524) this earthquake was a shallow crustal event with an "up dip propagation of the rupture together with a steep dip angle and shallow distribution of slip"; the rupture velocity was about 2 km/s. These two factors played an important role in causing heavy damage in the vicinity of the epicentre. According to Haseeb *et al*. (2011) most of the buildings in mountainous rural areas were destroyed along the fault rupture. The earthquake generated many landslides damaging those buildings which were situated on the sliding mass (*ibid*). For example a 68 × 106 m^3 rock avalanche (Dunning *et al*. 2007) was generated by the earthquake in the Hattian Bala area (in Muzaffarabad District) which toppled the whole village of Lodhiabad, killing nearly 247 of 350 people and destroying all 70 houses (personal interviews with survivors).

5.4.2. Physical Vulnerability

While discussing the 'progression of vulnerability' in PAR model, Wisner *et al*. (2004, p.4) have explained how 'unsafe conditions' comprising of 'dangerous locations' and 'unprotected buildings' interact with local hazard and cause disaster vulnerability (Figure 3.5). According to Bilham (1988) earthquake losses are very high in developing countries due to poor construction. In the case of 2005 Kashmir earthquake poor construction played an important role. From literature, my personal experience and field research I can conclude that the majority of buildings in the study area had not been constructed according to seismic specifications, the general quality of construction was very poor, local poor quality construction material was used, workmanship was poor, and there were low maintenance standards (Ali 2007; ERRA 2006; Khan 2013; Pieris *et al*. 2008). Most of the buildings were built without any proper technical specifications or supervision. Engineers had little input into the construction of the houses and private buildings. The construction of these buildings was done by masons who were usually ignorant about seismic standards or even about concrete structures (Halvorson & Hamilton 2010; Kazmi *et al*. 2012; Naeem & Okazai 2009; Rossetto & Pieris 2008). I interviewed three masons in three different areas (one in urban Muzaffarabad, one in urban Bagh and one in rural Bagh) during fieldwork and asked if they knew about seismic resistant construction before the earthquake; all said that they did not know anything about it. In fact they had no formal training for the job and learnt their skills by working with other senior masons, who themselves had no such knowledge.

As a result of my research, I have identified the following construction related issues which contributed towards the vulnerability of the building stock.

5.4.2.1. Lack of Local Knowledge of Seismic Hazard

> *"Earthquake kills us when we forget it. The earthquake did not kill us; it was our ignorance that killed us".* (A house owner in rural Bagh)

Although AJK, especially the northern part where the earthquake struck in 2005, is situated in a seismically active zone, but major earthquakes have been extremely rare. No instrumental data of past earthquakes was locally available, however both geological and historical evidence show that major earthquakes have been infrequent. The last major earthquake occurred in in this area in 1555 AD, but hardly anyone knew about it before the 2005 earthquake (Bilham 2004; Iyengar *et al*. 1996). "A devastating earthquake struck in 1827. The aftershocks were felt for three months. Hundreds of houses were destroyed and thousands of people were killed. The cholera epidemic broke out after the earthquake which lasted for six months" (Qureshi 2009, p. 76). In 1878 an Mw=6.7 earthquake occurred in nearby

Abbottabad (about 30 km away) and then in 1885 an Mw=6.3 earthquake hit Srinagar (about 125 Km away) (Peiris *et al*. 2008). People in those times must have learnt some lessons from these earthquakes because they incorporated seismic resistant techniques into their construction (Ali 2007; Peiris *et al*. 2008), for example the seismic resistant properties of the traditional *Dhajji-dewari* and *Leepa* construction, which remained prevalent in many areas until recent past, and proved to be seismically resistant. The good performance of these traditional techniques during the October 2005 earthquake is well documented (Barenstein *et al*. 2008; Kanji 2006; Stephenson *et al*. 2008; UN-Habitat 2009), however memory of these earthquakes faded away with the passage of time and people switched to seismically unsafe construction.

During fieldwork 200 respondents were asked through survey questionnaires if they had any prior knowledge of the seismic hazard in the area at the time of the 2005 earthquake; all of them said that they had no knowledge of the seismic hazard beforehand. Similarly 26 Key Informants were asked the same question during semi structured interviews; 21 of them said that they had no prior knowledge of the seismic hazard and only five said that they had some knowledge but never took it seriously. Following are the thoughts of some of the Key Informants who were all well-educated and were working at reasonably good positions.

"Never thought of such a severe earthquake, neither was there any warning." (Key Informant-12; Administrator of a Municipal Corporation)

"No, I had no knowledge of the seismic hazard nor there was any warning of the earthquake. When my house started to collapse, I didn't realize that it was an earthquake. Later on when I realized that the intensity was too much then I thought it was Qiyamat because earthquake couldn't be that severe." (Key Informant-8; Deputy Commissioner of a District)

"An acquaintance of mine, who was a geologist, used to say before the earthquake that you were sitting on fire but we used to take them as fairy

tales because we had not gone through it yet." (Key Informant-33; Officer in Reconstruction Organization)

"……we thought that the engineers were just scaring people." (Key Informant-19; Chairman of a Development Authority)

5.4.2.2. Kacha Construction

According to Bilham (2009, p. 840) mud is the most favourite building material in developing countries because it is cheap, easy to use, and has good thermal qualities, but buildings constructed with mud are "killer" because they instantly collapse in earthquakes. The same is true in the case of AJK where 57% houses in the earthquake affected areas were constructed with mud (*kacha*). Mud and round undressed stones were used in these houses employing local semi-skilled masons. There were no columns or beams in these structures, the thick wood rafters had no joints with roof beams, and the thick layers of mud were heavy. The bigger rooms had a thick column (called *Thum* in local language) in the middle of the centre to support roof beam. But this column neither had any strong joint with roof beam nor was strongly secured in the ground. That's why these columns readily slipped away due tremors. These structures had little seismic resistance (Ali 2007; Haseeb *et al*. 2011). Almost all *kacha* houses collapsed in the earthquake burying their inhabitants alive. Figure 5.8 shows a typical *kacha* house destroyed by the earthquake. The walls were unable to withstand the ground shaking and lateral movements produced by the earthquake (Ali 2007; EERI 2006).

As evident from the picture, these houses had heavy mud roofs. Thick wooden panels were laid on the walls without any kind of bracing, covered with twigs and a thick layer of mud. Though this type of roof did provide much needed insulation it was prone to water seepage, so every year, before the start of the monsoon season or before winter snow, a new layer of mud was added for extra protection thus making the roof enormously heavy. These *kacha* houses were of such poor quality that they even gave in to rain or snow. While working in Muzaffarabad District before the 2005 earthquake it regularly came into my experience that these *kacha* houses used to get damaged whenever there were heavy rains or snow. We used to receive hundreds of applications for government assistance after every such event. So the *kacha* construction was already a disaster in the making, exacerbated by the earthquake.

Figure 5.8 A destroyed Kacha house: note heavy wooden beams, loose joints, undressed stones and thick mud roof. (Source: ERRA 2015)

5.4.2.3. Poor Quality of Construction

The general quality of construction in these areas was also too poor and unable to resist even moderate tremors (Focus Group Discussions 2014; Peiris *et al*. 2008). Figure 5.9 depicts the cross section of a typical wall. Stones of irregular size and shallow foundation using weak materials were the contributing factors towards poor quality construction. Most of these structures collapsed or were intensely damaged in areas of ground shaking. Brick masonry buildings performed better (Haseeb *et al*. 2011).

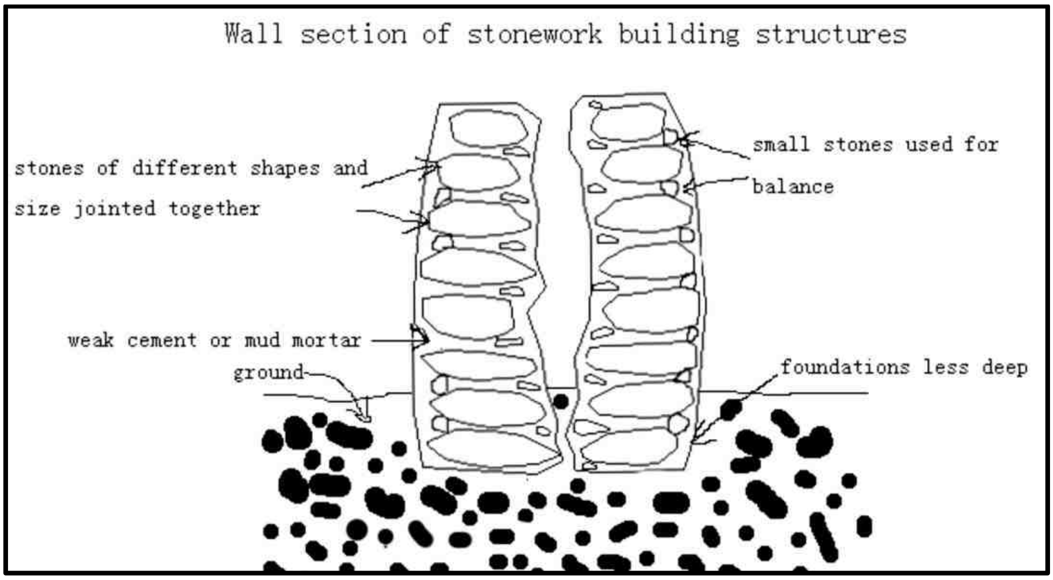


Figure 5.9 Cross section of a typical structure; round stones in walls with mud or weak cement mortar, shallow foundation, and weak mortar in foundation were used.
(Haseeb *et al*. 2011, p. 172)

Most of the housing stock in these areas had developed as a result of incremental housing. People mostly lived in a joint family system; rooms were added as sons were married. So the new unit had no structural connection or tie with the previous structure. With the passage of time there has been a change in the construction typology as well. In rural areas, there has been linear addition of mostly *pukka* structures (consisting of stone and in some cases concrete blocks) along with old *kacha* houses. So there used to be separate horizontal structures in rural areas, *kacha* alongside *pakka* (Figure 5.10). The structure on the right is a *pukka* structure made with concrete blocks and CGI sheet roof, whereas a *kacha* structure (on the left) made with stone, mud and flat roof with heavy wooden rafters of irregular size is added. These two structures have no proper joints between them (no joint is possible with engineering point of view). No doubt the quality of *kacha* houses was very poor, but the quality of the *pukka* structures was not much better either. Contrary to their name, the so called *pukka* houses could not prove themselves to be *pukka* (strong) against the earthquake and came down as readily as *kacha* structures.

Figure 5.10 kacha (left) and pakka (right) structures side by side in rural Bagh.

(Source: Author fieldwork)

In urban areas the situation was different. Due to the scarcity of land the development tended to be vertical i.e. addition of storeys on top of the existing stone structures. In many cases a cement concrete block storey was added on top of the old stone house and then the third cement concrete block or brick storey was added on top of the second storey. In some areas of the old city, for example the most congested Madina Market, even four storey high buildings were constructed in this manner. There was no frame structure in these buildings to give strength, so the original single storey structure was unable to bear such a load and crumbled under its own weight when the earthquake hit. Though considered to be *pukka*, these buildings collapsed as easily as *kacha* houses because these were loadbearing structures which had a variety of construction types and construction materials used in them (Figure 5.11).

Figure 5.11 A *pukka* building in urban Bagh, mixed construction material (stones and bricks) is used in the same wall (picture above); destroyed *pukka* construction in urban Muzaffarabad, mixed construction material such as bricks and concrete blocks can be noticed in red circles (picture below). (Source: SERRA)

Camerio (1997, p. 167-168) also found that there were concentrated losses of multi-family housing in dense urban areas of Mexico City, Loma Prieta, and Kobe.

One of the old residents of Muzaffarabad city observed:

“Then there was incremental housing e.g. the father had constructed the house forty years ago; he constructed another three room storey on the old building when his first son married. When the second son married, he added the third storey……….Now what happened that the houses got overloaded and due to the first jolt the third storey came down on the second storey and the second on the first one. There are many buildings in Muzaffarabad city

which sank fully into the ground due to the load". (Key Informant-9; Muzaffarabad)

As was the case in rural areas, the construction typology had undergone a lot of change in urban areas since 1970s and there has been a switch to more modern construction materials due to improved road infrastructure and market access, especially near urban areas. The material used in these buildings was usually of poor quality; local low quality sand which had silt and clay, low quality aggregate, cheap steel and low quality cement (Ali 2007). Locally made cement concrete blocks, often of very low quality and of small size e.g. 6"x6"x12" were used in walls. These blocks were not reinforced and hardly any curing was done so they had very low PSI strength so they quickly developed cracks during the earthquake resulting in collapse of buildings (Pieris *et al*. 2008). People made all sorts of compromises on quality to reduce cost. There was also a lack of workmanship. Most of the engineers had no idea of seismic standards and masons were ignorant about the basics of concrete structures (EERI 2006; Halvorson 2010; Kazmi *et al*. 2012; Naeem 2008; Naeem *et al*. 2007; Rossetto *et al.* 2009). Some houses did have RCC frame structures but they had many defects, for example fewer steel bars were used than necessary, there were wider spaces between steel rings to save cost, and the walls had no joints or connection with columns and beams thus providing no "lateral force-resisting system" (EERI 2006, p. 5).

Figure 5.12 A Destroyed Pakka House (Source: SERRA)

The widespread damage to building stock indicates structural design weaknesses in the construction that could not withstand the seismic shock (ERRA 2007). According to Ali (2007, p. 17) a ‘complex dynamism’ existed in these areas before the earthquake where 'modernization' and ‘deterioration’ occurred simultaneously resulting in extremely poor quality houses which were severely damaged by the earthquake. With changing times people started to make modern buildings using cement and steel but the required engineering standards, materials quality, and workmanship were not used so the quality of the these buildings was not up to the standard which ultimately deteriorated the quality of the building stock. Figure 5.13 illustrates these weaknesses in different parts of these buildings.

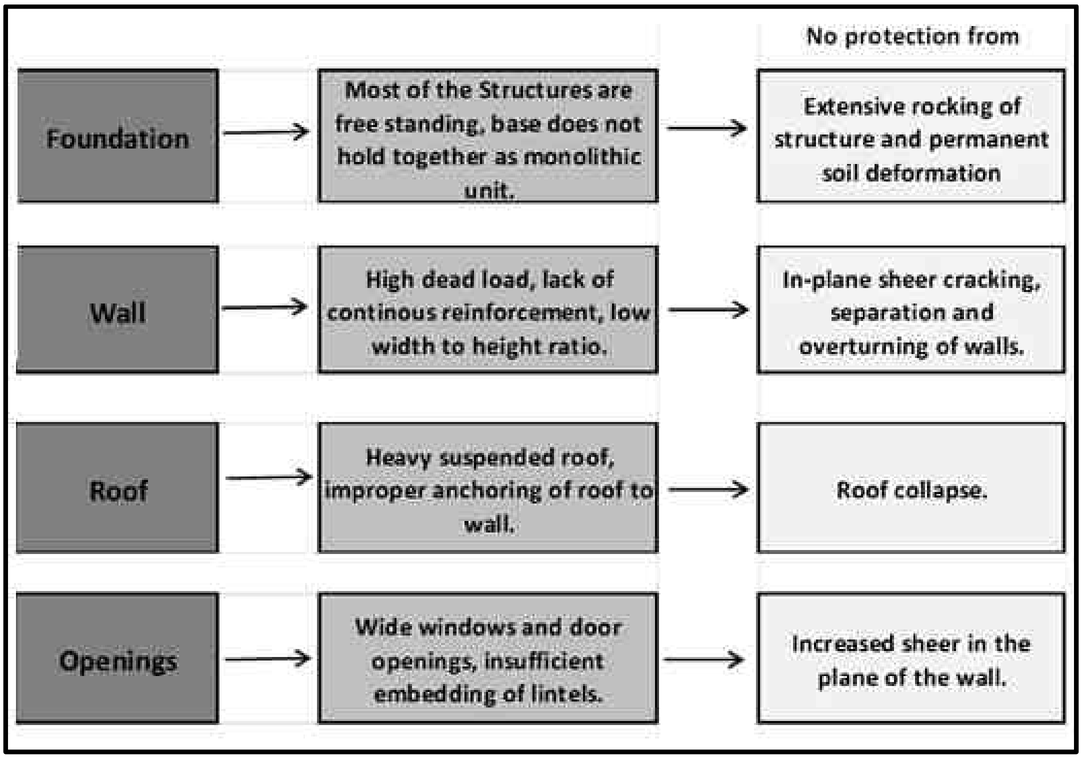


Figure 5.13 Structural performance of pre-2005 earthquake buildings. (Ali, 2007, p. 16)

The foundations were constructed as free standing structures (without the use of steel bars and rafts) and did not hold the building together as monolithic structures which could provide protection against extensive rocking or shaking or soil deformation in case of earthquake. The walls had a heavy dead load, there was lack of continuous reinforcement of steel columns and beams and low width to height ratio (rooms were too big) so wall structures cracked, separated from main structures or overturned as a result of ground shaking. The roofs were too heavy (either heavy mud roofs or heavy RCC slabs) which had no proper joints with walls and readily collapsed due to ground shaking. As compared to traditional houses and *kacha* houses the new buildings had much bigger windows and doors and there were no RCC bands at lintel level which made walls weaker.

In order to understand the reasons behind faulty construction, I asked 31 Key Informants and house owners to suggest likely causes of poor quality construction. They identified "ignorance of the seismic hazard", "poverty", and "lack of building control" as three most probable reasons of faulty quality. They were asked to rank these reasons: 68% ranked "ignorance" as number one, 16% identified "lack of control" as number one, and 16% identified "poverty" as number one cause of faulty construction (Figure 5.14).

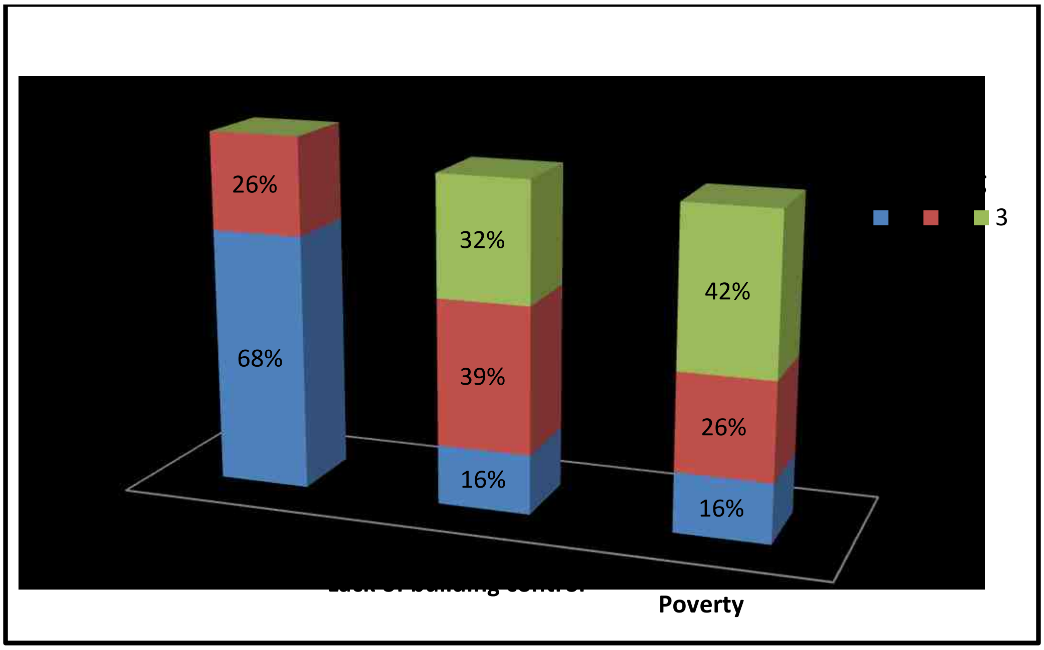


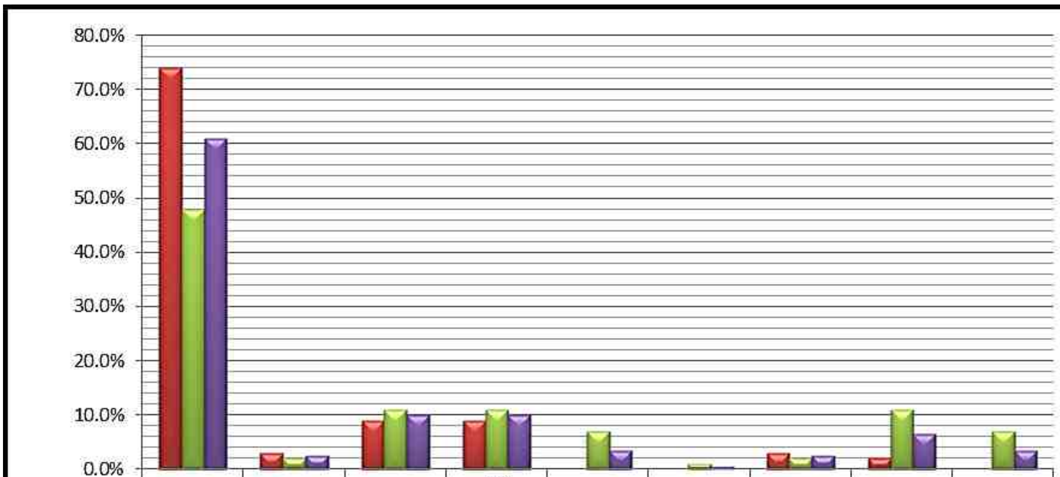
Figure 5.14 Reasons reported for faulty construction (based on semi-structured interviews) showing ranking of the reasons of faulty construction. (Source: Author fieldwork)

This issue was discussed in Focus Group discussions also. The Focus Group discussion held in Bagh identified *'Ignorance of the seismic hazard'* as number one reason and *'Poverty'* as the third. Focus group discussions held in Danna and Muzaffarabad identified *'Ignorance of the seismic hazard'* as the second and *'Lack of building control'* as the third most likely reason.

Poor quality construction was not particular to private buildings only; even the government buildings were of very poor quality. More than 3,000 educational buildings (95% of the total schools and colleges) collapsed killing around 19,000 students (Bilham 2010; EERI 2006; NDMA 2009). Many government officials or members of their family died in government built houses and offices. The official accommodation of the Deputy Commissioner (the highest ranking government functionary in the District) was no exception too. The Deputy Commissioner House of three Districts (Muzaffarabad, Bagh and Poonch) collapsed instantly. I was working as Deputy Commissioner Muzaffarabad at the time of the earthquake; my official house came down within first few seconds of the earthquake. My family and I were inside the house as it collapsed and we were lucky to dig ourselves out of the rubble. The daughter of the Deputy Commissioner Poonch and two young children and a wife of the Commissioner Muzaffarabad were killed in the government houses.

However despite experiencing such a big devastation, most of the people still do not consider that faulty construction had much role in this destruction. The quantitative data that I collected through survey questionnaires during fieldwork substantiate this assertion. The respondents were asked to identify reasons of damage (in order of priority) to their property. They could identify up to six reasons. The findings of this question are presented in Figure 5.15.
Overall a majority of respondents (61%) believed that the intensity of the earthquake was responsible for the damage. Only 17% identified construction related reasons. Another noticeable thing in this graph is the difference in perception between urban and rural areas. 74% of the urban respondents thought that the earthquake intensity was responsible for the damage and 23% pointed out construction related reasons. Whereas 48% of the rural respondents identified earthquake intensity and 35% identified the construction related reasons. One possible explanation could be the construction typology. In urban areas the number of *pukka* houses was quite high (94% in urban Muzaffarabad and 80% in urban Bagh), whereas in rural areas the number of *pukka* houses was relatively lower (rural Muzaffarabad 52% and rural Bagh 58%). Despite being of poor quality, the *pukka* houses

did give the owners the feeling that their houses were safe and had no quality issue and it was not the poor quality of the building but the intensity of the earthquake responsible for the damage to the building. Whereas, people living in *kacha* houses in rural areas already knew about the poor quality of these houses so this type of construction did give people a perception of being strong and reliable. So the rightly pointed out the reason of damage to their buildings.



N= Rural: 100 Urban: 100 Total: 200	EQ Intensity	Kacha House	Constructi on Quality	EQ Intensity & Poor Constructi on	EQ Intensity & Kacha House	Landslide & Stone Constructi on	Landslide	Stone Constructi on	No Reply
Urban	74.0%	3.0%	9.0%	9.0%	0.0%	0.0%	3.0%	2.0%	0.0%
Rural	48.0%	2.0%	11.0%	11.0%	7.0%	1.0%	2.0%	11.0%	7.0%
Overall	61.0%	2.5%	10.0%	10.0%	3.5%	0.5%	2.5%	6.5%	3.5%

Figure 5.15 Reasons of damage to housing stock (Source: Author fieldwork)

Another explanation emerged during my second period of fieldwork when I discussed these findings with key informants. Some of the key informants who had worked in the housing reconstruction programme at very responsible positions correlated this difference in perception to the housing reconstruction programme. They were of the opinion that in rural areas the Assistance and Inspection Teams (AITs), who were responsible for the implementation of the housing reconstruction programme, were given the task of sensitizing the house owners about the earthquake hazard, faults with their damaged buildings, and how to do seismic resistant construction. House owners were given training in these things as well. These teams inspected the construction progress at three different stages, identified the faults, and suggested remedial measures. The rural areas' people learnt a lot about seismic hazard and construction faults during this exercise so it was due to this training that they were able to identify other reasons of damage apart from earthquake intensity. Whereas, in urban areas there were no Assistance and Inspection Teams so the urban areas' people have a different perception which is heavily focused on earthquake intensity and gives less importance to other reasons. These key informants found the perception of urban resident particularly worrying because they thought that it meant that even nine years after the earthquake and suffering so much damage the urban residents had not learnt from the horrific experience and were still as vulnerable to seismic hazard as they were before the earthquake.

5.4.2.4. Lack of Building Control Mechanism

There were no seismic resistant building codes in the study area before the earthquake, although some codes for building did exist in urban areas (EERI 2006; Pieris *et al*. 2008) and there was no building control mechanism at all in rural areas. I know from personal experience (as Administrator District Council Poonch in 2001-2002 and Administrator District Council Bhimber in 2002-2004) that there were no building codes or building control mechanism in the rural areas of these districts. On the other hand the rudimentary type of building control mechanism was ineffective in urban areas (Halvorson 2010; Haseeb *et al*. 2011; Husain 2008; Naeem 2008; Rossetto *et al*. 2009), especially in the case of residential buildings.

5.4.3. Environmental Vulnerability

As enumerated in Wisner *et al*. s' (2004) PAR model, deforestation and decline in soil productivity contribute towards the 'progression of vulnerability' as 'macro forces' in the 'dynamic pressures' part of the model (ibid p. 51). Environmental degradation played an important role in making people vulnerable in the study area. Deforestation and soil erosion due to the construction of roads and buildings on mountains and depletion of vegetative cover contributed towards high losses. The consumption of wood is high in the study area due to high population density. On average three trees are burnt per household every year for fuel purposes and about five trees are required by every household every 8-10 years for construction purposes (P&DD 2010).

Deforestation has made the environment of the study area prone to landslides, soil erosion and slope instability even before the earthquake. Bloesch *et al*. (2005) observed that more landslides occurred on slopes in the 2005 earthquake where there was less vegetation as compared to those slopes that had thick forests. Dunning *et al*. (2007, p. 130) wrote that 26,500 people were killed as a “direct result of landslides” in the AJK in the 2005 earthquake. 88 landslides (out of 183 post-earthquake landslides) in the Hattian Bala catchment of District Muzaffarabad area were pre-earthquake and 5 km^2 area (out of 7.76 km^2 landslide affected area) was already reactivated by landslides, which alludes to the already degraded formation of the area (*ibid*). Thus the negative impacts of the earthquake were multiplied due to the fragile environment (Halvorson & Hamilton 2010; Husain 2008; Kazmi 2010).

According to Owen *et al*. (2008) road construction is one of the main factors triggering landslides in tectonically active areas and 53% of all the sites had undergone human activity where landslides were initiated after the 2005 earthquake. Due to steep hilly terrain, road construction requires extensive cut and fill activity in the study area. Earth cutting is the most favourite activity of the road contactors in these areas because it is easier and more profitable. Usually the contractors do the earth cutting, get the payment, and then they go into legal wrangling with the department for years leaving these road cuts open to the elements. Landslides were common on roads which exceeded 50° slopes (*ibid*). It is in my personal knowledge that a vast majority of people lived (and continue to live) on slopes exceeding 50° in the study area.

Apart from above mentioned reasons, poverty is another reason of environmental degradation in the study area. People are forced to make unsustainable use of their environment. Collins (2009) has highlighted the downward spiral relationship between poverty and environmental degradation (Figure 5.16). As poverty increases, so does the environmental degradation; on the other hand increasing environmental degradation enhances poverty. According to Collins (2009) the term ‘environment’ encompasses ‘physical environmental, social and economic components’ (p. 71) and poverty has three components i.e. ‘income poverty, basic needs poverty and capabilities poverty’ (*ibid*).

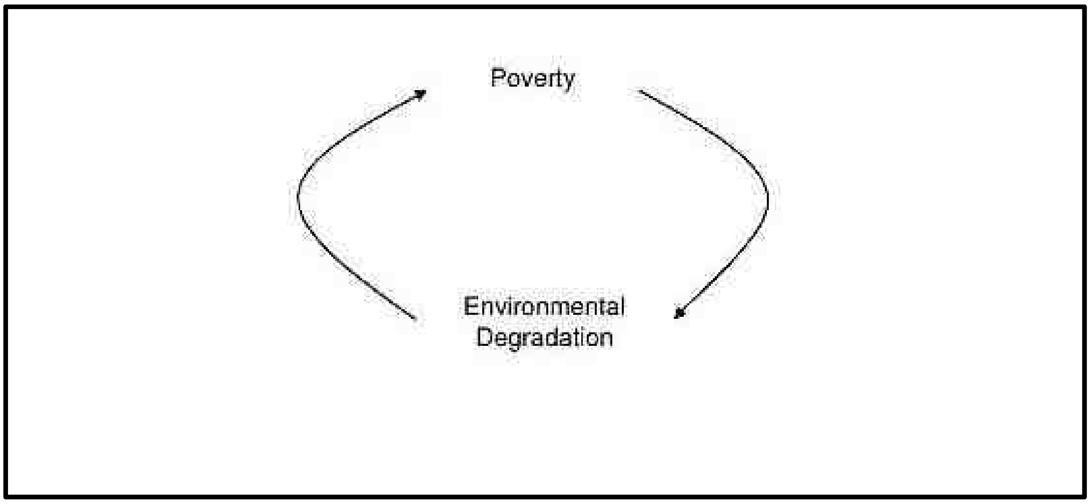


Figure 5.16 Link between poverty and environmental degradation (Collins 2009, p. 71)

5.4.4. Socio-economic Vulnerability

As explained in Wisner et al. s’ (2004, p. 51) PAR model, limited access to resource, lack of local institutions, lack of local investments, livelihoods at risk, and low income levels contribute towards the progression of vulnerability. According to Ozerdem (2006) a combination of a fragile physical environment, poverty and inadequate social and institutional structures is most likely to produce a disaster from the occurrence of a natural hazard; he declares the 2005 Kashmir earthquake a social disaster. Pakistan is amongst the lowest income countries of the world with average annual per capita income of US$1194 (World Bank 2012). About 60% of the population lives on less than US$ 2 per day (ADB 2012). The economic statistics of the study area are not much better than the national average because these areas are geographically remote having difficult terrain and there is hardly any industry or service sector; apart from employment in the public sector. Only 13% (of the total 13,292 km^2) area of AJK is under cultivation, but in the earthquake affected area this figure is even lower because of the scarcity of flat land. The productivity of land is negatively impacted by the fact that 92% of this area is rain fed. The average cultivated area is 1.43 acres per family which makes agriculture a highly uneconomic and unreliable livelihood activity, so people have to rely on other sources such as foraging in rural areas and informal labour in urban areas (P&DD 2006). Even before the 2005 earthquake these areas were generally considered poorer than the southern Districts of AJK.

Poverty played an important role in the vulnerability of the people of these areas. Unfortunately no official data on exact economic status are available in AJK. I have tried to assess the household economic status in study area. The results of data of 200 households (Figure 5.17) show that 12% households were in *"Very poor"* category, 40% were in *"Poor"* category, 36% were in *"Moderate but unstable"* category, 11% were in *"Moderate and stable"* category, 1% were in *"Strong"* category, and 0% were in *"Well-off"* category. It means that the poverty rate in these areas was 52% which is very high. The unemployment ratio in AJK was 6.5% pa in 2006 (P&DD 2012). There was no social security system for the poor and unemployed.

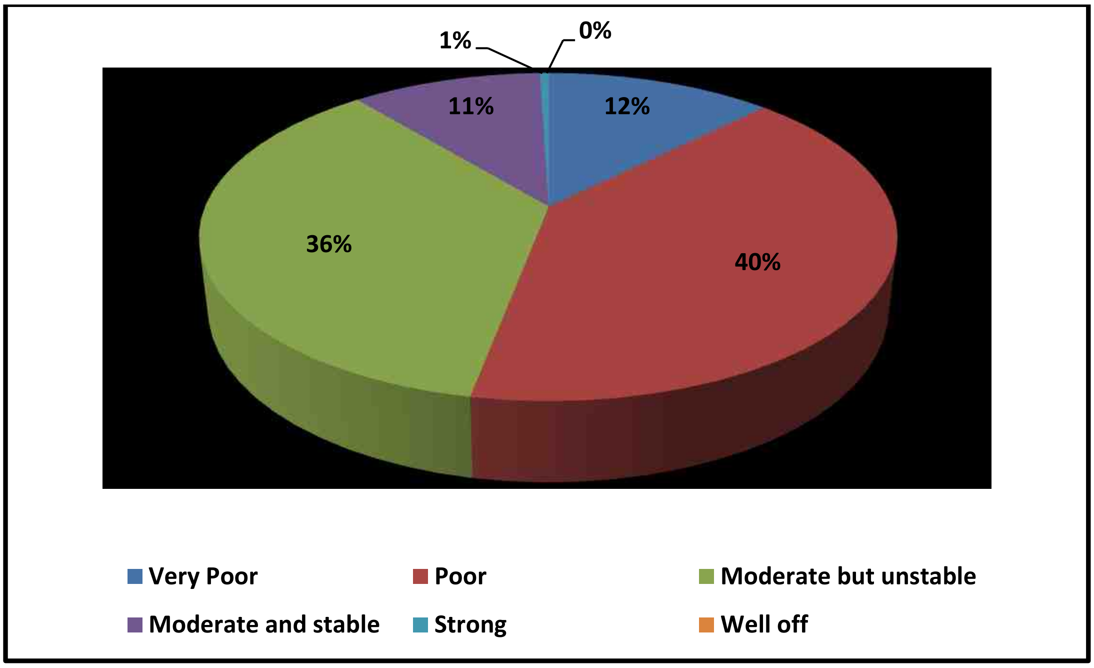


Figure 5.17 Pre-2005 earthquake household economic status in study area (N=200).
(Source: Author fieldwork)

Ambraseys & Bilham (2011) found a direct relationship between poverty and death toll from the earthquakes. In the case of my study area, poverty did play its role in poor quality housing (Section 5.2.1). Poor people in rural areas abandoned the traditional *‘Dhajji-dewari’* building technique in favour of much cheaper *‘Kacha’* houses. According to Ahrens & Rudolph (2006), Nigg (1995) and Qurentelli (2003) poor people who already struggle to survive have no choice but to live in unsafe structures built on precarious and vulnerable locations. In urban areas of AJK the land was very expensive due to scarcity so cheaper land on steep and dangerous slopes was utilised for construction of their houses. Since landholdings are very small in rural areas, people kept plane land for farming and built their houses on uncultivable steep and dangerous slopes (Halvorson & Hamilton 2010).

People used local cheap construction material because good quality material was transported from Rawalpindi and was too expensive. RCC structures built under the technical supervision of qualified engineers cost more so people opted for unsupervised poor quality buildings (Halvorson & Hamilton 2010; Husain 2008; Kazmi *et al*. 2012; Ozerdem 2006). Results of my quantitative data support this view; “*Poverty”* was identified by key informants as one of the three main reasons of poor quality construction (*“Ignorance of seismic hazard”* and *“Lack of building control”* being the other two) (Figure 5.14). Many house owners, whom I interviewed during fieldwork, also substantiated this point.

The area of AJK is relatively small (13,297 km^2) but has a large population (3.4 million). AJK is a densely populated area (270 persons/km^2), whereas the population density in the study area in 2005 was 307 (Persons/km^2) in District Muzaffarabad and 336 (Persons/Km^2) in District Bagh (*ibid*). The high population density became especially problematic in the study area because these areas have steep hilly topography so a high population density forced people to build their houses on steep slopes and susceptible places which were vulnerable to seismic activity (Halvorson 2010) (Figure 5.18).

Rapid population change and rapid urbanisation are some of the ‘Macro-forces’ which work as ‘dynamic pressures’ towards the ‘progression of vulnerability’ (Wisner et al. 2004, p. 51). According to Avouac *et al*. (2006) the extraordinary high death toll in the 2005 earthquake can be attributed to high population growth in the area. Internal population migration also forced people to live in vulnerable places. The element of poverty on the one hand affected the type and quality of construction and on the other it forced many people to migrate to urban areas in search of better livelihoods. These people could only afford to live on steep slopes because they were relatively cheaper. The geopolitical situation of the area also contributed towards this internal migration. For example, hundreds of families migrated from the Neelum and Jhelum valleys into Muzaffarabad city in the 1990s due to the decade long armed clashes between Indian and Pakistani forces on the Line of Control. Since these people were mostly poor and escaped from their ancestral homes leaving everything behind, they could only afford to build poor quality residential structures on steep slopes and vulnerable locations.

Figure 5.18 Massive building and road construction (yellow circles) on steep slopes in Muzaffarabad city. All the construction has been done after doing earth cutting.
(Source: Author fieldwork)

According to Collins (2009) risks are greater for those who are less able to adapt to urban environment. It was the poor rural migrant population was found it difficult to adapt to urban areas and ended up being more vulnerable perhaps as compared to their ancestral places. Cutter (2006) described almost similar situation in the case of Hurricane Katrina in the USA where poor black population occupied vulnerable locations in New Orleans and more affluent white population moved out to safer suburbs thus the hurricane damaged the poor black population more than the white population. However, in the case of Muzaffarabad city the construction on steep slopes was not due to poverty only; many well-off people and social elites preferred to construct their houses on slopes to escape congested inner city areas and to have better scenic views. This situation sits perfectly well with the view expressed by Collins (2009) that though disasters are essentially a result of inappropriate development which causes the 'marginalisation of the sub-groups as a precursor to disaster, it may be that some urban risks are not as much about who you are, but where you live' (p. 82).

Provision of civic amenities also played its role in internal migration to urban centres. Though the governments in AJK have been trying to provide basic civic amenities such as roads, electricity, health, and education to even far flung areas, the fact remains that service delivery and the quality of service remained a big question mark.

Though there were school or health buildings in rural areas, there were always complaints of absence of teachers and health staff, especially doctors, from their duties and the poor quality of service delivery. A lack of political institutions at the local level has also contributed towards these conditions. Though the political process has continued uninterrupted for the AJK Legislative Assembly (which is at the State level) since 1985, there has hardly ever been a political process at local government level and there has been no local governance system at the rural level either. People had no voice at local level for the resolution of their problems so they thought it better to move to urban centres in the hope of finding better facilities, however they ended up living in even poorer conditions and at more vulnerable locations, still without elected representatives. The urban civic bodies have almost always been headed by the bureaucrats or politically appointed people who did not have much interest in the resolution of peoples' problems. Wisner *et al*. (2004) have also identified political system and lack of local institutions as part of the factors responsible for the progression of vulnerability.

5.5. Laying the Foundations of Vulnerability

In the previous section, different types of vulnerability have been identified which prevailed in the study area at the time of the 2005 earthquake. As will be discussed in this section, this disaster vulnerability progressed over a long period of time. I will also try to explain in this section how the two theoretical approaches taken in this study i.e. Wisner *et al.'s* (2004) PAR model and Collins' (2009) 'disaster and development' approach perfectly explain the progression of this vulnerability. The three factors of the 'progression of vulnerability' presented in Wisner *et al.'s* (2004) PAR model i.e. 'Root Causes', 'Dynamic Pressures', and 'Unsafe Conditions' (*ibid*, p. 51) sit perfectly well in the case of study area (Figure 3.4). It was these factors which formed the vulnerability to seismic hazard and caused the disaster of the 2005 earthquake. These factors will be explained greater detail in the subsequent paragraphs of this section.

As highlighted by Collins (2009) disaster vulnerability is basically a consequence or by-product of development; either faulty development or lack of development (Chapter 2). Development does not mean economic development only; it is a holistic concept which encompasses sustainable and equitable economic development, sustainable infrastructure development, social protection, disaster mitigation and good governance as well. A development that focuses on economic progress only and ignores other aspects, or concentrates on infrastructure development only but remains oblivious to disaster mitigation, lacks good governance and ignores social protection and livelihoods is bound to create vulnerabilities. According to Collins (2009, p.16) such type of development breeds 'the risk of disaster through environmental degradation, social decay or economic collapse, to name a few.'

As highlighted by Key Informant-5, a high official of a multilateral development bank:

> *"If you ask me I would say that you have been asking for it since long. This damage was not due to earthquake only; some other events might have caused the damage as well because you have been doing faulty development. It was just a matter of time"*.

Unfortunately decades of narrowly focused development practices in AJK had created disaster vulnerability which eventually resulted in such a tremendous loss of life and property. Such loss could have been avoided to a greater extent. Our successive governments have been taking pride (and deservedly so to a great extent) in the development that has been made since liberation in 1947. All the development indicators in AJK are compared with the watermark of 1947, but this development mainly focused on infrastructure development (roads, health, and education) neglecting the side effects. I interviewed a former Prime Minister of AJK who agreed that the focus of the government has been infrastructure development at the expense of other sectors, which thus contributed towards creating disaster vulnerability and became main reason of wide spread destruction in 2005.

This focus on development at the cost of neglecting a very potent hazard was prevalent at the local level also. A former Chairman of Development Authority Muzaffarabad admitted that in 1993 the Geology Department of AJK University gave him a report about seismic hazard and faulty construction in the area but he did not take this report seriously because *"at that time my vision was to make parks, playgrounds, remove encroachments, improve bus stands and roads and things like that. And I used to think that my vision was very big and we were doing something grand"*.

Reasons of damage to housing stock discussed in previous sections could have been addressed had the governments been conscious enough and realised their duties. There were also deficiencies in the knowledge of seismic hazard at the scientific level in the country before the 2005 earthquake. The Pakistan Seismic Code Zoning Map 1986 divided Pakistan into four zones, Zones 1 to 4 (Zone 4 being the highest zone). The zonation was based on instrumental data collected from the Quetta Geophysical Centre (in the southwest of Pakistan) between 1905-1979, which recorded felt intensity in each region during past earthquakes. The code was "based on a simple premise that the ground motion of a certain intensity experienced once in a certain area is likely to be experienced again in that area", and "the map does not take into account recurrence intervals of different magnitude earthquakes” (Rossetto & Peiris 2008, p. 7). This code was advisory in nature and was never implemented in AJK (*ibid*). The uselessness of this code became evident after the 8th October 2005 Kashmir earthquake when it was realised that the earthquake hit areas had been assigned seismic zone 2 (corresponding to MMI VII), whereas the observed damage in these areas after the earthquake ranged between VIII-IX (Zone 4).

This deficiency of scientific knowledge resulted in a lack of knowledge of seismic hazard at the official level as well. No organization existed in AJK until the earthquake of 2005. Despite the presence of two active fault lines in Muzaffarabad the government and the city authorities remained unaware of the seismic hazard and took no mitigation or even response measures; the government and the people were ill prepared for this disaster (Husain 2009). This again takes us back to debate on relationship between development and disaster vulnerability (please refer to Chapter 2) because development ‘is also the means to forewarn about disaster through scientifically evaluated risk assessment and early warning systems. These are assisted by technological developments, such as the use of remote sensing to identify vegetation loss, or of seismic modelling to try to predict the likely timing and location of earthquakes’ (p. 30).

Unfortunately even those few who did have some knowledge of the seismic hazard did not take it seriously. A key informant, who headed the Muzaffarabad Development Authority before the earthquake, told me during key informant interview that the Chairman of the Geology Department of AJK University informed him in 1993 about the seismic hazard in the area and the faults in the construction that was being done in the city. He admitted that he did not put up a formal report to the government because he did not take it seriously, however he did mention about this hazard in his speeches before the then Prime Minister. He also said that six months before the earthquake a local of Muzaffarabad, who was a professor of Geology in a US University, warned him about the danger of an impending earthquake in Muzaffarabad, but again he did not take it seriously and did not inform anyone about it. He gave a very emotional account of his meeting with the same professor after the earthquake:

"About ten days after the earthquake Professor Mohsin Naqvi called me to an Iftar party in which he had invited former ministers and other political people. He said that he had gathered us to inform that we were the murderers of this city and that we had done nothing to save this city from destruction. He also mentioned about our meeting some six months ago. We all started crying that we couldn't do anything; we couldn't even give a statement in the newspaper that there was an earthquake hazard and people should be ready and shouldn't take this warning lightly. But none of us played their role".

I interviewed a professor of the Geology Department of AJK University about knowledge of seismic hazard in the area. He said that they did know about it and coordinated a conference on it in Muzaffarabad in 2004. The conference warned about the *"chances"* of an earthquake in the area; however the exact timing was not possible to predict. He said that the papers presented in the conference were sent to the government as well, but he was not sure what the government did about it.

Thus it was not only due to a general lack of knowledge of the seismic hazard but perhaps, at certain level, carelessness or negligence of those people who had the knowledge that nothing was done to mitigate the hazard. While discussing 'the progression of vulnerability' Wisner *et al*. (2004, p. 51) have explained how 'lake of preparedness' at the level of 'public actions and institutions' breeds 'unsafe conditions' which ultimately cause disaster vulnerability to a hazard. Cutter & Emrich (2006) have observed similar type of inaction on the part of government officials on reports of different researchers about impending danger of a hurricane in New Orleans.

The government agencies in AJK did little to ensure the quality of construction of private buildings. Key Informant-21 reported that the whole of Muzaffarabad city had been built on loose and weak soil which has a high content of dolomite. He said that the relevant government department should have done research as to which type of construction was suitable for this type of soil, but they did not do any such thing. Though there was no building control mechanism in rural areas, the civic bodies in urban areas could not implement the existing building codes thus not reducing disaster vulnerability. I headed the Municipal Corporation Mirpur in 2004 and Municipal Corporation Muzaffarabad in 2005-2006 and gave final approval of planning permission for dozens of residential and commercial buildings during this period, but I must admit that these planning permissions were hardly ever evaluated in the light of building codes (which were prevalent at that time) by the engineering section of these corporations. I also know out of my personal experience that construction monitoring and control mechanism was ineffective and weak in most of the cases.

During my fieldwork I interviewed a former Chairman of Muzaffarabad Development Authority (who had worked as Administrator of the Municipal Corporation Muzaffarabad as well) to know about the status of building control in Muzaffarabad. He said that they used to take private housing very lightly before the earthquake. There was no permanent civic body in Muzaffarabad city until 1988. A small Municipal Committee was responsible for building control but it had only one Municipal Engineer and he too was not properly qualified. Though the Municipal Committee had building code before the earthquake, these codes did not specify which quality of sand, steel, and aggregate material should be used in concrete and what type of buildings should be built. Construction drawings were passed without consideration of landslides and steep slopes. He said that the Muzaffarabad Development Authority was created in 1988 for building control, but a tussle started between the Development Authority and the Municipal Corporation because their jurisdiction and roles were not clearly defined and there was overlap in their functions. This tussle proved to be very damaging for the city because no institution was clear about its mandate and consequently was ineffective. This tussle and overlap came into my observation as well when I worked as Administrator of Municipal Corporation Muzaffarabad in 2005-2006.

The relationship between good governance, development, and vulnerability has been discussed in detail in Chapter 2. According to Ahrens & Rudolph (2006, p. 209), disaster vulnerability can only be reduced through sustainable socio-economic and livelihoods development, which in turn can only be achieved if the country's governance structures are capable of implementing and enforcing these public policies and *susceptibility to disaster can be* *interpreted as a consequence of institutional failure*. He identifies *accountability, participation, predictability and transparency* as key features of a governance structure to foster development and support risk reduction (*ibid*: 207). According to Stroemberg (2007) disaster losses may be lesser in those countries where governments are efficient and accountable. Collins (2009, p. 2) has also delved on the relationship between disasters and governance and has rightly pointed out that '[M]uch of disaster resilience is related to institutional strengthening. Poor governance predisposes to increased impacts of disasters, or can directly cause a disaster, such as when building regulations are not in place, investments are not made in preparedness for emergencies or where aid and relief are corrupted'.

Unfortunately, there has also been a gradual and sustained deterioration of the government authority in AJK. As Ahrens & Rudolf (2006) said the roots of disaster vulnerability and underdevelopment can be traced back to (or inferred to) institutional failure on theoretical grounds but it is difficult to prove it empirically; similarly although theoretically true in AJK, it is difficult for me to prove it empirically, however being a part of the system myself for a long period of time I can now infer how sustained deterioration of the governance system in AJK has led to disaster vulnerability through development which ultimately culminated in massive losses in the 2005 earthquake. Police, District Administration, and civic bodies gradually became unable to perform basic functions such as controlling encroachments, illegal construction, sale of poor quality construction material, and violation of the planning permission or even check whether masons, carpenters and steel fixers had any formal training and qualification. Corruption, inefficiency, nepotism, and political interference in the civic bodies and public administration institutions were the main reasons for this. As regards construction on marginal slopes, the government or the civic bodies never tried to control it. Informal settlements came up in an uncontrolled and unplanned manner with no civic amenities; however over a period of time the governments felt obliged to provide road infrastructure and other civic amenities thus encouraging more expansion of these settlements. A former Prime Minister of AJK agreed with me in his interview that the governance had weakened over a period of time and the civic authorities and law enforcement bodies could not perform their duties up to satisfactory level to implement even the rudimentary type of building codes.

The environment has rarely been a priority in the infrastructure-development-centric policies of the government. AJK had high forest cover when it became an independent entity in 1947, but with the passage of time the forest cover started to decrease due to deforestation. Presently 42.6% area of AJK is with the Forest Department but the actual forest cover is only 11% (Bloesch *et al*. 2005; ERRA 2010; P&DD 2012). Commercial logging has remained a major source of income for the Government of AJK since 1947. The income from forests was estimated to be 225 million rupees in 2005-2006. Unfortunately governments could not develop other more viable sources of income such as industry, hydroelectric generation, minerals, sericulture, apiculture, and tourism. Uncontrolled grazing, commercial logging by the government, local use of trees for firewood and construction, and encroachment on forest land by locals for cultivation and construction of houses played havoc with forests (Bloesch *et al*. 2005).

The rate of deforestation has been alarmingly high since 1980s. According to Iqbal (2010) about 5% forest of AJK has been lost in only two decades (1990s-2000s), however an IUCN study (IUCN 2006) reveals a decrease of 8% in just seven years (between 1997-2003). The main forests of AJK were located in the areas affected by the earthquake of October 2005, where massive deforestation has been going on for many decades. The control of the Forest Department has weakened over time due to corruption, inefficiency, political interference, population pressure, and cross border firing along the Line of Control (where most of the forests are located). The environmental impacts of deforestation were aggravated by the infrastructure development policy of the government. Extensive road construction has been one of the top priorities of the successive governments in AJK *"…..since at the time of liberation physical and social infrastructure was almost non-existent, the efforts over the decades, were focused on building the requisite infrastructure and priority was assigned to Transport & Communication and*

Education sectors and major portions of development funds and revenue budget were allocated to these sectors" (P&DD 2015). Table 5.2 shows the increase in road infrastructure since 1947.

Table 5.2 Length of roads in AJK between 1947 and 2006.

Type/year	1947	2006
Metalled	100	4852
Fair-weather	165	6116
Total	265	10968
Density (KM/KM^2)	0.008	0.41

(Source: P&DD 2015).

There has been a more than 4,000% increase in road length in less than 50 years (the real boom in infrastructure development started in 1980s). 55% of the total roads in AJK comprise of fair weather or dirt roads (P&DD 2015). These dirt roads are severely damaging for mountainous areas and a main reason of landslides. Such a huge increase in road infrastructure was bound to have adverse impacts on landscape. The roads are constructed at a very low cost to save money and even out of that low cost 15-20% money goes to corruption (personal communication with a former Chief Engineer). There has also been tendency to construct low cost roads for localities at steep slopes (Figure 5.18) which make already vulnerable areas even more vulnerable to landslides. A former Prime Minister of AJK reported that roads were constructed on steep mountain slopes with minimum costs, thus compromising the stability of the mountains. He said that roads were constructed under *"political pressure"* without any proper planning. The same view was shared by a high ranking official of a multilateral development bank, which has been doing huge investments in AJK. He was of the opinion that the overall land management and land use planning and control in AJK has been faulty: *"even in your public sector infrastructure development practices you don't respect your mountains"*. Construction of roads is still a priority of the government; 45% of the total development budget of AJK for the year 2014-15 has been allocated for the Communication & Works Department (P&DD 2015).

The role of poverty in creating vulnerability in AJK has been discussed in Section 5.4.4. The responsibility of the government in the economic uplift of the people in under-developed areas like AJK cannot be overemphasised. Income generation and diversification of livelihoods should have been included in the top priorities of the government because AJK has a weak economic base due to limited agricultural potential and absence of industry. Unfortunately governments could not do much to improve the economic condition of the people. Of late the government admitted this fact; *"until recently centralized Planning & Development has been the mainstay of Public Sector Development Plans but it has been observed that the rate at which benefits of development initiatives trickled down to grass root level was dismal"* (P&DD 2015).

Sustainable economic development has not been the priority of successive governments. Most of the resources were being spent on non-development expenditure. In the financial year 2005-2006, a 72% share of the budget was allocated for non-development expenditure. The remaining 28% budget mainly went on infrastructure development; there was hardly any allocation for livelihoods/income generation. Disaster and development approach, one of the two main theoretical basis of this study (Pressure and Release Model being the other) should have been the mainstay of the development paradigm of the Government of AJK. This approach emphasises that 'disasters can be significantly reduced through social, economic or environmentally governed early warning, conflict resolution and sustainable development initiatives' (Collins 2009, p. 32) in that appropriate development 'acts as a counterforce to disaster' and adverse impacts of development can be 'moderated' (ibid, p. 60). A former Prime Minister of AJK very candidly admitted during an interview that little has been done to improve and diversify the livelihoods of the people and creating economic opportunities by making policies for the development of agriculture, industries, tourism, and services sector. The economic pattern was such that there was a disparity between the rich and the poor; the rich were getting richer and the poor poorer. I specifically discussed this issue during my second fieldwork period with a former Secretary of the Planning and Development Department in

Government of AJK. He said *“the action and inaction in development work is also important to determine the vulnerability of the people; what development actions resulted in what results and what actions the government did not take which were necessary to reduce vulnerability…………The development in AJK has been infrastructure development focused; it did not focus on economic and social development. People’s livelihoods have not been the priority of the development; one jolt of the earthquake exposed everything*”. Collins (2009) has put forwarded almost the same premise and says that ‘disasters can be caused by multiple aspects of development’ and have environmental, social and economic origins ‘which may be dependent upon actions at institutional, community and individual levels’ (p. 84).

A lack of voice at local level (Wisner et al. 2004, p. 51) was one of the factors that peoples’ problems remained unattended in rural areas and they migrated to urban areas in search of better civic amenities (Section 5.4.4). There have been hardly any local government elections in AJK since 1947. Incidentally the only local bodies’ elections that I remember were held by a military dictator in early 1980s, whereas the politically elected governments have always tried to avoid elections. In fact the Members of the Legislative Assembly (MLAs) take the local government institutions as their rivals because all the development work is controlled by these MLAs. Development schemes are prepared on the recommendation of the MLAs (sometimes the development funds are also spent through them). So in order to keep their constituencies secure they do not let the local level institutions grow. For these MLAs, even minor development schemes, such as small village level water supply schemes, construction of dirt roads, schools, Basic Health Units, and provision of electricity are their exclusive domain, of course apart from legislation.

Results and analysis presented demonstrate that the development policies of the government created disaster vulnerability in the area and resulted in huge losses in 2005 earthquake. The geological vulnerability (which is not a direct result of the development policies) could have been addressed had the government been responsible enough to know what kind of hazards existed in the area and had made disaster mitigation part of the development policies. The physical vulnerability, the environmental vulnerability, and the socio-economic vulnerability were the direct outcome of the decades' of infrastructure-development-centric development policies which ignored socio-economic and livelihoods development and disaster mitigation. The responsibility of the rule of law and good governance, which have cyclical relation with development and susceptibility to disaster, again rests with the government.

Bilham (2009, p. 880) has also warned of earthquake related '*mega-death-toll'* in developing countries due to human settlements on hazardous locations. El Masri & Tipple (2002, p. 164-170) also highlight the risks involved in construction on hazardous sites and suggest that encroachment onto hazardous sites should be contained by the local authorities. Bilham (2012, p.1) identifies poverty, corruption, and ignorance as possible causes of non-observance of building codes in developing countries. Ambraseys & Bilham (2011) and Bilham & Gaur (2013) find direct relationship between corruption of government authorities and earthquake related deaths (Figure 5.19).

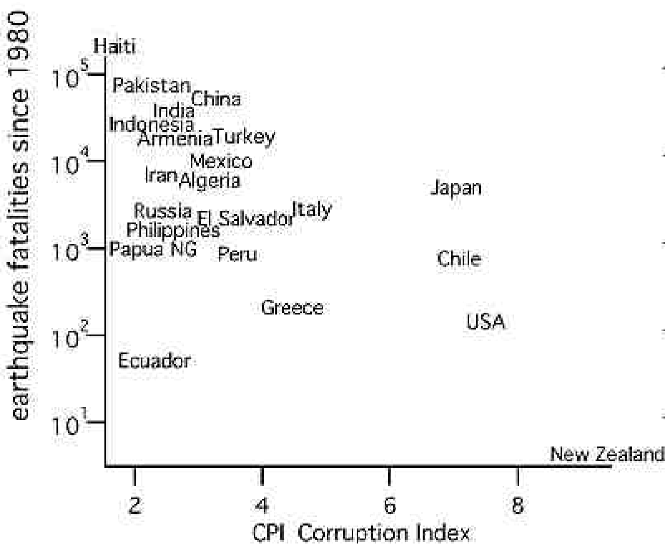


Figure 5.19 Cumulative death toll (DRE) caused by earthquakes in the period 1980-2010 as a function of corruption Index. (*Source*: Ambraseys & Bilham 2011, p. 8).

Pakistan is one of the countries which have highest CPI (Corruption Perceptions Index) and highest earthquake deaths, only after Haiti (*ibid*). It is my personal observation as well that illegal construction on hazardous locations in the study area is facilitated by the corrupt staff of the Municipal authorities (who are responsible for building control) and the Revenue Department (custodian of the government lands) in return for personal gratification. Ferreira *et al*. (2011) also observe that democratic accountability and lower level of corruption reduce the disaster mortality rate.

5.6. Summary

In this chapter I have identified how the relationship between disaster, vulnerability, and development worked in AJK and how the disaster vulnerability has resulted in wide spread damage to housing stock. I have tried to explain how the theoretical approach (i.e. Collins (2009) 'disaster and development approach' and Wisner *et al*. s' (2004) PAR model) discussed in Chapter 3 fit into the context of AJK. Construction typology prevalent before 2005 earthquake and the main factors for adopting it, the vulnerability of the housing stock in the study area, and how the development policies of the Government of AJK passively helped in creating these vulnerabilities have all been discussed.

The construction typology of the study area was a mixture of four different types, *kacha, pukka,* wood houses, and *Dhajji-dewari*. The majority of the houses (57%) in the earthquake affected areas were *kacha*; however in four rural Union Councils, where I conducted my fieldwork, 70%-80% houses were *kacha.* The reasons for adopting this type of construction were low cost (because locally available mud, stones, and wood were used with minimal engineering input) and climate (because these houses had better thermal qualities for harsh climate of these areas. The second major construction type was *pukka* (37%). This type of construction was more prevalent in urban areas where 73% houses were *pukka.* Major reasons of adopting this construction typology were improvement in the incomes of the people, improvement in road network, easy availability of modern construction materials, limited land in urban areas which required multi storey buildings, and status attached with this type of construction due to higher cost as compared to *kacha* structures. Wood houses and *Dhajji-dewari* were the two traditional construction types which were more frequently found in Leepa

Valley, Neelum Valley and in remote areas of District Bagh. The abundance of wood and past seismic activity were the main factors for adopting this type of construction because both these construction types have excellent seismic resistance and survived the 2005 earthquake.

Much of the housing stock (87%) in the study area was destroyed in 2005 earthquake. In some areas the entire housing stock was destroyed. I have identified four types of vulnerability which were responsible for this wide spread damage; geological vulnerability, physical vulnerability, environmental vulnerability, and socio-economic vulnerability. While discussing this section I have frequently referred to Collins (2009) and Wisner *et al*. s' PAR model and have tried to explain how this model fits into the context of the study area. The study area is situated in a seismically active zone. Proximity to epicentre, shallow depth, and steep hilly geomorphology were the main features of the geological vulnerability. Poor quality construction was the main feature of physical vulnerability. Based on my research, I have identified lack of knowledge of seismic hazard, *kacha* construction, poor quality construction, lack of building control mechanisms, and marginal locations as main reasons of the vulnerability of the building stock. In case of environmental vulnerability, I have identified deforestation and excessive road construction activities as the main reasons of generating landslides which contributed towards damage to the housing stock at local level. As regards socio-economic vulnerability, poverty was the main reason for poor quality construction and construction on steep slopes and marginal lands. Internal migration due to poverty, geopolitical situation, and lack of civic facilities in rural areas forced people to migrate to urban areas but they ended up living at vulnerable locations.

While discussing the relationship between development and vulnerability I have built my argument on Collins (2009) 'disaster and development approach' in that the development policies of the Government of AJK have ultimately contributed towards creating mentioned vulnerabilities. I have argued that although the geological vulnerability was not a direct outcome of the government's development policies, this vulnerability could have been reduced to a great extent had the governments invested in disaster mitigation. As regards physical vulnerability, the governments have not been able to uplift the economic conditions of the people so that the *kacha* construction and poor quality construction could have been avoided. I have also argued that development is a holistic term which encompasses sustainable and equitable economic development, sustainable infrastructure development, social protection, disaster mitigation and good governance as well. The governance has been relatively weak in AJK so there was lack of building control mechanism which resulted in poor quality construction. The over emphasis of the government on road infrastructure development and deforestation had contributed towards environmental vulnerability.

CHAPTER 6: POST-2005 EARTHQUAKE RECONSTRUCTION IN AJK

6.1. Introduction

This chapter deals with the housing reconstruction programme which was started by the Government of Pakistan in 2006 in the aftermath of 2005 earthquake. In previous chapters, I have explored the nature of the vulnerability of the built environment in AJK at the time of the earthquake and the level of the damage caused by the earthquake; the social element of the vulnerability will be discussed in this chapter. Here I focus on the following research question:

> *"How successfully has the Government of Pakistan implemented the housing reconstruction policy in the aftermath of the 2005 earthquake and is the characterization of this policy successful in the geography, economics and social contexts?"*

In this chapter, I have explored the progress of the housing reconstruction programme in three contexts (*Figure 6.1*). The first is the geographical context which looks into the progress in rural and urban settings in districts Bagh and Muzaffarabad (in four different Union Councils within the rural settings and two cities of Bagh and Muzaffarabad). The second is the economic context in which I will investigate the progress across different income groups in the study area. The third is the social context which mainly focuses on gender. Other themes mentioned in the triangle of Figure 6.1 i.e. sustainability, vulnerability, and family system and landownership pattern are discussed in Chapter 7.

6.2. Post-earthquake Housing Reconstruction

> *"The overall objective of the rural housing reconstruction policy is to ensure that an estimated 400,000 houses that were either destroyed or damaged, will be rebuilt by using earthquake resistant building techniques, through grant assistance from the Government to eligible households"* (ERRA 2006, p. 3)

The housing reconstruction programme was started by the Government of Pakistan with the above objective in 2006 in the rural areas of the earthquake affected districts. Section 6.2.1 of this chapter discusses the overall progress of the housing reconstruction programme at the level of AJK using secondary data from the State Earthquake Reconstruction and Rehabilitation Authority (SERRA) and the ERRA, grey literature, and primary qualitative data from Key Informant interviews. Sections 6.2.2, 6.2.3., and 6.2.4 are based on primary data (both quantitative and qualitative).

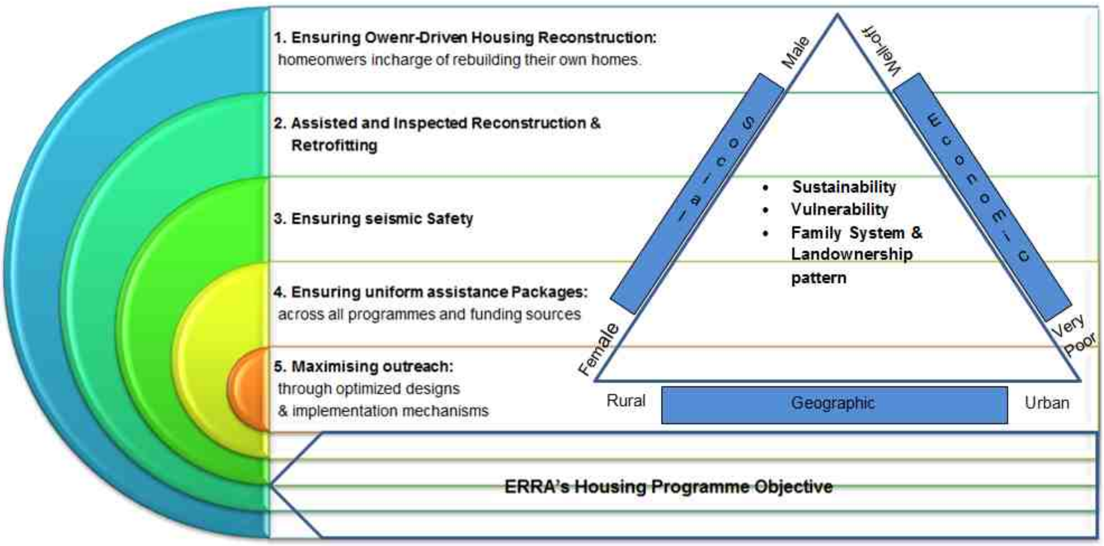


Figure 6.1 Evaluation of the housing reconstruction progress in different contexts.

6.2.1. Progress of the Housing Reconstruction Programme

According to the ERRA 419,624 damaged houses (96% of the damaged houses) had been reconstructed in the earthquake affected areas of AJK and KPK by 1st October, 2013 (Table 1). The ERRA has disbursed PKR 71.89 billion as Housing Cash Grants in the earthquake affected areas (ERRA 2011$_{a}$). Over 2.74 million (93%) displaced people had moved into their homes as a result of the funding (ERRA 2010; www.erra.gov.pk). The ERRA also claims that 96% of the reconstructed houses meet earthquake resistant standards (EERA 2011$_{a}$). The Government of Pakistan's housing reconstruction programme has been widely acclaimed as a successful experience (ADB 2011; Davis 2010; ERRA 2011$_{a}$; Qazi 2008; Stephenson 2008; UN-Habitat 2009; UN-Habitat 2011; World Bank 2010, 2011) and the

UN presented the Sasakawa Award for Disaster Reduction to ERRA in 2011 (www.erra.gov.pk).

Table 6.1 Housing reconstruction progress.

	Status	%
Construction Completed	419,624	96.14
Under Construction	16,862	3.86
No work started at all	26,757	5.16
Total	**436,486**	

(Source: ERRA 2014)

Although the figures from the ERRA show that 96% of houses have been reconstructed, the way in which houses are deemed to be rebuilt warrants more detailed investigation. The ERRA authorities consider a house as completed when the fourth (last) instalment of the housing subsidy was paid to the household. The fourth instalment was payable to those house owners who had constructed their house up to the lintel level and the AI Team had declared it compliant with the ERRA specifications. The fourth instalment was given to construct the roof and complete the house. Hence it was assumed that the house owner must have completed the house after getting the fourth and last instalment; however there was no mechanism for verifying this on the ground. Key Informant-17 and 21 were of the opinion that the ERRA's claim of progress was contestable for this reason and argued that the government's figure for completed houses was not based on actual ground verification but on the basis of the last tranche of the housing subsidy.

During my fieldwork I interviewed many key informants (those people who had been associated with the 2005 earthquake and recovery programme afterwards) to assess their understanding of the housing reconstruction progress. According to Ex-Deputy Chairman ERRA, Lt. General Nadeem Ahmed, 611,000 houses have been reconstructed in three years. A former Programme Manager (Housing) ERRA said that his *"hunch"* was that 90% houses have been reconstructed. Two Key Informants, who belonged to the World Bank and the Asian Development Bank (the two major donors of the rural housing reconstruction programme), were satisfied with the progress of the housing reconstruction in the earthquake affected areas.

Though 96% of houses being reconstructed the fact remains that no work has started on 26,757 houses and a further 16,862 houses were still under-construction. In spite of my best efforts I could not get rural Union Council and urban areas data of the reconstruction status directly from the ERRA. Though I personally knew the Director General (Housing) ERRA and contacted him many times, I couldn't get access to the ERRA Headquarters to get these data in spite of his promises. Therefore I am unable to comment on how the reconstruction programme has performed in different geographical contexts (e.g. in AJK and rural/urban settings) because the published reports of the ERRA do not reflect these details.

However, I can analyse the progress made in AJK with more confidence because I did collect the necessary data from the SERRA, which was extremely cooperative in providing all the requested data. This cooperation was probably due to my positionality and my long association with this organization (which also includes heading the SERRA for more than a year). The data of 314,474 damaged houses was acquired. Analysis of these data shows that 314,474 houses were paid the 1st instalment of PKR 25,000. The 2nd instalment was paid to 307,494 (100%) houses, which included the partially damaged houses as well. 273,151 totally damage houses were finalized for the 3rd and 4th instalments. Thus 273,151 totally damaged houses were to be reconstructed and 34,343 partially houses were to be repaired in AJK. The repair/retrofitting status of 34,343 partially damaged houses is not available in the SERRA. As regards the reconstruction status of 273,151 fully damaged houses, the analysis of the SERRA data shows that 199,906 (70%) houses have been reconstructed (Figure 6.2). However, the SERRA website states (www.serra.gov.pk, 19.07.2013) that 266,325 (86%) fully damaged houses have been paid the 4th (final) instalment. The status of 73,245 houses (273,151 fully damaged houses - 199,906 reconstructed houses) is not available with the SERRA.


(a)


(b)


(c)

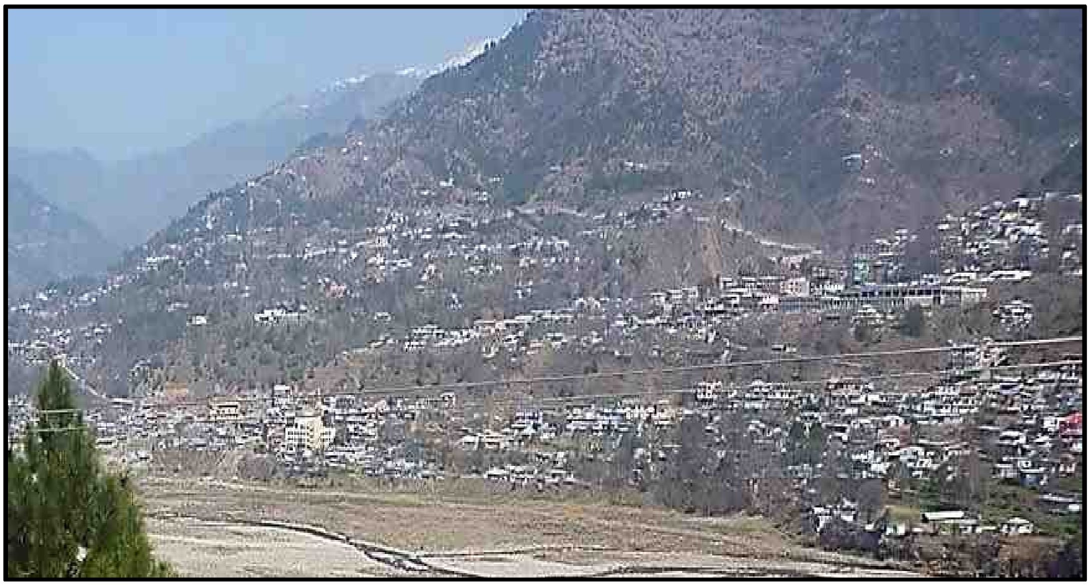

(d)

Figure 6.2 Housing reconstruction in different areas: Muzaffarabad rural (a), Bagh rural (b), Muzaffarabad urban (c), and Bagh urban (d). (Source: Author fieldwork)

Many key informants were interviewed in AJK about the housing reconstruction programme. There is a wide gap in the assessment of different key informants, for example Key Informant 15 and 16 said that 50% houses have been rebuilt, whereas Key Informant 2, 8, 22 and 31 quoted the figure of 85%-95%. A former Director General/Secretary of the SERRA was of the opinion that progress has been more than 100% in rural areas.

> *"This success is in the rural areas only that the grant money was converted into housing. As I mentioned earlier it went beyond 100%."*

A former Programme Manager (Housing) of the SERRA put the figure at 170%.

> *"I think as compared to pre-earthquake, 170% houses have been reconstructed. 170% because……..…………I will give you an example that the Electricity Department has submitted a claim with us which shows that only in the earthquake affected areas 125,000 new electricity connections have been installed".*

Some house owners were also asked the similar question. 5 house owners out of 40 put the figure of housing reconstruction between 70%-90%.

The above discussion demonstrates that there is a considerable gap between the official data and opinions of the Key Informants and house owners. My quantitative data of 200 houses collected from six different locations (four rural and two urban) also indicates this gap. Survey questionnaires were used to collect these data during fieldwork. SPSS was used to assess the progress of housing reconstruction. The results generated through SPSS show that 78.5% of the 200 visited houses have been reconstructed. The overall housing reconstruction progress is lesser than the amount of Housing Cash Grant disbursed by the government. According to the SERRA, 98% of the affected people (both in rural and urban areas) have been given the fourth and last tranche of the cash grant. This difference between the percentage of housing cash grants disbursed and the percentage of reconstructed houses indicates the gap between disbursement of the grant and the actual reconstruction on ground.

6.2.2. Progress in a Geographical Context

Urban rural differences in post-disaster recovery, especially housing reconstruction, have not been a focus of research (Nigg 1995). The reason for the lack of this type of research is the use of single case study method in disaster studies (*ibid*). The post-2005 earthquake housing reconstruction programme was designed to achieve the aim of reconstruction of all houses damaged by the earthquake in both urban as well as rural areas with equal success. The ERRA reports do not mention anything about difference of housing reconstruction progress in rural versus urban settings. However my own experience of living in the earthquake affected areas, working in the reconstruction programme, and review of some of the literature on post-2005 earthquake housing reconstruction provides a different view point, that reconstruction progressed differently in rural versus urban areas (Davis 2010b; ICIMOD 2012; Qazi 2008).

The data of 307,494 houses, acquired from the SERRA, was analysed to work out the housing reconstruction progress in a geographical context. The analysis of these data shows that 7,919 houses were fully damaged in Muzaffarabad and Bagh cities out of which 7,703 (97%) houses have been reconstructed. The urban area house owners were paid the whole amount of housing subsidy in two instalments without any condition of construction (contrary to rural areas where the money was paid in four instalments after inspection of construction status). The SERRA is not supposed to have the construction status of houses in urban areas, but it does have these data. Municipal Corporations of these cities, which give the planning permission in urban areas, are the most relevant authorities to give the exact number of reconstructed houses. The data of the Municipal Corporation Muzaffarabad, acquired during meetings with the staff, demonstrates that 517 residential and 13 mixed construction (residential/commercial) planning permissions have been issued since 2008. Thus, only 7% of houses have been reconstructed in urban Muzaffarabad (as opposed to the SERRA figure of 97%) or the remaining houses have been reconstructed without any planning permission.

Similarly, in contrast to the above mentioned official figures, my research finds a different picture on ground. My Survey Questionnaire data is the basis of this finding. SPSS was used to analyse the survey questionnaire data and assess the progress of the housing reconstruction programme across different geographical settings. This test was conducted on the following hypothesis:

H_0: There is no relationship between geographical setting and progress of housing reconstruction

H_1: There is relationship between geographical setting and progress of housing reconstruction

Table 6.2 presents the cross tabulation of the housing reconstruction progress. The expected count of constructed housing in rural areas is 78.5% but the actual count is 94%, which means more houses have been constructed in rural areas than expected. On the other hand, the expected count of constructed houses in urban areas is 78.5% but the actual count is 63%, meaning thereby considerably fewer houses have been constructed in urban areas than expected.

Table 6.2 Cross tabulation of reconstruction status.

			Location		Total
			Rural	Urban	
Construction Status	**Constructed**	Count	94	63	157
		Expected Count	78.5	78.5	157.0
		% within Location	94.0%	63.0%	78.5%
	Not Constructed	Count	3	21	24
		Expected Count	12.0	12.0	24.0
		% within Location	3.0%	21.0%	12.0%
	Incomplete	Count	3	14	17
		Expected Count	8.5	8.5	17.0
		% within Location	3.0%	14.0%	8.5%
	Repaired	Count	0	1	1
		Expected Count	.5	.5	1.0
		% within Location	0.0%	1.0%	0.5%
	Under Repair	Count	0	1	1
		Expected Count	.5	.5	1.0
		% within Location	0.0%	1.0%	0.5%
	Total	Count	100	100	200
		Expected Count	100.0	100.0	200.0
		% within Location	100.0%	100.0%	100.0%

A Chi-square test was also conducted to determine the significance of association between these two variables (Table 6.3). If the observed counts are different from the expected counts, the Chi-Square Test helps determine if the observed counts are different enough for the test to be significant for the association to accept or reject the hypothesis.

Table 6.3 Chi-Square Tests, 4 cells (40.0%) have expected count less than 5. The minimum expected count is .50.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	28.739[a]	4	.000
Likelihood Ratio	31.843	4	.000
Linear-by-Linear Association	22.925	1	.000
N of Valid Cases	200		

In the above table, Pearson Chi-square value is important. The Pearson Chi-square tests the hypothesis that the row and column variables in the table are independent. The lower the "Asymp. Sig." value, the less likely it is that these two variables are independent and would cause the rejection of the Null Hypothesis of "no relationship". The output of .000 suggests that geographical setting and housing reconstruction rate are related (i.e., they are dependent) since the significance of the Pearson Chi-Square test is below usual cut-off point of 0.05 (or sometimes 0.10). Thus there is enough evidence to reject the Null Hypothesis and therefore, must assume dependence/association. The assumption for bigger than 2x2 tables is that the expected count is not less than 5 or 20% of the cells have expected count of >5. In this particular case the expected count is 40% so the assumption has been violated. In case of violation of assumption, we need to look at the “Likelihood Ratio”. The Likelihood Ratio test rejects the null hypothesis if the value of this statistic is too small. Since the value of Likelihood Ratio is .000, we reject the Null Hypothesis.

However, the chi-square does not give us any information how the variables are related or how strong the relationship is. Hence Cramer's V test was used because it is a post-test to give additional information (Table 6.4).

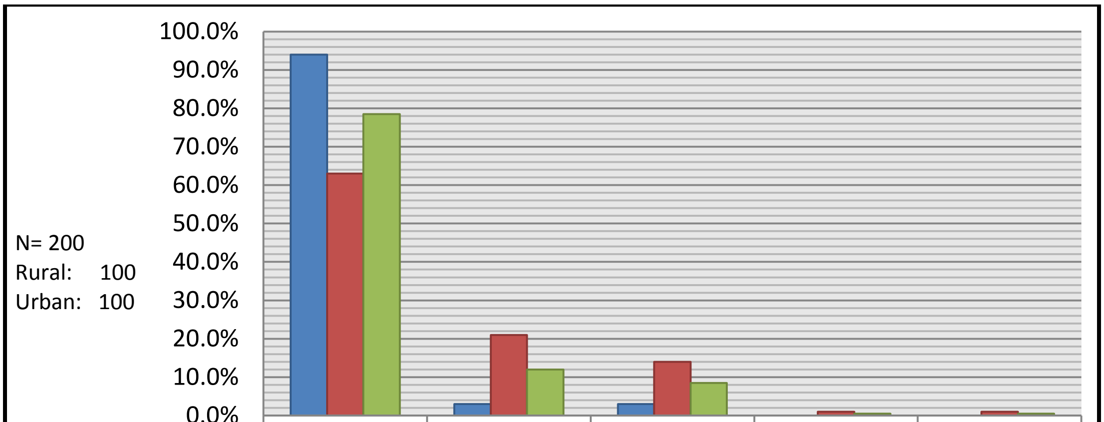
Table 6.4 Results of Cramer's V test.

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

		Value	Approx. Sig.
Nominal by Nominal	Phi	.379	.000
	Cramer's V	.379	.000
N of Valid Cases		200	

Cramer's V varies between 0 and 1. A value of 0.02 or less would be a weak relationship, between 0.2 and 0.3 a moderate relationship and above 0.3 would be a strong relationship. In other words, the closer the outcome is to 0 the weaker the association is between variables; and the closer it is to 1, the stronger the association is. In this particular case the Approximate Significance is closer to zero (0.000) so the significance of association or relationship is weak.

Based on the results of the cross tabulation table above, a bar chart was generated (Figure 6.3) which depicts the housing reconstruction progress in rural versus urban settings.



	Constructed	Not Constructed	Incomplete	Repaired	Under Repair
Rural	94.0%	3.0%	3.0%	0.0%	0.0%
Urban	63.0%	21.0%	14.0%	1.0%	1.0%
Overall	78.5%	12.0%	8.5%	0.5%	0.5%

Figure 6.3 Housing reconstruction progress in geographical settings.
(Based on cross tabulation of the survey questionnaire data)

Figure 6.3 demonstrates a marked difference of housing reconstruction progress between rural and urban settings. In rural areas, 94% houses have been constructed; whereas, in urban areas only 63% houses have been reconstructed. In rural areas the mean travel time from road to the household is 22 minutes and the minimum-maximum travel time is 0-180 minutes. In urban areas the mean travel time is 7 minutes and the minimum-maximum travel time is 0-16 minutes. The study areas in rural settings are between two and five hours away from urban Bagh and Muzaffarabad. The construction materials are difficult to transport to the rural areas, sometimes being carried on worker's heads, which increases the cost many fold. Skilled labour is also very difficult to come by and expensive in these rural areas but despite all these difficulties the rural households showed better reconstruction progress (than urban areas).

Slow housing reconstruction in urban areas is still an important issue. The aim of the ERRA's Urban Development Strategy was *"to provide a comprehensive and holistic approach for the reconstruction and rehabilitation of the urban areas affected by the October 8, 2005 earthquake, to ensure a higher level of quality, functionality, and enhanced social services delivery that existed before the earthquake"* (ERRA 2007, pp. 12). The general impression is that this aim has not been achieved significantly in urban areas even eight years after the earthquake. According to some studies (See, for example, ICIMOD 2012; Qazi 2008) sufficient attention has not been paid by the ERRA to the reconstruction and rehabilitation of Muzaffarabad. This finding is different from the one made by Nigg (1995) who found that after 2004 Tsunami the reconstruction authorities were more focused on main cities such as Banda Aceh, Meulaboh, Calang, and Lokseumaweh ignoring rural areas.

Some Key Informants were interviewed to expound their understanding of the situation. Most Key Informants agreed that there was a difference of progress between urban and rural areas and that the urban areas lagged behind in housing reconstruction. A former Director General of the SERRA was very candid about housing reconstruction progress in rural/urban settings and gave the following opinion:

“I will like to say one thing in clear terms that the impact and the meaningfulness of the private housing programme is not in the urban areas at all. The total and only impact of the private housing programme in the urban areas is that 175,000 rupees were paid to the house owner. Was that money converted into housing “No”; and into safe housing “No”; it was not even converted into housing.”

6.2.2.1. Reasons of Slow Housing Reconstruction Progress in Urban Areas

The following reasons were identified as a result of empirical research in the field, mainly consisting of discussions with different stakeholders, interviews with key informants and house owners, focus group discussions, and combined with my own experience of the reconstruction programme.

a. Reconstruction Started Later in Urban Areas

The housing reconstruction programme started very late in urban areas due to planning issues. Despite the ERRA’s Urban Housing Strategy being founded on the basic principles of the Rural Housing Strategy, in urban areas the construction of houses was not allowed until the development of urban infrastructure under the City Development Project was completed and planning permission from the concerned city authorities was acquired (Davis 2010b; ERRA 2007).

Table 6.5 shows the number of activities/stages involved before the actual housing reconstruction was allowed by the city authorities. These activities are not necessarily sequential; some of them could be overlapped with others.

Stage 1 (Rubble removal) was technically not part of reconstruction activity, however it was necessary to remove rubble on mass scale before initiating reconstruction in cities because the volume of rubble was too much for individuals to handle. Contracts were awarded to different firms to remove debris; the whole process took many months to complete. Stage 2 (Creation of a hazard map) provided technical basis for creating the zoning map and zoning code to accurately delineate boundaries and quantify the magnitude of hazard which the city is likely to face in future.

Table 6.5 Activities/stages involved in urban reconstruction.

Stage	Activity
1	Rubble removal
2	Creation of a hazard map
3	Conduct a building damage assessment survey
4	Adoption of a zoning map and zoning code
5	Adoption of a building code
6	Determine new land areas needed to contain the city
7	Develop a final damage definition (damaged areas) and site status (non-damaged areas) of the city
8	Determine the shared vision of what the rebuilt city should look like in future.
9	Create the basic land use plan for the rebuilt city
10	Create the component attributes (sector definitions) for the rebuilt city
11	Integrate into the physical redevelopment infrastructure of the town plan the social infrastructure attributes.
12	Create the final town plan
13	Create the Master Plan implementation strategy
14	Create the local means to implement the Town Plan
15	Acquire requisite land interests
16	Provide Medium Term Housing to affected Population
17	Implement the town plan
18	Conduct evaluation, monitoring and readjustment activities to keep the town plan on track.

(Source: developed by the author from the Urban Housing Strategy)

Stage 3 (Conduct a building damage assessment survey) was meant to acquire initial base-line data and provide basis for dealing with transitional shelters and other temporary building needs. Stage 4 (Adoption of a zoning map and zoning code) is the basic land use document which delineates what can be built where and to what standard. Stage 5 (Adoption of a building code) this code was adopted at the end of 2006. Stage 6 (Determine new land areas needed to contain the city) additional land was needed in some cities to accommodate the population needs. The new land needed to be identified before the city Master Planning started. Stage 7 (Develop a final damage definition (damaged areas) and site status (non-damaged areas) of the city) was meant to set the base line and strategically define the starting point of the reconstruction process. Stage 8 (Determine the shared vision of what the rebuilt city should look like in future) this was a consultative process which involved many stakeholders. Stage 9 (Create the basic land use plan for the rebuilt city) this plan defines the organization and layout of the reconstructed city; no construction could be started before the land use plan was approved. Stage 10 (Create the component attributes (sector definitions) for the rebuilt city) is where sub-plans were fitted into the total Town Plan. Stage 11 (Integrate into the physical redevelopment infrastructure of the town plan the social infrastructure attributes) this activity was at the ERRA level. Stage 12 (Create the final Town Plan) the Town Plan defines the structure, design, character and attributes of the city for the next 20-30 years and policies and procedures for getting there. The master plans for Muzaffarabad and Bagh cities were approved at the end of 2007. Stage 13 (Create the Master Plan implementation strategy) this is a detailed implementation strategy for turning the town plan into reality. Stage 14 (Create the local means to implement the Town Plan) involved capacity building of the Development Authorities to implement the Master Plans. Stage 15 (Acquire requisite land interests) this stage involved land acquisition for city development projects. Though important for reconstruction of the city, this activity didn’t directly impact the housing reconstruction. Stage 16 (Provide Medium Term Housing to affected Population) prefabricated houses were provided to house owners in Muzaffarabad and Bagh city to resolve their difficulties arising due to late start of reconstruction work. Stage 17 (Implement the town plan) all stages before this point are preparation for the rebuilding encompassed in the implementation. It involved construction of the sub projects. Construction of some projects such as widening of roads and streets and laying of sewerage and water supply network had direct impact on housing reconstruction.

The authorities did allow reconstruction in certain areas after the completion of stage 12 (Implement the town plan) but it took more than two years to reach this stage. In case of Muzaffarabad City, there were plans to shift certain population of the city to newly planned satellite towns many kilometres out of the city, but the construction of these satellite towns was not possible quickly enough; these satellite towns still remain incomplete and no one has shifted to these towns so far. The old part of Muzaffarabad City had very narrow streets which became the major cause of loss to life and property; the authorities decided to plan wider streets for the future (Schild 2015). People were asked not to start reconstruction of their houses until the new Master Plan was finalised. As mentioned above, this stage took a couple of years to reach. Such reasoning and planning confused people and negatively impacted on the pace of housing reconstruction.

Different Key Informants and house owners shared their views in following words:

> *"I think that urban areas had their own chronic issues which wasted a lot of our time in issues like Microzonation, seismic fault line mapping, land acquisition, master planning etc. So I think we got too much involved in technicalities and politics; that's what I think".* (Key Informant-2)
>
> *"The urban area people remained uncertain for a long time due to the unclear policy of the government".* (Key Informant-18)
>
> *"Construction of houses was also affected due to delay in the Master Planning. Then the plan was to shift many people from different areas of the city elsewhere so the people were uncertain whether to construct the house or not. That's why the progress has been slow in urban areas".* (Key Informant-21)
>
> *"About 95% people have reconstructed their houses in rural areas but due to scarcity of land and change in policies in urban areas the progress is not that good. People are forced to live in the same damaged houses". (A house owner in Bagh City)*

b. Higher Construction Cost in Urban Areas

As explained in earlier chapters, the Housing Cash Grant was uniform for both urban and rural areas and the government had calculated that this amount of money was enough for a certain size of house. However, the affected people felt that this money was not enough to construct a seismic resistant house according to the ERRA specifications. 200 house owners were asked through survey questionnaire whether the government money was enough for reconstruction; 91% people said that it was not enough and 8% did not reply. People claim that they had to top up from their own resources with an average of PKR 376,264 spent in addition on each house. People of the urban areas claim that keeping in mind the high cost of construction in urban areas, the amount of government's cash grant was not enough. Since, contrary to rural areas, there was no assistance and inspection regime and the cash grant was paid unconditionally in urban areas. This meant that most of the people had spent their funding on day to day needs because of the two year delay in starting the reconstruction. Some interviewees were quite vocal about this situation and explained their feelings in following words:

> *"The biggest injustice the government did was that the urban and rural properties were judged on the same scale. Houses in villages were mostly single storey mud houses, whereas in urban areas a lot of money was spent on the construction of houses. I think the primary beneficiaries of this programme were the people of the rural areas. A revolution did come there in the sense that people got the opportunity that everybody made new houses. I think the earthquake was a blessing in disguise for them".* (Key Informant-18)

> *"A house might be constructed with this money in rural areas but not possible in Muzaffarabad city. This amount is not enough to even construct the plinth of a seismic resistant house. This policy was very good for the rural areas in the sense that people were able to construct their houses quickly".* (Key Informant-13)

> *"Those who had no money they could not construct and are still living in tents. If you go to rural areas you will not find anybody living in tents but you will find many people living in tents in urban areas".* (A house owner in Muzaffarabad city)

People found the proposed earthquake resistant construction techniques devoid from ground realities and financially difficult to follow. Resultantly many people resorted to locally available cheap material and labour and even compromised on quality of construction (Kazmi *et al*. 2010). Although the housing reconstruction subsidy of PKR. 175,000 was far more than ever paid before in any disaster situation, it was substantially lower than required for a 400 Sq. Ft. seismic resistant house as recommended by the ERRA (ADB 2011; Kazmi *et al*. 2012). This posed a big challenge for people to follow the ERRA's specifications. The result was either compromise on quality as explained above or reduction in house size. About 60% of the reconstructed houses were smaller in size than people had before. This shows that people did not have enough financial resources to get the required living space for families (ADB 2012). Similarly people found the remedial measures suggested by the ERRA to make non-compliant houses eligible for the ERRA housing subsidy to be too expensive to follow. For example the ERRA had recommended 8 inch concrete blocks but a large majority of people used 6 inch concrete blocks due to easy availability and low price which were not permissible under the ERRA specification. The ERRA suggested measures like wire-mesh on walls, external seismic bands and corner stitches for reinforcement but people found these solutions prohibitively expensive (Leersum & Arora 2011).

c. Debris Removal

Millions of tons of debris were generated by the fallen buildings in the earthquake, especially in urban areas (ERRA 2015). The issue of debris was not very serious in rural areas because buildings were scattered over a large area and the government policy was to encourage people to recycle the debris and use it in the reconstruction of their houses. In urban areas the debris was an acute problem so the government decided to remove the debris itself in an environmentally friendly way (*ibid*). Millions of rupees were given to the Municipal Corporations for this purpose. However this decision had two impacts; one was that people had to wait for the authorities to come and remove debris which caused delays. The second was that unlike rural areas people could not recycle the material which could have reduced the cost of reconstruction (Focus Group Discussion, Muzaffarabad City). As explained by a key informant:

> *"There were two groups in the society; one that had lots of money and had no problem in hiring engineers, the other was that which did not have enough money and they could not build house with Rs. 150,000 like rural areas…………whereas in rural areas people had salvaged stones, wood, CGI sheets, doors and windows. The rural areas' people could construct with that money but not the urban area people".* (Key Informant-17)

d. Mechanisms for Implementation

The implementation mechanism was different in urban areas. Contrary to rural areas there was no assistance and inspection process for urban areas. House owners in urban areas did not have the facilitation from the ERRA which the rural areas house owners had. Urban households had to get a range of permissions: for example, the construction drawings of the house made by a qualified architect, for which they had to pay a hefty fee; a No Objection Certificate (NOC) form the Development Authority, for which they had to pay fee; and get planning permission from the Municipal Corporation, for which they again had to pay fee. All permissions required working through bureaucratic processes. Whereas, people in rural areas did not have to gain these permissions so there were neither incentives nor sanctions for the urban areas people to spend the government money for the same purpose and in the same manner as the government had intended.

> *"You know what I did with my Rs. 100,000 compensation money? I went to Islamabad and bought movie camera for Rs. 60,000 and a mobile phone for Rs. 40,000 because I knew that Rs. 100,000 was not enough for the construction of my house. What I want to say is what could have I done with that sum of money? That money was simply not enough".* (Key Informant-21)

An ICIMOD (2012) study observes that not enough attention has been paid to the reconstruction and rehabilitation of Muzaffarabad city despite the fact that world had great sympathy with it. The whole reconstruction programme has been narrowed down to a few public projects and these projects too are lingering due to poor decision making and lack of funds. The study fears that it might take a decade for 30,000 people living in temporary places to rebuild their houses because the money given by the government is not enough to build an urban earthquake resistant house and there is lack of technical support as well.

In rural areas, the progress both in performance and in beneficiary acceptance has been higher than in urban areas. Since no planning permission was required in rural areas and mid-course adjustments were also made to allow indigenous construction designs, the performance of ODR was better in rural areas as compared to urban areas which lacked this type of creativity and flexibility. There has been more focus of both authorities and NGOs on rural areas; may be due to enormous size of the damage and the population affected. Qazi (2008, p. 132) has noted a *'rural bias'* amongst the humanitarian community and lack of progress in urban areas resulting in frustration among the affected people of urban areas. Stephenson (2008) has also observed that the urban residents did not have the level of help and support which was available to the rural people.

e. Scarcity of Land

Scarcity of land in urban areas also played a role in the housing reconstruction progress. Availability of land was not a big problem in rural areas and people had the space to remove debris and reconstruct the house, or even constructed more than one house, where previously more than one family shared a house. In contrast, land was too expensive and limited in urban areas so it was not possible for many people to move their temporary shelter elsewhere and reconstruct the house, or even buy a new piece of land for this purpose (Key Informant-9). A Key Informant who, after leaving his earthquake damaged house, is still living in a rented house said:

> *"The price of land in certain parts of the city has increased more than five times since the earthquake so where one would do construction? Even if someone thinks that multi-storey building is a death trap, they have no choice because the land is too costly".* (Key Informant-18)

f. Interim Housing Provision

6,000 prefabricated shelters provided by the ERRA also played their part in delaying the housing reconstruction in urban areas. These shelters were provided to the affected people in the urban areas of Muzaffarabad and Bagh to solve the housing problem until such time as the Master Plan was implemented and people were allowed to start reconstruction of their houses. SIDA and Saudi Government provided 4200 shelters for Muzaffarabad city and 1800 shelters for Bagh city. These shelters comprised of two rooms, a kitchen, and a bathroom (ERRA 2011). Moreover, some other organizations also provided about 300 shelters in the city. About 8,600 houses were destroyed in Muzaffarabad city; the provision of 4,500 shelters solved the housing problem for almost half of the city population (Figure 6.4).

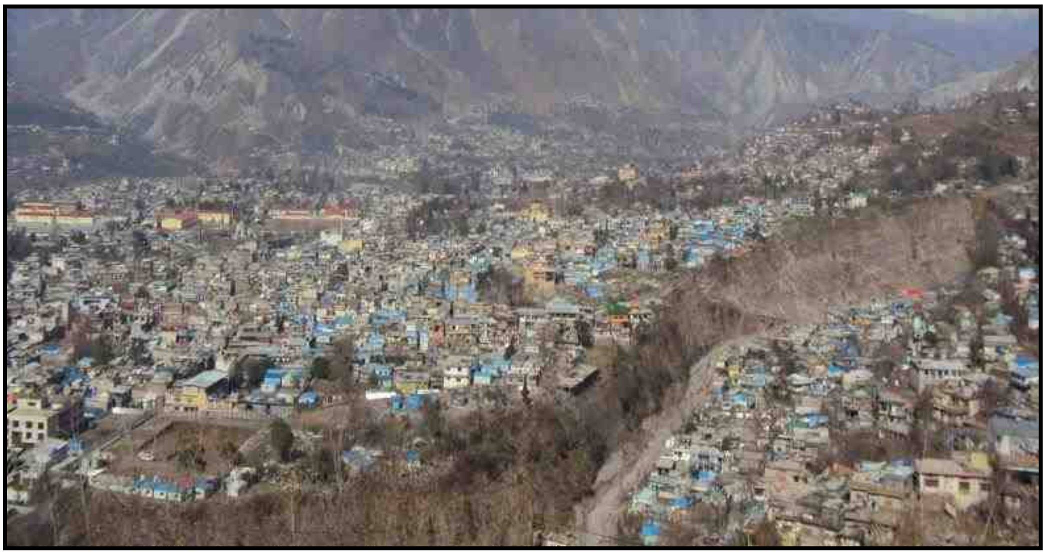


Figure 6.4 Transitional housing (blue structures) in Muzaffarabad city.

(Source: SERRA)

Similarly about 3,000 houses were destroyed in Bagh city and 1800 shelters were provided there. During my fieldwork in Bagh city I noticed that these shelters were still being erected in some areas, nine years after the earthquake. So provision of these pre-fabricated shelters eased the housing problem to some extent (Davis 2010b) and may be people didn't feel as much pressure to reconstruct their houses as much the rural people did.

Key Informant-22, whose house was destroyed in the earthquake in urban Muzaffarabad and who had worked in post-earthquake housing reconstruction programme, was of the opinion that the Saudi and SIDA shelters contributed towards low progress in urban areas because they not only solved the housing problem but also occupied the limited land thus leaving no space for the construction of permanent house. He suggested that either the shelter price or interest free soft loans should have been provided in urban areas. This view is shared by Davis (2006, 2010b) also.

Survey questionnaire data (N=200) also indicated difference of progress not only **between** rural/urban settings but **within** rural/urban settings also. For example, in rural Bagh 96% houses have been reconstructed; on the other hand in rural Muzaffarabad 92% houses have been reconstructed. Though the difference in not much in rural areas this difference is more noticeable in urban areas. For example, in urban Muzaffarabad 80% houses have been reconstructed, whereas in urban Bagh only 46% houses have been reconstructed.

6.2.3. Progress in Economic Context

One aim of my study was to assess how the housing reconstruction programme has performed across different income groups. The SERRA data are not disaggregated according to income groups so it was not possible to work out the housing reconstruction progress from these data. Questionnaires were, therefore, used to gather this information. The data of these survey questionnaires reveals the following composition of income groups (Table 6.6).

Table 6.6 Household financial status.

		Frequency	Percent	Cumulative Percent
Valid	Very Poor	31	15.5	15.5
	Poor	84	42.0	57.5
	Moderate but unstable	63	31.5	89.0
	Moderate and stable	19	9.5	98.5
	Strong	1	.5	99.0
	Well off	2	1.0	100.0
	Total	200	100.0	

According to the ERRA, one of the hallmarks of the Housing Reconstruction Programme was the uniform cash grant package irrespective of the size of the house and the type of construction. The aim was to convert the adversity of the earthquake into an opportunity and help people construct seismically resistant *pukka* houses (Key Informant-1). According to the former Deputy Chairman of ERRA, General Nadeem Ahmed the President of Pakistan, General Pervez Musharraf had instructed him to make the housing reconstruction programme as “pro-poor” as possible. The uniform subsidy package and other assistance measures should have ensured full reconstruction across all income groups.

SPSS was used to analyse the survey questionnaire data and assess the progress of the housing reconstruction programme across different income groups. This test was conducted on the following hypothesis:

H_0: There is no relationship between economic context and progress of housing reconstruction

H_1: There is relationship between economic context and progress of housing reconstruction

Table 6.7 shows the housing reconstruction status across five income groups.

This table presents the cross tabulation of the housing reconstruction progress in economic context. The expected count of constructed houses in case of *“Very Poor”* income group is 22 but the actual count is 12, which is very low. The expected count of Not Constructed houses is 3.4 in case of *“Very Poor”* income group but the actual count is 10, which is quite high. In case of the *“Poor”* income group, the expected count of reconstructed houses is 61.2 but the actual count is 63. Finally, the expected count of Not Reconstructed houses is 9.4, but the actual count is 8; there is not much difference between the expected and the actual count in this case. Three other income groups i.e. *“Moderate and stable”*, *“Strong”*, and *“Well-off”* (which make up 11% (N=22) of the total respondents) had reconstructed their houses and the difference between the expected count and the actual count is on the positive side i.e. more houses reconstructed than expected and less Not Constructed houses than expected.

Table 6.7 Housing reconstruction progress in economic context.

			Pre-EQ HH Financial Status					Total
			Very Poor	Poor	Moderate but unstable	Moderate and stable	Strong	
Construction Status	Constructed	Count	12	63	49	32	1	157
		Expected Count	22.0	61.2	47.1	25.9	.8	157.0
	Not Constructed	Count	10	8	6	0	0	24
		Expected Count	3.4	9.4	7.2	4.0	.1	24.0
	Incomplete	Count	6	6	4	1	0	17
		Expected Count	2.4	6.6	5.1	2.8	.1	17.0
	Repaired	Count	0	1	0	0	0	1
		Expected Count	.1	.4	.3	.2	.0	1.0
	Under Repair	Count	0	0	1	0	0	1
		Expected Count	.1	.4	.3	.2	.0	1.0
Total		Count	28	78	60	33	1	200
		Expected Count	28.0	78.0	60.0	33.0	1.0	200.0

A Chi-square test was also conducted to determine the significance of association between these two variables (Table 6.8).

Table 6.8 Chi-Square Tests a. 17 cells (68.0%) have expected count less than 5. The minimum expected count is .01.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	34.699[a]	16	.004
Likelihood Ratio	34.244	16	.005
Linear-by-Linear Association	12.565	1	.000
N of Valid Cases	200		

In the above table, Pearson Chi-square value is important. The Pearson Chi-square tests the hypothesis that the row and column variables in the table are independent. The lower the "Asymp. Sig." value, the less likely it is that these two variables are independent and would cause the rejection of the Null Hypothesis of "no relationship". The output of .004 suggests that economic context and housing reconstruction rate are related (i.e., they are dependent) since the significance of the Pearson Chi-Square test is below usual cut-off point of 0.05 (or sometimes 0.10). Thus there is enough evidence to reject the Null Hypothesis and therefore, must assume dependence/association. The assumption for bigger than 2x2 tables is that the expected count is not less than 5 or 20% of the cells have expected count of >5. In the case, the expected count is 68% so the assumption has been violated. In case of violation of assumption, we need to look at the “Likelihood Ratio”. The Likelihood Ratio test rejects the null hypothesis if the value of this statistic is too small. Since the value of Likelihood Ratio is .005, we reject the Null Hypothesis.

However, the chi-square does not give us any information how the variables are related or how strong the relationship is. Hence Cramer's V test was used because it is a post-test to give additional information (Table 6.9). The nominal measures of association take values from 0-1; with 0 being no association and 1 being perfect association. Since the p=0.0004 is less than the significance level (p=0.05), there is significant evidence that there is relationship between household financial status and progress of housing reconstruction. These differences are significant (x^2=34.69, df=16, p=0.004).

Though the Chi-square explains the significance of relationship between two variables, it does not say how much significant and important this relationship is. The Cramer's V test was used because it is a post-test to give us this additional information (Table 6.9).

Cramer's V varies between 0 and 1. The closer the outcome is to 0 the weaker the association is between variables; and the closer it is to 1 the stronger the association is. In this particular case the significance of association or relationship is weak.

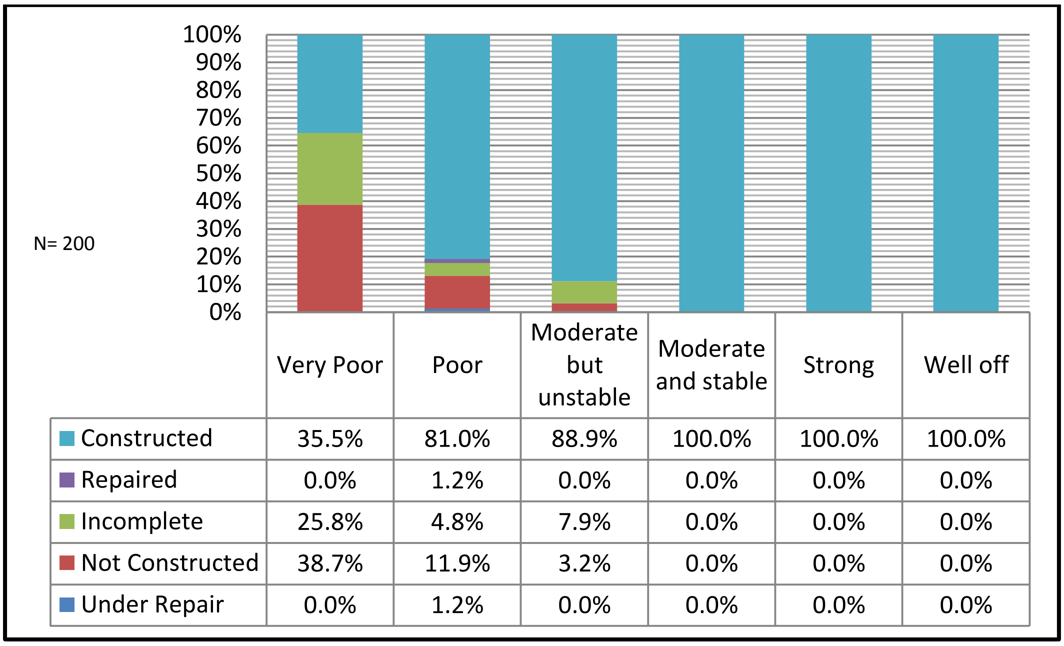
Table 6.9 Symmetric Measures.

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

		Value	Approx. Sig.
Nominal by Nominal	Phi	.417	.004
	Cramer's V	.208	.004
N of Valid Cases		200	

Based on the results of the cross tabulation table above, a bar chart was generated (Figure 6.5) which depicts housing reconstruction progress according to income groups.



	Very Poor	Poor	Moderate but unstable	Moderate and stable	Strong	Well off
Constructed	35.5%	81.0%	88.9%	100.0%	100.0%	100.0%
Repaired	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%
Incomplete	25.8%	4.8%	7.9%	0.0%	0.0%	0.0%
Not Constructed	38.7%	11.9%	3.2%	0.0%	0.0%	0.0%
Under Repair	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%

Figure 6.5 Housing reconstruction progress in economic context.

Figure 6.5 shows that in the “Very Poor” income group only 35% house owners could construct their houses, 38% were *Not Constructed*, and 25% were still incomplete. In the case of the “Poor” income group construction progress was better (81%) and the percentage of *Not Constructed* and *Incomplete* houses was lower (11.9% and 4.8% respectively). With a rise in the income group category the percentage of *Constructed* houses also increased. So it can be concluded that the household financial status did play a role in progress of housing reconstruction despite the fact that a uniform housing subsidy package was given to the house owners by the Government.

One reason for this difference of progress between different income groups could be that the amount of housing cash grant (PKR 175,000) was not enough for the reconstruction of seismically resistant house. 91.5% of the respondents said that the amount of grant was not enough (based on the Survey Questionnaire data).

The second reason could be that those house owners who couldn't reconstruct their houses either did not receive full amount of housing subsidy or did not receive it at all or spent the housing subsidy on other daily necessities. However officials do not agree with the view that the amount of Housing Cash Grant was not enough for the construction of a seismic resistant house. The former Deputy Chairman of the ERRA said in his key informant interview "*we calculated the cost of PKR 175,000 after constructing model houses".* Mr Tahir Shamshad, Vice President NESPAK, told that when they estimated the salvage value of the damaged houses they found that in about 80% cases most of the material could be salvaged. And in their estimate, the housing cash grant of Rs. 175,000 was enough to construct a two room house using this salvaged material. To verify this claim I interviewed a mason Syed Qadir Shah, who has constructed more than 100 houses since the earthquake; he also agreed that the amount of 175,000 rupees was enough for the construction of a 400 Sq. Ft. house in 2006.

The house owners were asked through survey questionnaires how much extra money did they spend on the reconstruction of their house. Table 6.10 shows the average amount (in Pakistani rupees) that each income group spent on the reconstruction of their house.

An interesting point which emerged from this table is that in the case of lower income groups (*Very Poor*, *Poor*, *Moderate but unstable*, and *Moderate and stable*) the maximum amount of money spent on reconstruction of houses is very high as compared to high income groups (*Strong* and *Well-off*). I cannot explain any reason of these extraordinary figures. I asked the respondents of my second fieldwork if they had any explanation of these outliers. All the participants of the three focus group discussion sessions and seven key informants were of the opinion that the reason of high amount in case of very poor category could be that people tend to exaggerate their expenditure to outsiders with the hope that they might get some more money from somewhere. One key informant, who was Director M&E in the SERRA, gave two reasons of exaggerated figure of extra money: poor people wanted to hide their poverty by showing inflated figures; they did not want to show themselves as too poor. He said that the other reason could be that they actually did spend that much money by borrowing etc. He also said that the amount showed by the well-off and strong categories is not realistic either because it is too less an amount for constructing a good quality house befitting their category. May be they wanted to hide their wealth.

Table 6.10 Additional money spent on housing reconstruction.

Income Group	N	Mean (PKR)	Std. Deviation	Minimum (PKR)	Maximum (PKR)
Very Poor	17	230000	225423	25000	1000000
Poor	73	286506	209650	20000	1250000
Moderate but unstable	60	467333	323800	60000	1600000
Moderate and stable	18	533333	337813	150000	1500000
Strong	1	800000		800000	800000
Well off	1	700000		700000	700000

6.2.3.1. Life Story of a Very Poor Family in Rural Bagh

> *"I have three children and we are living in one room…………My brother has given me one room in his house……he can kick me out of his house any time……………I am too much worried. If the government could somehow give me compensation, I could make two rooms for my children…….my father has given me a small piece of land".*

Mohammad Khan is a poor blacksmith living in a small village in District Bagh. He used to live in a joint family house with two other families, of his father and brother, before the earthquake. The 2005 earthquake destroyed their house. His father and brother got the housing compensation and reconstructed their separate houses, but Mohammad Khan somehow couldn't get the compensation money. He is a very simple soul and has no idea why he couldn't get the compensation. He has put forward many applications to the authorities in Bagh for compensation but to no avail. He says his neighbours are very nice and have offered him five trees to construct his house but he says he is too poor to afford even to feed himself and his family, so how could he afford to build a house? His income is very low because there is not much business in the village, especially after the earthquake. He is living with his wife and three children in his brother's house who has given him a room which is just big enough for two beds.

Figure 6.6 Mohammad Khan outside his brother's house.
(Source: Author fieldwork)

6.2.4. Progress in Social Context

In this section I explore housing reconstruction with respect to vulnerable groups. It is well established in disaster literature that vulnerable groups such as the poor, women, elderly, racial/ethnic minorities, and disabled are hit the hardest by disasters and find it extremely difficult to fully recover from the impacts of disasters (Alexander 2004; Bhatt 1998; Bolin 1976, 1985; Cuny 1983; Gangapati *et al*. 2012; McEntire 2004; Mitchell 1995; Qurentelli 2003; Rodney *et al*. 2011; Thurairajah 2011; Thurairajah *et al*. 2008). One of the

Key Informants, who works in a multilateral organization and has been closely involved in post disaster reconstruction programmes in Pakistan for a long period, observed that the vulnerable people usually do not have voice in the system. He was of the opinion that any post-disaster reconstruction, whether housing reconstruction or other, should always have a dedicated outreach which should identify the vulnerable and access them. While commenting on the post-2005 earthquake housing reconstruction he said that they learnt from experience that there was a section of population which had not been served in an appropriate fashion. As observed by one of the house owners that I interviewed *"………..well established and active families, which had males, were able to get more benefits as compared to more affected and deserving but powerless families."*

The 2005 Kashmir earthquake severely impacted the already vulnerable people. The ERRA conducted a Targeted Vulnerability Survey (TVS) to identify vulnerable people. Many vulnerable sections of society such as widows, orphans, elderly without care, persons with disability, and the landless were identified who needed special attention from the government because of being severely impacted by the earthquake and their limited capacity to recover (ERRA 2006c; 2007c). I focused my research on widows (more specifically female-headed households).

6.2.4.1. Female-Headed Households (FHHs)

Disasters impact women and men differently (ADB 2005b; Bari 1998; Begum 1993; Cannon 2002; Enarson 1992, 2001; Gangapati *et al.* 2012: Hannan 2002; Hines 2007; Khondker 1996; Neumayer & Plümper 2007; Sapir 1992; Thurairajah 2011; Thurairajah & Amaratunga 2009; Wiest *et al*. 1992). Women are usually the worst hit because of their vulnerabilities. This situation becomes even more damaging during the reconstruction phase due to two reasons. First, in patriarchal societies the land and employment related activities are mostly handled by men in normal situations but once the disaster strikes and women are left without men, it becomes very difficult for these women to perform these jobs because the society still works according to old 'gender stereotypes' (*ibid*). The second reason is that women do not have sufficient representation in normal development activities so they are under-represented in the reconstruction activities as well (*ibid*). Due to these limitations the women, particularly the female-headed households, take longer to recover from the negative impacts of the disasters (Bari 1998; Gangapati *et al.* 2012; Thurairajah & Amaratunga 2009).

The earthquake of 2005 severely impacted all segments of the society. The women who make up 49.82% population of AJK (P&DD 2014) were also severely impacted. In AJK thousands of households lost their male heads (ADB 2005b; ERRA 2009), leaving the responsibility of reconstruction of the destroyed houses with women. According to the ERRA 38,100 households (20%) are headed by women in AJK (*ibid*). Key Informant-5 notes that enhanced participation of women and improvement of their access to human, capital and information resources was proposed in Kashmir in the post-2005 earthquake reconstruction programme.

As women are key social actors before, during, after disastrous events, and during the reconstruction of homes (Enarson 2001) it is important to know how these 38,000 female-headed households fared in the housing reconstruction process. 42 FHHs (21% of the sample data) in six geographical units (4 rural union councils and 2 cities) were sampled to assess the status of housing. The earthquake not only resulted in new female-headed households but also affected existing female-headed households as well. Women who were already widowed or divorced, or unmarried prior to the earthquake would have continued to live in houses with some sort of male relations; for example father, son, brother etc. The earthquake not only killed many husbands but also took away many male heads of these households leaving behind these women with the responsibility of reconstructing houses and earning income in a patriarchal society (ADB 2005b).

The ERRA did promote gender equality policy in housing reconstruction and 30% members of the VRC (Village Reconstruction Committee) were women (ERRA 2009), but there were no special arrangements for female-headed households in housing reconstruction activity.

SPSS was used to analyse the survey questionnaire data and assess the progress of the housing reconstruction programme across two gender groups. This test was conducted on the following hypothesis:

H_0: There is a relationship between gender and progress of housing reconstruction

H_1: There is no relationship between gender and progress of housing reconstruction

Table 6.11 shows that the expected count of Constructed houses with male-headed households is 124, but the actual count is 121, whereas in the case of female-headed households the expected count is 33, but the actual count is 36. The expected count of Not Constructed houses in case of male-headed households is 19, but the actual count is 22; in case of female headed households the expected count is 5 but the actual count is 2. Thus the female-headed households showed better housing reconstruction progress as compared to male-headed households.

Table 6.11 Housing reconstruction progress according to gender.

			Gender		Total
			Male	Female	
Construction Status	**Constructed**	Count	121	36	157
		Expected Count	124.0	33.0	157.0
	Not Constructed	Count	22	2	24
		Expected Count	19.0	5.0	24.0
	Incomplete	Count	13	4	17
		Expected Count	13.4	3.6	17.0
	Repaired	Count	1	0	1
		Expected Count	.8	.2	1.0
	Under Repair	Count	1	0	1
		Expected Count	.8	.2	1.0
	Total	Count	158	42	200
		Expected Count	158.0	42.0	200.0

A Chi-square test was also conducted to determine the significance of association between these two variables (Table 6.12).

Table 6.12 Chi-Square Tests a. 5 cells (50.0%) have expected count less than 5.
The minimum expected count is .21.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.271[a]	4	.514
Likelihood Ratio	4.198	4	.380
Linear-by-Linear Association	.833	1	.361
N of Valid Cases	200		

In the above table, Pearson Chi-square value is important. The Pearson Chi-square tests the hypothesis that the row and column variables in the table are independent. The lower the "Asymp. Sig." value, the less likely it is that these two variables are independent and would cause the rejection of the Null Hypothesis of "no relationship". The output of .514 suggests that gender and housing reconstruction rate are related (i.e., they are dependent) since the significance of the Pearson Chi-Square test is above the usual cut-off point of 0.05 (or sometimes 0.10). Thus there is enough evidence to reject the Null Hypothesis and therefore, must assume dependence/association. The assumption for bigger than 2x2 tables is that the expected count is not less than 5 or 20% of the cells have expected count of >5. In the case, the expected count is 50% so the assumption has been violated. In case of violation of assumption, we need to look at the “Likelihood Ratio”. The Likelihood Ratio test rejects the null hypothesis if the value of this statistic is too small. Since the value of Likelihood Ratio is .380, we reject the Null Hypothesis.

However, the chi-square does not give us any information how the variables are related or how strong the relationship is. Hence Cramer's V test was used because it is a post-test to give additional information (Table 6.13).

However, the chi-square does not give us any information how the variables are related or how strong the relationship is. Hence Cramer's V test was used because it is a post-test to give additional information (Table 6.13). So I used the Cramer's V test because it is a post-test to give us this additional information and also because my table is asymmetric i.e. it is not a 2x2 table. Cramer's V varies between 0 and 1. The closer the outcome is to 0 the weaker the association is between variables; and the closer it is to 1 the stronger the association is. In this particular case the Approx. Sig. is closer to 1 (.514) so we can say that the significance of association or relationship is stronger (Table 6.13).

Table 6.13 Symmetric Measures.

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

		Value	Approx. Sig.
Nominal by Nominal	Phi	.128	.514
	Cramer's V	.128	.514
N of Valid Cases		200	

Based on the results of the above cross tabulation table, a bar chart was generated (Figure 6.7) which depicts housing reconstruction progress according to gender.

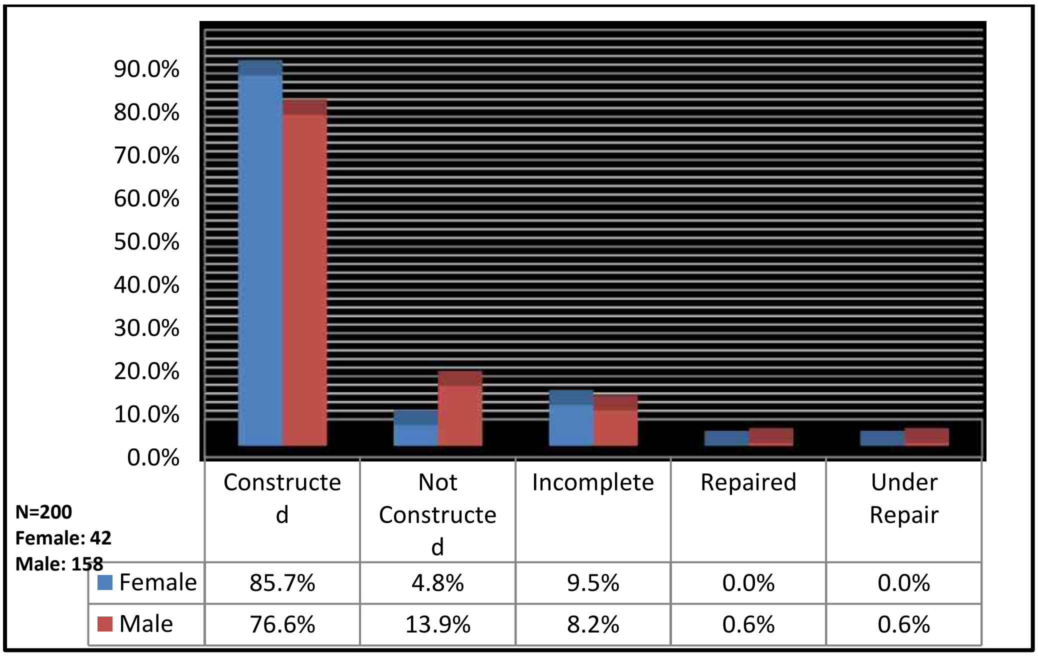


Figure 6.7 Housing reconstruction progress according to gender.

Female-headed households not only fared well in the case of “Constructed” houses but had lower percentage of “Not Constructed” houses as compared to Male-headed households; however the percentage of “Incomplete” houses is slightly higher than male-head households.

Figure 6.8 A Woman working on her under construction house (Source: ERRA)

6.2.4.2. Life Story of a Widow Who Reconstructed Her House

Iffat Begum lives in a small village of District Bagh. She is a head teacher in a government school. Her husband had died before the October 2005 earthquake. Her *pukka* house was fully damaged by the 2005 earthquake and her two children were injured. She took them to her parents’ home in Peshawar on the third day of the earthquake. She went to the television and radio stations to launch an appeal for relief goods for the earthquake affected people. In just two days she gathered two truckloads of relief goods. She left her children with her parents and travelled back to her village; she had to spend two nights on the road because the road was closed.

She says that she had no idea of the seismic hazard in the AJK and thinks that the main reason of widespread devastation was faulty construction. She spent one year in a tent and started reconstructing her house in 2006; it took her only three months to complete the house. She says that she was given 175,000 rupees housing cash grant by the government. The AI Team gave her the design and inspected the house at three stages. Keeping up her tradition of social work she helped the local community in the housing reconstruction process. She voluntarily helped the AI Team in their visits to other houses and was helpful in motivating people to do construction according to guidelines.

She was happy with her new house and was confident that her house was seismically safe because she constructed it according to the ERRA guidelines. Though she has reconstructed her house, she says that the housing subsidy was not enough and her father and brothers helped her greatly in reconstruction. Her estimate is that approximately 70% houses have been reconstructed in her village. She was particularly worried about a widow, Zeenat Bibi, who was living in a makeshift shelter with her little children because she couldn’t get the housing cash grant. Iffat Begum did not need to use the grievance redressal system for herself but she did go with some other people to get their issues sorted and they were really very helpful. She has installed rain water harvesting system on her roof and plans to install it in her school and in other houses in the neighbourhood as well.

She thinks that the amount of housing cash grant should be increased and technical support and motivation should be given to the people at village level in case of Owner Driven Approach. She supports the Agency Driven Approach for housing reconstruction, provided the government works honestly.

6.3. Summary

In this chapter I have discussed the progress of the post-2005 housing reconstruction programme. I have investigated housing reconstruction progress in three contexts; geographical (rural and urban), economic (across different income groups), and social (female-headed households). I have based my research on literature (both academic and grey literature), secondary data of the reconstruction agency of the AJK, and primary data (both quantitative and qualitative) which I collected during my fieldwork. I observed that in the case of geographical context, the official figures of the ERRA show that 96% of houses have been reconstructed. Much of the grey literature also agrees with this estimate. Similarly, most of the Key Informants whom I interviewed as part of my primary qualitative data also put the figure of housing reconstruction at a very high level.

However, my finding is that the ERRA's figure is not based on actual verification of the reconstructed houses on the ground; rather it is based on payment of the fourth tranche of the Housing Cash Grant (which is payable after verification of lintel level construction of the house). My primary quantitative data (N=200 survey questionnaires) collected from six different geographical units (four rural and two urban) show that overall 78.5% houses have been reconstructed. I have also explored housing reconstruction progress in rural versus urban contexts. The housing reconstruction authorities' data do not give disaggregated data for rural or urban contexts separately. My research shows that rural areas have showed better housing reconstruction progress than urban areas. My quantitative data (N=200 survey questionnaires) show that 94% respondents have reconstructed their houses in rural areas while 63% respondents in urban areas have been able to reconstruct their houses. Most of the Key Informants and house owners have agreed that the rural areas have fared better than urban areas. I discussed the reasons of this marked difference of progress in rural/urban contexts.

I also investigated the economic context of housing reconstruction. Analysis of survey questionnaire data demonstrated a relationship between income and housing reconstruction. Only 35% of the *Very Poor* income group have been able to reconstruct their houses. This percentage increases with the increase in income level, for example 81% *Poor*, 88.5% *Moderate but unstable*, 100% *Moderate and stable*, 100% *Strong*, and 100% *Well-off* respondents have reconstructed their houses.

Finally, I explored housing reconstruction progress in social context with regard to vulnerable groups. My quantitative data demonstrated that female-headed households have fared better compared to male-headed households. Despite the patriarchal family system and the particular socio-cultural makeup of the society that does not encourage women, 85.7% female-headed households have reconstructed their houses as compared to 76.6% of male-head households.

CHAPTER 7: IMPACT OF THE HOUSING RECONSTRUCTION PROGRAMME

7.1. Introduction

In this chapter I will discuss the impact of the housing reconstruction programme in the study area. The chapter is based on the following research question:

After the completion of the housing reconstruction programme:

a. To what extent are the seismic-resistant construction techniques sustainable in the study area, especially in rural areas?
b. How far has ODR been able to reduce / address the vulnerability of the building stock in the study area?
c. To what extent has the implementation of the ODR re-worked the family and household structures and patterns of land ownership?

The first impact that I have tried to evaluate is to what extent seismic resistant construction is being practised by people in rural and urban areas while constructing buildings with their own money, especially residential buildings. The second is the status of vulnerability of the total housing stock in the study area after the completion of the housing reconstruction programme. The third is to what extent the housing reconstruction programme has impacted the pre-earthquake family structure and land ownership pattern in the study area.

Unfortunately limited academic literature is available on these issues, particularly about the study area, so I have relied on whatever literature (mainly grey literature) is available, qualitative data (semi-structured interviews and focus group discussions) collected during fieldwork, my personal experience, and observations made during fieldwork.

7.2. Defining Impact Evaluation

Impact evaluation may be defined *as "analyses that measure the net change in outcomes for particular group of people that can be attributed to a specific* *program"* (Buttenheim 2009, p. 201). Impact assessment, especially Social Impact Assessment and Environmental Impact Assessment, is usually done before launching a project to assess what impacts the proposed project will achieve (Becker 2001; Burdge *et al*. 1995; Dietz 1987). Social Impact Assessment is now common in the case of development projects after completion to assess how the lives of the communities have changed. Post disaster impact assessment (PDIE) is also gaining currency to assess the impact of the humanitarian and development interventions after disasters (*ibid*). Impact evaluation of the post-disaster recovery interventions (especially after big disasters) is essential because usually a large section of the population is severely impacted for a long time and usually the more severely impacted people are already poor, vulnerable, and marginalized and do not necessarily have full access to relief and recovery activities. Thus it is important to evaluate the impact of the recovery interventions. Buttenheim (2010: p. 201, 212-213) has identified some challenges in the evaluation of post-disaster recovery interventions, for example programme interventions are not randomly assigned, target populations are by definition poor and vulnerable, several institutions may be implementing multiple interventions simultaneously for the same or neighbouring populations, and lack of baseline data; and also identified selection bias, information bias, contamination bias as potential sources of bias.

7.3. Sustainability of the Seismic Resistant Construction

Sustainability of the seismic resistant construction is of prime importance in the study area for two reasons; one is the massive damage to life and property as a result of 2005 earthquake and the other is the continued presence of seismic hazard. As discussed in previous chapters, more than 300,000 houses were destroyed in the earthquake in AJK alone and this damage could have been minimised by taking timely mitigation measures. Since AJK is situated in one of the most seismically active zones of the earth it is of the utmost importance to continue seismic resistant construction now and in the future to avoid such damages. The success and usefulness of the housing reconstruction programme will remain unfulfilled/ incomplete if seismic resistant construction is not sustained in future so that the success story is ongoing rather than being a one-off event.

One of the hallmarks of the post-2005 earthquake housing reconstruction was the introduction of seismic resistant construction because the government did not want people to reconstruct seismically unsafe houses as they used to do in the past (ERRA 2011). After the earthquake, the government swiftly took the opportunity to replace all the damaged/destroyed building stock with earthquake resistant buildings while keeping in mind other local hazards; "*build back better"* was the slogan of this campaign (*ibid*). As mentioned in previous chapters, several measures were undertaken for this purpose; earthquake resistant designs were provided to the house owners, training was given to artisans and house owners to implement these designs, material hubs were established to provide good quality construction material at reasonable prices, Assistance and Inspection Teams were set up to visit each under construction house at three key stages of construction, and housing cash grant was given in four instalments after these visits to ensure compliance with seismic resistant designs.

The ERRA claims that not only the reconstructed houses are earthquake resistant but a culture of seismic resistant construction has been established in these areas as a result of owner driven reconstruction (ERRA 2011). However the ERRA reports do not present any empirical evidence to support this claim. The Asian Development Bank (one of the main financers of the post-2005 earthquake housing reconstruction programme) has reported that 72% of the houses built without ERRA funding in earthquake affected areas have used seismic resistant construction techniques (ADB 2011). In the absence of any exact and reliable data of the housing stock in the study area, it is not possible to say with certainty how many houses were compliant with seismic standards and the level of safety of the housing stock of the area. Apart from above mentioned reports I couldn't find any academic literature on this issue about the study area.

I asked key informants during my fieldwork about the level of sustainability of seismic resistant construction in the study area. Most of the respondents were of the opinion that sustainability was an issue and seismic resistant construction, which was of the utmost importance due to the known high seismic hazard, was not being fully practised in the earthquake affected areas. Below are the comments by some of the key informants which show that seismic resistant construction is being practised to varying degrees (between 50%-75%, though one respondent put this figure to only 20%) in the study area (Table 7.1). It can be made out from the below table that most of the respondents were of the opinion that sustainability of the seismic resistant construction was an issue.

Table 7.1 Key Informant response on the sustainability of the seismic resistant construction in the study area.

Respondent	Comment
Key Informant-5	After the earthquake the construction of houses that the people did other than the reconstruction programme out of their own pocket, about 70-75% were compliant.
Key Informant-6	Sustainability is certainly an issue in rural as well as urban areas.
Key Informant-15	People have forgotten safe construction in later construction with their own money and have reverted back to old practices………in about 50% cases the code is not followed completely.
Key Informant-16	About 50% are doing better construction.
Key Informant-17	Seismic resistant construction which was ensured during the housing reconstruction programme is not only not sustainable it's gradually collapsing.
Key Informant-18	Yes sustainability is an issue. People are not doing safe construction and are floating the rules.
Key Informant-21	After the completion of the ERRA's housing reconstruction programme people have gone back to the old ways of construction and they are not that careful now. I must say the safety element is getting lesser and lesser with the passage of time.
Key Informant-22	Sustainability (of seismically safe housing) is a big issue.
Key Informant-25	About 20% people follow the guidelines and 80% have gone back to old system.
Key Informant-31	Even after the reconstruction programme is over, people are doing the compliant construction to some extent.
Key Informant-32	There is no guarantee that houses constructed outside the reconstruction programme are seismic resistant.
Key Informant-33	Not sure how safe new houses are. There might be some improvement due to awareness but it cannot be guaranteed.
Key Informant-40	In *rural areas it's going good* because people know that if they don't have pillars and beams in their house, it will fall down. Whereas in urban areas the story is bit different, multi-storey plaza are being constructed even on slopes and edges. We haven't learnt anything from the earthquake in the city.

The issue of sustainability was discussed in focus group discussion sessions also. All the four sessions agreed that sustainability of the seismic construction was an issue both in rural as well as urban areas.

Sustainability of the seismic resistant construction has different dimensions and issues in urban / rural contexts so I will discuss these separately in the following sections.

7.3.1. Sustainability in the Rural Context

According to Pandey *et al*. (2008) past experience shows that people, especially in rural areas, tend to forget lessons learnt from earthquakes and revert back to pre-earthquake construction practices. 88% of the population of the study area lives in rural areas (P&DD 2015), hence most of the housing stock is situated in rural areas. The population of the study area is growing at the rate of 2.36% pa (P&DD 2015) which means that every year thousands of new houses would be required to meet the needs of the growing population. Since most of the deaths in earthquakes are linked to the collapse of buildings, especially residential buildings (Chapter 5), it is important that future houses are not vulnerable to seismic hazard as they have been in the past.

Since there is no institutional mechanism in rural areas which could be approached for statistical data on housing, I had to rely on my personal observation and qualitative data. The outcome of my research is that the sustainability of the seismic resistant construction is a serious issue in the study area and nothing can be said with certainty about the seismic safety of the buildings constructed outside the reconstruction programme. I asked house owners during semi-structure interviews to what extent people still observe seismic resistant techniques while constructing their houses. Their replies (Table 7.2) suggest that seismic resistant standards were not observed in 100% of cases and sustainability was an issue.

Table 7.2 Response of house owners on sustainability of seismic resistant construction in rural areas.

Respondent	Comment
BR-3	I think that now people are constructing better houses than the ERRA designs.
BR-10	People still follow the ERRA guidelines.
BR-13	Yes people still try to comply with the ERRA guidelines.
BR-32	I think about 75% people still follow these guidelines.
BR-35	Yes people do follow the ERRA guidelines due to fear.
MR-5	I can't say that 100% houses are now being made according to seismic standards but I can say that they are better than before.
MR-11	About 70% people still follow the guidelines while constructing their houses.
MR-17	About 20% people follow the guidelines and 80% have gone back to old system.
MR-32	Those people who have money they are constructing good houses.
MR-35	Now people are making very good houses.
MR-37	Unfortunately people in rural areas are not fully practicing the building techniques they learnt during the reconstruction process.
MR-42	Mostly people ignore the seismic resistant construction techniques.

I have observed during my fieldwork that though most of the newly constructed houses were *pakka;* the full specifications of the *pakka* type of construction, which were strictly enforced by the ERRA during reconstruction programme, were not fully followed in later construction. People have modified the original EERA designs according to their own liking without any input by engineers. Defects such as partial or full absence of a frame structure (Figure 7.1), lesser numbers of steel bars or too much distance between steel rings in columns and beams to save steel, use of wood or small steel columns in walls instead of concrete columns which have no bond with walls thus severely compromising the strength of the building, use of sub-standard local construction material, unsupervised construction, and poor workmanship were frequently noticed during these visits. It was also observed during these field visits that in certain cases people did voluntarily try to incorporate seismic resistant measures in their construction (Figure 7.1). I asked a house owner in rural Bagh, who was doing excellent quality construction, why he was doing such good construction despite the fact that there was no inspection by any authority? To which he replied that he was doing so for the safety of his family no matter somebody checked or not, but at the same he said that most of the people were not doing good quality construction due mainly to economic reasons.

Figure 7.1 (left) An under-construction pukka house in rural Bagh with no plinth and lintel level beams in walls (yellow arrows) in contravention to the ERRA specifications; (right) a seismically compliant under-construction *pukka* house in rural Muzaffarabad with proper pillars and beams. (Source: Author fieldwork)

7.3.2. Sustainability in the Urban Context

> *"The more buildings that are damaged the more certain is the earthquake to be remembered, and the more likely is the reconstruction of that city to incorporate a measure of resilience to the next earthquake"* (Bilham 2009, p. 840).

As opposed to rural areas, sustainability in the case of urban areas is linked with building control and seismic resistant construction is not a purely voluntary act, as in rural areas. According to the AJK Building Regulations 2006, enforcement of the seismic resistant building codes in urban areas is the responsibility of the municipal corporations so sustainability of the seismic resistant construction should not be an issue in urban areas. However these civic institutions were found to be lacking in effective building control. A general impression in the study area, which I gathered through discussions with key informants and house owners, is that the building codes are not enforced vigorously. I interviewed bosses and other relevant staff of the development authorities and municipal corporations of Muzaffarabad and Bagh cities and they admitted that for various reasons they were unable to ensure full building control. I visited four under-construction houses in Muzaffarabad city during fieldwork and found that these houses were being constructed without any planning permission and building codes were not enforced by the concerned authorities. Common construction errors in urban areas include partial or full absence of a frame structure, lesser number of steel bars or too much distance between steel rings in columns and beams to save cost of steel, use of sub-standard local construction material, unsupervised construction, poor workmanship, and absence of supervision by consultant as per AJK Building Regulations 2006. Figure 7.2 is a picture of an under construction house in the old part of Muzaffarabad city (one of the worst hit areas in 2005 earthquake) where serious violation of even basic engineering principles, such as adding a new structure with an old damaged structure (which can be seen in the background), construction of brick and RCC frame structure, and poor quality of construction material and workmanship, are committed in this building.

Figure 7.2 An under-construction house in Muzaffarabad city; notice brick columns and concrete beam in utter violation of the engineering principles (yellow circles).

(Courtesy: Sheikh Ahsan)

Despite the lack of enforcement by civic authorities, there were some instances of voluntary compliance with seismic resistant construction (Figure 7.3). I visited an under-construction house in Muzaffarabad city and interviewed the owner who, despite being a low paid government employee, was very keen to build a seismic resistant house and the whole family was fully involved in the construction process. During a semi structured interview he said *"I am spending my limited money on safer structure….I do not have much money so I will not plaster walls and will put very ordinary doors and windows but at least this house will be safer for my family"*. He said that even if there was no restriction of planning permission, no checking by the Municipal Corporation staff, and he had limited money he will not forgo seismically safe construction because *"I have seen the earthquake and that fear is still in my mind……..No matter if someone checks it or not, I will make it safer and stronger".*

Figure 7.3 Properly formed steel rings for RCC frame structure, a rarity before the earthquake. (Source: Author fieldwork)

7.3.3. Challenges for Sustainability of Seismic Resistant Construction

The sustainability of the seismically resistant construction is an issue in the study area due to four issues: building control, technical competence, economics, and culture of safety/DRR.

7.3.3.1. Building Control

Building control becomes very important in the presence of seismic hazards. Seismic resistant construction cannot be left to the will of the home owners and untrained artisans only. There must be a strong, efficient, and effective building control mechanism to ensure multi hazard resistant building stock (Burby & May 1999; Malalgoda *et al*. 2014; Roosli & O'Keefe 2011).

As discussed earlier there was no building control mechanism in rural areas of AJK before the 2005 earthquake and this factor contributed towards seismically vulnerable housing stock (Chapter 5). Unfortunately this situation still continues in rural areas despite suffering such huge losses. The government should have learnt lesson from the 2005 earthquake and put in place an effective building control mechanism to ensure the continuity of seismic resistant construction started by the post-earthquake housing reconstruction programme; sadly though nothing was done in this regard. Two former employees of the UN-Habitat, who had worked for the housing reconstruction programme in the study area, told me that at the end of the housing reconstruction programme a series of meetings were held with different government officials in order to make seismic resistant construction sustainable in rural areas. They said that it was difficult to enforce a techno-legal regime in rural areas without a proper institutional set up so, as an alternate, it was suggested to at least provide technical advice to the rural areas people nearest to their places through the existing staff of the Local Government Department at the Union Council level. The UN-Habitat offered to train these staff and provide printed technical material. They also offered to give continuous training to Master Trainers so that they don’t forget these things. They thought that perhaps it was not the priority of the government so their proposal never materialized (Key Informant interviews). When I asked a former secretary to the Government of AJK about this proposal he told me that a proposal for establishing a building control mechanism was put up before the government in 2011 but there was no development in this regard although many governments had changed since then (personal communication). The situation at present is that there is no building control mechanism in rural areas and the sustainability of the seismic resistant construction is left to the will of the people.

As regards urban areas, although new seismic resistant building regulations were enforced in AJK after the earthquake, lack of enforcement is still an issue as in the past. People avoid getting planning permission and the concerned authorities cannot stop unauthorised construction (UN 2007a, 2007b). I interviewed heads and other relevant staff of development authorities and municipal corporations of Muzaffarabad and Bagh cities and asked them about building control; they agreed that they were unable to effectively control the building construction in their areas, *"it is only a legal formality that we issue construction permission otherwise we cannot check the actual construction even in 50% cases"* (Key Informant-15 & 16). The building control staff of the Municipal Corporation Muzaffarabad told me that according to AJK Building Regulations 2006 a consultant was required to supervise the construction of the buildings (even houses) and give a Completion Certificate to the owner and the Municipal Corporation staff were not supposed to check the construction. The owner was required to get "Occupancy Certificate" from Municipal Corporation on the basis of completion certificate by the consultant. They said that not a single occupancy certificate has been issued so far though thousands of new houses have been constructed (Key Informant-41, 42, 43).

I also visited some under-construction houses in Muzaffarabad city during my fieldwork and asked the house owners about the level of monitoring by the civic authorities; all of them told that no one had ever visited the construction site. Some other key informants from these cities also agreed that there was lack of enforcement in urban areas, *"the civic bodies only issue planning permission but don't check the actual construction. They don't stop people from doing sub-standard construction or construction on hazardous land. They sometimes come for checking and take the money and* *go away. We haven't learnt anything from the earthquake in the city"* (Key informant-40). I interviewed a mason in Muzaffarabad city who told me *"I have constructed more than 100 houses since the earthquake. In almost every case the Municipal Corporation Inspectors did come to check the quality of the work but they usually get a bribe and then ignore if, for example, 5 steel bars are used in a pillar instead of 6. I mean they do question why 5 bars are being used instead of 6 but then they get the money and go away".* Thus corruption, inefficiency, lethargy, incompetence, and political interference in development authorities and municipal corporations are the main reasons of lack of building control.

7.3.3.2. Technical Competence

Technical competence of engineers and artisans is important in the implementation of construction designs, thus resulting in sustainability of the seismic resistant construction. The ERRA was well aware of this importance and started a training programme for artisans and house owners in the earthquake affected areas during the housing reconstruction programme and thousands of people were given training (ERRA 2011). However this was a one-off activity and the local governments do not have any system to train and certify new entrants into the trade. A former employee of UN-Habitat told me that they had suggested that the Government mandate the Technical Education & Vocational Training Authority (TEVTA) to do the training and certification of the masons and other technical people, but the government did not take it seriously (Key Informant-36). The result is that untrained / unqualified artisans are working in the study area along with trained ones. These unqualified artisans are a point of concern in rural areas, especially because there are no building codes so seismic construction is purely a voluntary activity which is seriously marred in the hands of unqualified and untrained artisans. In urban areas this lack of qualification is compounded with lack of enforcement by the civic bodies.

7.3.3.3. Economics

Economics plays an important role in determining the type and quality of construction in those areas where the majority of the population have a low economic base (Bosher *et al*. 2007; Pandey *et al*. 2008). Poverty was one of three main reasons of faulty construction in the study area (Chapter 5) and it has again come up as one of the main reasons for issues around sustainability during my research. Many key informants and house owners were of the opinion that despite having the knowledge of the seismic hazard in the area and knowing about safe construction, many people were not following seismic specifications due to economic reasons: *"people have given up safety element in later construction with their own money and have reverted back to old practices……The biggest reason is poverty. Everybody wants to do good construction. If I don't have roof to cover my head I would do construction according to my resources"* (Key Informant-16). The technical staff of the Municipal Corporation Muzaffarabad said during key informant interview that according to The AJK Building Regulations (2006) a consultant was required to supervise the construction and give a completion certificate to the owner but usually the consultants were de-hired during the course of construction, especially in the case of small houses because people could not afford to pay the fee (Key Informant-41).

It is important to know the level of poverty in the study area after the earthquake to see if poverty is still as prevalent as it was before the earthquake. According to UN reports, poverty was prevalent in the earthquake affected areas of AJK (UN 2007a, 2007b). Most of the families in District Bagh have become poorer and at-risk to the difficulties of day-to-day survival after the earthquake. Most of the people do not have savings or access to banks and other safety nets to fall back upon in the case of an emergency and they are financially and economically vulnerable, contrary to the perception of many educated and professional planners that remittances are helping many families in Bagh (UN 2007a, p. 12). Similarly most of the people in Muzaffarabad city have neither savings nor access to financial institutions for lending so they are forced to live in the houses damaged by the earthquake (UN 2007b). I have tried to collect data on the economic condition of the people of the study area but as pointed out by Buttenheim (2010), there was no pre-earthquake baseline data available for the study area. Baseline data were therefore constructed on the basis of information provided by the surveyed households about their condition before the earthquake and after the intervention. Utmost care was taken in data collection to minimize errors or biases, for example instead of directly asking the income of the household, their sources of income, the condition and size of the house, the amount of the household assets, number and type of cattle and transport that the household owned, other items such as fridge, TV, mobile phone, and the schools (private or government) to which the children went were kept in mind while assessing the economic condition of the households (see Chapter 4).

My quantitative data (N=200) demonstrates that the financial condition of people in the study area has been mostly adversely affected by the earthquake, except for a very small percentage of upper income groups. Figure 7.4 shows that the percentage of the *Very poor* has increased from 14% before the earthquake to 17.5% after the earthquake and the percentage of the *Poor* has increased from 39% to 40%. The *Moderate but unstable* and *Moderate and stable* groups have gone down from 30% to 26.5% and from 16.5% to 14.5% respectively. Data demonstrate that poverty is one of the three factors (along with *Lack of building control* and *Ignorance of seismic hazard* being the other two) has actually increased after the earthquake.

These findings were strongly contested by some key informants. They were of the opinion that the financial condition of the people had improved a lot after the earthquake due to payment of compensation by the government, influx of huge sums of money as charity and donations, and increased economic opportunities as a result of billions of rupees investments in reconstruction projects. As already discussed in Section 8.2.1 (iv) of this thesis, most of the people of the earthquake affected areas could not benefit from the economic opportunities which became available soon after the earthquake. Apart from quantitative data, I collected the qualitative data (in the shape of semi-structured interviews and life stories) from house owners to assess their financial status and the impact of the earthquake on their livelihoods. Many respondents of the *Very poor* and *Poor* categories told heart-moving stories of the loss of their livelihoods. Many of them lost their source of livelihood due to physical disability caused by the earthquake. The financial condition of these people was opposite of the official version mentioned above. Loss of house, assets, and savings coupled with loss of livelihoods hit people of the study area hard. Figure 7.5 also highlights the livelihoods concern of the people of the study area. House owners were asked to identify and prioritize their future concerns. 77% respondents said that income was their biggest future concern.

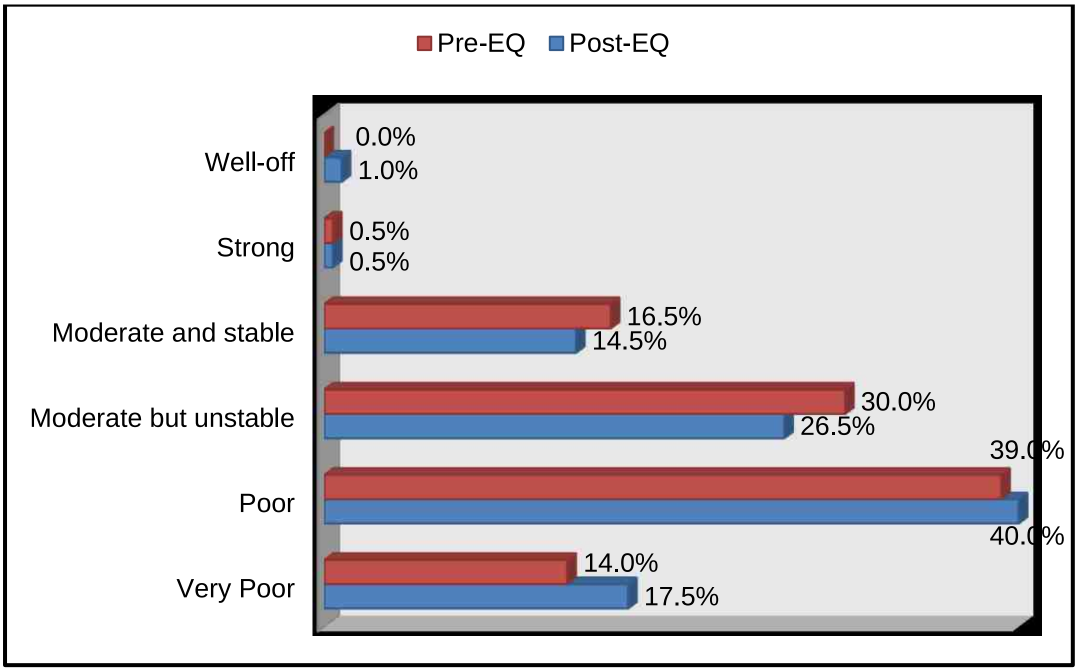


Figure 7.4 Financial status of respondents in the study area. *(Source: Author fieldwork)*

7.3.3.4. Culture of Safety/Disaster Risk Reduction

Apart from effective building control mechanism, a culture of safety in a society is also important to ensure safe construction. In the absence of effective building control, awareness of safe building techniques plays a major role in sustainable solutions to building vulnerability (Bosher *et al*. 2007; Macabuag 2010; Pandey *et al*. 2008). As Abidi (2011, p. 8) observed, sustainability can be achieved only if safe construction penetrates "*into the culture of a society. This is achievable only if earthquake risk is accepted by the society at large as a daily life threat, similar as the use of umbrella for rain risk, of pullovers for winter risk and of vaccination for disease risk"*.

It is unfortunate that despite going through a horrific earthquake, the culture of safety has not fully penetrated in the study area. I found that many people have already started to question the possibility of another earthquake in the foreseeable future, hence the need to be careful about construction quality. During my fieldwork 200 households were asked through survey questionnaire to identify their future concerns. The result of this survey shows that earthquake hazard was not their main future worry; 74% of respondents said that income was their biggest concern followed by health (15%) and education (6%), only 1% mentioned landslide (which was a localised hazard) as their biggest future concern (Figure 7.5). These results show that day to day issues and problems are prioritised by the affected people rather than a future disaster, which has a strong probability of occurring again and which they had recently experienced.

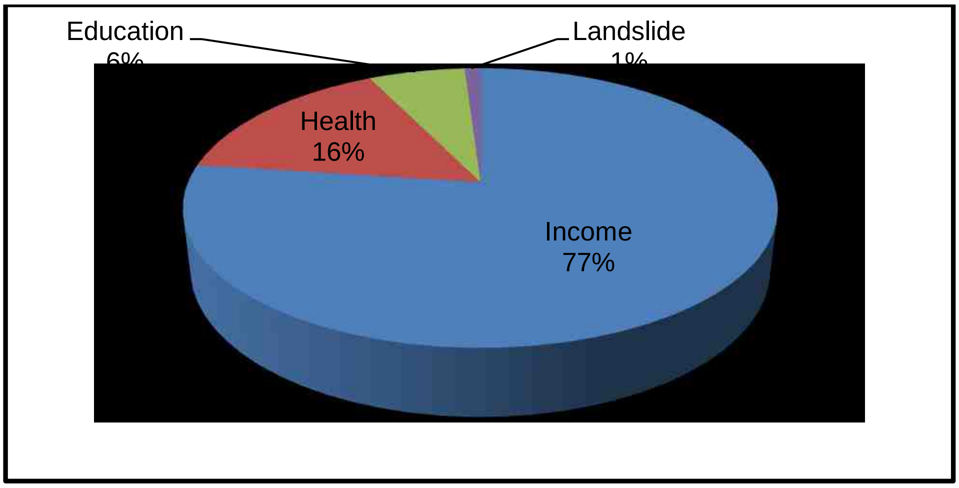


Figure 7.5 Future concerns of house owners in the study area. *(Source: Author fieldwork)*

However, Leersum & Arora (2011) gave a different explanation. They found from their study of the reconstruction programme that the majority of the people in AJK were satisfied with the quality of post-earthquake reconstruction and the earthquake risk was no more the most important threat in their lives; they attributed it to the success of the reconstruction programme of the ERRA. My study partly agrees with this finding; data from 200 households also found that 82% respondents thought that their new house was seismically safe (67% of them attributed this safety perception to the fact that they had constructed their new house according to the ERRA guidelines).

However, my point is that the safety perception of the house is one thing, whilst the risk perception of a hazard is another; people should be aware of the hazard irrespective of the safety of the structure. Success of a reconstruction programme should not make them oblivious to the potential hazard. Such reasoning is corroborated by the fact that many house owners and key informants admitted during semi-structured interviews that people have either not learnt any lesson from the earthquake or they have already started to forget the earthquake. If a society starts to forget such a horrific tragedy in less than a decade then how can it inculcate the culture of safety and DRR and sustain seismic resistant construction in the absence of a strict building control mechanism?

In the light of the discussion above it can be concluded that although the post-2005 earthquake housing reconstruction programme successfully introduced and enforced seismic resistant construction techniques in rural areas, the sustainability of seismic resistant construction is a big issue in both rural and urban settings due to various reasons.

7.4. Impact on the Vulnerability of the Built Environment

Success of the post-disaster reconstruction should be judged in terms of its impact on vulnerability as well as the number of reconstructed houses. According to Clinton (2006) cited in Mannakkara (2014, p. 316) *"a key test of a successful recovery effort is whether it leaves survivors less vulnerable to natural hazards"* because disasters and ensuing reconstruction provide a window of opportunity to address pre-disaster vulnerabilities (Chapter 2). However, ensuring that pre-disaster vulnerabilities do not exacerbate is always a challenge (Da Silva 2010).

In this section I discuss the impact of the housing reconstruction programme on the vulnerability of the housing stock in the study area and see to what extent the pre-earthquake vulnerability of the housing stock has been addressed as a result of this intervention. First I explore the quality of two different types of housing stock, one constructed in the reconstruction programme and the other constructed post reconstruction programme, and then I determine the level of vulnerability of the total housing stock of the study area.

7.4.1. Quality of the Reconstructed Housing Stock

Technical evaluation of the structural strength of these houses is not within the scope of this study; I therefore rely on literature and non-technical data collected during my fieldwork to discuss its quality. The literature on the quality of the reconstructed houses in the study area is limited and divided. There is a body of literature (both grey and academic) which reports that the reconstructed houses were mostly built according to seismic resistant standards. For example, ERRA (2011) claims that 96% of the reconstructed houses were seismic and other hazard resistance compliant; the World Bank (2011) reports that 99% of houses were compliant with seismic resistance standards at plinth level and 94% were compliant at lintel level; ADB (2011), IDB (2014), and Leersum & Arora (2011) term the reconstructed houses mostly compliant with earthquake standards and seismically safe. There is another body of literature, for example Ejaz (2013) and Kazmi *et al*. (2012) which contest this version and point out shortcomings in the reconstructed housing stock. Kazmi *et al*. (2012) have identified flaws such as construction on steep slopes and cutting toes of hill slopes, poor construction designs, poor quality construction, and mixed construction which compromise the safety of the structures.

My personal observation is that a big change has occurred in the construction typology in the study area; however the quality of construction is debatable in certain cases, especially in the case of urban areas (see section 7.3). My data of 200 households show that *kacha* houses, most prevalent before the earthquake, have been almost eliminated (Figure 7.6).

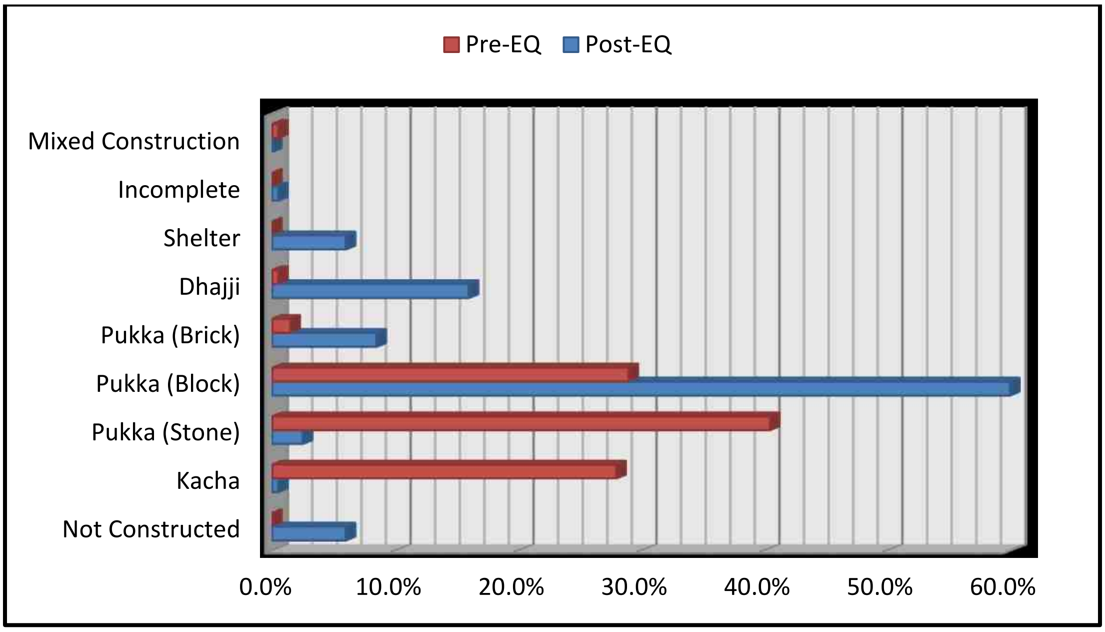


Figure 7.6 Change in the housing typology of the study area. (Source: author fieldwork data)

The good thing is that the ratio of *pukka* (brick and concrete block) houses has increased and the ratio of *pukka* (stone) has decreased. These *pukka* (stone) houses were not seismically resistant. Another good thing is that the vernacular seismic resistant *Dhajji-dewari* type of construction has been revived and many people have expressed their satisfaction and acceptance for these houses during discussions with me. If these houses were constructed according to the ERRA guidelines, then pre-earthquake vulnerability should not be an issue anymore, however four issues need to be kept in mind with regard to the quality of the reconstructed housing stock. One is the quality of reconstructed houses in urban areas, two the repaired/retrofitted houses, three additions into reconstructed houses, and four violation of the Master Plan or illegal construction in hazardous places in urban areas.

As discussed earlier, ensuring seismic resistant buildings in urban areas was the responsibility of the civic authorities (unlike AI Teams in rural areas) and the quality of reconstructed houses depended on the effective control of these authorities. Unlike rural areas, where house owners followed engineering designs by the ERRA, the house owners in urban areas needed the construction drawing (called Planning Permission in the UK) prepared according to the AJK Building Regulations (2006) by a charted architect and get it agreed by the Development Authority and the Municipal Corporation. This was to ensure that the construction was carried out according to the Master Plan and that the building was seismically resistant.

Until 2014 more than 5,500 houses were reconstructed in Muzaffarabad city out of more than 8,600 destroyed houses (SERRA 2014). When the Municipal Corporation Muzaffarabad was asked how many planning permissions were issued by them, it reported that only 591 planning permissions were issued. It means that either not more than 591 houses were reconstructed (which is obviously not correct) or around 5,000 (90%) houses were reconstructed without any planning permission (this seems more plausible). Similarly in the case of Bagh city 2,856 houses were destroyed and more than 2000 were reconstructed till 2014 (SERRA 2014), but only 1300 planning permissions have been issued by the Municipal Corporation Bagh (personal communication). Construction supervision was to be done by a consultant hired by the house owner. The consultant would issue a Completion Certificate to the owner on the basis of which the Municipal Corporation would issue the Occupancy Certificate, which declared that the building was fit for living. Both in the case of Bagh and Muzaffarabad cities not a single Completion Certificate and Occupancy Certificate were issued (personal communication). It means that there is no guarantee of compliance with building codes and safety standards in case of those thousands of houses which were constructed without planning permission. Incidentally these civic bodies do not even know the exact number of reconstructed houses.

Repair or retrofitting of the damaged houses in the study area is a big issue for vulnerability. According to the SERRA data more than 34,000 houses were damaged. The government paid 75,000 rupees each for repair/retrofitting. Not enough has been done to ensure that repair or retrofitting was carried out in a proper manner. In rural areas, unlike the reconstruction of destroyed houses where the AI Teams visited at three different stages of construction to ensure compliance, the AI Teams did not visit the damaged houses. In the case of urban areas the civic bodies issued planning permission for the construction of new houses, not for repair or retrofitting of damaged houses. According to a resident of the old part of Muzaffarabad city "*Nobody checked the quality of retrofitting and repair; people were just given money and that's all……….Superficial and cosmetic treatment has been done on these houses. 80% houses in the inner city are the same and 20% people have made new houses. These 80% houses have superficial treatment and God forbid if an earthquake hits again the situation would not be different than 2005. That's what I think. This is a dangerous situation".* So the vulnerability of the repaired/retrofitted structures is a serious issue and nobody is sure about their safety.

I visited many such houses during my fieldwork and witnessed the high risk in which the residents of these houses were living (Figure 7.7). The picture on the left is of a multi-storey house in Bagh which was severely damaged due to earthquake. The owner told me that he was doing the repair work according to his own understanding without hiring any engineer. The building on the right is a big pre-earthquake commercial building. It is obvious from the picture that there is no frame structure in it. The building is in precarious condition and danger to public but neither knocked down nor retrofitted.

Figure 7.7 A damaged house in Bagh city which has been partially repaired and still inhabited by the owner and his family (left). A pre-earthquake multi storey commercial building in Bagh city, non-frame structure and cracked walls pose serious threat (right).
(Source: Author fieldwork)

Most of the pre-earthquake housing stock had been developed in an incremental manner and was one of the reasons for the vulnerability of the housing stock (Chapter 6). The same practice of addition to reconstructed houses has already started in the study area. With the passage of time the needs of the people have increased and they need to extend their houses. The original housing designs of the ERRA for rural areas had the provision for further extension using the same material and design, but (as in the past) people are not following these instructions. The added structures do not fit with the original structures, are constructed with different material and are not necessarily built according to seismic standards (Figure 7.8). The reconstructed houses do not provide thermal insulation so people are adding *kacha* rooms with reconstructed houses, especially at high elevations (Figure 7.9). Thus, whilst houses reconstructed with government money according to the ERRA specifications might be seismically safe, the structures added later on are not necessarily so.

Figure 7.8 A poor quality structure (foreground) added with a reconstructed house (background) in Bagh city; notice different types of materials and irregular stones used in the added structure. *(Source: Author fieldwork)*

Figure 7.9 Kutcha structures (yellow arrows) added with reconstructed pukka house in rural Muzaffarabad. *(Source: Author fieldwork)*

Master Plans were formulated in urban areas of Muzaffarabad, Bagh, and Rawalakot after the earthquake to ensure reconstruction of strong urban structure against recurrent natural disasters (JICA 2007). The basic purpose of these master plans was to control unsafe and irregular construction and infrastructure development, especially in hazardous areas, to avoid damage in case of future disasters. Muzaffarabad city was divided into Urban Promotion Zone and Urban Preservation Zone. The 850 hectares Urban Promotion Zone is the area designated as suitable for future development. The land specified for this zone is safe from natural hazards such as landslides and floods. This area was found suitable for intensive urban development in the future. The Urban Preservation Zone area is 1150 hectares (most of the area has been declared Red Zone) and is not suitable for future urbanization due to potential hazards and risks. According to the Land Use Plan and Master Plan, construction on Red Zone (Highly Hazardous Zone) Active Land Slides, Fault Lines (MBT & HFT) has been restricted (personal communication with DAM official).

There were around 1500 houses on the MBT at the time of the 2005 earthquake. Reconstruction of these houses only in the shape of light earthquake resistant structures was allowed along 500 meters of the fault line. But this restriction is being seriously violated and hundreds of heavy structures have been constructed in the Red Zone without the permission of the authorities (personal communication with MCM official). Unfortunately the city authorities seem to be unable to control this illegal and dangerous practice. A mason in Muzaffarabad city told me that *“construction rules are being violated in the Red Zone even. If people cannot do the construction during the daytime due to the fear of the authorities, they do it in the darkness of the night. I have constructed about 30% houses in the darkness of the night to avoid the authorities. Even Stay Orders from the Courts are violated during the night”* (KI-29). Figure 7.10 is a picture of one such three storey heavy residential structure which has been constructed in the Red Zone by an important businessman of the city.

Figure 7.10 A three storey heavy *pukka* house in Red Zone, where only a lightweight single storey structure should have been constructed. *(Source: Author (fieldwork)*

The restriction of 500 meters is being flaunted as well and people are doing construction right on the fault line in the areas of *Chelabandi*, *Nisar* Camp, *Gojra*, *Mohri*, *Bala Pir*, *Upper Chatter, Bandi Saman*, and *Maakrri* etc. Hundreds of heavy structures have been built right on the fault lines. A former Chairman of Muzaffarabad Development Authority (who had also worked as Administrator of the Municipal Corporation Muzaffarabad) told me that implementation of the Building Codes and Master Plan was very difficult due to political interference, *“despite being a political worker myself I say that where there is a lot of politics in a small area, it is not possible at all to implement these things. It’s too difficult. According to the Microzonation plan, Bandi Samaan is a highly hazardous area and no one should live or build house there but due to the political pressure people are still living there. Too much politics is involved here which doesn’t accept all these rules and regulations”* (Key Informant-17). The enforcement staff of the Municipal Corporation Muzaffarabad also admitted that political interference was one of the main reasons of non-implementation of Building Regulations and Master Plan (Key Informant-41, 42, 43).

7.4.2. Quality of the Housing Stock Built Post-reconstruction Programme

Unfortunately up-to-date figures of the total housing stock in the study area are still not available. There is no institution in AJK for the collection and updating of housing or census data, so we do not know how many houses have been constructed outside the housing reconstruction programme. In the absence of building control in rural areas, and weak enforcement in urban areas, the seismic safety of the housing stock is in doubt. All sorts of houses are being built in rural areas without any control by the authorities. The worrying thing is that pre-earthquake vulnerable *kacha* style construction, which was eliminated as a result of reconstruction programme, is coming up again in rural areas.

In the case of urban areas, despite building regulations, the construction practices have not improved much and defective practices are being repeated. My findings during fieldwork are that the factors that contributed towards the vulnerability of the housing stock are still there to certain degree. According to Iqbal & Khan (2014) the population of Muzaffarabad city (and also of Bagh city) has increased many times due to the influx of settlers. ‘*The population of Muzaffarabad has increased by more than 50,000 since the earthquake due to the influx from rural areas’* (Key Informant-41). This migration has contributed to the already high density of the building stock.

Apart from the quality of structures themselves, the Master Plans are being seriously violated in urban areas and there are slum like conditions due to the lack of civic amenities, which is a vulnerability issue in itself. According to the AJK Building Regulations 2006, construction is allowed up to 35° in the case of rocky and hard soil, and up 20° slope in the case of non-rocky soil in Urban Promotion Zone in Muzaffarabad city. This restriction is also being violated and hundreds of new houses have been constructed on slopes more than 65° in *Sangri Mera, Sathera, Tariqabad, Kheshker, and Bala Pir* areas of Muzaffarabad city (personal communication with a Chief Engineer, Buildings). This is a potentially dangerous situation and might cause more damage than in the 2005 earthquake in case of a future earthquake (*ibid*). Figure 7.11 shows construction activity on steep slope in Muzaffarabad city.

Figure 7.11 Construction on steep slopes in Muzaffarabad city; these houses have been built by cutting the hill. Almost half the house is on ground and half of stone pedestal or concrete pillars which seriously compromises the safety of the structure.

(Source: Author fieldwork)

Due to steep slope these structures are constructed partially on pillars and dry stone masonry pedestals and partially into excavated hillsides which compromises their structural strength as well as destabilising the slopes. There were hardly any structures here before the earthquake, but dozens of structures have been constructed since, and development continues unchecked. A Key Informant from Muzaffarabad city blamed the city authorities for this and said that according to rules nobody can purchase land in Muzaffarabad city without the NOC (No Objection Certificate) of the Development Authority Muzaffarabad. He questioned why the Development Authority was issuing NOCs in case of hazardous land.

Construction on encroached government land still continues after the earthquake. According to a high official of the Municipal Corporation Muzaffarabad, 3000-4000 houses have been constructed on encroached land in different parts of the city; all these structures were constructed without any planning permission and nobody knows about their construction quality and safety level (personal communication). A senior official of the Muzaffarabad Development Authority said that they did not have exact data of illegal houses, however their estimate was that about 7000/8000 structures involving approximately 40,000 people have been constructed by those people who migrated into the city from rural areas after the earthquake. He frankly admitted *"this new development is a disaster in the making. Fast and illegal development lacking basic civic amenities and infrastructure plus the possibility of massive damage in case of a future earthquake should be a point of concern for the authorities"* (personal communication).

This influx of population not only resulted in construction on steep slopes but also within watercourses. Hundreds of illegal structures have been built in different watercourses of Muzaffarabad city since the earthquake, especially in *Gojra Nala, Gulshan Nala, Tariqabad Nala*, and *Saathera Nala*. Again the city authorities do not have the exact data of these structures but they admit that a few hundred houses have been constructed illegally in different nullahs (Key Informant-35, 41, 42, 53). Hundreds of structures can be seen by a quick tour round these nullahs. The Google Earth images below (Figure 7.12) clearly depict the level of construction in *Gojra Nala* since 2005. There were very few structures in this watercourse until the 2005 earthquake, but since then the number of these structures has increased enormously. These structures might be seismic resistant but they are prone to flood risk or liquefaction due to loose riverbed strata (Figure 7.13).

Figure 7.12 Construction in Gojra Nullah since 2005; black lines are roughly the boundary of the nullah. Huge amount of construction in the nullah is visible. *(Courtesy: Google Earth)*

The situation in Bagh city is also alarming. The population of Bagh city has almost doubled since the earthquake (65,000 in 2014 as compared to 35,000 in 2005) due to migration from rural areas (Personal communication). According to the head of Bagh Development Authority, within one or two years after the earthquake about 2,000 houses were constructed in a haphazard manner without any permission by those people who came from rural areas. He said that there were no proper roads and streets or other civic amenities. Most of the people have encroached into two nullahs and are vulnerable to flooding (Key Informant-15 & 16).

Figure 7.13 Construction in the Gojra Nullah; the yellow arrow shows the width of the nullah that has been taken over by illegal houses. *(Source: Author fieldwork)*

Another point of concern is that the old parts of Muzaffarabad and Bagh cities are still as narrow and congested as they were before the earthquake; in fact they have become even more congested due to population increase. Much of the damage in 2005 earthquake in these cities was due to the high building density. The fallen buildings became a mountain of rubble making search and rescue difficult. Unfortunately a visit to these areas is enough to reveal that the situation might not be much different in case of a similar earthquake in future. A resident of a very congested part of Bagh city told me that the narrow streets were not widened because of the shortage of land and funds so *"people had to construct their houses according to previous layout; thus their vulnerability still continues and in case of a future earthquake, the damage will be even greater. The situation is even worse than before 2005 because many new houses have been built due to the split of families"* (BU-34).

A Key Informant from Muzaffarabad city reported that the congestion in the old city area of Muzaffarabad, especially the Madina Market area had become worse than in 2005 and was a serious safety issue for future: *"if any calamity hits it would be difficult to take out dead bodies because of narrow streets. There is no authority to check this. People are constructing big houses with expensive tiled bathrooms but don't leave space for a street. There has been fire here three or four times but the fire engine couldn't enter into these narrow streets"* (Key Informant-18). The number of high rise commercial buildings has sky rocketed in the older parts of these cities after the earthquake because destruction of old buildings provided the owners the opportunity to construct even higher buildings (Figure 7.14). The safety of the houses in these areas is not only dependent on the quality of construction but of the neighbouring high-rise commercial buildings also. This concern was shared by many residents of these cities.

Figure 7.14: Newly constructed multi-storey buildings in the congested old city area of Muzaffarabad. Notice narrow street and addition of new storeys on an old dilapidated building on the left. (Source: Author fieldwork)

Serious concerns arise about the vulnerability of the housing stock nine years after the earthquake. One doesn't need much engineering knowledge to notice that not all structures are fully safe. Kazmi *et al*. (2012) fear that due to construction flaws that they noticed during their research in the earthquake affected areas, any future seismic activity in these areas could be as devastating as the 2005 earthquake. A study conducted by the NDMA on Muzaffarabad City's Earthquake Scenario has also calculated the same level of damage in case of a future earthquake scenario. According to this study 14,240 buildings were surveyed in Muzaffarabad city. The study concluded that in the case of a future earthquake, 10% of buildings will collapse, 30% will suffer heavy damage, 44% will be moderately damaged and about 15% will suffer none to slight damage (Table 7.3) (NDMA 2009a). This study was conducted in 2009 and the housing stock has increased even more since then. In terms of number of deaths expected in this scenario, the death toll would be about 50% lesser than in 2005 earthquake.

Table 7.3 Casualty estimation for Muzaffarabad city in case of future earthquake.
(NDMA 2009a, p. 30)

Time	Morning	Day	Evening	Night
Total Population	95,951	86,002	96,335	104,969
Injury	10,961	8,915	11,079	12,295
Death	2,361	1,995	2,394	2,750

I have discussed this issue with key informants and house owners during my fieldwork and they were asked how much damage they expected in case of an earthquake in the future. Most of them agreed that the vulnerability of the housing stock was still an issue; they were of the opinion that in case of a future earthquake of a similar magnitude there would be 30%-50% less damage than occurred in the 2005 earthquake. As observed by a resident of Muzaffarabad city (Key Informant-17) *"if we have made certain things better in certain areas, we have created new vulnerabilities in certain other areas"*.

7.5. Landslide Activity in the Study Area in 2014

During my fieldwork in 2014 some landslide events happened in the study area which highlighted the vulnerability of the housing stock once again. These landslides started in different areas of Muzaffarabad and Bagh Districts in February/March 2014 after days of heavy rain and snow. Local newspapers repeatedly published news of damage to houses and the threat to populations in *Naseerabad, Karrli* in *Chakar* area, *Lohar Gali* in rural Muzaffarabad, *Tariqabad* area of Muzaffarabad city, and in some areas of Bagh Districts. I visited *Maldrah* village in Bagh District but could not identify a significant landslide hazard. I visited all four places in Muzaffarabad District also. In *Naseerabad*, two adjacent settlements of *Nallan Katha* and *Mohalla Bajjar* of *Kanoor* area were particularly at risk. This area is highly mountainous and very narrow. The two villages are located at the height of about 1500 meters ASL.

Nallan Katha is located along two parallel mountains and has about 80 houses. About 16 houses were under threat of rock fall from mountain top on the eastern side of the mountain. According to local residents and officials of administration in *Naseerabad,* this mountain was destabilised during the 2005 earthquake and minor incidents of rock fall had occurred since then; however major rock fall activity started recently after heavy rains and snow. Since this area was close to the epicentre, almost all the houses were destroyed in the 2005 earthquake. These houses were replaced by seismic resistant *pukka* houses during the reconstruction programme. However *kacha* construction is reviving in this area again; *kacha* rooms have been added with almost every *pukka* house and there were even some fully *kacha* houses in this area as well. I visited one such *kacha* house which was damaged by debris about 1500-2000 meters above in the mountain (Figure 7.15). According to the owner his house was destroyed in the 2005 earthquake and he constructed a *pukka* house further up in the mountain, which he uses during summers. He has also constructed a *kacha* house here, which he uses in winters. He told me that the AI Team did advise them to construct their houses at a safer location but they had no choice because they had no land elsewhere.

Figure 7.15 Inspecting *kacha* house damage by a tree which rammed into the wall in village *Nalla Katha*.

(Source: Author fieldwork)

Mohalla Bajjar is situated on the northern side of the same mountain on a relatively flatter piece of land. There are about 200 houses in this locality. According to residents, about 80 houses were at immediate risk. There were huge boulders scattered nearby, which people said had rolled down form the mountain top, but luckily they didn't reach the houses. I met the Assistant Commissioner *Naseerabad* who reported that about 60 families might get relocated because of this risk.

I visited *Karli* area in *Chikar* the next day. It is located at about 1600 meters ASL. The area is under significant landslide threat and is situated near *Zilzal* Lake (*Hattian Bala* Lake) which was formed by a massive landslide in the 2005 earthquake (Dunning *et al*. 2007) which blocked the stream passing through the area. This area was severely damaged during the earthquake. Most of the houses were *kacha* which collapsed immediately. Seismically resistant *pukka* houses were constructed as a result of the housing reconstruction programme. Unfortunately about 200 houses were damaged again in the flood in 2010 from the *Zilzal* Lake failure. The water of the lake receded and a further landslide was triggered. According to residents the government announced compensation of 400,000 rupees and alternate land for each damaged house but these promises never materialised. People constructed their houses again at this hazardous location with their own resources. It was for the third time in 2014 that about 350 houses were once again under threat due to landslide activity. About a dozen houses were damaged by debris flows and many more were directly in the line of land sliding (Figure 7.16).

Figure 7.16 Landslide hazard in Karrli Muzaffarabad (within yellow lines showing the limits). Houses directly under the landslide can be seen. (Source: Author fieldwork)

A few dozen families were already displaced and were living in nearby houses, which were also in danger. Local people were understandably too worried. A local said *“Allah had given us five years; don’t know how much time we have”*. The local administration reported that they had set up a relief camp and some families had shifted there whilst others had moved in with friends and families at safer places nearby (personal communication).

The *Lohar Gali* area is about 10 KM west of Muzaffarabad city. A small locality of about 100 houses called *Mughal Mohalla* was facing danger due to landslide activity. This locality is situated along the ridge of the mountain. Residents of the area told me that the landslide hazard was generated because of earth cutting about 500 m downslope for a major road about forty years ago. The road remains blocked frequently since then due to landslide and the Highways Department keeps cutting the mountain to keep the road clear. This landslide has become more active since the 2005 earthquake. Heavy rains in 2014 had worsened the situation even more and a major portion of the mountain had started to move, causing about 80 houses to develop cracks. I could see large cracks in the ground during my visit. I visited about 20 houses and 11 of them were in immediate danger of collapse (Figure 7.17). Many of these houses were reconstructed after the earthquake but they face further danger now.

Figure 7.17 A house facing immediate collapse due to landslide in Lohar Gali area of Muzaffarabad District. *(Source: Author fieldwork)*

Tariqabad area in Muzaffarabad city was also facing landslide hazard. This area was one of the worst hit during the 2005 earthquake. Situated on steep slope, this locality has seen an unplanned and irregular development for mostly low income people who migrated to the city from rural areas during last forty years or so. Due to a lack of basic infrastructure and low incomes this is one of the most vulnerable areas of the city. Unfortunately unplanned construction has increased here after the earthquake. Hundreds of new houses have been constructed without any planning permission and this practice continues unchecked. I have seen gradual increase in population in this area since 1991, but the development after the earthquake is not only unprecedented but alarming. There is a mix of housing stock in this area; *pukka* houses (both reconstructed and new), repaired houses, government provided pre-engineered structures, shelters, and damaged structures.

A big landslide has developed in the middle of the locality. Although the civic authorities say that this landslide has developed due to illegal and unplanned construction over the years in the water course which block the flow of storm water, local residents claim that the main reason is road construction by the civic authorities (personal interviews). Dozens of houses are at risk due to this landslide. I visited the area and interviewed some residents who were under immediate threat of landslides. All of them said that the only cause of landslide was earth cutting for road construction. Figure 7.18 shows some of the houses. I interviewed a lady here whose house had slid down many yards and she was living in a tent pitched on the heap of debris. She told me that the road work by the development authority was the cause of this damage.

Figure 7.18 Houses facing grave danger due to landslide. People are still living in these houses. (Source: Author (fieldwork)

The above mentioned incidents highlight the fact that although seismic resistant houses have been constructed in the study area under the housing reconstruction programme, people of many places are still vulnerable to local hazards. Massive damage to housing stock in the case of a major earthquake in the future cannot be ruled out.

7.6. Reworking of the Family and Landownership Patterns

Improvement in the quality of housing stock in the earthquake affected areas was the direct impact of the housing reconstruction programme; however this programme had some indirect outcomes as well. Reworking of the traditional family system and land ownership pattern are two such impacts.

7.6.1. Reworking of the Family System

It was the policy of the Government of Pakistan at the start of the reconstruction programme to award one compensation package per damaged house irrespective of the number of families living in that house (called *"aik chhat aik muawaza",* literally meaning one roof one compensation). Very soon the issue arose that in many cases more than one family lived in a house so it was unfair to give only one set of compensation to many families. In response the government changed the policy and decided to also give compensation to those people who could prove themselves to be a separate family living under one roof; however it was required that a separate house should be constructed with that money. According to the SERRA, about 70,000 additional houses were constructed at the completion of the housing reconstruction programme (personal communication). It is interesting to see to what extent the addition of these houses has impacted upon the traditional family system in these areas. 200 house owners were asked what their family system was before and after the earthquake.

Figure 7.19 shows that the family system was almost identical before the earthquake in rural and urban areas; nuclear family 74% rural, 73% urban and joint family system 26% rural and 27% urban. This composition is interesting because it is widely believed that joint family system is more prevalent in rural areas and nuclear family system is more prevalent in urban areas. However, this composition has dramatically changed after the earthquake; the percentage of nuclear families has increased by 20% (from 74% to 94%) in rural areas and has decreased by 4% (from 73% to 69%) in urban areas. The percentage of joint family system has decreased by 20% (from 26% to 6%) in rural areas and has increased by 4% (from 27% to 31%) in urban areas.

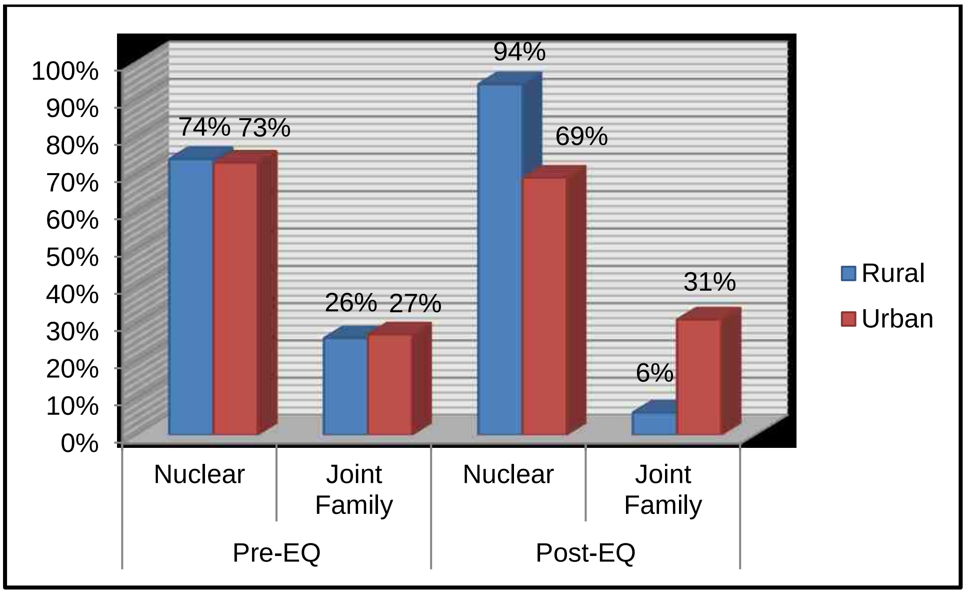


Figure 7.19 Family system in the study area before and after the earthquake.

Almost all the house owners whom I interviewed during my fieldwork agreed that the joint family system was broken to a great extent after the reconstruction programme, *"Yes people have separated. My son was living with me before the earthquake but he got separate compensation and has made his own house now"* (MR-35). The above graph was shown to different Key Informants, house owners, and focus group discussion participants during my second period of fieldwork.

Almost all respondents agreed with the findings shown in Figure 7.19; however some respondents were of the opinion that the drop in the percentage of joint families in urban areas was not as big as shown. The respondents were asked what they thought was the reason for the increase in the percentage of joint families in urban areas. All respondents were of the opinion that limited land and high construction costs in urban areas were two of the main reasons. They told me that land was limited and too expensive in urban areas and it was not possible for the already impacted families to buy land and build separate houses. The construction cost was also higher so people pooled the compensation money and built multi storey houses and continued living as joint families. Even those people who were living as a nuclear family before the earthquake and could not reconstruct their damaged house moved in with their extended families. I met a house owner in Bagh city who told me that he and his brother were living as a joint family before the earthquake, their house was destroyed in the earthquake and they moved in with their uncle. Now four families were living in a house where there used to be only one family before the earthquake: *"We got two compensations for partially damaged house whereas our house was fully damage……..we cannot construct a new house so we moved in our uncles' home…….we are four families living here. Every brother has one room each"* (BU-18).

Another reason for this difference between rural and urban areas could be due to the difference between the implementation of housing reconstruction policy. AI Teams were responsible for the monitoring the housing reconstruction in rural areas and were supposed to visit every house to ensure construction (Chapters 2 and 5). So whoever received the compensation in rural areas had to construct the house as well. In urban areas the house owners were given a lump sum of money after getting an affidavit that they will construct their house according to seismic resistant codes after getting planning permission from relevant civic body. However, there was no system to check whether the house was actually constructed or not. I have already discussed that the percentage of reconstructed houses was far less in urban areas as compared to rural areas (Chapter 5).

Results demonstrate that the family system prevalent in the study area at the time of the earthquake has been greatly impacted by the housing reconstruction programme; although split families have not moved to different areas, they live in the same compound but they now have separate houses and live as separate families. People have mixed views about this change, some think it is a positive change but some do not appreciate it and feel nostalgic. There are socio-economic implications of this change as well which are not in the scope of this study. However, one major positive outcome of splitting of families is the safety of the residents. One of the major causes of high mortality rate was that too many people were living in single houses and when that house collapsed many people died. Now the housing units are smaller with fewer residents so causalities should be reduced in future. This was the intention of the government. Some house owners also pointed out this fact during semi-structured interviews. Some top ranking officials, who had remained associated with the housing reconstruction programme, were surprised to see these results, but were of the opinion that it was never the intention of the reconstruction programme to break the prevalent family system.

7.6.2. Reworking of the Landownership Pattern

Up-to-date land records, especially landownership records, are very important for any society. They can be effectively used for policy decisions and the implementation of these decisions, timely disposal of court cases, effective tax collection, and land reforms (Himachal 2015; Prakash & De' 2007). Above all it assures a person’s right to their property (New England 2015) so it saves people from disputes and unnecessary litigation and tensions.

The landownership record in the earthquake affected areas has not been updated for decades before the earthquake (Key Informant-5). Though households had divided property verbally amongst themselves, the land record had not been updated. Thus there were many cases where owners couldn’t sell their land on time because of legal issues (*ibid*). The issue of entitlement also emerged when the housing reconstruction programme was started after the earthquake of 2005. Affected people faced difficulties in getting Housing Cash Grants because they did not have written proof of landownership (*ibid*). People realized the importance of updating records and started getting land ownership transferred in their name in order to get compensation. The ERRA and other multilateral development agencies involved in the reconstruction work were aware of the importance of the updating of the land records and encouraged it. The government also took special measures to facilitate the process.

I have used data of ten years (2004-2013) of the hereditary land ownership transfer (called *"Warasti Inteqal"* or *"Mutation"* in technical language) of District Muzaffarabad and District Bagh to see if there was any change in the rate of land ownership transfer. These data were acquired from Commissioners of Muzaffarabad and Poonch Divisions. Figure 7.20 was generated with these data which shows an unprecedented increase in the number of *Warasti Inteqal* in Bagh and Muzaffarabad districts in 2006 when the housing reconstruction started.

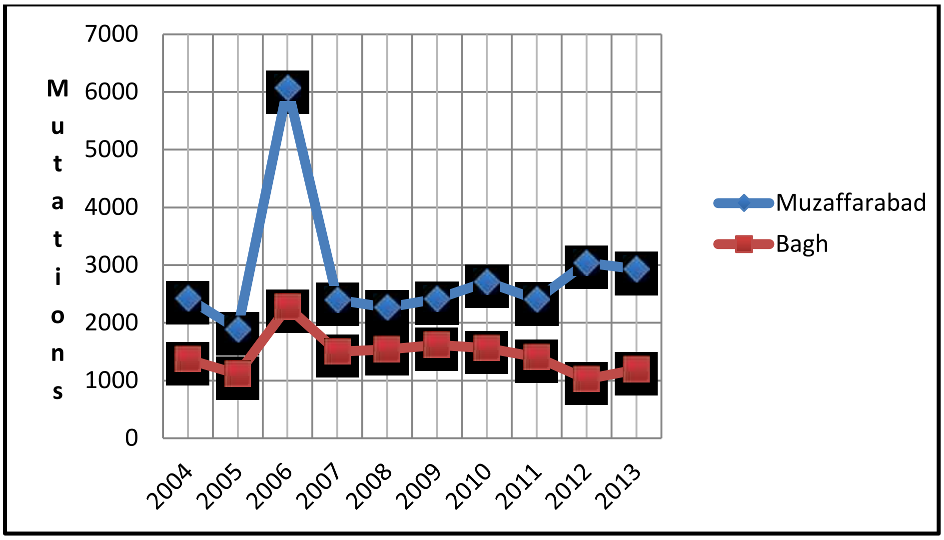


Figure 7.20 Number of hereditary landownership transfers in study area.

(Source: developed by the author based on official data)

Deputy Commissioner of District Bagh (the person responsible for updating and keeping of the land record) agreed that there has been serge in hereditary mutations soon after the earthquake. According to Key Informant-5 (high official of a multilateral development bank) who headed the reconstruction portfolio after the earthquake, it was a very positive development that the land record had been updated: *"previously many people did not have property in their name but now they have. Now they realize that this is something that needs to be updated………. It will go a long way in future for other projects as well*". It will hopefully greatly reduce disputes in a society in which, according to a local axiom, there are three reasons of enmity; *"zan, zar, aur zameen"* (woman, wealth, and land) and empower families to utilize their property according to their wishes and needs.

I also asked the households about landownership before and after the earthquake. Quantitative data of 200 households, collected through survey questionnaires from the field, also indicate changes in the landownership pattern at household level (Table 7.4).

Table 7.4 Change in the landownership pattern at household level in study area.

Type of Ownership	Pre-earthquake	Post-earthquake
Not Owned	0.5%	0.5%
Head of Family	47.0%	51.5%
Wife	1.0%	2.5%
Husband	16.5%	12.5%
Father	33.0%	23.5%
Mother	0.0%	0.5%
Son	0.5%	4.5%
Brother	0.0%	0.5%
Daughter	0.0%	0.5%
No Reply	0.0%	2.0%
Missing	1.5%	1.5%

(Source: Author fieldwork)

There is an increase in the percentage of land ownership by the *Head of family* (from 47% pre-earthquake to 51.5% post-earthquake) because the number of families has increased due to the increase in the number of nuclear families (Section 7.4.1). A positive change, though not too big in terms of figures, is that the ownership has increased in the case of women. In the case of wives it has increased from 1% to 2.5%, in case of daughters from 0% to 0.5% and in the case of mothers it has increased from 0% to 0.5%. This could perhaps be due to the reason that the male head of the family died and the male child was a minor so the ownership went to the females. However, this is a positive change because before the 2005 earthquake, there was no practice of giving women their share in the property although Islam makes it mandatory to give share of property to women also.

7.7. Summary

This chapter was focused on the impact of the housing reconstruction programme in the study area after its completion in 2010. Three impacts were evaluated in this chapter. The first was the impact on the sustainability of the seismic resistant construction. It was found that the sustainability of the seismic resistant construction was an issue due to the lack of building control mechanisms in rural areas and weak building control in urban areas. People have started to either revert back to pre-earthquake construction practices or have modified the seismic resistant designs without any technical input from qualified engineers. UN-Habitat tried to convince the Government of AJK to institutionalise building control in rural areas. A proposal was submitted to the Government through the Local Government & Rural Development Department, but it could not get through due to unknown reasons.

The second impact that was evaluated was on the vulnerability of the housing stock. Two types of housing stock were discussed in this section. One was the housing stock built during the reconstruction programme and the other was housing stock being added post-reconstruction programme. It was discussed that literature was divided on the quality of the reconstructed houses, the ERRA and other organizations reported that more than 96% reconstructed houses were seismically safe whereas some writers have pointed out flaws in these structures. These contesting claims could not be verified because technical evaluation of the structural strength of the reconstructed houses was not within the scope of this study; however based on the literature on the subject and the qualitative data collected during fieldwork it was found that since there was an official inspection and monitoring system to ensure the construction quality in rural areas the likelihood was that these houses were compliant with seismic standards, though local level hazards and addition of poor quality structures with them did pose challenge for these structures.

Safety of the reconstructed houses was found to be a big issue in urban areas due to weak control by the city authorities. It was found that most of the houses in urban areas were constructed without any planning permission and supervision. The city authorities were not sure about the exact number of reconstructed houses, or their quality. Safety of repaired houses and violation of the Master Plan in cities were also major concerns. In case of housing stock being added post-reconstruction programme, it was found that in rural areas the quality of these structures was highly doubtful due to the absence of building control mechanism; in urban areas lack of enforcement of building regulations, construction in Red Zone, and construction on steep slopes and in watercourses have become major safety issues. It was also discussed that the landslide activity in different areas of Muzaffarabad district has raised concerns about safety of the housing stock. It was concluded that despite being a big wake-up call (in the shape of earthquake), technical knowledge (of the seismic hazard and safe construction techniques), good reconstruction experience, and capacity building (of the civic bodies) the vulnerability of the total housing stock was still a big issue in the study area even after the reconstruction programme ended.

The third impact which was evaluated was the reworking of the family system and the landownership pattern. It was found that the pre-earthquake family pattern was differently impacted in rural / urban contexts. In case of rural areas the percentage of nuclear families had increased after the reconstruction; whereas in urban areas the percentage of joint families had increased and the number of nuclear families had decreased. As regards landownership pattern, some positive changes were noticed. It was found from the official data that pre-earthquake practice of not transferring hereditary ownership was markedly changed with the start of the housing reconstruction programme, in order to claim housing compensation. It was also found from the fieldwork data that the pattern of landownership within the family had also been impacted and those members of the household who previously did not own property rights were given ownership. The most positive change was that more women now owned property.

CHAPTER 8: SHARING THE FINDINGS WITH RESPONDENTS

8.1. Introduction

This chapter discusses my research findings and themes presented in the previous chapters. Several indicators have been used to examine the performance and impact of post-disaster housing reconstruction in the study area. Qualitative and quantitative data were collected and results were generated to evaluate the performance indicators. These findings were shared with most of the respondents (from whom I had collected data earlier) to obtain their feedback during my second period of fieldwork in January 2015. This chapter builds mainly on this feedback, my personal experience and observations, and also upon literature related to this topic.

Section 8.2 summarises the key findings of this study which were presented to respondents during fieldwork and then their feedback is discussed. Section 8.3 discusses the lessons learnt from the experience of housing reconstruction programme and recommendations for future disasters. In Section 8.4, I outline my opinion about the performance of the post-2005 housing reconstruction programme vis-a-vis other disasters before and after the 2005 earthquake.

8.2. Study Findings

This section discusses how respondents of the second fieldwork viewed the study findings and how these findings map onto the housing reconstruction policy of the Government of Pakistan and the existing knowledge on the subject.

8.2.1. Vulnerability and its Causes

By deducing from Collins (2009) ‘disaster and development approach’ and Wisner et al. s’ (2004) PAR model, I have identified four types of vulnerability which were responsible for massive damage in AJK: geological vulnerability, physical vulnerability, environmental vulnerability, and socio-economic vulnerability (Chapter 5).

i. *Geological Vulnerability*

As regards geological vulnerability, the study area is situated in a seismically active zone. There are many active faults in the study area and elsewhere in the region (See *figure 1.1*). This type of vulnerability is permanent and is expected to cause major fatal seismic events in the future (Bilham 2004 2009; NDMA 2009). The $M_{w=}8$ earthquake on 26th October 2015 in the Hindu Kush region in Afghanistan is a reminder of this stark reality.

This study has found that despite suffering immense losses in the 2005 earthquake, the pre-earthquake ignorance of seismic hazard in the study area has been replaced by a general attitude of obliviousness and fatalism on the part of the authorities and the people alike. Many respondents of my field surveys admitted that people have already forgotten the earthquake to a great extent and in another ten or twenty years it will completely fade from their memory. Many suggestions were put forward to the government after the earthquake to include the subject of disaster studies in the school and college curricula, but unfortunately nothing has been done even after a decade. This study highlights that the only way to deal with natural hazards is to know them, remember them, and be prepared for them; not fatalism and apathy towards them.

ii. *Physical Vulnerability*

This research found that poor quality construction was the main feature of physical vulnerability (Section 5.4.2). Unfortunately it has also been found that some of the main causes of physical vulnerability such as *kacha* construction, poor quality construction, lack of building control mechanism, and construction on marginal locations have not been addressed yet (see sections 7.3 & 7.4). Most of the respondents agreed with this finding and expressed their concern about this situation.

iii. *Environmental Vulnerability*

In the case of environmental vulnerability, by drawing from Collins (2009) Wisner et al. s' (2004) PAR model, this study identified deforestation and excessive road construction activities as some of the main reasons for generating landslides which contributed towards damage to the housing stock at local level (Section 5.4.3). Illegal cutting of trees still continues in the study area. Local newspapers regularly publish reports of deforestation at the hands of timber industry in collusion with the Forest Department. Road construction also continues, with renewed resolve of the government to invest more and more in this sector. Hundreds of kilometres of new roads are being planned every year. The impact of construction of so many roads on already destabilized mountains is not difficult to imagine. These findings were mostly agreed by the Key Informants and focus groups participants in their feedback.

iv. Socio-economic Vulnerability

The negative impact of disasters on livelihoods is well documented in the literature (see for example, Cannon 1994; Pomeroy *et al*. 2006; Twigg 2006). According to Cannon (1994, p. 27) the impacts of hazards may create 'newly impoverished people' who have lost their already meagre resources. My study found that poverty is one of the main reasons for poor quality construction and settlement on both steep slopes and marginal areas of land in the study area. In the ten years since the earthquake the financial condition of the people in the study area has not improved and the poverty related pre-earthquake construction patterns have intensified. My study also found that the livelihoods of the people have been negatively impacted by the earthquake and the financial condition of most of the surveyed households has deteriorated (See *Figure 7.3.3.3.*). Majority of the homeowners and key informants claimed that their financial condition has deteriorated after the earthquake, especially those people who were disabled due to earthquake injuries. I interviewed five such people who had lost their pre-earthquake livelihoods due to disability and were living in impoverished conditions. The official figures also suggest that the unemployment rate has risen from 6.5% per annum in AJK in 2005 (P&DD 2006), to 14.4% in 2014 (P&DD 2014). However, some key informants (especially those working for the government) fervently contested the findings and claimed that the financial condition of the majority of the people has improved after the earthquake; though they don't have official figures to prove this assertion.

Although poverty is not the only cause of disaster vulnerability, the importance of sufficient and reliable livelihood sources in reducing vulnerability cannot be underestimated. Restoration of livelihoods in post-disaster recovery becomes even more important because most of the people have their livelihoods impacted, lose their savings or spend them on other needs and hence find it difficult to restore livelihoods without government help. Middleton & O' Keefe (1997) have also highlighted the importance of the restoration of peoples' livelihoods through disaster relief. Schilderman & Lyons (2011) observed that the reduction of people's vulnerabilities requires more than just better housing; rebuilding of people's livelihoods, restoration of local markets and social networks and involvement in decision making are important factors in addressing vulnerability. In the case of the study area, the ERRA did provide some livelihood support after the earthquake through Livelihood Cash Grants for the poor, provision of seeds and farm animals to farmers and cash-for-work activities (ADB 2006; ERRA 2011b; Heltberg 2007) in certain areas. However, these initiatives were for a limited time and had limited beneficiary coverage. Twigg (2006, p. 5) also observed similar steps in disaster situations elsewhere and found that livelihoods support in disaster response is 'largely confined to support for agriculture and food security – for example, distribution of cash, seeds and tools as part of agricultural support packages – or to providing short-term assistance through food-for-work and cash-for-work projects' and meet limited and immediate needs of the people rather than 'replenishing livelihood assets in general'.

In the case of the study area, the Government of AJK should have taken steps to further improve upon the initiatives of the ERRA and should have continued them once the reconstruction was over. Though many respondents agreed with my findings, many people in the study area argued that billions of rupees were pumped into the local economy during the early recovery and reconstruction phases and this money must have provided immense earning opportunities for local people and hence improved their financial conditions. Davis (2010a) has also found that the owner-driven reconstruction has benefited people in livelihoods development in the study area. Evidence of this is however lacking.

My experience is that the affected people couldn’t benefit from these opportunities for two reasons. The first reason is that soon after the earthquake people were focused on immediate response; they had lost their loved ones, they had to look after the injured, their homes and livelihoods were destroyed, and they were traumatised. They neither had the financial resources nor the time and emotional stability to benefit from earning opportunities; they found it easier to get relief goods and aid instead. This gap was filled by outsiders; business opportunities were availed by people from the Punjab and NWFP provinces and employment opportunities in relief activities were mostly taken over by people from the NWFP province, which already had experience of working in Afghan refugee camps since the 1980s.

The second reason is that during the reconstruction phase most of the people remained focused on the reconstruction of their homes, such that they could not benefit from employment opportunities provided by widely available in wider reconstruction work. Cuny (1983) also observes that peoples’ livelihoods are disrupted during disasters because they have to leave their jobs and get involved in disaster-related activities. In the case of study area the reconstruction jobs were again filled by outside labour, contractors, and professionals; though some local businessmen and educated people did benefit from some opportunities. However, a widespread and sustained benefit of these opportunities to the local population is unlikely in my opinion. I agree with Pomeroy *et al*. (2006, p. 792) that livelihood rehabilitation should not mean giving people jobs only; it should address ‘*fundamental social, economic and environmental reforms that affect… communities and livelihoods*’.

Analysis of results in this study suggests that the relationship between development and vulnerability is evident in the case of the study area. The development policies of the Government of AJK also contributed towards creating the above mentioned vulnerabilities (see Section 5.5). Qurentelli (2003) highlights the importance of commitment on the part of policy makers to give disaster planning top priority in their agendas. Collins (2009, p. 22) also suggests that all ‘the stages of the disaster management cycle require sustainable development solutions if disaster risk is to be reduced.' In the study area the pre-earthquake lack of disaster mitigation measures has not improved significantly and hardly any investment has been made; for example, there is no provision for the State Disaster Management Agency in the AJK budget. According to El Masri & Tipple (2002, p. 162) two lessons are important for effective disaster mitigation: the first is that disasters must be seen as 'unresolved development problems' or 'failures in development' so disaster mitigation should 'address the ongoing socioeconomic processes which marginalize people and increase their vulnerability'. The second lesson is that apart from technological solutions, disaster mitigation should be based on a wide range of measures including 'engineering devices, land management, social regulation and economic improvements' (*ibid*). Qurentelli (2003) also suggests that disaster mitigation should be made part of development planning.

My study also argues that there is a relationship between development and disaster vulnerability and the development policies should aim at addressing vulnerability. Development is a holistic term which encompasses sustainable and equitable economic development (or in McEntire *et al*.'s 2002, p. 271 words *"invulnerable development"*), sustainable infrastructure development, social protection, disaster mitigation and good governance (Avellaneda 2009). While discussing the relationship between development and disaster vulnerability Collins (2009) has also highlighted the importance of sustainable development which gives priority to disaster mitigation because 'development may be both part of prevention and also part of response' in a society (*ibid*, p. 27). The importance of sustainable and responsible development, which in the terms of Collins (2009, p. 28) is the 'right type of development' cannot be underestimated because this type of development 'in the pre disaster stages can prevent as disaster…………..Appropriate development can provide the means to avoid disasters, mitigate their impact or aid in sustainable recovery once one has occurred' (*ibid*).

This study found that the pre-earthquake development policies, which led to disaster vulnerability (i.e. heavily skewed towards building roads, environmentally unsustainable and lacking in livelihoods improvement and diversification) still continue in AJK. For example, the throw-forward in AJK in 2014-15 budget in the roads sector is 30,726 million rupees (equivalent to the 6 year budget of the roads sector) which reflects overwhelming concentration on infrastructure development, perhaps at the cost of other important issues such as livelihoods and disaster mitigation. This observation was shared with some key policy makers during my second fieldwork and they endorsed my concerns.

A lack of transparency discourages accountability of the policy makers and also promotes corruption in governance structures (Ahrens & Rudolph 2006) resulting in bad governance. Bad governance not only negatively impacts institutions, it 'predisposes to increased impacts of disasters or can directly cause a disaster, such as when building regulations are not in place, investments are not made in preparedness for emergencies or where aid and relief are corrupted' (Collins 2009, p. 8). The governance has been weak in AJK which resulted in ineffective building control in urban areas and also impacted the development practices of successive governments (see Section 5.5). Unfortunately inefficiency, corruption, political interference, and weak governance have increased after the 2005 earthquake (I do not have empirical evidence but I base this assessment as being part of the governance system myself; this issue had been a topic of passionate discussions during my two periods of fieldwork and most of the people I met shared their concerns). Figure 8.1 shows a "Good Governance March" in Muzaffarabad by those government employees who feel frustrated and marginalized due to corruption and poor governance. The banner displays three main points: Merit, Justice, and the Rule of law.

The job of the ERRA was to restore the earthquake damages only, but the governments in AJK should have made structural changes in the governance system to address those socio-economic and structural issues which caused disaster vulnerability in the first place. Until this is done, people will remain vulnerable to future disasters despite undertaking a huge reconstruction and rehabilitation programme. According to Pomeroy *et al*. (2006, p. 792) rehabilitation must 'seek to address the root causes of vulnerability'. Cannon (1994, p. 13) also highlights the importance of considering the 'social and economic systems that both generate vulnerability and determine the type of interventions' in rehabilitation and disaster mitigation activities.

Figure 8.1 Good Governance March in Muzaffarabad by Azad Jammu & Kashmir Gazetted Officers Association on 2nd June, 2015. (Source: The Daily Mahasib 2015)

v. Disaster as a Window of Opportunity

It has been discussed in this study that although environmental disasters cause death and destruction, they have a positive side as well and provide a window of opportunity to undo past mistakes and address disaster vulnerability through better reconstruction (see Section 3.6).

This study found that the Government of Pakistan did take the 2005 Kashmir as a window of opportunity and decided to *'convert the adversity into an opportunity'* and rebuild the lives of the affected people (ERRA 2012). The whole post-earthquake reconstruction and rehabilitation programme revolves around the theme of 'Build Back Better' (ADB 2010; ERRA 2012; IDB 2014). The owner-driven housing reconstruction component of the reconstruction programme attempted to make full use of the opportunity provided by the earthquake. More than 86% of the housing stock in the study area was damaged (Chapter 5) and efforts have been made in the housing reconstruction programme to address some of the causes.

Almost all poor quality and *kacha* housing in the rural areas (which make up 88% of the study area) has been replaced by good quality seismic resistant housing (ADB 2012; ERRA 2011a; Leersum & Arora 2011). Affected homeowners and artisans were given training in seismic resistant construction and they practised these skills in the construction of their homes

(Davis 2010a). The pre-earthquake ignorance of seismic hazard has been addressed through extensive public awareness campaigns by the ERRA. In the case of urban areas, seismic hazard micro zonation was undertaken for the first time in the history of the study area to make people and authorities aware of the danger at the micro level. Hazard sensitive master planning of the urban areas was done and seismic resistant building codes were introduced for the first time. However, enforcement and sustainability of these initiatives remains an issue. Based upon my experience of working in the study area for more than two decades, I can say that the post-2005 housing reconstruction programme has utilized the opportunity in a far better way to improve things as compared to the past or later disasters in the country. This viewpoint was agreed by almost all respondents during my second fieldwork.

8.2.2. Progress of the Housing Reconstruction Programme

My research found that the ERRA reports and most of the other literature (mostly grey literature) report the progress of the post-2005 earthquake housing reconstruction programme in geographical terms only i.e. the total number of reconstructed houses in the earthquake affected areas. These figures do not show the whole picture of the reconstruction and rehabilitation status. In contrast I have evaluated the performance of this programme in three contexts: geography (rural and urban), economics (across different income groups), and social (female-headed households) to evaluate progress in a more comprehensive manner.

i. Geographical Context

This study finds that overall 78.5% houses have been reconstructed, not 96% as claimed by the ERRA. I note though that if this figure is for rural areas only then there is not much difference between the findings of my study and the official figures. The fieldwork survey results showed that rural areas have seen more successful housing reconstruction progress than urban areas; 94% of respondents have reconstructed their houses in rural areas while only 63% of respondents have been able to reconstruct their houses in urban areas (*Figure 6.3*).

This finding was presented before three focus groups held in the study area during the second leg of my fieldwork. All participants of focus group in Bagh agreed with the progress depicted in the graph (*Figure 6.3*). In the case of the focus group in rural Muzaffarabad one participant agreed with the graph, whereas four participants did not agree and were of the opinion that the progress in case of rural areas was not more than 90% (as opposed to 94% shown in the graph).

In the case of the focus group in urban Muzaffarabad, five participants agreed with the progress figures, one participant was of the opinion that the overall progress and rural areas' progress should be higher, and another was of the opinion that progress in the case of urban areas should be higher than shown in the graph. All these respondents also agreed with the finding that the conditional cash grant, assistance and inspection regime, and the focus of the NGOs are the major contributing factors of better progress in rural areas; whereas higher construction cost, lengthy master planning process, transitional housing, and limited land are the main reasons behind slow progress in urban areas. A former Director General of the SERRA said "*master plans, limited land, and cost of construction are three major factors that impacted the progress in the urban context but, in my opinion, the cost was the major factor"* (Personal communication). A former Deputy Chairman ERRA also agreed with this finding (*ibid*).

Literature on this subject also corroborates my findings. For example, Mumtaz *et al*. (2008, p. 82) observed that the owner-driven approach adopted in the case of post-2005 earthquake in Pakistan has *'expedited the construction pace'* in rural areas but the '*same could not be the case in urban reconstruction due to different socio-economic regime, legislative system, land and planning issues'*. Qazi (2008, p. 132) noted a *'rural bias'* amongst the humanitarian community and lack of progress in urban areas resulting in frustration among the affected people of urban areas. Stephenson (2008) also observed that the urban residents did not have the level of help and support which was available to the rural people. A former Deputy Chairman ERRA admitted that due to the sheer number of damaged houses in rural areas his focus was more in these locations; 'o*ur rural housing was managed* *far better than our urban housing, the management was better in rural areas that's why there was better progress in rural areas*' (Personal communication). An official of a multilateral funder of the housing reconstruction programme also agreed that *'the design of the [housing reconstruction] programme was driven by the rural areas because they were the majority and they were massively hit'* (*ibid*).

ii. Economic Context

Since the government had given a uniform housing cash grant package to all house owners (which it claims was sufficient to construct a core house of 400 ft^2) it was expected that the progress of the housing reconstruction should be uniform across all income groups. However, my study found that the progress of the housing reconstruction was impacted by the financial status of the household with different income groups showing different levels of progress of housing reconstruction; progress of construction has a positive correlation with financial status of the household (See *Figure 6.5*).

This finding was presented to three focus groups, eight key informants, and one house owner for their feedback. All the participants of the focus groups, one house owner, and five key informants agreed with the finding. A participant of a focus group in rural Muzaffarabad (who had worked for the UN-HABITAT in the study area) said that the reason for low progress in the case of very poor category was the changes in policies of the ERRA; for example initially only frame structures were allowed but later *Dhajji-dewari* was also permitted. He said that at certain places he had seen three different types of plinths for one house; this not only confused the house owners but increased the cost of construction also. Another participant noted that he did get the housing grant but couldn't complete his house because he has six children and has a lot of other needs to spend the money on.

Key informant-1, who is a former Deputy Chairman of the ERRA, gave similar reasoning and said that the poor had other needs as well as housing so they "*may have spent the money elsewhere"*. Key informant-2 (a former Programme Manager Housing of the ERRA) tried to explain this issue in great detail and said that it was not that the very poor were totally ignored;

the ERRA started the Livelihood Cash Grant programme and other income generation programmes for the poor. He tried to justify the amount of housing cash grant, *“this amount of 175,000 rupees was never meant to and never supposed to meet the whole cost, it was never meant to. It was a support, it was a subsidy”*. He said that it was possible that the *‘Very Poor’* income group had used the Livelihood Cash Grant and some money from other sources to reconstruct their houses but the remaining people were so poor that they couldn’t do it. He admitted that these results/findings highlight that *“some other targeted interventions should have been made within this programme, probably after running the programme for two or three years. Probably we should have given them something more after 175,000 rupees”*.

Key Informant-30, who had worked in the housing reconstruction programme, was of the opinion that there should be a difference in the progress between rural and urban settings within the income groups as well; the progress should be better in *‘Very Poor’* and *‘Poor’* categories in rural areas because it was conditional cash grant and people had no choice but to construct the house if they wanted government money.

This study also found that the amount of additional money spent by the homeowners from their own resources on the reconstruction of their house was exceptionally high in some cases (See *Table 6.10*). I had no explanation for this finding so discussed it with respondents during my second fieldwork. Almost all the participants of the focus groups observed that such a high amount was quoted by the house owners with the hope that they might get some more money in this way. Most of the key informants gave similar explanation; *‘the reason of very high figure of maximum additional money spent on the reconstruction of house could be that they hoped that they will get something’* (Key informant-7).

The impact of financial status of the household on post-disaster housing reconstruction in case of the ODR approach has not been discussed in existing literature.

iii. Social Context

There is a wide consensus that disasters impact genders differently, hence their recovery is also affected (See, for example, Begum 1993; Cannon 2002; Delaney & Shrader 2000; Enarson 1999 & 2001; Enarson & Morrow 1998a, 1998b; Fothergill 1996; Hanan 2002; Hines 2007; Khondker 1996; Neumayer & Plümper 2007; Sapir 1992; Thurairajah 2011; Wiest *et al*. 1992). However, not much is known about gender and reconstruction (Fothergill 1996) and this is particularly true for my study area. Due to the patriarchal family system and the particular socio-cultural makeup of the society that does not encourage women in Pakistan to take part in out-of-the-home activities, I expected lower housing reconstruction rates in female-headed households. Delaney & Shrader (2000, p. 14) have pointed out a similar situation elsewhere stating that *'cultural vulnerabilities such as women's restricted mobility and cultural taboos that prohibit women from engaging in certain activities, such as house construction'.* Interestingly, the results of my field survey showed that female-headed households have shown better reconstruction progress in the study area compared to male-head households (see *Figure 6.6*).

This finding was presented to three focus groups and eight key informants. Participants of all focus groups agreed with the finding and put forward four possible reasons for the better progress. One reason is psychological. The house provides protection and privacy to single women so they preferred to complete their houses first. Enarson & Fordham (2001, no pagination) are of the view that safe shelter is vital for women because *'much of their daily life revolves around the household'*. The second reason is the social support system; people help women and widows in this society so women were able to complete the construction of their houses. The third reason is that NGOs particularly helped widows and single women in the construction of their houses. The fourth reason is that the women are perhaps generally more responsible than men: A female participant of the focus group Bagh said that women were more responsible and everybody supported the widows in the construction of their houses and that's why the reconstruction progress was better in case of female-headed households. A male participant of the same focus group said that men spent their money mostly on income generation activities, especially on buying taxis; whereas women spent their money on housing reconstruction due to their psychological and social need because they felt insecure without a house.

Delaney & Shrader (2000) noticed that in the post-disaster rehabilitation phase men tend to focus more on productive activity and income generation. Some participants commented that some men spent the money on a second marriage, whereas women spent it on construction of their house. Seven key informants agreed with the findings and the reasons mentioned above. Key informant-1 (a former Deputy Chairman of ERRA) agreed with the findings and said that the participation of women in VRCs '*allowed female participation at grassroots level in a very inclusive manner. They were more worried and pushed that their house should be constructed. And they became agent of change as far as housing is concerned in Kashmir…………….. Sense of responsibility in women is far better than men'*. He said that another reason of better performance of female-headed households was that as a policy the ERRA had asked the NGOs to help the vulnerable, especially the women who didn't have able bodied men in their home. He said that there was better handholding of female-headed households as compared to male-headed households.

Key informant-2 (a former Programme Manager Housing in the ERRA) agreed with the finding and said that there was a preferential treatment for female-headed households in the housing reconstruction programme of the ERRA. He said that programme and non-programme factors contributed towards better performance of female-headed households. Declaring FHHs a vulnerable group, construction of model houses for them, priority in inspection, and female-specific housing construction training sessions are the programme factors; whereas psychological and social reasons are the non-programme factors.

Key informant-5, who headed the post-2005 earthquake reconstruction programme in a bilateral funding agency, said that compared to men he had found the women in AJK to be more engaging and proactive in housing reconstruction. His finding was that 80% of the men who were given training in post-earthquake housing reconstruction did not construct houses themselves because of hard labour; whereas many women were found laying bricks and doing hard physical labour. A Key informant, who works in social protection, was surprised to see the findings because in his opinion men were supposed to be more resourceful and responsible in a male dominated society, so the progress of the male-headed households should have been higher than the female-headed households.

Mumtaz *et al*. (2008, p. 81) found the women of the study area 'more dedicated, responsible and sensitive to achieving quality construction' and 'committed to see what they had learned was implemented in their houses'. However, Fothergill (1996) noted that female-headed households suffer more in the reconstruction phase; as happened in case of Hurricane Andrew in the US where the majority of women were without proper housing even two years after the event. Similarly, Delaney & Shrader (2000) also observed that female-headed households, among other marginalized groups, face greater challenges in implementing the post-disaster housing reconstruction projects.

8.2.3. Impact of the Housing Reconstruction Programme

Apart from evaluation of the physical progress of the post-2005 earthquake housing reconstruction programme this study also evaluated the impact of the programme after completion. Three aspects have been evaluated in this study; sustainability of the seismic resistant construction in the study area, impact on disaster vulnerability, and reworking of the family and landownership patterns.

i. Sustainability of Seismic Resistant Construction

The issue of the sustainability of seismic resistant construction is very important in the study area due to high seismic hazard and prevailing status of vulnerability. Adopting seismic resistant construction culture addresses the vulnerability of the building stock to a greater extent. It has been reported by many that the reconstructed housing stock is safe from future seismic activity (see for example, ADB 2010, 2011; 2012; DFID 2011; ERRA 2009, 2010;

2012; Leersum & Arora 2011; Malik 2011; Mumtaz *et al*. 2008; Qasim *et al*. 2010; Qazi 2008; Schilderman & Lyons 2011; Stephenson 2008; UN-Habitat 2009, 2011; World Bank 2010, 2011). This notion is generally believed by the people of the study area as well (personal communication).

The aim of the housing reconstruction programme was to rebuild the earthquake damaged houses in accordance with seismic resistant techniques through *'rebuilding with familiar methods & easily accessible materials – ensuring sustainability and cultural preferences in design*' (ERRA 2006, p. 4). Technical expertise of the international community, international financing, institutional support of the Pakistan Army and effective monitoring by the reconstruction authorities contributed towards achieving this aim. However the real challenge is to sustain it without this support.

This study found that sustainability was an issue in the study area because of the absence of a building control mechanism in rural areas and weak enforcement in urban areas. It has been found that in most cases people have reverted back to pre-2005 earthquake construction practices once the government's reconstruction programme was over.

Sustainability of new construction techniques is an issue in other developing countries also. For example, Jigyasu (2002) also found sustainability issues in the case of post-disaster reconstruction in earthquakes of Marathwada in 1993 and Gujarat in 2001.

I presented my findings on sustainability of seismic resistant construction to different respondents during my second fieldwork. Participants of all focus groups and almost all key informants agreed with the findings and showed their concern over the sustainability issue. A focus group participant from rural Muzaffarabad said that although people still have seismic resistant construction drawings (which were provided by the ERRA and the Army during reconstruction phase), they usually do not follow these designs and try to cut costs by using less steel and poor quality construction materials. He was of the opinion that poverty was not the reason for cutting cost because people spend so much money on *'showiness'* in their houses.

Key informant-5, who works for one of the main funders of the housing reconstruction programme, while agreeing with my findings he didn't believe that seismic resistant construction can be achieved without a control mechanism just through awareness. He was of the opinion that a high level of awareness after the reconstruction programme should have been sustained through efficient and reliable building control mechanisms. He believes that one reason of low disaster risk financing (insurance) in Pakistan is the poor quality of construction; no insurance firm wants to take on these risks. Key informant-21, who has a long political and administrative experience in the study area, observed that the local housing bodies were very weak in the country and proposed that these institutions should be strengthened and made responsible for overseeing the construction of houses in the rural areas. He agreed that the ERRA seismic guidelines were not properly followed any longer. A former Deputy Chairman of the ERRA agreed that seismic resistant construction was not sustainable in the earthquake affected areas without a strong building control mechanism.

The literature on this issue is limited in the study area and mostly does not identify sustainability as a problem. For example, an Asian Development Bank report (ADB 2011, p. 11) observes that the achievements of ERRA's rural housing programme are *'very likely to be sustainable'*. The study used three criteria to determine sustainability: diversity of seismic resistant designs to fit to the needs of the people; capacity of the stakeholders to apply these designs; and the level of adoption: The ERRA rural housing programme fulfils these criteria to a greater extent. Another study (ADB 2012) reports that about 77% of houses constructed with peoples' own money were compliant with seismic standards. Mumtaz *et al*. (2008) also found that the seismic resistant construction is sustainable in rural areas. Leersum & Arora (2011) observed that the practice of SRTs is likely to sustain in the future as well. The DFID Project Completion Review (2011) is silent on the issue of sustainability.

ii. Impact on the Vulnerability in the Study Area

There are two aspects to vulnerability; one is the vulnerability of the housing stock post-reconstruction programme and the other is the overall vulnerability of the people in the study area to future disasters.

As regards the status of vulnerability of the housing stock, my research found that there was no valid reason to question the seismic safety of the houses constructed under the supervision of the ERRA in rural areas. However, the rest of the housing stock i.e. houses reconstructed and repaired in the urban areas without the supervision of the ERRA and the housing stock added in the study area (both urban and rural) post-reconstruction period, may have serious quality issues. As Bilham & Gaur (2013) observed that deaths from future earthquakes can be reduced greatly, without any additional scientific input, by enforcing construction codes. The relationship between settlements on hazardous locations, negligence and corruption of civic authorities and disaster losses has been discussed by many (see for example, Ambraseys & Bilham 2011; Bilham 2008, 2012; El Masri & Tipple 2002).

My research also found that the absence of building control mechanism in rural areas and weak enforcement of building codes in urban areas are the main reasons for poor quality construction apart from an attitude of apathy and carelessness on the part of house owners. The result is an extremely dangerous situation where most of the housing stock is almost as vulnerable to seismic activity as it was at the time of the 2005 earthquake; but with an added false sense of safety (of the buildings) amongst the authorities and people. This study found that unauthorised and illegal construction onto vulnerable sites is adding to the future disaster vulnerability in Muzaffarabad and Bagh cities.

Most of the respondents of the focus groups and key informants agreed with this finding. Key Informant-35, a high-ranking official in the Development Authority Muzaffarabad, informed that there was no survey of the illegal construction in the city after the earthquake but his guess was that about 7000-8000 structures involving approximately 40,000 people have been constructed by people who migrated into the city from rural areas after the earthquake. These new structures are not only constructed on vulnerable locations but their quality of construction is also unknown. He termed this situation as *'a disaster in the making'*. The flash floods in 2014 caused much damage to these structures. The Chairman of National Disaster Management Authority of Pakistan (NDMA) also noted that *'encroachments, poor town planning… and the civic bodies' negligence'* were responsible for this damage (The Express Tribune 2014).

As far as disaster vulnerability of the people in the study area is concerned, my research identified certain reasons for vulnerability (*Section 5.4 & 5.5*). Relying mainly on Collins (2009) 'disaster and development' approach and Wisner et al. s' (2004) PAR model, I have tried to explain how disaster vulnerability progressed in the study area. My research has also found that, unfortunately, not much has been learnt from the previous disaster; most of the past practices, which led to disaster vulnerability, still continue. Collins' (2009) cycle of relationship between poverty and disaster vulnerability, which explains how the cycle perpetuates itself and vulnerable people continue to remain vulnerable at different levels, is greatly relevant here (Figure??????). As mentioned above, most of the construction in urban areas is being done without planning permission. This illegal construction is developing illegal settlements lacking basic civic amenities such as electricity, clean drinking water, sewerage system, and road infrastructure. Most of the houses that I visited during my fieldwork were situated on steep slopes and had no road access; I had to climb down steep slopes with great difficulty making me wonder what will happen in the case of a future major earthquake. These houses did not have the facility of clean drinking water or sewerage systems.

Some sensible people working in civic bodies and other government departments in the these cities are concerned with this situation and think that the social issues arising out of these slums could be a big problem in the future. Poor living conditions, lack of civic amenities and the congested population could be a potential disaster in the case of a future seismic activity, but these conditions are likely to cause social problems even without an earthquake. Based on my past experience of living and working in the study area and my fieldwork I fear that the number of poorly constructed buildings in vulnerable locations and the poor socio-economic conditions of these localities has increased the level of vulnerability much more than before the 2005 earthquake. In my opinion the earthquake exposed contradictions and weaknesses (Olson 2000) in our society which already existed in the undercurrents and it has also given new dimensions to existing vulnerabilities apart from creating new vulnerable sections in the society. For example, in the case of physical vulnerability, the element of large number of people living on steep slopes, Red Zone, and water courses has been added which has increased the disaster vulnerability of the study area. This vulnerability is not confined to seismic hazard only but to hazards also such as flash floods and landslides (Please see Section 7.3 and 7.4 for more details). In the case of socio-economic vulnerability, the negative impact of the earthquake on the livelihoods of the people and increase in the poverty level is an added dimension. Similarly, increase in the unplanned and illegal housing in the study area after the earthquake has created slum like situation which has increased disaster vulnerability (Please see Section 7.4.2). The earthquake rendered many people physically disabled creating a new section in the society which is physically, economically, and socially dependent. Their life is very hard due to the absence of a proper public social support system. These people might become an easy target in case of a future disaster situation.

Had this earthquake not occurred, these contradictions would have come out in some other form of crises. According to Cutter (2006, no pagination) the role of 'social vulnerability' is very important in disasters. The social vulnerability is not only a product of social inequalities but also 'involves basic provision of health care, the liveability of places, overall indicators of quality of life, and accessibility to lifelines (goods, services, emergency response personnel), capital and political representation'.

In Chapter 3, I discussed that it is not only the physical scale of the event but the vulnerability of the people as well which determines the scale of damage in case of a natural disaster. The vulnerability is determined by the socio-economic conditions in which these people live. These socio-economic conditions are in turn a product of the development policies of the state.

iii. Reworking of the Family System and the Landownership Pattern

The third impact that my study evaluated is the reworking of the family system and landownership patterns.

a. Reworking of the Family System

Though the impact of natural disasters on social structures and families is well documented in the literature (See, for example, Aldrich 2010; Bode 1977; Bolin 1976, 1985; Gupta & Sharma 2006; Pomeroy *et al*. 2006, p. 791), literature on the impact of post-disaster housing reconstruction on family structure is minimal.

A joint family system mainly prevailed in the study area before the earthquake. Every family/household was given a separate housing cash grant to reconstruct their house after the earthquake. The reconstruction authorities in AJK estimate that some 70,000 new houses have been added to the housing stock in the study area after the earthquake. This means that the family system could have been reworked as a result of the housing reconstruction programme. This study found that the number of joint families has decreased in rural areas; whereas the number of joint families has increased in urban areas after the earthquake (*Figure 7.18*).

This finding stimulated intense discussion during my second fieldwork. All participants of the focus groups in Bagh and rural Muzaffarabad agreed with the finding of the study; whereas the focus group in Muzaffarabad city did not agree that the joint family system has increased in urban areas. The reason of increase in joint family system in urban areas, as put forward by many respondents, was the lack of land and higher cost of construction.

Most of the key informants agreed with the findings of the study. Key informant-21 (a resident of Muzaffarabad city) agreed that the higher cost of construction was the main reason for an increase in the joint family system in urban areas and he said that he himself was planning to live as a joint family with his two sons because of the higher cost of construction. Key informant-2 (a former Programme Manager Housing in the ERRA) said that the breakage of the joint family system *'was neither our intension nor the intended outcome'* of the housing reconstruction policy.

People in the earthquake affected areas had mixed opinions about breaking of the joint family system. Some of the respondents of my field survey thought that it was a positive outcome because families were independent and more responsible now. There is a lesser risk of casualty as the population is distributed across more houses. These respondents reported that many families wanted to part even before the earthquake but didn't because they couldn't afford financially to build a separate house. Also social and family pressures discouraged them, but the earthquake and the government's housing reconstruction programme proved a *'blessing in disguise'*. An *Imam* of a mosque and another key informant put forward a religious explanation and said that there was no concept of the joint family system in Islam and it was a good thing that families had separated.

On the other hand many respondents were not happy with the situation and said that the breaking of the joint family system was not only a financial strain on families but it had psychological and social implications also. In case of a future disaster there might not be as much social capital as there was in the case of 2005 earthquake. A former Director General of the SERRA discussed this subject in great depth. He expressed his concern over the breaking of the joint family system and said that the consumption and expenditure patterns of the families had changed and the interactive decision making process of the families and the community had also changed. In response to my observation that it was, in a way, a transition from a more conservative and traditional society to a more modern one he responded that there used to be safety nets internally and locally in the society which had been looking after the needs of the people at the local and internal level; these internal safety nets have been destroyed with the breaking of the joint family system.

My observation is that the families have not parted to distant locations geographically. Excluding a few exceptions, the separated families have built their separate homes in the same premises. The difference is that unlike in the past, families now live in separate houses, though in close proximity, having their own head of the household, their own financial resources, possibly with their own internal decision-making mechanism and hence deal with society as a separate and independent family unit.

b. Reworking of the Landownership Pattern

The impact of the owner-driven reconstruction on the landownership pattern in the study area has not been assessed before. This study found that some positive changes have occurred in the landownership pattern. The pre-earthquake practice of not transferring hereditary ownership to the rightful heirs markedly changed with the start of the housing reconstruction programme in order to claim housing compensation (*Figure 7.19*). This finding is supported by the household data collected during fieldwork which showed that the pattern of landownership within the family has also been impacted and those members of the household who previously did not own property rights were given ownership. The most positive change is that more women own property now (*Table 7.4*).

This finding was not a surprise for the respondents of my second fieldwork. All the participants of the three focus groups and all key informants agreed with the findings. A former Director General of the reconstruction organization said that it was not the intended outcome of the programme, though he was happy with the increase in the landownership of the women.

8.3. Lessons Learnt and Recommendations

This part of my study is mainly based on qualitative data collected during my fieldwork. Focus group proceedings and interviews with key informants and house owners are synthesised here. I have not deliberately utilized literature because I want to highlight the thinking of the earthquake affected people.

8.3.1. Lessons Learnt

I asked all interviewees what lessons were learnt from the 2005 earthquake and the subsequent housing reconstruction programme. The most worrisome thing for me is that many respondents said that people haven’t learnt any lesson. A former Deputy Chairman said ‘*my biggest grief is that* we *have not learnt our lessons’*. Some key lessons are summarised below:

i. Address Internal Migration

It has been learnt from the experience of the earthquake that after a disaster people should be encouraged to stay at their places of residence to minimise migration to towns and cities. Establishing tent villages in the cities after the 2005 earthquake encouraged an exodus of people from rural areas. Instead of setting up relief camps, relief should be provided at their homesteads and they should be encouraged to start building shelters/homes as soon as possible.

ii. Housing Reconstruction Grant

The government's housing cash grant was given in four instalments over a period of three years. The amount given was not enough to construct a seismic resistant house in a period of three or more years because the prices of labour and construction material increased during this period. Thus people faced great difficulty in completing the reconstruction with the grant money provided by the government.

iii. Vulnerable Groups

Though the government did try to protect the rights of vulnerable groups, some vulnerable groups found it especially hard to reconstruct their houses. The housing reconstruction programme should be designed to take special care of the socially and economically marginalised households and Persons with Disabilities (PWDs). Vulnerable people usually do not have a voice. Any post-disaster reconstruction, whether housing reconstruction or other, should always have a dedicated outreach arm which should identify the vulnerable and provide access for them.

iv. Avoid Geographical Disparity

The housing reconstruction programme showed better progress in rural areas compared to urban areas. This situation has created bitterness and disappointment in residents of urban areas. The policy makers should design a programme to cater for both urban and rural settings to avoid any disparity between these areas. The findings of my study identify the underlying reasons.

v. Repair of Damaged Buildings

Homeowners were given money for retrofitting/repair of their partially damaged houses but there was no technical advice or inspection by the AITs. Seismic safety of these buildings is uncertain. Retrofitting/repair of the damaged buildings should be ensured to eliminate this element of vulnerability.

vi. Sustainability of Safe Construction

Sustainability of the seismic resistant construction should be ensured to avoid revival of former vulnerability. An effective building control mechanism, continuous public awareness campaigns and sustainable and equitable development policies play an important role in ensuring sustainability and addressing vulnerability.

vii. Livelihoods Diversification

Improvement in the livelihoods of the people, especially the poor, plays an important role not only in the reconstruction of damaged houses but also in reducing future disaster vulnerability, 'to reduce poverty is to reduce disaster' (Collins 2009, p. 252). The Government should do everything possible to improve and diversify peoples' livelihoods so that they are able to recover from the negative impacts of the disaster. The affected people should be enabled to benefit from the economic opportunities created by the relief and recovery work.

viii. Set Achievable Targets

Realistic and achievable reconstruction targets should be set for the affected areas so that people are not frustrated if grand projects are not achieved. Many governments changed in AJK since 2006 and every new government claimed that it would make Muzaffarabad like Tokyo or Paris, but wasted precious time in doing so. Ambitious Master Plans could not be fully implemented in urban areas. The delay in the urban sector infrastructure also impaired the progress of the private housing reconstruction.

ix. Disaster Awareness

Awareness of disasters increased after the 2005 earthquake, but most of the people have forgotten the earthquake and the lessons learnt. In urban areas people are still constructing unsafe houses in hazardous places. Narrow streets in old parts of Bagh and Muzaffarabad proved to be death traps during the earthquake; people still violate the Master Plans and don't leave enough space for widening streets. If any calamity hits in the future, these narrow streets will cause huge damage.

x. Debris Recycling

Debris recycling/reuse was encouraged by the ERRA in rural areas which not only reduced the cost of construction but protected the environment from millions of tons of rubble. Unfortunately this environment-friendly practice was not undertaken in the urban areas where the authorities spent millions of rupees on debris removal. Scandals of misuse of the government funds and improper dumping of the rubble were frequently reported, as well as increase in the cost of construction in urban areas.

xi. Institutional Issues

Late decision making, especially in the case of land use planning in urban areas, delayed the housing reconstruction progress. It was also noted that lack of coordination between departments impacted the preparation and implementation of the Master Plans in urban areas. Capacity building of civic bodies has not been implemented as per plans so these institutions are not able to cope with the post-earthquake reconstruction activity and future development needs.

xii. Better Planning

The success of the ODR approach also depends on the amount of time taken in the response mechanism to address the issues of the home owners. The shorter the response time the more successful the recovery programme. It took authorities months to process the homeowners' construction queries and concerns and convey the solutions back to them. This made the homeowners frustrated, wasted their time and increased the cost of construction. Instead of issuing the housing reconstruction policy and instructions in piecemeal, a more comprehensive document should have been issued in the beginning.

xiii. Participation of Homeowners

Participation of the affected people is important for the success of a housing reconstruction programme. The ODR approach is only successful when quality control and standards are maintained across the board. The awareness level of people, literacy rate, poverty level and the security of the land tenure are also necessary for the success of the ODR approach.

xiv. Addressing the Complaints

A dedicated, well established, and efficient grievance redress system is essential to increase the level of confidence among the affected people who are involved in housing reconstruction.

xv. Importance of Awareness

Awareness-raising through print and electronic media is very import for encouraging people to comply with safety standards in construction. Efforts such as a compliance catalogue issued by the ERRA to provide additional technical support to those who couldn't comply with construction guidelines were of great benefit.

xvi. Workable Construction Options

Flexibility in design and implementation is more effective than a one size fits all approach. Use of local construction techniques, materials and solutions ensured ready acceptance and adoption.

8.3.2. Recommendations for Future Disaster Scenarios

Respondents of the field survey were asked to give their recommendations regarding housing reconstruction policy and practice in case of a future disaster. These recommendations are summarised in the following points:

i. The government has learnt from the 2005 housing reconstruction programme and should base its policy on this learning in case of future disasters. The successes and positive points of this programme may be replicated and the shortcomings may be addressed elsewhere in the country in case of future disasters.

ii. The ODR approach is workable in the context of Pakistan. 81% of respondents (N=200) of this study recommended the ODR approach for housing reconstruction in case of any future disaster, whereas only 8% opposed it. However, this approach cannot be recommended at face value, as every disaster has its context and every situation has its own dynamics. This approach should be applied by keeping in mind a particular situation. The ODR approach is more suitable for rural areas than for urban areas. Thus a more workable solution should be developed for urban areas based on the lessons learnt from the post-2005 experience in urban settings.

iii. The ODR approach in future should include more checks and balances in the system. Monitoring of the staff and inspection of the under construction houses should be improved.

iv. Livelihoods of the disaster affected people are as important as shelter. The government should plan for livelihoods as well as planning reconstruction activities. Village level vocational and technical training institutes should be established to address poverty.

v. Community awareness of DRR should be a continuous process. Disaster training should be given in schools to manage hazards and disasters. Necessary training and equipment should be provided at the village level to undertake rescue activities in case of a disaster. Local Support Organizations (LSOs), Local NGOs, and Community Based Organizations (CBOs) should be made more affective. Collins (2009) has rightly pointed out that 'with political will, communities and individuals can be persuaded to change their behaviour. Beyond encouraging changes in behaviour by choice, political will can drive legislation that effectively controls the threat of disasters' (p. 254). The Hyogo Framework for Action also calls for 'development and strengthening of institutions, mechanisms and capacities to build resilience to hazards, (Collins 2013, p. S117).

vi. The Government should develop land use policy to stop construction of houses in hazardous areas and this policy should be strictly implemented.

vii. Building codes should be developed for rural areas as well and these codes should be implemented through Local Government and Rural Development Department and Village Reconstruction Committees. Local Government & Rural Development staff at Union Council level (e.g. Project Manager, Sub-engineer, and Secretary) can be used for the housing construction management. These staff can utilize the ERRA seismic resistant designs for planning permission and construction monitoring.

viii. The data of the housing reconstruction programme should be handed over to some authority and should be updated regularly. *Patwaris* can be used to maintain the record of the housing stock at village level. The *Patwari* is required to undertake crop inspections (called *Girdawari*) twice a year; he can be asked to also carry out the housing inspection and update the housing data. In this way the record of the housing stock will be updated every six months and there will be no need to produce housing surveys every ten years at a massive scale and at a staggering cost.

ix. There should be a permanent institution for reconstruction in case of future disasters.

x. Shelter is the foremost requirement after a disaster; the government should give top priority to housing. Compensation money should be paid as quickly as possible and without barriers so that people construct their houses quickly and don't waste time and money in pursuing their compensation cases and waiting for the instalments to be paid.

xi. There were some complaints of rent seeking or illegal gratification on the part of some AITs. The government should devise some mechanism to stop corruption in case of future disasters. Policies are good but the lower staff should be closely monitored because they often create problems for the people.

xii. There should be a pre-emptive and proactive instead of reactive approach towards disasters. Instead of waiting for disaster to happen and then undertaking relief work, the best thing is to think about our vulnerabilities. The Government of Pakistan should learn from the experience of the earthquake and should undertake an audit of the vulnerable buildings in urban areas such as Karachi, Lahore, Peshawar, and Rawalpindi. These vulnerable buildings should be dismantled or strengthened instead of waiting for an earthquake.

xiii. The government should set up some safety nets such as soft loans and insurance for residential and commercial properties in disaster prone areas to help people recover from disasters quickly instead of waiting for outside help.

xiv. Vulnerable people usually do not have a voice. Any post-disaster reconstruction, whether housing reconstruction or otherwise, should always have a dedicated outreach programme which should identify the vulnerable and support access for them to decisions and funding.

xv. Disaster mitigation should be made an essential part of the development process. As highlighted by Collins (2009, p.250) 'disaster reduction is fundamentally a development issue, whether in terms of dealing with risks associated with underdevelopment or any other form of inappropriate development. Development is also about learning and adapting to the risk of disaster'. The Hyogo Framework for Action also calls for the 'integration of disaster risk reduction into sustainable development policies and planning' (Collins 2013, p. S117).

8.4. Final Assessment

As a final analysis of the post-2005 earthquake housing reconstruction programme, based on over two decades of experience of working in the study area and dealing with different environmental and human-induced disasters in the study area, the discussions that I had with different stakeholders of the programme, and anlysis of literature on the subject (see for example, Abidi 2011; ADB 2010, 2011; 2012; Ahmad *et al*. 2011; Cosgrave & Herson 2008; Davis 2010a; DFID 2011; ERRA 2009, 2010; 2012; Haq *et al*. 2009; ICIMOD 2012; IDB 2014; Leersum & Arora 2011; Madiwale 2012; Malik 2011; Mumtaz *et al*. 2008; Qasim *et al*. 2010; Qazi 2008; Schilderman & Lyons 2011;

Stephenson *et al*. 2008; UN-Habitat 2008, 2011; World Bank 2010, 2011) this programme can be regarded a major success. In the context of a developing country like Pakistan, this programme excels any other post-disaster housing reconstruction initiative in the country (before and after 2005 earthquake) in the following terms:

- ***Scale of the Programme***: reconstruction and repair of more than 600,000 damaged houses spread over thousands of square kilometres (Davis 2010);
- ***Financial and Technical Assistance***: the amount of housing cash grant was far more than for past or later disasters (Annex-1) and technical assistance in the shape of seismic resistant construction designs, hazard risk mapping, micro zonation, urban areas land use planning and master planning were undertaken for the first time;
- ***Seismic Resistant Construction****:* was introduced in the country at the household level for the first time in the country (Davis 2010);
- ***Beneficiary Participation and Empowerment:*** homeowners were free to decide the type of construction, the size of the house, and the pace of work as long as it complied with the seismic standards;
- ***Hazard Awareness and Training:*** more than 700,000 people got technical and social mobilization training;
- ***Town Planning and Seismic Hazard Microzonation:*** Master Plans were developed for the reconstruction and future development of urban areas of Muzaffarabad, Bagh, Rawlakot for the first time in history of these towns (Annex-7). The Master Plans were developed on the basis of Land Use Plans and Seismic Hazard Maps.
- ***Revival of the Traditional Local Seismic Construction Techniques:*** *Bahttar* and *Dhajji-dewari* construction techniques were revived and thousands of these houses have been built;
- ***Ownership and Commitment of the Government:*** was of very high level compared to other disaster situations in the country;
- ***Progress of Construction:*** 94% of houses have been reconstructed in the rural areas in 5 years;

- ***Data Management and Complaint Handling:*** the enormous data of the housing reconstruction programme was managed in excellent manner; all the details at household level could be acquired through one-window facility and different regional offices, or telephone or online. A detailed and efficient complaint redressal system was also introduced in the country for the first time whereupon more than 15,000 complaints were handled between October 2008 and March 2009 alone (ERRA 2016).
- ***The Landless Policy:*** thousands of families lost their already very small landholdings in the earthquake (due to landslides, liquefaction, proximity to fault lines, and master planning requirements). The government gave money to approximately 14,000 landless families to purchase land for the construction of their homes (Annex-10). This initiative is unprecedented in the history of the country and was acclaimed by many in the world (Davis 2010); and
- ***Impact on the Lives of the People:*** the pre-earthquake *kacha* houses have been replaced with good quality *pukka* houses, people have bank accounts now as a result of payment of housing cash grant through banks (Davis 2010), family system and land ownership patterns have changed and people of AJK were exposed to the outside world due to the work of dozens of international organizations.

Internationally, this programme stands out from other housing reconstruction programmes such as after 2003 Bam earthquake, 2001 Gujrat earthquake, and 2004 Tsunami (see for example, Abidi 2011; Audefroy 2011; Barenstein *et al*. 2008; Davis 2010; Ge *et al*. 2010; Ghafory-Ashtiany & Hosseini 2008; Gharaati 2006; GSDMA 2002; Kenny 2005; Omidvar *et al*. 2010; Rand *et al*. 2011; Ratnayake & Rameezdeen 2007; Samaddar & Okada 2006; Sanderson & Sharma 2008; Shaw *et al*. 2003; Steinberg 2007; Twigg 2006) in terms of universal application of the owner-driven reconstruction approach, conditional cash grant, progress of housing reconstruction, occupancy of the reconstructed houses, disaster risk reduction, and beneficiary satisfaction with the reconstructed houses (*Section 3.8.1*). As an acknowledgment of this contribution the ERRA was awarded the *United Nations Sasakawa 2011 Award for Disaster Reduction*.

CHAPTER 9: CONCLUSION

9.1. Introduction

This study was set out to evaluate the government of Pakistan's 'Owner-driven' housing reconstruction programme in AJK after 2005 earthquake in Kashmir. It has sought to identify the relationship between disaster vulnerability and development, reasons of disaster vulnerability in AJK, and the role that the development policies of the Government of AJK played in creating vulnerability to the 2005 earthquake. The study has evaluated the progress of the housing reconstruction programme in geographic, economics, and social contexts and the impact it made. This study has also ventured to draw lessons learnt and recommendations for transferability/replication of the ODR in case of future disasters.

The study has sought to answer the following set of questions:

1. What factors made people vulnerable to seismic hazard in AJK?
2. How successfully has the Government of Pakistan implemented the housing reconstruction policy in the aftermath of 2005 earthquake and is the characterization of this policy as successful in the geography, economics and social contexts?
3. After the completion of the housing reconstruction programme:
    a. To what extent are the seismic-resistant construction techniques sustainable in the study area, especially in rural areas?
    b. How far has ODR been able to reduce/address the vulnerability issues in the study area?
    c. To what extent has the implementation of the ODR re-worked the family and household structures and patterns of land ownership?
4. What lessons can be learnt from the Pakistan experience and what are the recommendations for transferability/replication of this approach in the case of future disaster events?

9.2. Geographical Setting

The research was conducted in the earthquake affected areas of AJK in the north of Pakistan. The study area is highly mountainous and is located in one of the most seismically active areas in the world where the Indian and the Eurasian tectonic plates meet. Four major faults are found in the study area. The 2005 earthquake is associated with the rupture of one of these faults. This earthquake was the biggest in the documented history of the country and caused massive damage over a large area. Due to enormity of damage in the housing sector, the Government of Pakistan launched a major housing reconstruction programme using the Owner-driven reconstruction approach for the first time. A brief history and geography of the study area were described in Chapter 1 and the details of the 2005 earthquake were described in Chapter 2.

9.3. Theoretical Basis

Chapters 3, 4, and 5 of this thesis set out the theoretical basis of the study. Disasters, vulnerability, and development came out as central themes on which the foundation of this study was laid in Chapter 3 (Theoretical Framework). Disaster losses are unevenly distributed between the developed and the developing countries. In the developed world there is lesser loss of life and more economic losses; whereas in the developing countries, the life losses are exceptionally high and economic losses are low. Vulnerability plays important role in determining the degree of loss from a disaster; the nature and level of vulnerability is, in turn, mainly the outcome of the development processes.

My research has relied on the 'Pressure and Release' or PAR model developed by Blaikie *et al*. (1994 and further developed by Wisner *et al*. 2004) and Collins (2009) "disaster and development approach" to explore the reasons of vulnerability in the study area. Disasters can work as a window of opportunity to reduce vulnerability by addressing the past mistakes. Post-disaster housing reconstruction is one of the important ways to reduce disaster vulnerability. Four mainstream housing reconstruction approaches (i.e. Unconditional cash grant approach, Community-driven reconstruction, Agency-driven reconstruction, and Owner-driven reconstruction) were discussed in this chapter.

Chapter 4 (Research Methodology) explained the research methodology of this study. It is an ethnographic study undertaken by an insider for which mixed methods approach has been adopted. This approach served the purposes of *triangulation*, *complementarity*, *initiation*, *development*, and *expansion* through Concurrent Nested Design. Methodological tools for data collection consisted of collection of secondary data, key informant interviews, survey questionnaires, house owner interviews, focus group discussions, and life stories. The data were collected from four rural union councils and two cities of Muzaffarabad and Bagh districts in AJK.

Chapter 5 (Vulnerability of the Housing Stock in the Study Area) has explained how the relationship between disaster, vulnerability, and development (discussed in Chapter 3) worked in AJK and how disaster vulnerability resulted in widespread damage to housing stock. This chapter sought to answer the following research question:

1. *What factors made people vulnerable to seismic hazard in AJK?*

Four types of vulnerability have been identified which were responsible for the massive damage to the housing stock in the study area: geological vulnerability, physical vulnerability, environmental vulnerability, and socio-economic vulnerability. While explaining the role of the development policies of the Government of AJK towards creating these vulnerabilities, the study has argued that although the geological vulnerability was not a direct outcome of the government's development policies, this vulnerability could have been reduced to a great extent had the governments been responsible enough to invest in disaster mitigation. As regards physical vulnerability and socio-economic vulnerability, successive governments have not been able to uplift the economic conditions of the people so that the peoples' vulnerability could have been addressed. The main argument here was that development was a holistic term which encompassed sustainable and equitable economic development, sustainable infrastructure development, social protection, disaster mitigation and good governance as well. The governance had been weak in AJK so there was lack of building control mechanisms which resulted in poor quality construction. The over-emphasis of the government on road infrastructure development and deforestation had contributed towards environmental vulnerability.

9.4. Empirical Findings

The main empirical findings of the study were summarized in two empirical chapters of this thesis: (Chapter 6, Post-2005 Earthquake Housing Reconstruction in AJK; and Chapter 7, Impact of the Housing Reconstruction Programme). This section synthesizes the empirical findings to answer two research questions of the study:

1. ***How successfully has the Government of Pakistan implemented the housing reconstruction policy in the aftermath of 2005 earthquake and is the characterization of this policy as successful in the geography, economics and social contexts?***
    a. ***Progress in geographical context:*** the study has found considerable variation in the progress of housing reconstruction between rural and urban contexts. 94% of the surveyed houses had been found constructed in rural areas and 63% of the surveyed houses in urban areas were constructed. Thus the overall progress of the reconstruction was 78.5%.
    b. ***Progress in economic context:*** this study has found that despite uniform housing cash grant package, the household economic status has impacted the progress of the housing reconstruction. Only 35% households of the *"Very Poor"* income group had been able to reconstruct their houses. The progress increased with increase in the income level; 81% *"Poor"*, 88.5% *"Moderate but unstable"*, 100% *"Moderate and stable"*, 100% *"Strong"*, and 100% *"Well-off"* surveyed households had been found to have reconstructed their houses.
    c. ***Progress in social context:*** despite the patriarchal and male-dominated nature of the society, the female-headed households showed better housing reconstruction progress than the male-headed households. 85.7% female-headed households had

reconstructed their houses as compared to 76.6% of male-head households.

2. ***After the completion of the housing reconstruction programme:***
   a. ***To what extent are the seismic-resistant construction techniques sustainable in the study area, especially in rural areas?*** The study has found that the sustainability of the seismic-resistant construction is an issue in the study area. In rural areas, the absence of building control mechanism is responsible for it; whereas in urban areas, weak enforcement of building codes is the main reason.
   b. ***How far has ODR been able to reduce/address the vulnerability of the building stock in the study area?*** Vulnerability of the housing stock has been addressed to the extent of houses constructed under the reconstruction programme in rural areas; whereas the safety of the houses reconstructed (or repaired) in urban areas remains a big question mark. Similarly the Post-reconstruction period construction practices had been found adding to the vulnerability of the housing stock in the study area.
   c. ***To what extent has the implementation of the ODR re-worked the family and household structures and patterns of land ownership?*** The study has found that both family structures and patterns of landownership have been impacted by the housing reconstruction programme. The percentage of joint families has decreased in rural areas and increased in case of urban areas. It has also been found that the landownership pattern has also been reworked as a result of ODR policy and the ratio of females owning the land titles has increased slightly in the study area.

9.5. Limitations of the Study / Challenges during Fieldwork

This study has put forward an evaluative perspective on an important post-disaster recovery programme. It was conducted by an ‘insider’ using a variety of quantitative and qualitative data collection methods in a society recovering from physical, social, psychological, and economic impacts of one of the worst disasters of its history. The direct result of this research setting is the limitations of this study, which are discussed in this section.

9.5.1. Positionality

My positionality and power relationship was a big challenge. England (1994); Finlay (2002); Ganga & Scott (2006); Gilbert (1994); LaBaree (2000); and Mullings (1999) have discussed in detail the ethical, methodological and power relationship issues associated with being a researcher. At the start of the fieldwork I was aware of the fact that my positionality might affect the power relationship with respondents; especially the house owners and some key informants. I expected that due to the fact that I worked as Director General/Secretary of the reconstruction agency, some house owners might not express their true feelings due to fear on one hand or due to expected gain in future on the other hand.

Unlike Robinson (2014) who revealed his positionality to respondents (homeowners) before interviews, I thought it proper not to reveal my positionality to respondents prior to interviews because it had great potential to bias their opinion (Ganga & Scott 2006). In some cases where the respondents insisted on revealing my identity or somehow came to know about it, their opinions were clouded by their personal biases to certain extent. For example, many house owners exaggerated the amount of additional money that they spent on the reconstruction of their damaged house. A very poor house owner even said that he had spent one million rupees extra on the reconstruction of his house; it was obvious from his financial condition and the condition of the house that this amount was exaggerated, perhaps with the hope to get some of this money back. Some house owners complained during interviews that they were unduly denied full compensation but when I checked from the SERRA it was found that in almost all the cases their complaints were unfounded.

As regards my positionality and power relationship in case of key informants I expected that those key informants who had worked with me as junior colleagues might not express their true feelings or might feel intimidated. This was also confirmed during my fieldwork when I interviewed those key informants who had worked under me in different organizations, they were confused and embarrassed to see me in their room and would offer me their chair to sit in instead of visitors chairs. One of my former subordinates (though I do not like to use this terminology but this is the only prevalent terminology there so I keep it as such to keep the flavour of the situation) avoided the interview many times and kept running around on one pretext or the other, which angered me also to be honest. Later on I realised that he was too embarrassed to talk to me. I, therefore, arranged a combined interview with two of his other colleagues in a different room. After a few minutes he gained confidence and became the most vocal and contributing participant. Every effort was made to clarify to them that this research will not in any way adversely affect anybody or would not be source of any undue gain in future (Whiting 2008). They were encouraged to be themselves and express their feelings freely.

9.5.2. Challenges of being 'insider'

Although my background of being from the same country, my work experience and local contacts were a clear advantage (Dyck 2000, cited in Robinson 2014, p. 70), it led to a limitation as well i.e. the issues related with the phenomenon of being an 'insider', and notably someone who is a high raking government official (Ganga & Scott, 2006). As highlighted by Delyser (2001); LaBaree (2000); Mullings (1999); and Rose (1997) it's not easy and simple being an insider and in every research the insider has to face the dilemma of insider-outsider. As LaBaree (2000) explained, by being insider it is expected that the researcher already knows the answer because '[b]y "insider" research, we mean social interviews conducted between researchers and participants who share a similar cultural, linguistic, ethnic, national and religious heritage' (Ganga & Scott 2006, no pagination).

I had to face the same problem during my fieldwork, especially while doing semi-structured interviews and focus group discussions. Most of the respondents expected me to already know the answer of my questions due to the reason that I belong to AJK and my experience of the earthquake myself and working in the reconstruction programme, for example when I asked a key informant about problems in housing reconstruction in urban areas he said *“who knows the issues of Muzaffarabad better than you, so it’s better not to ask me* (Key Informant-2). Some even mentioned my job at the time of the earthquake “y*our Revenue Department was involved in the disbursement of compensation”* (Key Informant-5). While answering my questions some respondents were aware of the fact that I had worked in the reconstruction programme and must be having my own opinion as an insider “y*ou had also been involved in it and must be having your own opinion as well”* (Key Informant-7). Some respondents tried to carefully craft their answers being conscious of my position; *“you have worked at very high administrative positions”* (MR-3).

According to Delyser (2001) the change of role, from being an insider to an outsider, sometimes confuses people. This is exactly what happened to me as well. My change of role, from being a high-level government official to a researcher, confused those people who already knew me. They frequently mentioned that they were confused that whether they should consider me a government officer or a researcher. It was too difficult for them to replace more than two decades old role with a new and completely opposite one. A former boss of mine was very amused to see me when I went to interview him wearing khakis instead of a business suit, carrying a rucksack instead of a briefcase and armed with camera, voice recorder, and noting pad. I tried to keep myself as “normal” and “down to earth” as possible by my demeanour, for example, sitting on the ground or standing instead of using a chair, speaking in local dialects, sharing jokes with them, having cup of tea with them, etc. (Figure 9.1).

Barnes (1979); Herbert (2000); LaBaree (2000) and Lee & Renzetti (1993) observe that the insider-outsider phenomenon is a very sensitive issue and may raise suspicions about the research motives also. In my case many people were not sure about true purpose of my research and couldn’t convince themselves that despite being a senior level government officer I was carrying out a purely academic exercise. I had to face difficulties in getting data from some organizations unofficially. My “parent department” was a particularly hard nut to crack. I had to ask them repeatedly for something and they would not budge. The Deputy Commissioner and the Commissioner office had a readymade excuse that the whole record was destroyed by the earthquake, whereas I personally knew that the Commissioner office was not even slightly damaged by the earthquake and most of the record of the Deputy Commissioner office was either salvaged or reconstructed afterwards. I must admit that it frustrated and angered me a lot and I mentioned it to them also. As warned by Bourdieu (1988, cited in Robison 2014) about analysing one’s own group, later on I came to know that basically the staff were afraid that I was doing some kind of enquiry against them so they tried to avoid giving me any kind of data. I took great pains to assure them that it was not an enquiry but purely an academic exercise and would not affect them in any manner. Some people even mentioned that it was a way of the Western governments to give scholarships to local people and get vital information about their country through research otherwise why would they spend so much money on them.

Figure 9.1 Conducting house owner interviews. (*Source*: Author fieldwork)

9.5.3. Socio-cultural Issues

The study area has a peculiar socio-cultural set up and religious mind set. Women usually do not interact with *“Na-mehram”* (all those men with whom a Muslim woman is permitted by Islam to marry). I thought that it would be difficult to collect data from women through interviews and survey questionnaires or do focus groups and life stories. To tackle this limitation it was planned to hire an experienced female research assistant to interact with female respondents. I had anticipated this issue on the basis of my knowledge and past experience of that society. I must admit that my thinking proved to be not entirely correct in this regard. To my surprise things had changed a lot since the earthquake. I had hired both male and female research assistants for data collection, as I had planned in my research methodology. The male research assistant told me after the completion of the exercise that they did not face any particular hesitation on the part of female respondents or their families in conducting the survey and in fact it was more difficult for them to take care of a female colleague in difficult terrain and extremely harsh weather. He was of the opinion that it was possible to conduct interviews with female respondents even without a female research assistant. Moreover the female research assistant for Bagh District was not available for domestic issues and the lady for Muzaffarabad District had got a job by the time I started interviews, hence both were unavailable for qualitative data collection phase. So I decided not to hire new female research assistants and make an attempt to do interviews without them.

I was pleasantly surprised to see that interviewing female respondents was not too difficult, of course in the presence of male member of the family. I personally found it welcoming because women could now voice their feelings in front of an outsider. This change might have happened due to the working of a large number of international organizations and national and international NGOs that came into the study area soon after the earthquake and remained there for quite some time; more than 15 international organizations and 75 national and international NGOs were involved in reconstruction work and more than 150 national and international NGOs worked during rescue and relief phase (SERRA 2015). Such a heavy presence of outside actors was unprecedented in the history of the study area because due to the disputed nature of AJK, international organizations and INGOs had no access there before the earthquake. I found during my fieldwork that people were not shy of interacting with outsiders and were usually ready to talk, though they expected that the survey would eventually bring some material benefits for them and sometimes one had to be discerning and careful in judging their statements.

It was a general impression in the area that people had become very sharp after the earthquake and knew what to tell and what information needed to be held back. Another thing that I experienced was that may be due to their interaction with international organizations, the participants of the focus group discussion sessions expected same level of standard and facilities from me as from international organizations; for example a good venue, sumptuous meal, refreshments before and after meal, travel expenses, and some money at the end of the session.

9.5.4. Ethical Issues

Ethical issues were also very important in this research. The most sensitive issue was going through the trauma of remembering the tragic earthquake event again. At the start of the fieldwork I was aware of the fact that remembering the traumatic personal and societal impacts of the earthquake would be a very painful experience for the respondents, especially those house owners who had lost their loved ones and their whole lives' earnings. I was also aware that since I belong to the same country and have been working in the study area for many years and I experienced the earthquake myself as victim, I could understand the pain of these people and could make them realize that I share their pain. Every effort was made to handle this issue as sensitively as possible. People did feel pain while telling the tales of death and misery but I think my being "insider" proved to be the biggest asset to solace them a bit; I could never help crying with them (Robinson 2014) and sharing my own experiences of going through the traumatic event.

The second ethical issue was the anonymity of the informants because in countries like Pakistan it is quite possible that the authorities might in anyway harm those people who criticise the government. Every effort was made to maintain the anonymity of the informants. Every interviewee was explained before the start of the interview that they had the choice to remain anonymous and could withdraw from the interview during or after the interview. The whole process of anonymity and usage of data in the thesis and destruction of data after the completion of the research was explained to them. Consent forms were also used to get written consent but some key informants did not want to sign the consent form so they were not forced to do so. However, the house owners were wary of signing a paper so they were not asked to sign the consent form; their verbal consent was sought instead. These measures were taken for all stages of the field work i.e. gathering of official data, survey questionnaires, key informant interviews, semi-structured interviews, focus group meetings and life stories. Most of the key informants and some house owners said that they had no objection in mentioning their name in the report, in fact a few insisted on mentioning their names, however I deem it proper not to mention any name in the thesis and try to conceal their identity as much as possible. I will mention some names only in those cases where they made positive comments.

9.5.5. Geographical Challenges

AJ&K is a geographically remote area of Pakistan. Earthquake affected areas are mountainous and were very difficult to access even prior to the earthquake (Leersum & Arora 2011). Most of the road network was severely damaged, which until today has not been reconstructed fully. Access to rural areas was thus one of the major challenges for fieldwork. These rural settlements are widely distributed and most of the time houses are situated far away from each other within settlements. It is usually very time consuming to travel between these houses in this difficult mountainous terrain; for example the mean distance from nearest road to the household visited during quantitative data collection was a 23 minute walk and the farthest household was a 180 minute walk. I was told that our female research assistant found it very difficult to walk such long distances on steep and snow covered mountains. Thus it was decided not to send her on such difficult expeditions. Frequent landslides were the main problem due to which many field visits were rescheduled (Figure 9.3).

Many of these landslides were very dangerous and had taken many lives. While travelling I had not only to be careful about my safety but also the safety of my research assistants and their driver. They were given clear instructions to check the weather forecast and coordinate with the local Highway Department people to know about the situation of the roads well before travelling.

Figure 9.2 Landslide hazard on the roads. (*Source*: Author fieldwork)

9.5.6. Situated Knowledge

My positionality and the phenomenon of being 'insider' are the strength as well as weakness of this study. On the one hand these factors give me strength, as compared to an outsider, to know so many things personally about my research topic (Stoetzler & Yuval-Davis 2002) and get the things done during research (See, for example, Section 8.4.1 & 8.4.2). On the other hand these factors make the knowledge produced highly 'situated' (Rose 1997, p. 305). McDowell (1992, cited in Rose 1997, p. 305) writes that *'we must recognize and take account of our own position, as well as that of our research participants, and write this into our research practice'*.

Perhaps as a logical outcome of reflexivity, it is not possible to avoid the situatedness of knowledge in my kind of study. Being a member of the same society, being a high-level civil servant, and personally going through the very phenomenon which is being researched; neutrality comes seldom. I have remained continuously conscious of these three factors throughout my research. As a member of this society how far can I neutralise myself from my psyche, my biases, my preconceived notions, and my prejudices and preferences that my 50 year socialization process has shaped? As a civil servant, how successfully can I detach myself from the norm to confine neutrality to being impersonal only while writing something official (not to use first person pronouns, for example, using 'undersigned' instead of 'I' in official writing) because impartiality and neutrality have their limits here? And how much *dispassionate* and *objective* can a great tragedy like the 2005 earthquake let someone to remain?

Is my study ethnography or auto-ethnography or an objective study or a subjective one? I am not sure. Should I write it as a personal story or as a cold, factual, and objective research paper? I am not sure. And I do not claim the neutrality and objectivity of my research. How can a study be objective when it is written with tearful eyes and trembling hands? Yes my study might be 'subjective' and 'situated' but does it become invalid and unreliable because of it? Perhaps NO because as observed by Sole & Edmondson (2001, p. 3) *'situated knowledge is critical to learning'.* Harding (2004, p. 127) also finds situated knowledge *'possible'* and *'desirable'*. My study is not meant to be a guide on disaster management; it is an effort to understand one of the most important events in the history of a nation; an event which might soon fall prey to the oblivion of those very people whom it hurt the most.

Is this study universally applicable (Rose 1997)? No, I do not make any such claim because every society and every locale has its own peculiarities; but it may provide some insight to academics and policy makers in their efforts to make this world safer from disasters.

9.5.7. Logistic Issues

The holy month of Ramadan was expected to fall in the second month of my field work and impact my activities to some extent. This month is a time of relatively reduced daily activity and reduced working hours due to fasting and other religious activities. Convincing people to be available for research work during their schedule of enhanced religious activities is a limitation. So I designed my fieldwork timetable accordingly from the beginning; I therefore undertook secondary data collection and analysis of these data and other relevant activities during this time.

Being an insider I knew that finding some of the key informants could be a limitation because some of the key informants had left their job or had moved to other organizations. I was lucky to have found them after some searching. Though most of the people were readily available for interviews and gave me as much time as necessary, some agreed to be interviewed but were never available. Despite the fact that I had worked with the ERRA for many years and I knew many people there I couldn't get access to the concerned people though they promised to meet whenever I contacted. I had to travel to Islamabad (about 135 Km away) twice to interview a former Programme Manager of the ERRA, who was working in another government organization now, but the gentleman somehow missed his appointment. Once I went to his office and we started to chat but then he got a call from his boss and he went away saying he will contact me when he was free and will also email me some important reports; I stayed in the hotel for two nights waiting for his call but he never got in contact. Another former employee of the SERRA also slipped away frequently, though I managed to get hold of him due to my patience and persistence.

It was in the middle of my fieldwork in the month of December that my wife, my youngest daughter and I fell ill, on the same day. It started with severe fever. The doctors first treated for Malaria but when there was no respite in the fever we were admitted into a local hospital. After a few days of tests on us by different doctors they finally concluded that I was suffering from Dengue fever (a deadly type of fever which was very common at that time and had caused many deaths) and my wife and daughter were suffering from some unknown type of fever. We were referred to a bigger hospital in Islamabad (about 130 Km away from our home). Doctors there concluded that all of us were suffering from Typhoid fever but due to experimentation with different types of antibiotics it had become too resistant. Thus they had to resort to extra high doses of antibiotics. It took us three weeks to come out of the hospital and another four weeks of bed rest to recover. Doctors were of the opinion that we got the infection through contaminated food or drink.

Tricky situations also developed during my fieldwork. My research assistant was constantly chased and questioned by certain policemen in Bagh city. They even took away a survey form saying they would investigate what this research was about. I had to personally contact the Deputy Commissioner to resolve the matter who told me that many con men were active in the area cheating people in the name of financial assistance and the police might have become alert due to this reason. However, no such thing happened afterwards. I am impressed by the efficiency and vigilance of the police, if this was the only reason for doing so.

9.6. Contribution of the Study to Existing Body of Knowledge

I cannot say like Mohapatra (2009) that no serious attempt has been made in my field of study before. However, as far as post-2005 earthquake housing reconstruction in AJK is concerned, this perhaps is the only and the first study of its kind (i.e. a PhD research by a local stakeholder of the reconstruction programme). As compared to existing studies, my study throws a new light on the subject by looking beyond reconstruction and trying to find out the real reasons of disaster vulnerability in the study area and how this vulnerability is linked with the development policies of the state.

Another contribution of this study is that unlike existing studies it evaluates the progress of the housing reconstruction programme in the study area in geographic, economics, and social contexts. It tries to explain what factors influenced housing reconstruction in these contexts. There is hardly any literature on the study area that evaluates the impact of the housing reconstruction programme with the angle of sustainability of the seismic resistant construction, disaster vulnerability, family system, and landownership patterns.

The above analyses (evaluation of the progress in different contexts and impact of the programme) can prove useful not only to policy makers for future planning but to academicians also for further research elsewhere in the world.

This study is unique in the sense that it blends literature, policy, practice, and lessons learnt aspects to evaluate the housing reconstruction programme in the study area. It builds on the existing *literature* and examines the Owner-driven housing reconstruction *policy* in the light of this body of knowledge. It then evaluates how successfully this policy was translated into *practice*. And

Lessons learnt are drawn from this practice, which will hopefully become part of the existing body of knowledge (Figure 9.3).

This study adds to the existing body of knowledge in respect of the research approach that it adopts. Unlike other studies in the study area, my study uses a mixed-methods approach in which a range of quantitative and qualitative data collection tools have been used. Only Leersum & Arora (2011) have used this technique in their study to evaluate the housing reconstruction programme in AJK. However, their study is limited to the rural context only and was conducted too early (during the implementation phase in 2008) to fully evaluate the performance and impact of the programme. My study is conducted three years after the completion of the programme and is not limited to rural context only; it not only spans over rural/urban, economics, and social contexts but evaluates its impacts in different contexts as well.

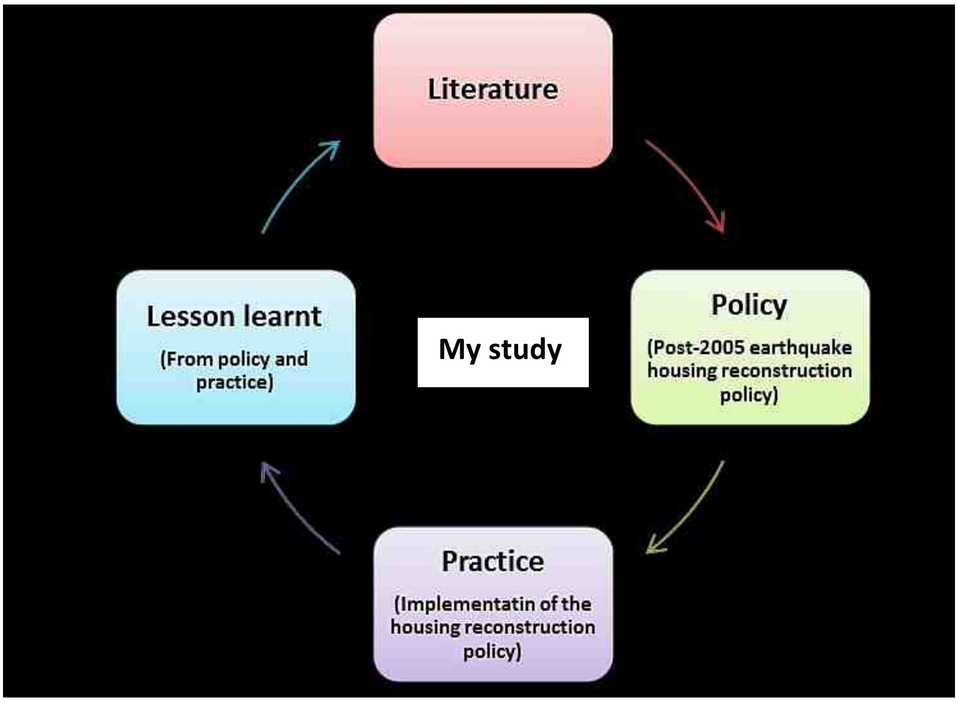


Figure 9.3 Contribution of the present study to the existing body of knowledge.
(*Source*: Author)

9.7. Suggestions for Future Research

Due to its limitations and the enormity of the subject, this study is by no means final and conclusive. In fact when I was preparing the Research

Proposal for this study, I did not know that this subject has so many layers which have sufficient material and importance for separate studies. The following could be the future research projects:

9.7.1. Replication of ODR in Later Disasters

Since 2005 earthquake, Pakistan has experienced four major floods, two major earthquakes, and three military operations against terrorists which rendered millions of people homeless and destroyed many houses. Despite successfully practising the Owner-driven reconstruction approach after 2005 earthquake, this approach has not been replicated in Pakistan in case of later disasters (Abidi 2010). It would be worthwhile to conduct research to know the reasons of not replicating the ODR approach in the country and its consequences. Another study can be done to know whether ODR approach has been practised elsewhere in the world after 2005 Kashmir earthquake and how successfully this was achieved?

9.7.2. ODR and Vulnerable Groups

As discussed in this thesis, disasters not only hit the vulnerable groups hard; they create more vulnerable people as well. The importance of their recovery and the difficulties that they face in this process cannot be overemphasised. Vulnerable groups such as marginalised people, ethnic minorities, and persons with disabilities (PWDs) add up to sizeable population who can become a focus of future research.

9.7.3. Impact of the Earthquake on the Livelihoods of the People

I have very briefly discussed in my thesis that 2005 earthquake has negatively impacted the livelihoods of the people in the study area, hence the reconstruction of their houses, sustainability of the seismic resistant construction, and their future disaster vulnerability. I do not think that I could do justice with this aspect in my thesis because it is such a big area and needs a separate study. This type of study becomes especially important due to the gap between the perception of the government and the people. The government authorities think that livelihoods of the people have recovered in a much better way and people are economically much better after the earthquake; whereas most of the affected people are of the view that their financial conditions have worsened after the earthquake.

9.7.4. Environmental Impacts of Housing Reconstruction

Many people discussed with me during my research that though the newly constructed houses were seismically safe and better than before in many respects, they lacked the thermal qualities of the pre-earthquake houses. These people said that they now needed more energy to combat the harsh climate. Cutting of trees for heating during winters and increased use of air-conditioners during summers will definitely have negative impact on already fragile natural environment of AJK. A study in this respect will prove useful to government to take necessary measures.

9.8. Conclusion

Natural disasters act as wakeup calls to warn us about our weaknesses. They also provide us the window of opportunity to reduce future disaster vulnerability by addressing past mistakes. The 2005 earthquake in Kashmir was one such call. It exposed the contradictions and weaknesses within our society. The housing reconstruction programme was able to *"convert the adversity into opportunity"* by replacing more than 85% poor quality housing stock with safe and better quality housing. Unfortunately, that window of opportunity could not be utilized by the government for the reorientation of the development paradigm and sustainability of safe construction practices.

EPILOGUE

Everybody has their own future planning…. Before the earthquake I too had so many plans for my future; I wanted to get higher education and be something. The biggest 'bad affect' of the earthquake was that all my plans were shattered by the earthquake and I could not shape my life towards my plans. The earthquake took away five years of my life; I had to spend these years in pursuit of mundane things of life instead of realizing my dreams. I had to sail according to time and couldn't utilize the time according to my aspirations.

(Sajjad, a young victim of the earthquake in Urban Bagh)

REFERENCES

Abidi, S.R.T.Z., Akbar, S. and Bioret, F. 2011. Post-Event Reconstruction in Asia since 1999: An Overview Focusing on the Social and Cultural Characteristics of Asian Countries. *International Conference on Earthquake Engineering and Seismology.* Islamabad, 25-26 April, 2011: ICEES 2011, NUST.

Abidi, S.R.T.Z., Akbar, S. and Bioret, F. 2011. Post-Event Reconstruction in Asia since 1999: An Overview Focusing on the Social and Cultural Characteristics of Asian Countries. *International Conference on Earthquake Engineering and Seismology.* Islamabad, 25-26 April, 2011: ICEES 2011, NUST.

ADB. 2005. *ADB'S RESPONSE TO THE EARTHQUAKE DISASTER: PAKISTAN.* The first Board Information Paper on the South Asian earthquake was issued 13 October 2005.

ADB 2005a. *FROM DISASTER TO RECONSTRUCTION: A Report on ADB's Response to the Asian Tsunami*. Mandaluyong City: Asian Development Bank.

ADB 2005b. *Pakistan 2005 Earthquake Preliminary Damage and Needs Assessment*. Islamabad: Asian Development Bank and World Bank.

ADB 2011. *Completion Report, Project Number: 40563, Loan Number: 2335, August 2011. Pakistan: Earthquake-Displaced People Livelihood Restoration Program*. Islamabad: Asian Development Bank.

ADB. 2012. *TECHNICAL ASSISTANCE COMPLETION REPORT*. *TA 4943-PAK : CAPACITY BUILDING FOR INSTITUTIONS RELATED TO EARTHQUAKE RECONSTRUCTION AND REHABILITATION*. Islamabad: Asian Development Bank.

Adger, W. N. 2006. Vulnerability. *Global Environmental Change, 16*, pp. 268‑281

Ahmad, F., Kazmi, S.F. and Pervez, T. 2011. Human response to hydro-meteorological disasters: A case study of the 2010 flash floods in Pakistan. *Journal of Geography and Regional Planning*, *4*(9), pp.518.

Ahrens, J. and Rudolph, P.M. 2006. The importance of governance in risk reduction and disaster management. *Journal of contingencies and crisis management*, *14*(4), pp.207-220.

Ainuddin, S., Routray, J.K. and Ainuddin, S. 2014. People's risk perception in earthquake prone Quetta city of Baluchistan. *International Journal of Disaster Risk Reduction*, *7*, pp.165-175.

Albala-Bertrand, J. M. 1993. *The Political Economy of Large Natural Disasters with Special Reference to Developing Countries*. Oxford: Clarendon Press.

Aldrich, D. P. 2010. Fixing Recovery: Social Capital in Post-Crisis Resilience. *Journal of Homeland Security, 6*, pp. 1-10.

Alexander, C. 1995. Conquest of Laddakh. In: Grower, V. ed. *The Story of Kashmir: Yesterday & Today.* New Delhi: Deep & Deep Publishers, pp. 119-123, Vol. I.

Alexander, D. 1997. The study of natural disasters, 1977–97: Some reflections on a changing field of knowledge. *Disasters*, *21*(4), pp.284-304.

Alexander, D. 2004, April. Planning for post-disaster reconstruction. In *I-Rec 2004 International Conference Improving Post-Disaster Reconstruction in Developing Countries*.

Alexander, D. 2006. Globalization of disaster: trends, problems and dilemmas. *Journal of International Affairs*, pp.1-22.

Alexander, H. 1995. Kashmir. In: Grover, V. ed. *THE STORY OF KASHMIR YESTERDAY AND TODAY*. New Delhi: Deep & Deep Publications, pp. 107-139, Vol. I.

Alexander, D. 2012. Disasters: lessons learned?. *Journal of Geography and Natural Disasters*, *2*(1), pp.1-2.

Alexander, D. and Davis, I. 2012. Disaster risk reduction: an alternative viewpoint. *International journal of disaster risk reduction*, *2*, pp.1-5.

Ali, Z.Z.H. 2007. *Sustainable shelters for post disaster reconstruction: an integrated approach for reconstruction after the South Asia earthquake.* PhD Thesis. Massachusetts Institute of Technology.

Alvesson, M. and Skoldber, K. 2000. *Reflexive Methodology: New Vistas for Qualitative Research*. London: Sage Publications.

Amaratunga, D. and Haigh, R. 2010. Disasters and the built environment: towards a mature discipline. *International Journal of Disaster Resilience in the Built Environment 1*(1).

Ambraseys, N. and Bilham, R. 2011. The influence of poverty and corruption on the loss of life in earthquakes. *Nature, 469*, pp. 153–155.

Amendola, A., Linnerooth-Bayer, J., Okada, N. and Shi, P. 2008. Towards integrated disaster risk management: case studies and trends from Asia.*Natural Hazards*, *44*(2), pp.163-168.

Anderson, J. and Jones, K. 2009. The difference that place makes to methodology: uncovering the ‘lived space’ of young people’s spatial practices. *Children’s Geographies*, 7, pp. 291-303.

Archer, D. and Boonyabancha, S. 2011. Seeing a disaster as an opportunity-harnessing the energy of disaster survivors for change. *Environment and Urbanization, 23* (351), pp. 351-364.

Arshad, R.R. and Shafi, S. 2010. Pakistan Floods 2010: Preliminary Damage and Needs Assessment. *Asian Development Bank, Pakistan*.

Asgary, A., Badri, A., Rafieian, M. and Hajinejad, A. 2006. Lost and used postdisaster development opportunities in Bam earthquake and the role of stakeholders. *Post-disaster reconstruction*, p.441.

Atkinson, P. and Hammersley, M. 1994. Ethnography and participant observation. *Handbook of qualitative research*, *1*(23), pp.248-261. Thousand Oaks, CA: Sage Publications.

Attri, P., Gupta, A.K., Chaudhry, S. and Sharma, S., Sustainable Urban Development: Integrating Land Use Planning and Disaster Risk Reduction. *Disaster Management and Risk Reduction*.

Audefroy, J. F. 2010. Post-disaster emergency and reconstruction experiences in Asia and Latin America: an assessment. *Development in Practice, 20* (6), pp. 664-677.

Audefroy, J. F. 2011. Haiti: post-earthquake lessons learned from traditional construction. *Environment and Urbanization, 23*, pp. 447-462.

Avellaneda, S. D. 2009. Review article: Good governance, institutions and economic development: Beyond the conventional wisdom. *British Journal of Political Science, 40*(01) pp.195-224.

Avouac, J.P., Ayoub, F., Leprince, S., Konca, O. and Helmberger, D.V. 2006. The 2005, M w 7.6 Kashmir earthquake: sub-pixel correlation of ASTER images and seismic waveforms analysis. *Earth and Planetary Science Letters*, 249(3), pp.514-528.

Aysan, Y. and Davis, I., 2013. *Disasters and the Small Dwelling: Perspectives for the UN IDNDR*. Routledge.

Balamir, M. 2001. DISASTER POLICIES AND SOCIAL ORGANISATION*. Paper to be presented at the 5th Conference of ESA, Helsinki, August 28-September 1, 2001. ‘Disaster and Social Crisis Research Network’ sessions: ‘Deconstructing Disaster Management: Beyond the Command and Control Model’, Chaired by Maureen Fordham.*

Bankoff, G., Frerks, G. and Hilhorst, D. 2004. *Mapping vulnerability: disasters, development, and people*. Routledge.

Barber, R.J. 2008. Protecting the right to housing in the aftermath of natural disaster: standards in international human rights law. *International Journal of Refugee Law*, *20*(3), pp.432-468.

Bardhan, P. and Mookherjee, D. 2005. Decentralizing antipoverty program delivery in developing countries. *Journal of public economics*, *89*(4), pp. 675-704.

Barnes, J.A. 1979. *Who should know what?: social science, privacy, and ethics*. Cambridge : Cambridge University Press.

Barenstein, J. D. and Pittet, D. 2007. *Post-disaster housing reconstruction Current trends and sustainable alternatives for tsunami-affected communities in coastal Tamil Nadu*. Canobbio: University of Applied Sciences of Southern Switzerland.

Barenstein, J. D. and Iyengar, S. 2008. India: From a culture of housing to a philosophy of reconstruction. In Lyons, M. et al. eds. *Building Back Better: Delivering people-centred housing reconstruction at scale*. Rugby: Practical Action Publishing Ltd, pp. 163-188.

Bari, F. 1998. Gender, Disaster, and Empowerment: A Case Study from Pakistan. In: Enarson, E. and Morrow, B. H. eds. *The Gendered Terrain of Disaster: Through Women's Eyes.* New York: Praeget, pp. 125-131.

Barry, C.A., Britten, N., Barber, N., Bradley, C. and Stevenson, F. 1999. Using reflexivity to optimize teamwork in qualitative research. *Qualitative health research*, *9*(1), pp.26-44.

Bates, C. E. 1991. A Gazetteer of Kashmir and the Adjacent Districts of Kishtwar, Badarwar, Jamu, Naoshera, Pu'nch, and the Valley of Kishan Ganga. Calcutta: Office of the Superintendent of Government Printing, 1873. Lahore: SANG-E-MEEL PUBLICATIONS.

Baxter, J. and Eyles, J. 1997. Evaluating qualitative research in social geography: establishing 'rigour' in interview analysis. *Transactions of the Institute of British Geographers*, *22*(4), pp.505-525.

Bazaz, P. N. 1976. *THE HISTORY OF STRUGGLE FOR FREEDOM IN KASHMIR CULTURAL AND POLITICAL FROM THE EARLIEST TIMES TO THE PRESENT DAY*. Karachi: National Book Foundation.

Bazely, P. 2006. The Contribution of Computer Software to Integrating Qualitative and Quantitative Data and Analyses. *RESEARCH IN THE SCHOOLS, 13*(1), pp. 64-74.

Becker, H.A. 2001. Social impact assessment. *European Journal of Operational Research*, *128*(2), pp.311-321.

Begum, R. 1993. Women in environmental disasters: the 1991 cyclone in Bangladesh. *Gender & Development, 1*(1), pp. 34-39.

Bell, F. G. 1999. *Geological Hazards: Their Assessment, Avoidance and Mitigation.* New York: Taylor & Francis.

Bendimerad, F. 2001. Modeling and quantification of earthquake risk: Application to emerging economies. In *Mitigation and Financing of Seismic Risks: Turkish and International Perspectives* (pp. 13-39). Springer Netherlands.

Bennett, K. 2004. Emotionally intelligent research. *Area*, 36, pp. 414-422.

Bennett, K. 2006. Kitchen drama: performances, patriarchy, and power dynamics in a Dorset farmhouse kitchen. *Gender, Place and Culture*, 13, 153-160.

Berke, P. R. 1995. Natural-Hazard Reduction and Sustainable Development: A Global Assessment. *Journal of Planning Literature, 9*(4), pp. 370-382.

Berke, P.R., Kartez, J. and Wenger, D. 1993. Recovery after disaster: achieving sustainable development, mitigation and equity. *Disasters*, *17*(2), pp.93-109.

Berke, P. R. and Campanella, T. J. 2006. Shelter from the Storm: Repairing the National Emergency Management System after Hurricane Katrina. *Planning for Postdisaster Resiliency: Annals of the American Academy of Political and Social Science,* 604, pp. 192-207.

Bhatt, M. R., 1998. Can Vulnerability be Understood? In: Twigg, J. and Bhatt, M. R. eds. *Understanding Vulnerability: South Asian Perspective*. London: Intermediate Technology Publications Ltd (ITP), pp. 68-77.

Bhattacharjea, A. 1994. *Kashmir the Wounded Valley*. New Delhi: UBS Publishers' Distributors Ltd.

Bhavnani, R. 2006. *Natural Disaster Conflicts*. Cambridge, Massachusetts: Harvard University.

Bilham, R. 1988. Earthquakes and urban growth. *Nature, 366,* pp. 625-626.

Bilham, R. 2004. Earthquakes in India and the Himalaya: tectonics, geodesy and history. *ANNALS OF GEOPHYSICS, 47*(2/3), pp. 839-858.

Bilham, R. 2009. The seismic future of cities. *Bulletin of Earthquake Engineering*, *7*(4), pp.839-887.

Bilham, R. 2012. Societal and observational problems in earthquake risk assessments and their delivery to those most at risk. *Tectonophysics*, *584*, pp.166-173.

Bilham, R. and Ambraseys, N., 2005. Apparent Himalayan slip deficit from the summation of seismic moments for Himalayan earthquakes, 1500–2000. *Current Science*, *88*(10), pp.1658-1663.

Bilham, R. and Gaur, V. 2013. Buildings as Weapons of Mass Destruction. *Science 341(618),* pp. 618-619.

Birkmann, J. 2006. Measuring vulnerability: expert workshop in Kobe, Japan. Report on the 1st Meeting of the Expert Working Group "Measuring Vulnerability" Of the United Nations University Institute for Environment And Human Security (Unu-Ehs). January 23-24, 2005. Kobe, Japan

Blaikie, P., Cannon, T., Davis, I. and Wisner, B. 1994. *At Risk: natural hazards, peoples' vulnerability, and disasters*. London: Routledge.

Blaikie, P. 2012. Should some political ecology be useful? The Inaugural Lecture for the Cultural and Political Ecology Specialty Group, Annual Meeting of the Association of American Geographers, April 2010. *Geoforum*,*43*(2), pp.231-239.

Black, R., Arnell, N.W., Adger, W.N., Thomas, D. and Geddes, A. 2013. Migration, immobility and displacement outcomes following extreme events.*Environmental Science & Policy*, *27*, pp.S32-S43.

Bloesch, U., Khurshid, M. and Raja, N. A. 2005. Impact of the earthquake and the subsequent relief operation on the natural resources in north-eastern Pakistan Environmental Assessment Report 30 October – 16 November 2005. The Joint UNEP/OCHA Environment Unit.

Boano, C. and Hunter, W. 2012. Architecture at risk (?): The ambivalent nature of post-disaster practice. *Architectoni. ca*, *1*(1), pp.1-13.

Bode, B. 1977. DISASTER, SOCIAL STRUCTURE, AND MYTH IN THE PERUVIAN ANDES: THE GENESIS OF AN EXPLANATION. *Annals of the New York Academy of Sciences, 293*(1), pp. 246-274.

Bolin, R. 1976. Family recovery from natural disaster: A preliminary model. *Mass Emergencies, 1*(4), pp. 267-277.

Bolin, R. 1985. Disasters and Long-term Recovery Policy: A Focus on Housing and Families. *Policy Studies Review, 4*(4), pp. 709-715.

Borbasi, S., Jackson, D. and Wilkes, L. 2005. Fieldwork in nursing research: positionality, practicalities and predicaments. *Journal of advanced nursing*, *51*(5), pp.493-501.

Bosher, L.S., Lodi, S. and Rafeeqi, S.F.A. 2007. Engineering design for dwellings and small housing in seismically active regions of Pakistan:

towards a more holistic approach. *New Silk Route: Design Education and Research Conference.* Karachi, 10th-11th February 2007.

Bosher, L. and Dainty, A. 2011. Disaster risk reduction and 'built-in' resilience: towards overarching principles for construction practice. *Disasters, 35*(1), pp. 1−18.

Bourdieu, P. and L. Wacquant. 1992 An Invitation to Reflexive Sociology. Chicago, IL: University of Chicago Press.

Bouwer, L.M., Crompton, R.P., Faust, E., Höppe, P. and Pielke Jr, R.A. 2007. Confronting disaster losses. *Science-New York then Washington-*,*318*(5851), p.753.

Bowen, Z., 1981. Joyce and the epiphany concept: a new approach. *Journal of Modern Literature, 9*(1), pp. 103-114.

Brassard, C. and Raffin, A. 2012. Resilience in Post Disaster Societies: From Crisis to Development, *Asian Journal of Social Science, 39*(4), pp. 417- 424.

Brassard, C., Howitt, A.M. and Giles, D.W. 2015. Confronting Disaster: Recent Lessons from the Asia-Pacific. In *Natural Disaster Management in the Asia-Pacific* (pp. 1-13). Springer Japan.

Bremer, R. 2003. Policy development in disaster preparedness and management: lessons learned from the January 2001 earthquake in Gujarat, India. *Prehospital and disaster medicine, 18*(04), pp.372-384.

Broadbent, S.G. and Broadbent, D.M. 2006. Rethinking future UK support to post-disaster reconstructions: meeting stakeholder interests. In: *Proceedings of the Conference on Post-Disaster Reconstruction: Meeting Stakeholder Interests, Florence, Italy*. 17-19 May 2006, pp. 151-641.

Brooks, N., Adger, W.N. and Kelly, P.M. 2005. The determinants of vulnerability and adaptive capacity at the national level and the implications for adaptation. *Global environmental change*, *15*(2), pp.151-163.

Brown, D., Saito, K., Spence, R., Chenvidyakarn, T., Adams, B., Mcmillan, A. and Platt, S. 2008. Indicators for measuring, monitoring and evaluating post-disaster recovery. In: *Proceedings of the 6th international workshop on remote sensing for disaster applications*, Pavia.

Bryman, A. 1984. The Debate about Quantitative and Qualitative Research: A Question of Method or Epistemology? *The British Journal of Sociology, 35*(1), pp. 75-92.

Burby, R.J. and May, P.J. 1999. Making building codes an effective tool for earthquake hazard mitigation. *Global Environmental Change Part B: Environmental Hazards*, *1*(1), pp.27-37.

Burdge, R. J., Fricke, P., Finsterbusch, K., Freudenburg, W. R., Gramling, R., Holden, A., Llewellyn, L., Petterson, J. S. Thompson, J. and Williams, G. 1995. GUIDELINES AND PRINCIPLES FOR SOCIAL IMPACT ASSESSMENT. *Environment Impact Assessment Rev, 15*, pp. 11-43.

Burgess, J., Limb, M. and Harrison, C.M. 1988. Exploring environmental values through the medium of small groups: 1. Theory and practice. *Environment and planning A*, *20*(3), pp.309-326.

Buttenheim, A. 2009. Impact evaluation in the post-disaster setting: A conceptual discussion in the context of the 2005 Pakistan earthquake. *International Initiative for Impact Evaluation (3ie)*.

Cabinet Division 1971. D.O. No. 8/9/70-Coord. I. Government of Pakistan. Rawalpindi, May 11, 1971.

Cameron, J, 2010. Focusing on the focus group. In: Hay, I. ed. *Qualitative research methods in human geography*. Ontario: Oxford University Press. pp. 152-172.

Cannon, T. 1994. Vulnerability Analysis and the Explanation of 'Natural' Disasters. In: Varley, A. ed. *DISASTERS, DEVELOPMENT AND ENVIRONMENT.* Chichester: John Wiley & Sons Ltd, pp. 13-30.

Cannon, T. 2002. Gender and climate hazards in Bangladesh. *Gender & Development, 10*(2), pp. 45-50.

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

Carter, K. 1993. The Place of Story in the Study of Teaching and Teacher Education. *Educational Researcher, 22*(1), pp. 5-12+18.

Carter, W.N. 2008. Disaster Management: A Disaster Manager's Handbook. Asian Development Bank.

Chandrasekhar, D. 2010. *Understanding stakeholder participation in post-disaster recovery (case study: Nagapattinam, India).* PhD Thesis, University of Illinois at Urbana-Champaign.

Chang, S. 1984. Do disaster areas benefit from disasters? *Growth and Change, 15*(4), pp. 24-31.

Cavallo, E.A. and Noy, I. 2009. *The economics of natural disasters: a survey*. IDB Working Paper Series No. IDB-WP-124. Inter-American Development Bank.

Chang, Y., Wilkinson, S., Potangaroa, R. and Seville, E. 2010. Resourcing challenges for post-disaster housing reconstruction: a comparative analysis. *Building Research & Information*, *38*(3), pp. 247-264.

Chang, Y., Wilkinson, S., Potangaroa, R. and Seville, E. 2011. Donor-driven resource procurement for post-disaster reconstruction: Constraints and actions. *Habitat International*, *35*(2), pp.199-205.

Chaudhary, P. 2005. A STUDY OF CULTURAL ROUTES OF JAMMU REGION. *Presented during 15th General Assembly and Symposium, Xian, China.2005.*

Cheema, M. 2006. The Appraisal of the Government Compensation Scheme for Citizens of Azad Jammu and Kashmir Affected by the October 8 Earthquake. *Report, Risepak team, Lahore University of Management Sciences, Lahore.*

Clarke, C. and Munasinghe, M. 1994. Economic Aspects of Disasters and Sustainable Development: An Introduction. In: Munasinghe, M and Clarke, C. eds. *Disaster Prevention for Sustainable Development: Economic and Policy Issues*. IDNDR and The World Bank.

Collins, A. E. 2009. *Disaster and Development*. London: Routledge.

Collins, A.E., 2013. Applications of the disaster risk reduction approach to migration influenced by environmental change. Environmental science & policy, 27, pp.S112-S125.

Comerio, M.C. 1997. Housing issues after disasters. *Journal of Contingencies and Crisis Management, 5* (3), pp. 166-78.

Comfort, L., Wisner, B., Cutter, S., Pulwarty, R., Hewitt, K., Oliver-Smith, A., Wiener, J., Fordham, M., Peacock, W. and Krimgold, F. 1999. Reframing disaster policy: the global evolution of vulnerable communities. *Environmental hazards*, *1*(1), pp.39-44.

Cosgrave, J. and Herson, M. 2008. Perceptions of crisis and response: A synthesis of evaluations of the response to the 2005 Pakistan earthquake.*ALNAP seventh review of humanitarian action*, p.208.

Craig D. C. 2010. Don't Tear It Down! Preserving the Earthquake Resistant Vernacular Architecture of Kashmir. *Earthquake Spectra, 26*(1), pp. 309-310.

Crang, M. and Cook, I. 1995. *Doing Ethnographies*. Norwich: Geobooks

Creswell, J. W. 1994. *Research design: Qualitative and quantitative approaches*. Thousand Oaks, CA: Sage.

Creswell, J.W., Plano Clark, V.L., Gutmann, M.L. and Hanson, W.E. 2003. Advanced mixed methods research designs. In: Tashakkori, A. & Teddlie, C. eds. *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: Sage, pp. 209–240.

Crook, R. C. 2003. Decentralisation and poverty reduction in Africa: the politics of local–central relations. *Public administration and development 23*(1), pp. 77-88.

Cuny, F. C. 1983. *Disasters and Development*. New York: Oxford University Press.

Cutter, S.L. 1996. Vulnerability to environmental hazards. *Progress in Human Geography, 20(4)*, pp. 529-539.

Cutter, S.L. 2006. GI Science, disasters and emergency management.*Hazards, Vulnerability and Environmental Justice*, pp.399-406.

Cutter, S.L. and Emrich, C.T. 2006. Moral hazard, social catastrophe: The changing face of vulnerability along the hurricane coasts. *The Annals of the American Academy of Political and Social Science*, *604*(1), pp.102-112.

Cutter, S.L. and Finch, C. 2008. Temporal and spatial changes in social vulnerability to natural hazards. *Proceedings of the National Academy of Sciences 105*(7), pp. 2301-2306.

Cutter, S.L., Mitchell, J.T. and Scott, M.S. 2000. Revealing the vulnerability of people and places: a case study of Georgetown County, South Carolina. *Annals of the association of American Geographers*, *90*(4), pp.713-737.

Cutter, S.L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E. and Webb, J. 2008. A place-based model for understanding community resilience to natural disasters. *Global environmental change*, *18*(4), pp.598-606.

Cutter, S.L., Boruff, B.J. and Shirley, W.L. 2003. Social vulnerability to environmental hazards. *Social science quarterly*, *84*(2), pp.242-261.

Daly, P. and Brassard, C. 2011. Aid Accountability and Participatory Approaches in Post-Disaster Housing Reconstruction. *Asian Journal of Social Science, 39*, pp. 508–533.

Dasgupta, A. and Beard, V. A. 2007. Community driven development, collective action and elite capture in Indonesia. *Development and Change, 38*(2), pp. 229-249.

Da Silva, J. 2010. Lessons from Aceh. *Key Considerations in Post-Disaster Reconstruction*.

Davis, I., 1978. *Shelter after disaster*. Oxford Polytechnic.

Davis, I., 2006. Learning from disaster recovery: Guidance for decision makers. International recovery platform (IRP).

Davis, I. 2010a. *Report on the Rural Housing Reconstruction Programme (RHPP) following the Pakistan Earthquake of October 8th 2005*.

Davis, I. 2010b. *Observations on Urban Recovery following the Pakistan Earthquake of October 8th 2005.*

Davis, I. 2014. Introduction. In: Davis, I. ed. *Disaster Risk Management in Asia and the Pacific*. Routledge, pp. 3-32.

Delaney, C. 1988. Participant-observation: The razor's edge. *Dialectical Anthropology*, *13*(3), pp.291-300.

Delaney, P. and Shrader, E. 2000. Gender and post-disaster reconstruction: the case of Hurricane Mitch in Honduras and Nicaragua. *Decision review draft. Washington, DC: LCSPG/LAC Gender Team, The World Bank*.

DeLyser, D. 2001. "Do You Really Live Here?" Thoughts on Insider Research. *The Geographical Review, 91*(I-2), pp. 441-453.

DeLyser, D. and Sui, D. 2013. Crossing the qualitative-quantitative divide II Inventive approaches to big data, mobile methods, and rhythmanalysis. *Progress in human geography*, *37*(2), pp.293-305.

Deng, F. 2010. Post-disaster reconfiguration of property rights in a transition Economy. *Post-Communist Economies, 22*(2), pp. 193–206.

DFID. 2011. Pakistan Post-Earthquake Reconstruction and Rehabilitation Programme. Project Completion Review. 05/12/2011.

Dietz, T. 1987. Theory and Method in Social Impact Assessment. *Sociological Inquiry*, *57*(1), pp.54-69.

DMTP. 1994. *Disaster Preparedness*. Disaster Management Training Programme. http://www.pacificdisaster.net/pdnadmin/data/original/dmtp_07_disaster_preparedness_8.pdf

DMTP. 1997. Disaster Management Ethics. Disaster Management Training Programme. http://www.disaster-info.net/lideres/spanish/mexico/biblio/eng/doc13980.pdf

Dunford, M. and Li, L. 2011. Earthquake reconstruction in Wenchuan: assessing the state overall plan and addressing the 'forgotten phase'. *Applied Geography*, *31*(3), pp. 998-1009.

Dunning, S.A., Mitchell, W.A., Rosser, N.J. and Petley D.N., 2007. The Hattian Bala rock avalanche and associated landslides triggered by the Kashmir Earthquake of 8 October 2005. *Engineering Geology*, *93*(3), pp.130-144.

Dynes, R.R. 2002. Disaster and development, again. PRELIMINARY PAPER #321. University of Delaware Disaster Research Center.

EERI. 2005. Learning from Earthquakes First Report on the Kashmir Earthquake of October 8, 2005. EERI Special Earthquake Report — December 2005. https://www.eeri.org/lfe/pdf/kashmir_eeri_1st_report.pdf

Ejaz, N., Dace, E., Naeem, U.A. and Tahir, M.F. 2013. Drastic impacts of 8th October earthquake in Kashmir and role of sustainable development. In: *International Conference on Sustainable Built Environment (ICSBE-2010) Kandy,* 13-14 December 2010.

Elliott. J. R. and Pais, J. 2006. Race, class, and Hurricane Katrina: Social differences in human responses to disaster. *Social Science Research, 35*, pp. 295–321.

El-Masri, S. and Tipple, G. 2002. Natural disaster, mitigation and sustainability: the case of developing countries. *International Planning Studies, 7* (2), pp. 157-175.

Elwood, S. and Martin, D.G. 2000. 'Placing' interviews: location and scales of power in qualitative research. *Professional Geographer*, 52, pp. 649-657.

Enarson, E. and Morrow, B. H. 1998a. Why gender? Why Women? An Introduction to Women and Disaster. In: Enarson, E., Morrow, B.H. eds. *The gendered terrain of disaster.* New York: Praeget, pp. 1-8.

Enarson, E. and Morrow, B. H. 1998b. Women Will Rebuild Miami: A Case Study of Feminist Response to Disaster. In: Enarson, E., Morrow, B.H. eds. *The gendered terrain of disaster.* New York: Praeget, pp. 1-8.

Enarson, E. 1999. Women and housing issues in two US disasters: case studies from Hurricane Andrew and the Red River Valley flood. *International Journal of Mass Emergencies and Disasters, 17*(1), pp. 39-63.

Enarson, E. and Fordham, M. 2001. From women's needs to women's rights in disasters. *Environmental Hazards*, *3*(3), pp.133-136.

England, K. V. L. 1994. Getting Personal: Reflexivity, Positionality, and Feminist Research. *The Professional Geographer, 46*(1), 80-9, pp. 241-256.

ERRA. 2006. *Strategy Document Rural Housing Reconstruction Building Back Better: RURAL HOUSING RECONSTRUCTION STRATEGY OF EARTHQUAKE HIT DISTRICTS IN NWFP AND AJK*. ERRA, Islamabad.

ERRA. 2006a. *Guidelines For Earthquake Resistant Construction Of Non-Engineered Rural And Suburban Masonry Houses in Cement Sand Mortar In Earthquake Affected Areas*. Islamabad: Earthquake Reconstruction & Rehabilitation Authority.

ERRA. 2006 c. *Social Protection Strategy, July 2006-June 2009.* Earthquake Reconstruction and Rehabilitation Authority Prime Minister Secretariat, Islamabad.

ERRA. 2007. *Planning Cities is a first step towards Building Back Better planned Cities Urban Development A Strategy for Reconstruction, Rehabilitation and Development of Earthquake Affected Urban Areas*. ERRA, Islamabad.

ERRA. 2007a. *District Profile Muzaffarabad*. Islamabad: Earthquake Reconstruction & Rehabilitation Authority.

ERRA. 2007b. *District Profile Bagh*. Islamabad: Earthquake Reconstruction & Rehabilitation Authority.

ERRA. 2007c. *Gender Policy for Earthquake Affected Areas. 01 June 2007.* Earthquake Reconstruction and Rehabilitation Authority Prime Minister Secretariat, Islamabad.

ERRA. 2011a. *ERRA - M&E Annual Report January 2010.* Islamabad: Earthquake Reconstruction & Rehabilitation Authority.

ERRA. 2011b. *Annual Review 2010-2011.* Islamabad: Earthquake Reconstruction & Rehabilitation Authority.

ERRA. 2013. http://erra.pk/sectors/housing.asp

ERRA. 2014. http://erra.pk/sectors/housing.asp

ERRA. 2015. www.erra.pk

ERRA. 2016. www.erra.pk

Fallahi, A. 2007. Lessons Learned from the Housing Reconstruction Following the Bam Earthquake in Iran. *The Australian Journal of Emergency Management* 22(1), p. 26.

Finlay, L. 2002. Negotiating the swamp: the opportunity and challenge of reflexivity in research practice. Qualitative research, 2(2), pp.209-230.

Fordham, B., 1998. Partisanship, macroeconomic policy, and US uses of force, 1949-1994. Journal of Conflict Resolution, 42(4), pp.418-439

Fothergill, A. 1996. Gender, risk, and disaster. *International Journal of Mass Emergencies and Disasters, 14*(1), pp. 33-56.

Ferreira, S., Hamilton, K. and Vincent, J.R. 2011. Nature, socioeconomics and adaptation to natural disasters: new evidence from floods. In: *Policy Research Working Paper 5725.* The World Bank Development Research Group, Environment and Energy Team.

Ganga, D. and Scott, M. 2006. Cultural "Insiders" and the Issue of Positionality in Qualitative Migration Research: Moving "Across" and Moving "Along" Researcher-Participant Divides. *Forum: Qualitative Social Research, 7*(3, Art 7), [no pagination].

Ganapati, N., Cheng, S. and Ganapati, S. 2012. Resilient rural communities? Housing recovery patterns following hurricane katrina. In: *USDA Disaster Resiliency Conference, University of Central Florida, Orlando, FL. Accessed March* (Vol. 19, No. 2014, pp. 73-85).

Ge, Y., Gu, Y. and Deng, W. 2010. Evaluating China's national post-disaster plans: The 2008 Wenchuan Earthquake's recovery and reconstruction planning. *International Journal of Disaster Risk Science*, *1*(2), pp.17-27.

Geis, D.E. 2000. By design: the disaster resistant and quality-of-life community. *Natural Hazards Review*, *1*(3), pp.151-160.

Ghafory-Ashtiany, M. and Hosseini, M. 2008. Post-Bam earthquake: recovery and reconstruction. *Natural Hazards*, *44*(2), pp.229-241.

Gharaati, M. 2006. An overview of the reconstruction program after the earthquake of Bam, Iran. *Post-disaster reconstruction, 453*, pp. 1-14.

Gilani, S. M. 2007. *The Constitution of Azad Jammu & Kashmir (In the historical backdrop with corresponding Pakistan, India & Occupied Jammu and Kashmir constitutions.* Islamabad: National Book Foundation.

Gibbs, A. 1997. Focus groups. *Social research update, 19*(8), pp. 1-8.

Gilbert, M.R. 1994. The Politics of Location: Doing Feminist Research at "Home". *The Professional Geographer*, *46*(1), pp.90-96.

Gilbert, C. 1998. Studying disaster: Changes in the main conceptual tools. In: Quarantelli, E. L. ed. *What is a disaster? : Perspectives on the question*. London: Routledge, pp. 11-18.

Gilbert, R. 2001. *Doing More for Those Made Homeless by Natural Disasters*. WORKING PAPER SERIES NO. 1. Washington DC: The World Bank.

Ginige, K.N. and Amaratunga, R.D.G. 2009. Disaster Risk Reduction and Sustainable Development: Exploring the Relationships. In: Ahmed, V. et al.

eds. *PROCEEDINGS OF THE BUHU 9TH INTERNATIONAL POSTGRADUATE RESEARCH CONFERENCE.* Greater Manchester: 29–30 January, 2009. Manchester: University of Salford, pp. 772-780.

Glaser, B.G. and Strauss, A.L. 2009. *The discovery of grounded theory: Strategies for qualitative research*. Transaction Publishers.

Goss, J. D. 1996. Introduction to focus groups. *Area*, pp. 113-114.

GSDMA 2002. *Gujarat Earthquake Reconstruction and Rehabilitation Policy*. Gandhinagar: Gujarat State Disaster Management Authority.

Greene, J.C., Caracelli, V.J. and Graham, W.F. 1989. Toward a Conceptual Framework for Mixed-Method Evaluation Designs. *Educational Evaluation and Policy Analysis, 11*(3), pp. 255-274.

Guarnacci, U. 2012. Governance for sustainable reconstruction after disasters: Lessons from Nias, Indonesia. *Environmental Development, 2*, pp. 73-85.

Gupta, A.K., Yunus, M. and Misra, J. 1998. Disaster reduction and sustainable development. *Enviro. News 4*, pp. 6-7.

Gupta, M. and Sharma, A. 2006. Compounded loss: the post tsunami recovery experience of Indian island communities. *Disaster Prevention and Management, 15*(1), pp. 67-78.

Halvorson, S. J. and Hamilton, J. P. 2007. Vulnerability and the Erosion of Seismic Culture in Mountainous Central Asia. *Mountain Research and Development, 27*(4), pp. 322–330.

Halvorson, S.J. and Parker Hamilton, J. 2010. In the aftermath of the Qa'yamat: 1 the Kashmir earthquake disaster in northern Pakistan. *Disasters*, *34*(1), pp.184-204.

Harding, S. G. 2004. *The feminist standpoint theory reader: Intellectual and political controversies*. London: Routledge.

Hallegatte, S. and Dumas, P. 2009. Can natural disasters have positive consequences? Investigating the role of embodied technical change. *Ecological Economics*, *68*(3), pp.777-786.

Hannan, C. 2002. Mainstreaming gender perspectives in environmental management and mitigation of natural disasters. *United Nations Division for the Advancement of Women and the NGO Committee on the Status of Women, 46th Session of the Commission on the Status of Women, United Nations. (January 17, 2002)*.

Haseeb, M., Xinhailu, A.B., Khan, J.Z., Ahmad, I. and Malik, R. 2011. Construction of earthquake resistant buildings and infrastructure implementing seismic design and building code in northern Pakistan 2005 earthquake affected area. *International Journal of Business and Social Science*, *2*(4), pp. 168-177.

Heidegger, M. 1977. *The question concerning technology, and other essays*. Harper & Row: New York, Hagerstown, San Francisco & London.

Heltberg, R. 2007. Helping South Asia cope better with natural disasters: the role of social protection. *Development Policy Review*, *25*(6), pp.681-698.

Henderson, L.J. 2004. Emergency and disaster: Pervasive risk and public bureaucracy in developing nations. *Public Organization Review*, *4*(2), pp.103-119.

Herbert, S. 2000. For ethnography. *Progress in human geography*, *24*(4), pp.550-568.

Herod, A. 1999. Reflections on interviewing foreign elites: praxis, positionality, validity, and the cult of the insider. *Geoforum*, *30*(4), pp.313-327.

Hertz, R. 1997. *Reflexivity & voice*. Sage Publications.

Hertz, R. and Imber, J.B. eds., 1995. *Studying elites using qualitative methods* (Vol. 175). Sage Publications.

Hewitt, K. 1983. The Idea of Calamity in a Technocratic Age. In Hewitt, K. ed. *Interpretations of Calamity: From the Viewpoint of Human Ecology*. London: Allen and Unwin, pp. 2-32.

Hewitt, K. 1995. Excluded perspectives in the social construction of disaster. *What is a disaster*, pp.75-91.

HFA. 2007. Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters. The United Nations Office for Disaster Risk Reduction (UNISDR).

Hilhorst, D. and Bankoff, G. 2004. *Mapping Vulnerability*. In: Bankoff, G. et al. eds. *Mapping Vulnerability: Disasters, Development and People*. London: Earthscan, pp. 1-9.

Himachal 2015. http://himachal.nic.

Hines, P. I. 2007. NATURAL DISASTERS AND GENDER INEQUALITIES: THE 2004 TSUNAMI AND THE CASE OF INDIA. *Race, Gender & Class, 14*(1-2), pp. 60-68.

Holt, N.L., 2003. Representation, legitimation, and autoethnography: An autoethnographic writing story. *International journal of qualitative methods*,*2*(1), pp.18-28.

Hopkins, P.E. 2007. Thinking critically and creatively about focus groups.*Area*, *39*(4), pp.528-535.

Hughes, C. 2012. Developing reflexivity in research. *Teaching Research Process, University of Warwick Department of Sociology*. [online]. http://www2.warwick.ac.uk/fac/soc/sociology/staff/academicstaff/hughes/researchprocess.

Huisman, K. 2008. "Does This Mean You're Not Going to Come Visit Me Anymore?": An Inquiry into an Ethics of Reciprocity and Positionality in Feminist Ethnographic Research. *Sociological Inquiry, 78*(3), pp. 372-396.

Husain, S. E. 2008. *Post-Earthquake Reconstruction Scenario in the Rural Northern Areas (N.W.F.P.) of Pakistan.* The 14 the World Conference on Earthquake Engineering October 12-17, 2008, Beijing, China.

ICIMOD. 2012. http://www.icimod.org/

IDB. 2014. How Pakistan built back better: Owner-driven reconstruction after the 2005 earthquake. IsDB SUCCESS STORY SERIES: NO. 20 (JUNE 2014. Islamic Development Bank Group.

Iqbal, M.F. and Khan, I.A. 2014. Spatiotemporal land use land cover change analysis and erosion risk mapping of Azad Jammu and Kashmir, Pakistan. *The Egyptian Journal of Remote Sensing and Space Science*, *17*(2), pp.209-229.

IUCN. 2006. Earthquake in Pakistan. An Assessment of Environmental Risks and Needs Based on IUCN Field Missions to NWFP and AJK. November 19–26 and December 4–7, 2005. IUCN Pakistan.

Iversen, V., Chhetry, B., Francis, P., Gurung, M., Kafle, G., Pain, A. and Seeley, J. 2006. High value forests, hidden economies and elite capture: Evidence from forest user groups in Nepal's Terai. *Ecological economics*, *58*(1), pp. 93-107.

Iyengar, R.N., Sharma, D. and Siddiqui, J.M. 1999. Earthquake history of India in medieval times. *Indian Journal of history of science*, *34*, pp.181-238.

Jackson, P. 1983. Principles and problems of participant observation. *Geografiska Annaler. Series B. Human Geography*, pp.39-46.

Jha, A.K. and Duyne, J.E. 2010. *Safer homes, stronger communities: a handbook for reconstructing after natural disasters*. Washington DC: World Bank Publications.

JICA. 2007. *The Urgent Development Study on Rehabilitation and Reconstruction in Muzaffarabad City in the Islamic Republic of Pakistan*. Final Report I, Volume 1: Summary. Islamabad: JICA.

Jick, T. D. 1979. Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly, 24*, pp. 602-611.

Jigyasu, R. 2002. From Marathwada to Gujarat–emerging challenges in post-earthquake rehabilitation for sustainable eco-development in South Asia. In: *Proceedings of the First International Conference on Post-disaster Reconstruction: Improving post-disaster reconstruction in developing countries,* pp. 23-25.

Johnson, R. B. and Onwuegbuzie, J. A. 2004. Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher, 33*(7), pp. 14-26.

Johnson, R.B., Onwuegbuzie, A.J. and Turner, L.A. 2007. Toward a definition of mixed methods research. *Journal of mixed methods research*,*1*(2), pp.112-133.

Jouanne, F. et al. 2011. Postseismic deformation in Pakistan after the 8 October 2005 earthquake: Evidence of afterslip along a flat north of the Balakot-Bagh thrust. *Journal of Geophysical Research: Solid Earth*,*116*(B7).

Kalia, S. 2013. Bureaucratic policy making in Pakistan. *The Dialogue*, 8(2), pp.156-170.

Kamberelis, G. and Dimitriadis, G. 2013. *Focus Groups: From structured interviews to collective conversations.* Oxon: Routledge.

Kapur, M. L. 1976. *The History and Culture of Kashmir*. New Delhi: Anmol Publications.

Kanji, N. 2006. Multidimensional post-earthquake reconstruction: the Chakama Valley in Pakistan-administered Kashmir and the Uri Block in Indian-administered Jammu and Kashmir. Aga Khan Development Network.

Katz, C. 1994. Playing the field: questions of fieldwork in geography. *The Professional Geographer*, *46*(1), pp.67-72.

Kazmi, Z.A. et al. 2012. Evaluation Of Design And Construction Practices-A Lesson Learnt From Kashmir Earthquake. *Proceedings of the International Symposium on Engineering Lessons Learned from the 2011 Great East Japan Earthquake.* Tokyo, March 1-4, 2012. Japan, pp.1846-1857.

Kellenberg, D.K. and Mobarak, A.M. 2008. Does rising income increase or decrease damage risk from natural disasters?. *Journal of Urban Economics*,*63*(3), pp.788-802.

Kenny, S. 2007. Reconstruction in Aceh: Building whose capacity?. *Community Development Journal*, *42*(2), pp.206-221.

Khan, M. H. 2007. *In Retrospect: The Story of a Bureaucrat*. Islamabad: Profile Publishing Printing.

Khan, H.M., Shah, A., Jan, I. and Khan, R. 2011, April. Evaluation and improvement of seismic performance of locally constructed nonengineered buildings in the earthquake prone areas of Pakistan. In *Proceedings of the International Conference on Earthquake Engineering and Seismology (ICEES, 2011). SCEE NUST:* Islamabad, pp. 248-255.

Khondker, H. H. 1996. Women and floods in Bangaladesh. *International Journal of Mass Emergencies and Disasters, 14*(3), pp. 281-292.

Kirkby, J., O'Keefe, P., Convery, I. and Howell, D. 1997. On the emergence of complex disasters. *Disasters*, *21*(2), pp.177-180.

Kitzinger, J. 1995. Qualitative research: Introducing focus groups. *BMJ 29*, 311(7000), pp. 299–302.

Kobayashi, A. 1994. Coloring the field: Gender, "race," and the politics of fieldwork. *The professional geographer*, *46*(1), pp.73-80.

Kondo, T. 2008. Planning for Post-Disaster Recovery in New Orleans after Hurricane Katrina. *In: Proceedings International Symposium on City Planning*. Jeonju: 12 -15 January, 2008. Korea: Vol. 17, pp. 631-645.

Kothar, C.R. 2006. *Research Methodology: Methods and Techniques*. New Delhi: New Age International Publications.

Kreps, G. A. 1998. Disaster as systematic event and social catalyst. In: Quarantelli, E. L. ed. *What is a disaster? Perspectives on the question.* London: Routledge, pp. 31-55.

Krueger, R. A. and Casey, M. A. 2009. *Focus groups: A practical guide for applied research*. Beverly Hills: Sage.

Kulatunga, U., Wedawatta, G., Amaratunga, D. and Haigh, R. 2014. Evaluation of vulnerability factors for cyclones: the case of Patuakhali, Bangladesh. *International journal of disaster risk reduction*, *9*, pp.204-211.

Kumar, S., Wesnousky, S.G., Rockwell, T.K., Ragona, D., Thakur, V.C. and Seitz, G.G. 2001. Earthquake recurrence and rupture dynamics of Himalayan Frontal Thrust, India. *Science*, *294*(5550), pp.2328-2331.

Labaree, R. V. 2000. The risk of 'going observationalist': Renegotiating the hidden dilemmas of being an insider participant observer. *Qualitative Research, 2*(1), pp. 97-122.

Lal, P. G. 1995. A Short History of Kashmir: From the Earliest Times to the Present Day. In: Grower, V. ed. *The Story of Kashmir: Yesterday & Today.* New Delhi: Deep & Deep Publishers, pp. 9-54,Vol.I.

Latham, A. 2003. Research, performance, and doing human geography: some reflections on the diary-photograph, diary-interview method. *Environment and Planning A*, *35*(11), pp.1993-2017.

Law, J. 2004. *After method: Mess in social science research*. Routledge.

Leersum, V. A. and Arora, S. 2011. Implementing seismic-resistant technologies in post-earthquake Pakistan: A process analysis of owner driven reconstruction. *Habitat International*, *35*(2), pp.254-264.

Levine, C., 2004. The concept of vulnerability in disaster research. Journal of Traumatic Stress, 17(5), pp.395-402

Lewis, J. 1999. *Development in Disaster-Prone Places: Studies of Vulnerability*, London: Intermediate Technology Publications.

Linnerooth-Bayer, J., Mechler, R. and Pflug, G. 2005. Refocusing disaster aid. *Science*, *309*(5737), pp.1044-1046.

Loh, B. 2005. Disaster risk management in Southeast Asia: a developmental approach. *ASEAN Economic Bulletin*, *22*(2), pp.229-239.

Lu, J., Peacock, W. G., Zhang, Y., Dash, D. 2007. A Comparative Study of Single Family and Multifamily Housing Recovery Following 1992 Hurricane Andrew in Miami-Dade County, Florida. In: Boswell et al. eds. *Proceedings of the Hazards and Disasters Researchers Meeting*. Boulder, Colorado July 11–12, 2007, pp. 22-26.

Lupton, D. 1999. *Risk*. London: Routledge.

Lyons, M. 2010. Can large-scale participation be people centred? Evaluating reconstruction as development. In: Lyons, M. et al. eds. *Building Back Better: Delivering people-centred housing reconstruction at scale.* Rugby: Practical Action Publishing Ltd., pp. 39-62.

Macabuag, J. 2010. Dissemination of seismic retrofitting techniques to rural communities. EWB-UK National Research Conference 2010 *'From Small Steps to Giant Leaps...putting research into practice'* Hosted by The Royal Academy of Engineering 19th February 2010.

Macbeth, D. 2001. On "reflexivity" in qualitative research: Two readings, and a third. *qualitative inquiry*, *7*(1), pp.35-68.

Macnaghten, P. & Myers, G. 2007. Focus groups. In: Seale, C., Gobo, G., Gubrium, J.F. & Silverman, D. eds.. *Qualitative research practice*. SAGE Publications: Los Angeles, London, New Delhi & Singapore. pp. 65-79.

Mahajan, V. D. 1982. *Mughal Rule in India*. New Delhi: S. Chand and Co.

Mahdi, T. and Mahdi, A. 2013. Reconstruction and retrofitting of buildings after recent earthquakes in Iran. *Procedia Engineering*, *54*, pp.127-139.

Majova, L., 2010. Disaster and Development.
Malalgoda, C., Amaratunga, D. and Haigh, R. 2014. Challenges in Creating a Disaster Resilient Built Environment. *Procedia Economics and Finance*,*18*, pp.736-744.

Malalgoda, C., Amaratunga, D. and Haigh, R. 2014. Challenges in Creating a Disaster Resilient Built Environment. *Procedia Economics and Finance*,*18*, pp.736-744.

Malik, A.A. 2011. The Pakistan floods 2010: Public policy lessons. *International Policy and Leadership Institute*, *1*(1), p. 6.

Maly, E. and Shiozaki, Y. 2012. Towards a policy that supports people-centered housing recovery—learning from housing reconstruction after the Hanshin-Awaji Earthquake in Kobe, Japan. *International Journal of Disaster Risk Science*, *3*(1), pp.56-65.

Manandhar, R. and McEntire, D. A. 2014. Disasters, Development, and Resilience: Exploring the Need for Comprehensive Vulnerability Management. In: N. Kapucu, K. et al. eds. *Disaster and Development, Environmental Hazards*. Switzerland: Springer International Publishing, pp. 19-37.

Manyena, S.B., O'Brien, G., O'Keefe, P. and Rose, J. 2011. Disaster resilience: A bounce back or bounce forward ability. *Local Environment, 16(5)*, pp.417-424.

Morrow, B.H., 1999. Identifying and mapping community vulnerability. Disasters, 23(1), pp.1-18

Mascia-Lees, F.E., Sharpe, P. and Cohen, C.B. 1989. The postmodernist turn in anthropology: Cautions from a feminist perspective. *Signs*, *15*(1), pp.7-33.

Mauthner, N.S. and Doucet, A. 2003. Reflexive accounts and accounts of reflexivity in qualitative data analysis. *Sociology*, *37*(3), pp.413-431.

McCarthy, F.X. 2008. FEMA disaster housing and Hurricane Katrina: overview, analysis, and congressional options. Congressional Research Service, Library of Congress.

McDonald, M.G. 2008. The nature of epiphanic experience. *Journal of Humanistic Psychology*, 48(1), pp.89-115.

McDowell, L. 1992. Doing gender: feminism, feminists and research methods in human geography. *Transactions of the Institute of British Geographers*, pp.399-416.

McEntire, D. A. 2004. Development, disasters and vulnerability: a discussion of divergent theories and the need for their integration. *Disaster Prevention and Management, 13*(3), pp. 193-198.

McEntire, D.A., Fuller, C., Johnston, C.W. and Weber, R. 2002. A comparison of disaster paradigms: The search for a holistic policy guide.*Public Administration Review*, *62*(3), pp.267-281.

Middleton, N. and O'Keefe, P. 1997. *Disaster and development: the politics of humanitarian aid*. Pluto Press.

Mileti, D. 1999. *Disasters by Design: A Reassessment of Natural Hazards in the United States*. Joseph Henry Press.

Miller, R. and Acton, C. 2009. *SPSS for social scientists*. Palgrave Macmillan.

Mitchell, J.K. 1995. Coping with natural hazards and disasters in megacities: Perspectives on the twenty-first century. *GeoJournal*, *37*(3), pp.303-311.

Moe, T. L. and Pathranarakul, P. 2006. An integrated approach to natural disaster management: public project management and its critical success factors. *Disaster Prevention and Management: An International Journal*,*15*(3), pp.396-413.

Mohapatra, R. 2009. *Community Based Planning in Post-Disaster Reconstruction: A Case Study of Tsunami Affected Fishing Communities in Tamil Nadu Coast of India.* PhD Thesis, University of Waterloo.

Mohapatra, S., Joseph, G. and Ratha, D. 2009. Remittances and natural disasters: ex-post response and contribution to ex-ante preparedness. *World Bank Policy Research Working Paper Series, Vol*.

Mohmand, S. and Gazdar, H. 2007. Social structures in rural Pakistan.*Thematic paper prepared under TA4319, Determinants and Drivers of Poverty Reduction and ADB's Contribution in Rural Pakistan. ADB, Islamabad*.

Mona, L. 2009. Seismic Hazard Assessment of Muzaffarabad. Islamabad: National Disaster Management Authority, Government of Pakistan.

Morgan, D. L. 1996. Focus groups. *Annual review of sociology, 22*, pp. 129-152.

Morgan, D. L. and Kruger, R. A. 1993. When to use focus groups and why. In: Morgan, D. L. ed. *Successful focus groups: Advancing the state of the art*. Sage focus editions Vol. 156, pp. 3-19. Thousand Oaks, CA, US: Sage Publications, Inc.

Mountz, A. 2002. Feminist politics, immigration, and academic identities. *Gender, Place and Culture, 9(2).* pp. 187-194.

Mullings, B. 1999. Insider or outsider, both or neither: some dilemmas of interviewing in a cross-cultural setting. *Geoforum, 30*, pp. 337-350.

Mumtaz, H., Mughal, S.H., Stephenson, M. and Bothara, J.K. 2008. The challenges of reconstruction after the October 2005 Kashmir earthquake. *BULLETIN OF THE NEW ZEALAND SOCIETY FOR EARTHQUAKE ENGINEERING, 41*(2), pp. 68-82

Naeem, G. and Okazaki, K. 2009. EARTHQUAKE RISK PERCEPTION OF STAKE HOLDERS INVOLVED IN HOUSING SAFETY IN PAKISTAN. *Bulletin of the International Institute of Seismology and Earthquake Engineering*, *43*, pp.91-96.

Nazarea, V. D. 1999. *Ethnoecology: situated knowledge/located lives*. University of Arizona Press.

NDMA. 2009. *Annual Report 2009.* National Disaster Management Authority Prime Minister's Secretariat, Islamabad. http://www.ndma.gov.pk.

NDMA. 2009a. *Muzaffarabad City's Earthquake Scenario.* National Disaster Management Authority Pakistan. www.ndma.gov.pk

NDMA. 2011. *NDMA Annual Report 2011.* National Disaster Management Authority Prime Minister's Secretariat, Islamabad. http://www.ndma.gov.pk

NDMA. 2013. *Balochistan Earthquake-16 April 2013*. Islamabad: National Disaster Management Authority, Government of Pakistan. www.ndma.gov.pk

NESPAK. 2006. *SEISMIC HAZARD MICROZONATION OF MAJOR TOWNS AFFECTED BY EARTHQUAKE OF OCTOBER 08, 2005*. REPORT ON SEISMIC HAZARD MICROZONATION OF MUZAFFARABAD, AJK. February 2006. NESPAK Lahore, Pakistan.

Neumayer, E. and Plümper, T. 2007. The gendered nature of natural disasters: The impact of catastrophic events on the gender gap in life expectancy, 1981–2002. *Annals of the Association of American Geographers, 97*(3), pp. 551-566.

New England. 2015. https://familysearch.org

Nigg, J.M. 1995. Disaster recovery as a social process. PRELIMINARY PAPER #219. University of Delaware Disaster Research Center.

Nigg, J.M. and Tierney, K.J. 1993. *Disasters and social change: Consequences for community construct and affect*. PRELIMINARY PAPER #I95. University of Delaware, Disaster Research Center.

O'Keefe, P. and Westgate, K., 1977. Preventive planning for disasters. *Long Range Planning*, *10*(3), pp.25-29.

O’Keefe, P., Westgate, K. and Wisner, B. 1976. ‘Taking the Naturalness out of Natural Disasters*’, Nature*, 260, pp. 566-567.

Oliver-Smith, A. 1998. Global changes and the definition of disaster. In Quarantelli, E. L. ed. *What is a disaster? Perspectives on the question*. London: Routledge, pp. 177-194.

Olson, R. S. 2000. Toward a Politics of Disaster: Losses, Values, Agendas, and Blame. *International Journal of Mass Emergencies and Disasters*, *18*(2), pp. 265–287.

Oliver-Smith, A., 1996. Anthropological research on hazards and disasters.*Annual review of anthropology*, pp.303-328.

Omidvar, B., Zafari, H. and Khakpour, M. 2011. Evaluation of public participation in reconstruction of Bam, Iran, after the 2003 earthquake.*Natural hazards*, *59*(3), pp.1397-1412.

Onwuegbuzie, A. J. 2002. Positivists, post-positivists, post-structuralists, and post-modernists: Why can't we all get along? Towards a framework for unifying research paradigms. *Education, 122*(3), pp. 518-530.

Oslen, W. 2004. Triangulation in Social Research: Qualitative and Quantitative Methods Can Really Be Mixed. *Developments in Sociology, 20*, pp 103-118.

Oven, K, J. 2009. *Landscape, Livelihoods and Risk: Community Vulnerability to Landslides in Nepal*. PhD thesis, Durham University. Available at Durham E-Theses Online: http://etheses.dur.ac.uk/183/

Owen, L.A., Kamp, U., Khattak, G.A., Harp, E.L., Keefer, D.K. and Bauer, M.A. 2008. Landslides triggered by the 8 October 2005 Kashmir earthquake. *Geomorphology*, *94*(1), pp.1-9.

Özerdem, A., 2006. The mountain tsunami: afterthoughts on the Kashmir earthquake. *Third World Quarterly*, *27*(03), pp.397-419.

Palliyaguru, R., Amaratunga, D., and Haigh, R. 2009. Practice of disaster risk reduction in post-disaster infrastructure reconstruction in Sri Lanka: success or failure? In: Ahmed, V. et al. eds. *PROCEEDINGS OF THE BUHU 9TH INTERNATIONAL POSTGRADUATE RESEARCH CONFERENCE.* Greater Manchester: 29–30 January, 2009. Manchester: University of Salford, pp. 824-835.

Pandey, B.H., Okazaki, K. and Ando, S. 2008. Dissemination of earthquake resistant technologies for non-engineered construction. In *The 14th World Conference on Earthquake Engineering, Beijing, China.* pp. 12-17.

Panikkar, K.M. 1995. Treaty of Amritsar and the Foundation of the Kashmir State. In: Grower, V. ed. *The Story of Kashmir: Yesterday & Today.* New Delhi: Deep & Deep Publishers, pp. 92-113,Vol.I.

Parmu, R. K. 1969. *History of Muslim Rule in Kashmir*. New Delhi: People's Publishing House (P) Ltd.

P&DD. 2006. *AJK at a Glance 2006*. Muzaffarabad: Planning & Development Department, Government of Azad Jammu & Kashmir.

P&DD. 2010. *AJK at a Glance 2010*. Muzaffarabad: Planning & Development Department, Government of Azad Jammu & Kashmir.

P&DD. 2014. *AJK at a Glance 2014*. Muzaffarabad: Planning & Development Department, Government of Azad Jammu & Kashmir.

P&DD. 2015. http://pndajk.gov.pk/.

Peiris, N, Rossetto, T., Burton, P. and Mahmood, S. 2008. *Kashmir Pakistan Earthquake of 8 October 2005, A FIELD REPORT BY EEFIT.* Earthquake Engineering Field Investigation Team. Institution of Structural Engineers. 11 Upper Belgrave St. London SW1X 8BH. United Kingdom. www.eefit.org.uk

Pelling, M. and Dill, K. 2009. Disaster politics: tipping points for change in the adaptation of sociopolitical regimes. *Progress in Human Geography*.

Palliyaguru, R., Amaratunga, D. and Haigh, R. 2009. Practice of disaster risk reduction in post-disaster infrastructure reconstruction in Sri Lanka: success or failure? In: Ahmed et al. eds. *PROCEEDINGS OF THE BUHU 9TH INTERNATIONAL POSTGRADUATE RESEARCH CONFERENCE 2009.* The Lowry, Salford Quays, Greater Manchester, January 29 – 30, 2009. United Kingdom, pp. 824-835.

Pandey, B.H., Okazaki, K. and Ando, S. 2008. Dissemination of earthquake resistant technologies for non-engineered construction. In: *The 14th World Conference on Earthquake Engineering, Beijing, China.* pp. 12-17.

PMD. 2007. *Seismic Hazard Analysis and Zonation for Pakistan, Azad Jammu and Kashmir*. Pakistan Meteorological Department, Government of Pakistan. www.pmdnmcc.net

Polkinghorne, D. E. 1995. Narrative configuration in qualitative analysis. *International Journal of Qualitative Studies in Education, 8*(1), pp. 5-23.

Polkinghorne, D.E. 1995. Narrative configuration in qualitative analysis. *International journal of qualitative studies in education*, *8*(1), pp.5-23.

Pomeroy, R.S., Ratner, B.D., Hall, S.J., Pimoljinda, J. and Vivekanandan, V. 2006. Coping with disaster: rehabilitating coastal livelihoods and communities. *Marine Policy*, *30*(6), pp.786-793.

Powell, R. A. and Single, H. M. 1996. Focus groups. *International journal for quality in health care, 8*(5), pp. 499-504.

Prakash, A. and De', R. 2007. Importance of development context in ICT4D projects: A study of computerization of land records in India. *Information Technology & People*, *20*(3), pp.262-281.

Pratt, M. L. 1986. Fieldwork in common places. In: J. Clifford & G. E. Marcus. eds. *Writing culture: The poetics and politics of ethnography.* Berkeley: University of California Press. pp. 27-50.

Pyles, L. and Cross, T. 2008. Community revitalization in post-Katrina New Orleans: A critical analysis of social capital in an African American neighborhood. *Journal of Community Practice*, *16*(4), pp.383-401.

Qasim, M., Tayyab, H.M. and Ahmad, E. 2010. Use of Salvage Wood for Reconstruction in Earthquake Affected Sites of Muzaffarabad, Azad Jammu & Kashmir. *World Applied Sciences Journal, 8*(7), pp. 914-916.

Qazi, U. 2008. Pakistan: Implementing people-centred reconstruction in urban and rural areas. In: Lyons, M. et al. eds. *Building Back Better: Delivering people-centred housing reconstruction at scale*. Rugby: Practical Action Publishing Ltd., pp. 113-134.

Quarantelli, E. L. 1977. Social aspects of disaster and their relevance to pre-disaster planning. *Disasters, 1*, pp. 98-107.

Quarantelli, E. L. 1998. Epilogue: Where we have been and where we might go. In: Quarantelli, E. L. ed. *What is a disaster?: Perspectives on the question.* London: Routledge, pp. 317.

Quarantelli, E. L. 2003. Urban Vulnerability to Disasters in Developing Countries: Managing Risks. In: Alcira, K. et al. eds. *Building Safer Cities: The Future of Disaster Risk.* Washington, D.C: The World Bank Disaster Management Facility, pp. 211-232.

Radcliffe, S. 1994. (Representing) post-colonial women: authority, difference and feminisms. *Area 26(1)*, pp. 25-32.

Rand, E.C., Hirano, S. and Kelman, I. 2011. Post-tsunami housing resident satisfaction in Aceh. *International Development Planning Review*, *33*(2), pp.187-211.

Ratnayake, R.M.G.D. and Rameezdeen, R. 2008, February. Post disaster housing reconstruction: comparative study of donor driven vs. owner driven approach. In *CIB Conference on Building Education and Research, Kandalama, Sri Lanka. Retrieved May* (Vol. 23, p. 2010).

Ray, S. C. 1970. *Early History and Culture of Kashmir.* New Delhi: Munshiram Manoharlal.

Reinhart, T. and Reuland, E. 1993. Reflexivity. *Linguistic inquiry*, *24*(4), pp.657-720.

Renzetti, C.M. and Lee, R.M. 1993. *Researching sensitive topics*. Sage Publications.

Riley, M. 2010. Emplacing the research encounter: exploring farm life histories. *Qualitative Inquiry*, 16, pp. 651-662.

Robinson, P. A. 2014. *A political ecology of bovine tuberculosis eradication in Northern Ireland*. PhD thesis, Durham University. Available at Durham E-Theses Online: http://etheses.dur.ac.uk/10796/

Rodney, .D. G., Kouassi, M. and Mambo, B. 2013. Housing, race, and recovery from Hurricane Katrina. *The Review of Black Political Economy*, *40*(2), pp.145-163.

Roosli, R. and O'keefe, P. 2011. An evaluation of barriers in implementing disaster planning and the housing programme in Malaysia. *Risk Management*, pp.209-227.

Rose, G. 1997. Situating knowledges: positionality, reflexivities and other tactics. *Progress in human geography, 21*(3), pp. 305-320.

Rosenthal, U. 1998. Future disasters, future definitions. In: Quarantelli, E. L. ed. *What is a disaster? : Perspectives on the question*. London: Routledge.

Rossetto, T. and Peiris, N. 2008. *Kashmir Earthquake of October 8, 2005: Field Observations and Study of Current Seismic Provisions for Buildings in Pakistan*. The 14th World Conference on Earthquake Engineering October 12-17, 2008, Beijing, China. [No pagination]

Sabot, C. E., 1999. Dr Jekyl and Mr H (i) de: the contrasting face of elites at interview. In *Geoforum, 30(4)*, [no pagination].

Samaddar, S. and Okada, N. 2006. Participatory approach for post-earthquake reconstruction in the villages of Kachchh, India. *Ann. Disaster Prev. Res. Inst. Kyoto Univ. B*, *49*, pp.197-205.

Sanderson, D. and Sharma, A. 2008. Winners and losers from the 2001 Gujarat earthquake. *Environment and urbanization*, *20*(1), pp.177-186.

Sandoval, V. and Boano, C., 2014. The Progression of Vulnerability: A Multi-Scalar Perspective on Disasters. The Case of Chaiten in Chile. VALMAR

Sapir, D. G. 1992. Natural and man-made disasters: the vulnerability of women-headed households and children without families. *World health statistics quarterly. Rapport trimestriel de statistiques sanitaires mondiales, 46*(4), pp. 227-233.

Saraf, M. Y. 1977. *Kashmiris Fight For Freedom*. Vol. 1 (1819-1946). Lahore: Ferozesons Ltd.

Sarantakos, S. 2012. *Social research*. Palgrave Macmillan.

Sato, H.P., Hasegawa, H., Fujiwara, S., Tobita, M., Koarai, M., Une, H. and Iwahashi, J. 2007. Interpretation of landslide distribution triggered by the 2005 Northern Pakistan earthquake using SPOT 5 imagery. *Landslides*, *4*(2), pp.113-122.

Saunders, A. and Moles, K. 2013. The spatial practice of public engagement: 'doing' geography in the South Wales valleys. *Social and Cultural Geography,* 14, pp. 23-40.

Schacher, T. Good Engineering without Appropriate Communication doesn't lead to Seismic Risk Reduction: some thoughts about appropriate knowledge transfer tools. In: The 14 the World Conference on Earthquake Engineering October 12-17, 2008, Beijing, China.

Schild, P. 2015. Local politics of reconstruction along and across Azad Kashmir's border with Pakistan. *Contemporary South Asia* [Online] *23*(3), pp. 292–313. Available at: http://dx.doi.org/10.1080/09584935.2015.1040736. [Accessed: 23 January, 2016]

Schilderman, T. 1993. Disasters and development. A case study from Peru.*Journal of International Development*, *5*(4), pp.415-423.

Schilderman, T. 2010. Putting people at the centre of reconstruction. In: Lyons, M. et al. eds. *Building Back Better: Delivering people-centred housing reconstruction at scale.* Rugby: Practical Action Publishing Ltd., pp. 7-38.

Schilderman, T. and Lyons, M. 2011. Resilient dwellings or resilient people? Towards people-centred reconstruction. *Environmental Hazards*, *10*(3-4), pp.218-231.

Schofield, V. 1996. *Kashmir in the Crossfire*. London: I.B. Tauris Publishers.

Seneviratne, K. and Amaratunga, D. 2009. Strengthening Post Disaster Reconstruction through Capacity Building: A Literature Review. In: Ahmed, V. et al. eds. *PROCEEDINGS OF THE BUHU 9TH INTERNATIONAL POSTGRADUATE RESEARCH CONFERENCE.* Greater Manchester: 29–30 January, 2009. Manchester: University of Salford, pp. 681-691.

Seneviratne, K., Baldry, D. and Pathirage, C. 2010. Disaster knowledge factors in managing disasters successfully. *International Journal of Strategic Property Management*, *14*(4), pp.376-390.

SERRA. 2014. www.serra.gov.pk

SERRA. 2015. www.serra.gov.pk

Shafqat, S. 1999. Pakistani bureaucracy: Crisis of governance and prospects of reform. *The Pakistan Development Review*, *38*(4), pp.995-1017.

Shah, F. A. 2012. *Moving Mountains: The Story of Debris Removal from the Earthquake-hit City of Muzaffarabad, Pakistan*. www.erra.gov.pk/

Shaw, R., Gupta, M. and Sarma, A. 2003. Community recovery and its sustainability: Lessons from Gujarat earthquake of India.

Shrestha, S. And Dixit, A. 2008. A HIERARCHICAL SYSTEM FOR TRAINING AND AWARENESS RAISING AT GRASS ROOTS LEVEL: EXPERIENCES OF NSET FROM EARTHQUAKE-RESISTANT HOUSING RECONSTRUCTION IN PAKISTAN. In: *The 14th World Conference on Earthquake Engineering October 12-17, 2008, Beijing, China.*

SIDA 2008. *Housing Reconstruction Programme Pakistan Report on Model Houses in the two union councils (Shamlai District Batagram, Mohandri Tehsil Balakot) October 2007 to May 2008*, pp. 1-11.

Sidaway, J. D. 2000. Recontextualising positionality: geographical research and academic fields of power*. Antipode, 32*(3), pp. 260-270.

Sin, C.H. 2003. Interviewing in 'place': the socio-spatial construction of interview data. *Area*, *35*(3), pp.305-312.

Singh, J. 1996. *JAMMU & KASHMIR Political and Constitutional Development.* New Delhi: Har-Anand Publishers.

Snedden, C. 2013. *Kashmir: the unwritten history.* India: HarperCollins.

Sohail, M. 2007. *Good Governance Reform Agenda in Pakistan: Current Challenges*. New York: Nova Science Publishers, Inc.

Sohail, M. 1990. *Bureaucracy in Pakistan: An Historical Analysis*. Lahore: Progressive Publishers.

Sole, D. and Edmondson, A. 2002. Situated knowledge and learning in dispersed teams. *British J. Management, 13*, pp. S17–S34.

Spence, R. and So, E. 2009. Estimating shaking-induced casualties and building damage for global earthquake events. *Cambridge, UK.: Cambridge Architectural Research Ltd*.

Staeheli, L.A. and Nagar, R. 2002. Feminists talking across worlds. *Gender, Place and Culture: A Journal of Feminist Geography*, *9*(2), pp.167-172.

Stallings, R. A. 1998. Disasters and the theory of social order. In: Quarantelli, E. L. ed. *What is a disaster? : Perspectives on the question*. London: Routledge.

Steinberg, F. 2007. Housing reconstruction and rehabilitation in Aceh and Nias, Indonesia—Rebuilding lives. *Habitat International*, *31*(1), pp.150-166.

Stephenson, M. 2008. Notes from experience in post-earthquake rural housing reconstruction in Pakistan. *Building Back Better workshop*. Beijing, July 2008. www.unhabitat.org.pk

Stewart, D. W. and Shamdasani, P. N. 2014. *Focus groups: Theory and practice*. Vol. 20. Sage Publications.

Stoetzler, M. and Yuval-Davis, N. 2002. Standpoint theory, situated knowledge and the situated imagination. *Feminist theory*, *3*(3), pp.315-333.

Stromberg, D. 2007. Natural Disasters, Economic Development, and Humanitarian Aid. *Journal of Economic Perspectives, 21*(3), pp. 199–222.

Suharwardy, A. H. 1983. *TRAGEDY IN KASHMIR*. Lahore: Wajidalis.

Sultana, F. 2007. Reflexivity, positionality and participatory ethics: Negotiating fieldwork dilemmas in international research. *ACME: An International E-Journal for Critical Geographies, 6*(3), pp. 374-385.

Szeliga, W., Hough, S., Martin, S. and Bilham, R. 2010. Intensity, magnitude, location, and attenuation in India for felt earthquakes since 1762. *Bulletin of the Seismological Society of America*, *100*(2), pp.570-584.

Tanwir, M. and Fennell, S. 2010. Pakistani bureaucracy and political neutrality: a mutually exclusive phenomenon?. *The Pakistan Development Review*, pp.239-259.

Tashakkori, A. and Teddlie, C. 1998. Mixed methodology: Combining qualitative and quantitative approaches. *Applied Social Research Methods Series* (Vol. 46). Thousand Oaks, CA: Sage.

Tashakkori, A. and Teddlie, C. 2003. *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: Sage.

The AJK Building Regulations 2006. Azad Government of the State of Jammu & Kashmir.

The Daily Mahasib 2015. www.mahasib.com.pk

The Sphere 2011. *Humanitarian Charter and Minimum Standards in Humanitarian Response, 2011 Edition*. The Sphere Project.

Thurairajah, N. 2011. Empowerment in Disaster Response and Reconstruction: Role of Women. In: Amaratunga, D and Haigh, R. eds. *Post-disaster Reconstruction of the Built Environment, Building for Resilience*. Wiley-Blackwell, pp. 70-90.

Thurairajah, N. and Amaratunga, R. D. G. 2009. Empowerment of Women in Post Disaster Reconstruction: Research Methodological Perspectives. In: Ahmed, V. et al. eds. *PROCEEDINGS OF THE BUHU 9TH INTERNATIONAL POSTGRADUATE RESEARCH CONFERENCE.* Greater Manchester: 29–30 January, 2009. Manchester: University of Salford, pp. 661-671.

Thurairajah, N., Amaratunga, R.D.G. and Haigh, R.P. 2008. Post disaster reconstruction as an opportunity for development: women's perspective.

Toya, H. and Skidmore, M. 2007. Economic development and the impacts of natural disasters. *Economics Letters*, *94*(1), pp.20-25.

Turner, B.L., Kasperson, R.E., Matson, P.A., McCarthy, J.J., Corell, R.W., Christensen, L., Eckley, N., Kasperson, J.X., Luers, A., Martello, M.L. and Polsky, C. 2003. A framework for vulnerability analysis in sustainability science. *Proceedings of the national academy of sciences*, *100*(14), pp.8074-8079.

Twigg, J. 2006. Technology, Post-Disaster Housing Reconstruction and Livelihood Security. *Disaster Studies Working Paper 15* (January 2002/May 2006). Benfield Hazard Research Centre, pp. 1-12.

Twain, M. 2010. *Mark Twain's Own Biography*. Edited by Michael J. Kiskis. The University of Wisconsin Press, 1930 Monroe Street, 3rd Floor Madison.

UK Essays. 2013. The Elements Of Class Conflict In Pakistan Sociology Essay. [online]. http://www.ukessays.com/essays/sociology/the-elements-of-class-conflict-in-pakistan-sociology-essay.php?cref=1. [Accessed: 20 August 2015].

UN. 2004. *From Emergency Humanitarian Assistance To Reconstruction And Risk Management: A United Nations Strategy For Support To The Government Of The Islamic Republic Of Iran Following The Bam Earthquake Of 26 December 2003.* United Nations 27 May 2004 Version 4.0.

UN. 2007a. *Bagh District Disaster Management Plan*. Islamabad: United Nations System in Pakistan. http://www.undp.org.pk

UN. 2007b. *Muzaffarabad District Disaster Management Plan*. Islamabad: United Nations System in Pakistan. http://www.undp.org.pk

UN. 2015. www.un.org/Depts/Cartographic/map/profile/kashmir.pdf. [Accessed 22. 04. 2016]

UN-Habitat. 2009. Country Programme Document 2008 – 2009, Pakistan. United Nations Human Settlements Programme Regional Office for Asia and the Pacific. http://www.UN-HABITAT.org.

UN-Habitat. 2011. Housing After Disasters Guideline. The ERRA Experience in Pakistan. Vol. 2 – Support For Programmatic and Technical Discussions. http://hadb.unhabitat.org.pk

UNISDR. 2013. http://www.preventionweb.net

USAID. 2013. Technical Note on Conducting Mixed-Method Evaluations. VERSION 1 JUNE 2013. https://www.usaid.gov/sites/default/files/documents/1870/Mixed_Methods_Evaluations_Technical_Note.pdf

USGS. 2013. http://earthquake.usgs.gov/

USGS. 2014. http://earthquake.usgs.gov/earthquakes/eqinthenews/2005/usdyae/.

Valdiya, K.S. 1993. *Earthquake hazard and large dams in the Himalaya*. Indian National Trust for Art and Cultural Heritage.

Varley, A. 1994. Disasters, Development and Environment. John Wiley & Sons Ltd.

Weichselgartner, J. 2001. Disaster mitigation: the concept of vulnerability revisited. *Disaster Prevention and Management: An International Journal*, *10*(2), pp.85-95.

Whatmore, S. 2003. Generating materials. In: *Using social theory: thinking through research*. In: eds. Pryke, M., Rose, G. & Whatmore, S. SAGE Publications Ltd.: London, Thousand Oaks & New Delhi, pp. 89-104.

White, P., Pelling, M., Sen, K., Seddon, D., Russell, S. and Few, R., 2005. Disaster risk reduction: a development concern. *London: DfID*.

Whiting, L.S. 2008. Semi-structured interviews: guidance for novice researchers. *Nursing Standard*, *22*(23), pp.35-40.

Wiest, R. E., Mocellin, J. S., and Motsisi, D. T. 1994. *The needs of women in disasters and emergencies*. University of Manitoba: Disaster Research Institute.

Wisner, B. 1998. Marginality and vulnerability: Why the homeless of Tokyo don't 'count' in disaster preparations. *Applied Geography*, *18*(1), pp.25-33.

Wisner, B. 2009. Vulnerability. Benfield UCL Hazard Research Centre, London, UK. pp. 177-182.

Wisner, B., Blaikie, P., Cannon, T. and Davis, I. 2004. At risk. *Natural hazards, people's vulnerability and disasters*, *2*.

Wolf, D. 1996. *Feminist Dilemmas in Fieldwork*. Boulder: Westview Press.

World Bank. 2002. Gujarat Emergency Earthquake Reconstruction Project. Technical Annex India, April 10, 2002. www.worldbank.org

World Bank. 2010. Implementation Status & Results Pakistan, Pakistan Earthquake ERC (P099110), Report No: ISR2254. The World Bank, Pakistan.

World Bank. 2011. Implementation Completion and Results Report (IDA-41340 TF-56748 TF-56749) On A Credit in The Amount Of SDR 281.8 Million (US$ 400 Million Equivalent) to the Islamic Republic Of Pakistan for an Earthquake Emergency Recovery Credit Report No: ICR1662. December 31, 2011. The World Bank, Pakistan.

World Bank. 2012. *The Dawn of a New Beginning. Post-Earthquake Rural Housing Reconstruction Program in AJK and NWFP*. The World Bank, Pakistan.

Yohe, G. and Richard S.J. Tol. 2002. Indicators for social and economic coping capacity - moving toward a working definition of adaptive capacity. *Global Environmental Change*, *12*, pp. 25–40.

Yumarnia, T., Amaratunga, D. and Haigh, R. 2014. Assessing gender vulnerability within post-earthquake reconstruction: case study from Indonesia. *Procedia Economics and Finance* 18 (2014) 763 – 771.

ANNEXURES

Annex-1: Comparison of Compensation Packages.

Property/Nature of damage			Amount of Compensation (PKR)		
			Before Earthquake	**Earthquake 2005**	**After Earthquake**
Pakka House	(i)	Completely damaged	20,000	175,000	25,000
	(ii)	Partially damaged	10,000	75,000	15,000
Kacha House	(i)	Completely damaged	10,000	175,000	15,000
	(ii)	Partially damaged	5,000	75,000	10,000

Annex-2: Earthquake 2005 damages in AJ&K

Sector	Damages	Est. Cost (PKR in billions)
Education	Education institutions: 2792 including 1702 primary schools,174 mosque schools, 570 middle, 296 high/ higher secondary schools, 23 inter, 14 degree colleges,6 post graduate colleges & 2 university campuses	28.239
Transport & Communication	Roads: 810 km Bridges: 2,725 meter	6.140
Health	Health institutions: 176 including 96 BHUs, 47 civil dispensaries, 15 RHCs, 4 THQs, 2 CMHs, 2 DHQs, Jinnah Dental Hospital, 01 Chest Disease Hospital & AIMS MZD	5.926
Physical Planning & Housing	Official accommodation: 806 Nos (2050385 sft.)	5.153
LG&RDD	Rural access roads: 1809 km, bridges: 18, foot bridges: 56, and rural water supply & solid waste: 1630	4.988
Environment	Forests, landslides and office buildings: 128	1.394
Livelihood	Means of livelihoods	1.577
Electricity	Damage to electrical infrastructure and hydroelectric generation facilities	0.944
Others	(Industries, Tourism, Agriculture)	9.969
Total		**64.328**

Annex-3: List of key informants

List of Key informants
a. ERRA
1. Ex Deputy Chairman, ERRA, Islamabad
2. Ex Director Housing, ERRA, Islamabad
b. Multilaterals
3. Asian Development Bank (Pakistan Country Office, Islamabad Mission)
4. World Bank (Islamabad Office)
c. GoAJK
5. Deputy Commissioner, Bagh
6. Deputy Commissioner, Muzaffarabad
7. Deputy Director, Social Welfare & Women Development Department, Muzaffarabad
8. Geology Department University of AJK.
9. Director, State Disaster Management Agency, Muzaffarabad
d. SERRA
10. Ex Director General, SERRA Muzaffarabad
11. Ex Director (Housing) SERRA, Muzaffarabad
12. Director (M&E) SERRA, Muzaffarabad
13. Director Social Protection/Donors & Sponsors, SERRA
14. Housing data resource centre, SERRA Muzaffarabad
15. Ex-Chairman, Assistance & Inspection Team
16. Ex-Chairman, of Village Reconstruction Committee
17. Ex-Chairman, Assistance & Inspection Team
e. Local government
18. Administrator, Municipal Corporation Muzaffarabad
19. Chairman, Development Authority Muzaffarabad
20. Chairman, Bagh Development Authority
21. Administrator, Municipal Corporation Bagh
22. Director Estate, Development Authority Muzaffarabad
23. Deputy Director Building Control, Municipal Corporation Muzaffarabad
24. Secretary, Municipal Corporation Muzaffarabad
25. Municipal Magistrate, Municipal Corporation Muzaffarabad

f. Civil society
1. Member of AJK Legislative Assembly, Muzaffarabad
2. Chairman, Muzaffarabad City Development Foundation
3. Correspondent, The Daily Dawn
4. Chief Editor, The Daily Khabernama, Muzaffarabad
5. Freelance journalist, Muzaffarabad
6. Imam of mosque in rural Muzaffarabad
g. International Organizations
7. Ex-Employee of UN-Habitat, Muzaffarabad
8. Ex-Employee UN-Habitat, Muzaffarabad
h. Business
9. Mason in Muzaffarabad city
10. Architect in Muzaffarabad city
11. Vice President, Nespak Islamabad

Annex-4: Consent form for interviews

CONSENT FORM FOR QUALITATIVE RESEARCH

PhD Project: Pakistan Earthquake-2005: Private Housing Reconstruction in Azad Jammu & Kashmir, Pakistan – A Study of "Owner-driven approach"

I, the undersigned, confirm that (please tick box as appropriate):

1.	I have read and understood the information about the project, as provided in the Information Sheet dated ________________.	☐
2.	I have been given the opportunity to ask questions about the project and my participation.	☐
3.	I voluntarily agree to participate in the project.	☐
4.	I understand I can withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	☐
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, pseudonyms, anonymisation of data, etc.) to me.	☐
6.	If applicable, separate terms of consent for interviews, audio, video or other forms of data collection have been explained and provided to me.	☐
7.	The use of the data in research, publications, sharing and archiving has been explained to me.	☐
8.	I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form.	☐
9.	Select only **one** of the following: • I would like my name used and understand what I have said or written as part of this study will be used in reports, publications and other research outputs so that anything I have contributed to this project can be recognised. • I do not want my name used in this project.	☐ ☐
10.	I, along with the Researcher, agree to sign and date this informed consent form.	☐

Participant:

__________________ ____________________ ________________

Name of Participant Signature Date

Researcher:

____________________ ____________________ _______________

Name of Researcher Signature Date

Annex-5: House damage assessment form

Photo or Thumb

ERRA

Urban Housing Project

Form Number

Date DD MM YYYY

Earthquake Reconstruction and Rehabilitation Authority

Detailed Visible Damage Assessment

Case Reference with Army/Govt Survey Serial Number

Damage Category: Livable / Unlivable

Previously Payment Made: Yes / No

Engineer

Govt Representative

1. Location of House

1. Admin Code
2. Tehsil
3. Union Council
4. Province/City: AJK – Muzaffarabad, Rawalakot, Bagh; NWFP – Abbottabad, Mansehra, Batagram
5. Area of the House Plot (Marla): < 5 / 5 - 10 / 11 - 15 / 16 - 20 / 21 - 40 / > 40
6. Proximity of the House Plot to the nearest commercial area: 0-50 yds / 50-500 yds / 500-1000 yds / 1000-1500 yds
7. House Plot Location: Primary Rd / Secondary Rd / Tertiary Rd
8. Did you own a shop? Y / N
9. If yes, Number of Shops
10. Was the house insured? Y / N
11. Outstanding House Loan? Rs

2. Livelihood

12. Your livelihood before earthquake?
- Private Business / Industry
- Trained Labor
- Govt. Service
- Private / Professional
- Livestock / Farming
- Shop
- Hotel / Restaurant
- Transportation
- Other (Specify)

3. Family Information

13. Occupant's Name
14. Father's Name
15. NIC/CNIC Number
16. Land Ownership
17. Number of Households (living in the house): 1 / 2 / 3 / > 3
18. Number of Persons (living in the house)
19. Gender: Male / Female
20. Age (Years)
21. Marital Status: Married / Unmarried / Widow / Separated/Divorced

4. Applicant's Bank / Post Office Information

22. BANK / POST OFFICE / NO ACCOUNT

Post Office/Bank Branch Address

23. Title Account (Must be same as Occupant's Name)
24. Account Number
25. Name of Post Office/Bank
26. Post Office/Bank Branch Address

5. House Description

KATCHA

Type of Roof
- Wooden Beams With Mud Covering
- Others:

Type of Wall
- Masonry in Mud Mortar
- Others:

OR

PUCCA

Type of Roof
- Wooden Truss With CGI Sheets
- Steel Truss With CGI Sheets
- Reinforced Brick Masonry Slab
- Reinforced Concrete Slab
- Others:

Load Bearing Masonry
- Rubble masonry in Cement/Sand Mortar
- Dressed Stone masonry in Cement/Sand Mortar
- Brick Masonry
- Concrete Masonry
- RCC Band at Plinth
- RCC Band at Lintel

RCC Frames Structure

YES / NO

Type of Floor (For more than 1 Story)
- RCC
- Timber
- Others

6. Screening Criteria Triggering Reconstruction Grant

		Yes	No
A	Completely Destroyed/Partially Collapsed (above 25% of Covered Area)		
B	Structurally Damaged Katcha House		
C	Ground Failure Endangering Building Safety		
D	Less Than 200m From a Visible Fault Line		
E	Other Aspects of Layout/Designs That May Endanger Structural Stability e.g. House Abuts/Retains Hill Side Fill		

If 60% of columns (nos.) have developed major cracks as defined in field manual, then mark as "completely damaged/ structural damage beyond repair" in Section 8 — Yes / No

If answer of any of 5 questions in section 6 is YES, proceed directly to Section 8, mark as unsafe; otherwise fill Section 7

7. Type of Damage

LOAD BEARING WALLS (Approx. Length)
- Fully Collapsed — Ft
- Partially Collapsed — Ft
- Length of Wall with Major Cracking — Ft
- Length of Wall with Minor Cracking — Ft
- Length of Wall out of Deflection — Ft

RCC COLUMN (Number)
- Spalling of Concrete / Major Damage
- Total number of RCC Columns
- Number of Structurally Damaged Columns

Corners
- Number of Opening Corners

RCC BEAMS (Number)
- Spalling of Concrete/Major Damage
- Total number of RCC Beams
- Number of Structurally Damaged Beams

Roof (Yes / No)
- Visible Deflection/Sliding/Tilting of Roof

8. Degree of Destruction

Completely Damaged / Structural Damage Beyond Repair — Repairable Structural Damage — Negligible Structural Damage

9. Present State of building now

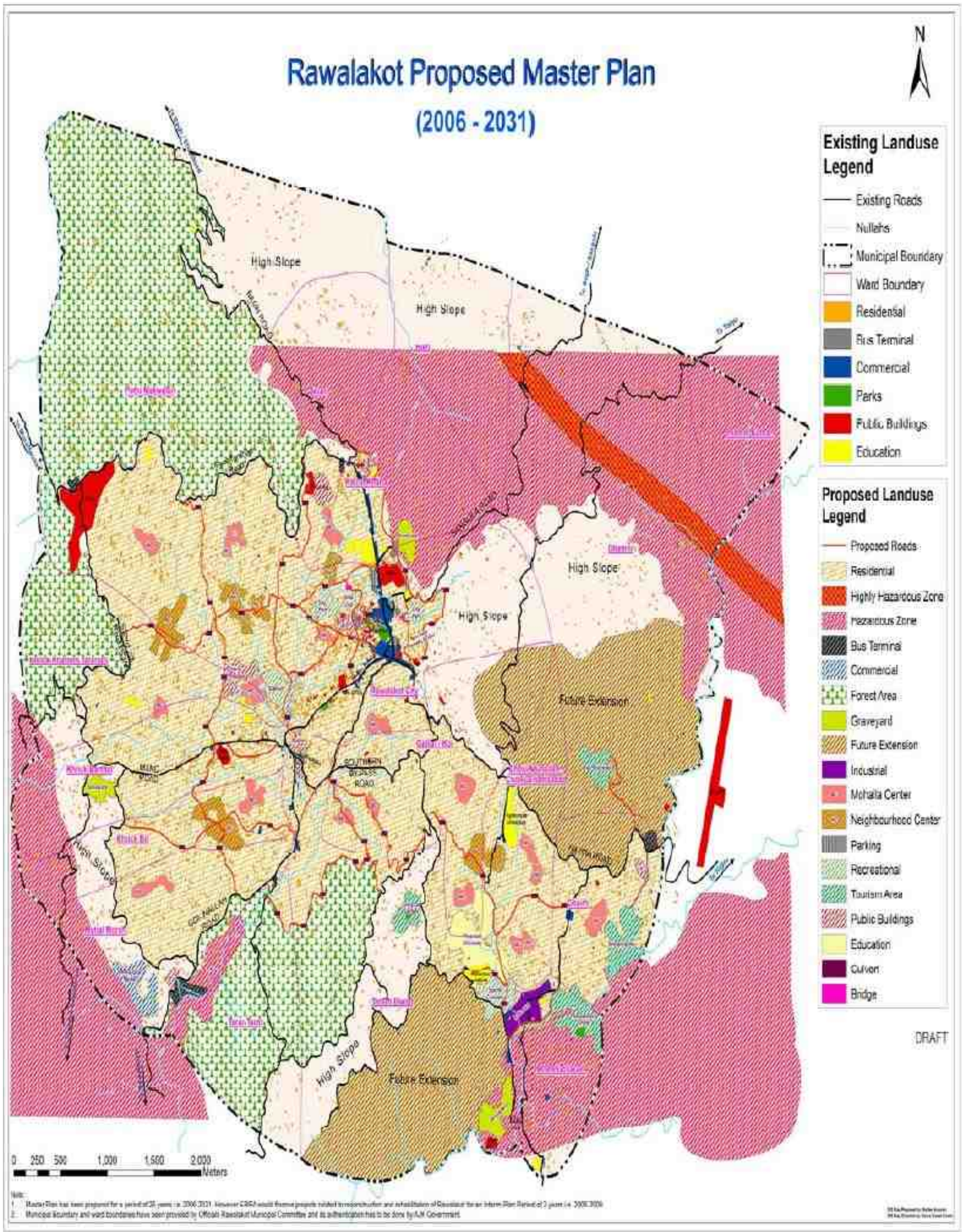
No Construction — Foundation: Started / Completed — Walls: Started / Completed — Roof: Started / Completed

Designed and Prepared by Media Wing, ERRA

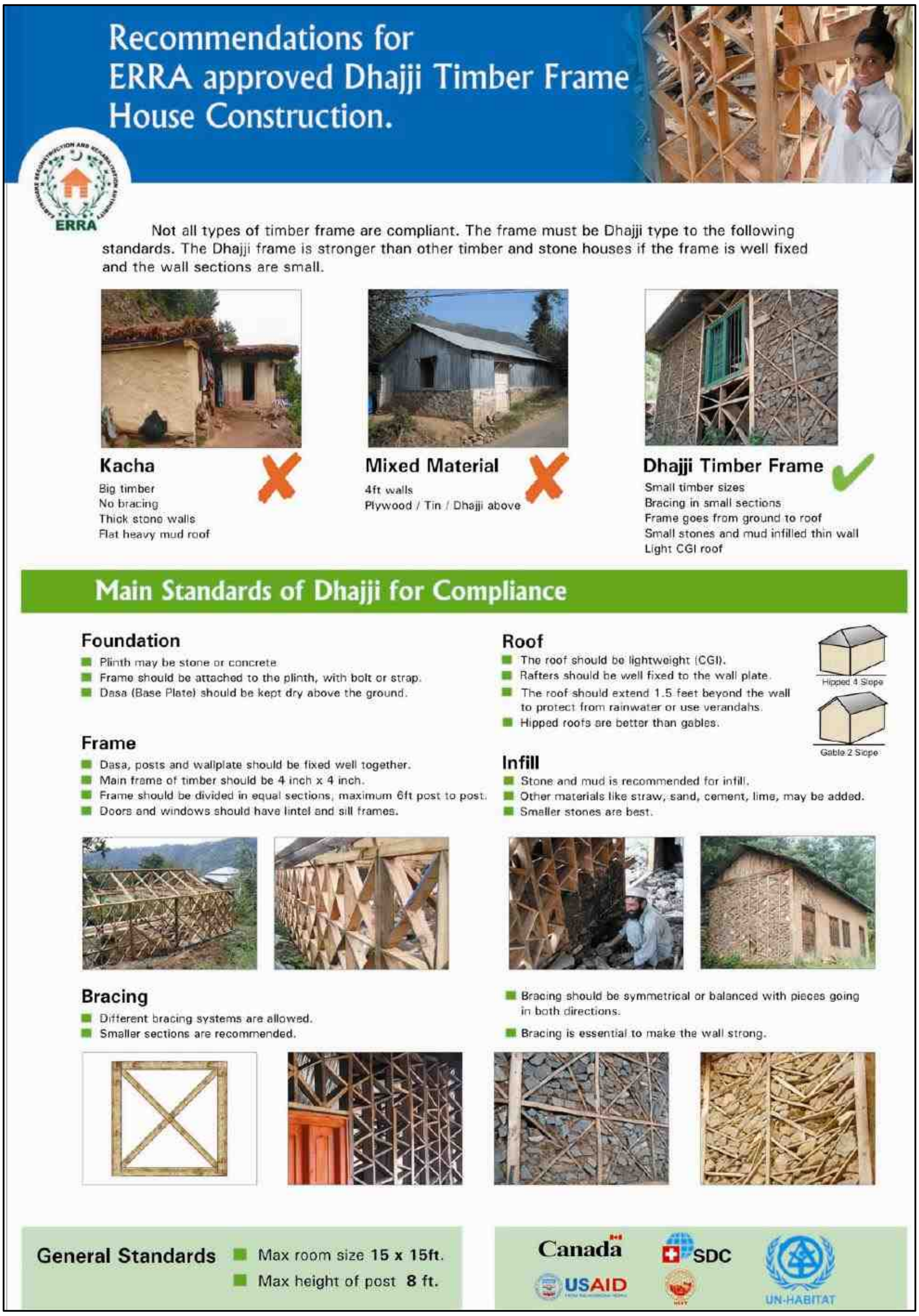
Name and Signature of Engineer — Name and Signature of Social Organizer — Name and Signature of Govt. Representative

Annex-6: Land use plan for Muzaffarabad city

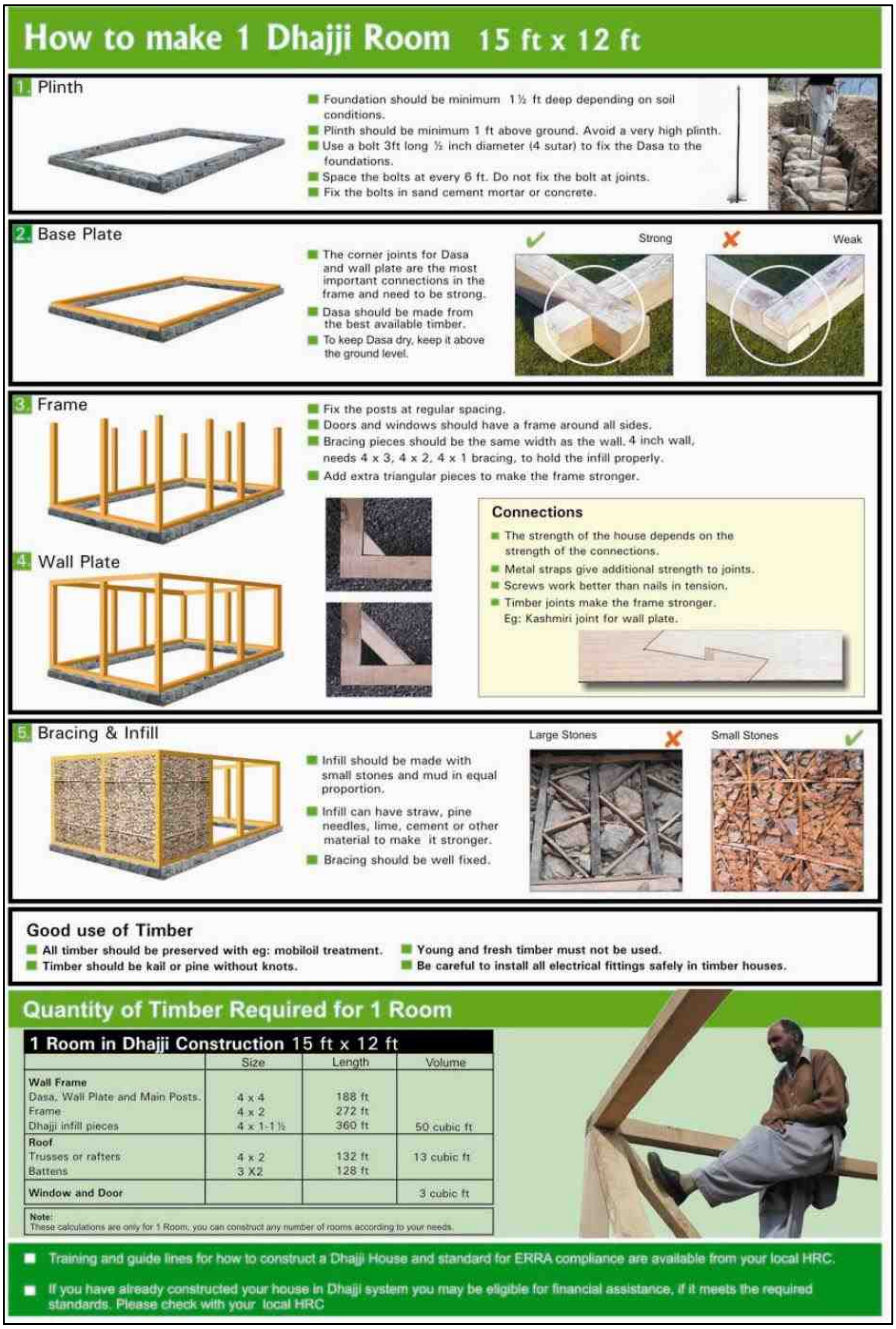
Annex-7: Master Plan of Rawalakot city



Annex-8a: ERRA's guidelines for *Dhajji-dewari* construction.



Annex-8b: ERRA's guidelines for *Dhajji-dewari* construction.



How to make 1 Dhajji Room 15 ft x 12 ft

1. Plinth

- Foundation should be minimum 1 ½ ft deep depending on soil conditions.
- Plinth should be minimum 1 ft above ground. Avoid a very high plinth.
- Use a bolt 3ft long ½ inch diameter (4 sutar) to fix the Dasa to the foundations.
- Space the bolts at every 6 ft. Do not fix the bolt at joints.
- Fix the bolts in sand cement mortar or concrete.

2. Base Plate

- The corner joints for Dasa and wall plate are the most important connections in the frame and need to be strong.
- Dasa should be made from the best available timber.
- To keep Dasa dry, keep it above the ground level.

3. Frame

- Fix the posts at regular spacing.
- Doors and windows should have a frame around all sides.
- Bracing pieces should be the same width as the wall. 4 inch wall, needs 4 x 3, 4 x 2, 4 x 1 bracing, to hold the infill properly.
- Add extra triangular pieces to make the frame stronger.

4. Wall Plate

Connections

- The strength of the house depends on the strength of the connections.
- Metal straps give additional strength to joints.
- Screws work better than nails in tension.
- Timber joints make the frame stronger. Eg: Kashmiri joint for wall plate.

5. Bracing & Infill

- Infill should be made with small stones and mud in equal proportion.
- Infill can have straw, pine needles, lime, cement or other material to make it stronger.
- Bracing should be well fixed.

Good use of Timber

- All timber should be preserved with eg: mobiloil treatment.
- Timber should be kail or pine without knots.
- Young and fresh timber must not be used.
- Be careful to install all electrical fittings safely in timber houses.

Quantity of Timber Required for 1 Room

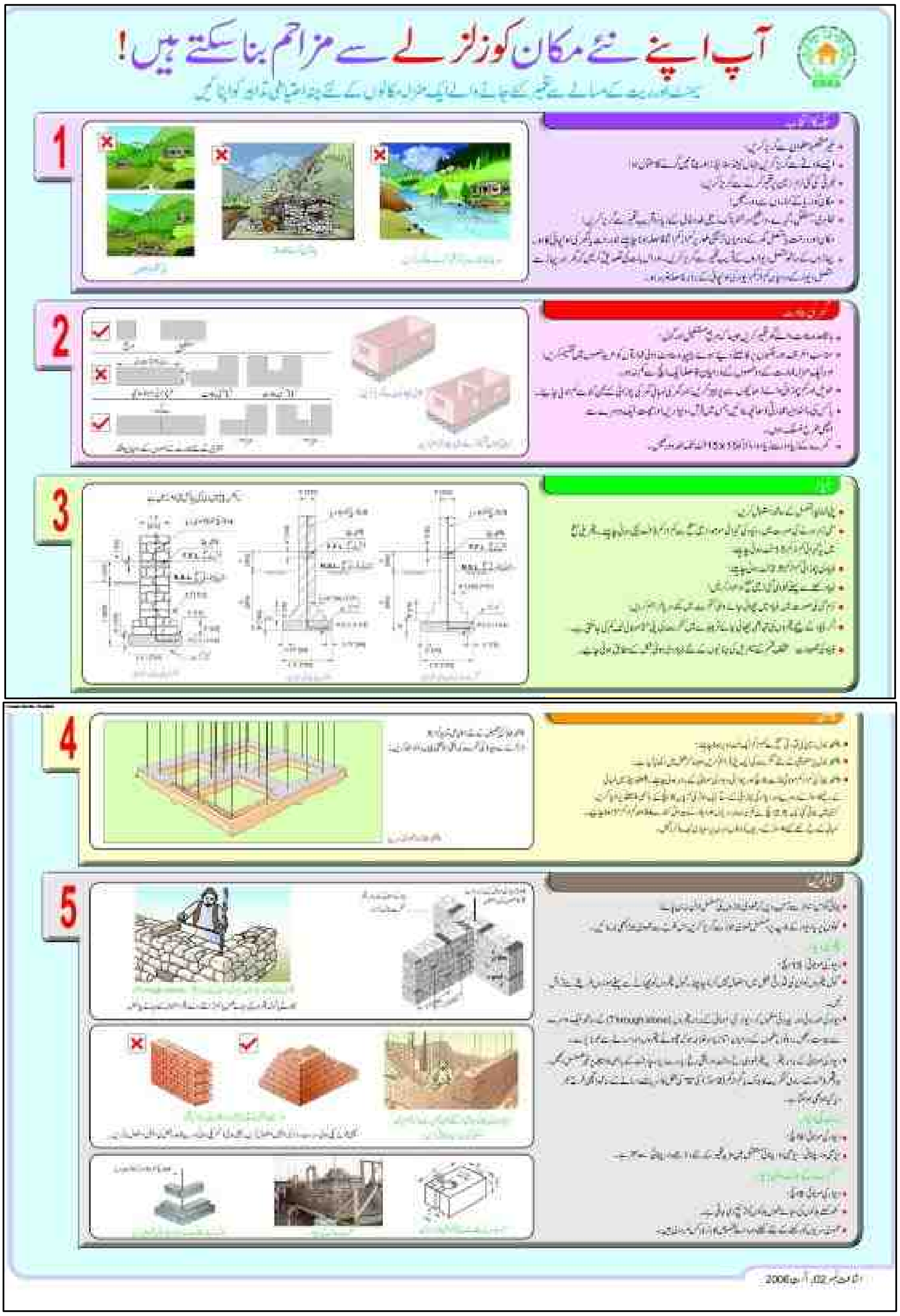
1 Room in Dhajji Construction 15 ft x 12 ft

	Size	Length	Volume
Wall Frame			
Dasa, Wall Plate and Main Posts.	4 x 4	188 ft	
Frame	4 x 2	272 ft	
Dhajji infill pieces	4 x 1-1 ½	360 ft	50 cubic ft
Roof			
Trusses or rafters	4 x 2	132 ft	13 cubic ft
Battens	3 X2	128 ft	
Window and Door			3 cubic ft

Note: These calculations are only for 1 Room, you can construct any number of rooms according to your needs.

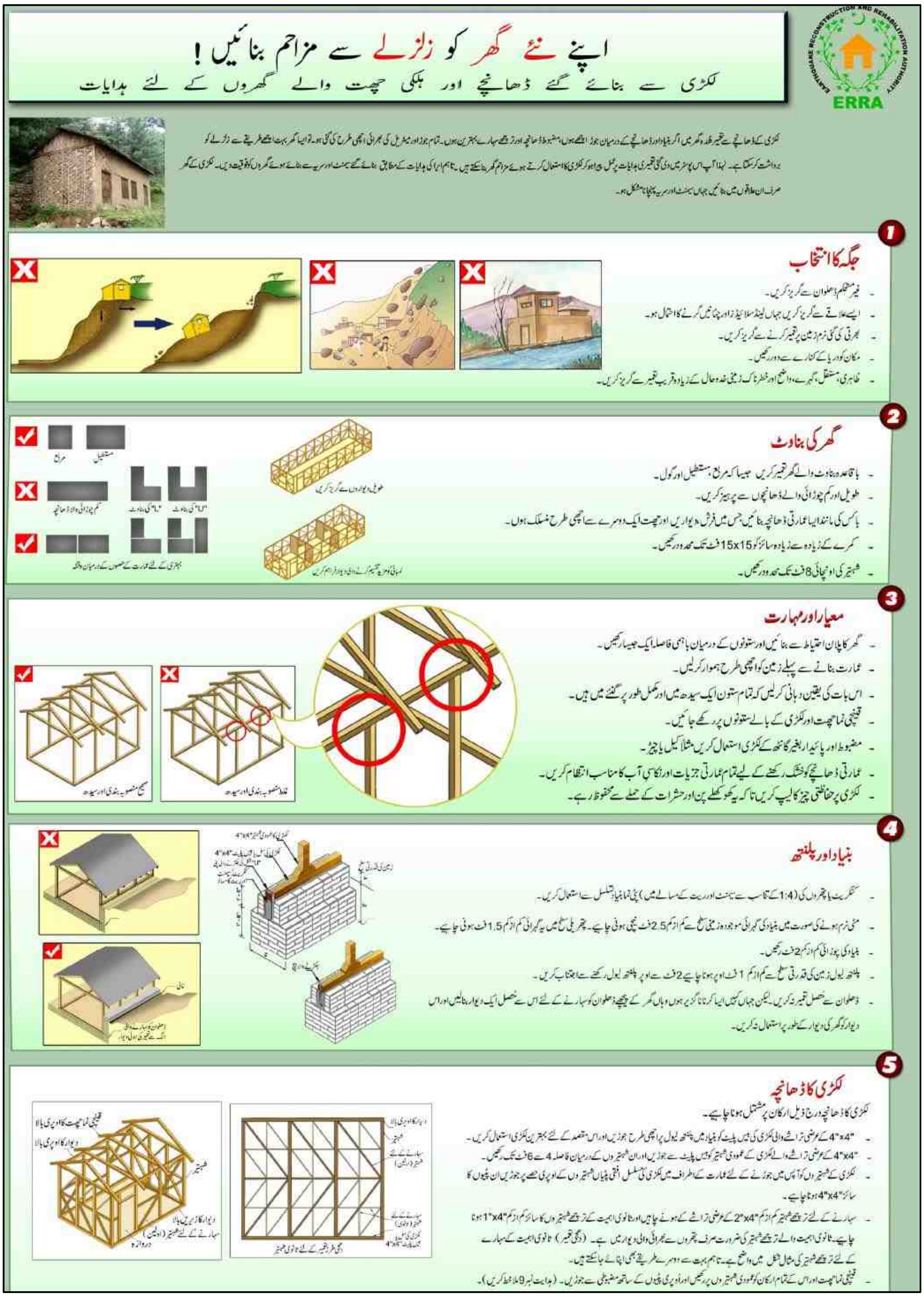
- Training and guide lines for how to construct a Dhajji House and standard for ERRA compliance are available from your local HRC.
- If you have already constructed your house in Dhajji system you may be eligible for financial assistance, if it meets the required standards. Please check with your local HRC

Annex-9a: ERRA's guidelines for seismic resistant construction.

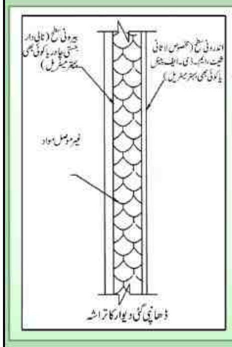


Annex-9b: ERRA’s guidelines for seismic resistant construction.

Annex-9c: ERRA's guidelines for seismic resistant construction.



6 بھرائی اور حفاظتی سطح



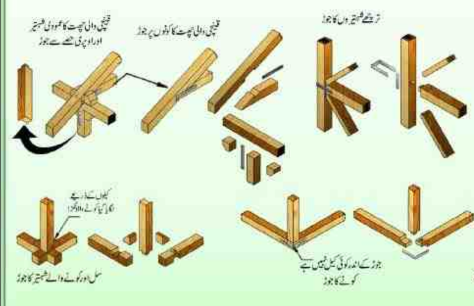
- دیواروں کی اندرونی اور بیرونی حفاظتی سطح کے لئے مقامی دستیاب میٹریل استعمال کریں اور اسے کیلوں اور پیچوں سے اچھی طرح جوڑ دیں۔ لکڑی کے تختوں کو اس مقصد کے لئے استعمال نہ کریں۔ اندرونی اور بیرونی حفاظتی سطحوں اور دیوار کے درمیان خلاء کو کسی مناسب غیر موصل مواد سے بھر دیں۔

- حفاظتی سطح کے بجائے لکڑی کے عمارتی ڈھانچے کو پتھروں سے بھی بھرا جاسکتا ہے (دجی تعمیر) جس کی موٹائی "4 سے زیادہ نہ ہو۔ لکڑی کے تمام ارکان کی چوڑائی دیوار کی موٹائی کے برابر رکھیں تاکہ پتھر لکڑی کے فریم میں اچھی طرح مقید ہو جائیں۔ تمام پتھروں کا سائز ایک جیسا ہونا چاہیے اور سیمنٹ اور ریت یا مٹی کے مسالے میں اچھی طرح بھرے ہوئے ہونے چاہئیں۔

پتھروں کی بھرائی کے معیار کو بہتر بنانے کے لئے دیوار کے اندرونی اور بیرونی اطراف پر دھاتی جالی کا استعمال ضرور کریں جو کہ لکڑی کے ڈھانچے اور سہارنے والے ترچھے شہتیروں سے کیلوں کے ذریعے مضبوطی سے جوڑی گئی ہو۔

7 لکڑی کے ڈھانچے میں جوڑوں کی تفصیل

- زلزلے کے دوران عمارتی ڈھانچے کی اچھی کارکردگی کے لئے اسکے تمام ارکان کو آپس میں اچھی طرح سے جوڑیں۔
- بنیاد کے ساتھ لکڑی کے ڈھانچے کی اچھی طرح پیوستگی کے لئے درج ذیل میں سے کسی ایک طریقے کو اپنائیں۔ (شکل کے لئے ہدایت نمبر 4 ملاحظہ کریں)
- 1/2 انچ کے "J" یا "L" شکل کے 15 انچ لمبے چوڑی دار بولٹ 6 سے 8 فٹ کے باہمی فاصلے پر کم از کم 9 انچ بنیاد میں پیوست کریں اور لکڑی کی نچلی پٹی یا سل کے ساتھ نٹ اور واشر کے ساتھ اچھی طرح کس دیں۔ لکڑی اور واشر کے درمیان سٹیل کی ایک پلیٹ بھی مہیا کریں۔
- اگر بولٹ میسر نہ ہوں تو 1/8 سے 3/16 انچ تک کی موٹائی اور 1 سے 1.5 انچ چوڑائی کی U شکل کی دھاتی پٹی بنیاد میں پیوست کریں۔ اس دھاتی پٹی کو سل یا بیم پلیٹ کے گرد بغیر کسی وقفے کے اچھی طرح مضبوطی سے لپیٹیں اور سل یا بیم پلیٹ کے اوپر اور اطراف سے پیچوں اور کیلوں سے جوڑ دیں۔
- تمام افقی اور عمودی جوڑوں پر لکڑی کا تکونی ٹکڑا یا ترچھا سہارا مہیا کریں اور کناروں کو کاٹ کر جوڑ کے ساتھ اچھی طرح فٹ کر دیں۔
- ہر جوڑ کو کیلوں اور پیچوں کی مدد سے مضبوط بنائیں۔
- جہاں کہیں بھی کیلوں کا استعمال کرنا ہو تو ان کیلوں کی لمبائی اتنی رکھیں کہ وہ جوڑ کے دوسری طرف سے کچھ باہر نکل آئیں۔ پھر اس باہر نکلی ہوئی زیادہ لمبائی کو اس جوڑ کے عمودی رخ پر موڑ کر مزید مضبوط کر لیں۔
- ہر جوڑ پر "3/32"x1.5 کی سٹیل کی پٹی استعمال کی جاسکتی ہے جس کی دونوں طرف کم از کم دو کیل لگائے جائیں۔ اس پٹی کو زنگ سے بچانے کے لئے پینٹ کر لیں۔
- سہارنے کے لئے ترچھے شہتیر (اولیں) مناسب طریقے سے کاٹ کر عمارتی ڈھانچے کے ساتھ برابر کر دیں اور افقی اور عمودی ارکان سے بہتر جوڑ کی یقین دہانی کر لیں۔



8 دروازے اور کھڑکیاں

- دروازوں کو کھڑکیوں کو دیوار کے کونے سے کم از کم 2 فٹ دور رکھنا چاہیے۔
- دروازوں اور کھڑکیوں کی کل لمبائی کسی ایک دیوار کے لئے دیوار کی نصف لمبائی سے زیادہ نہیں ہونی چاہیے۔
- دروازوں اور کھڑکیوں کا باہمی فاصلہ 2 فٹ سے کم نہیں ہونا چاہیے۔
- لکڑی کے ڈھانچے میں دروازوں اور کھڑکیوں کو چاروں اطراف مناسب طریقے سے رکھیں اور اس بات کی تصدیق کر لیں کہ یہ ڈھانچے سے جدا نہیں ہیں۔

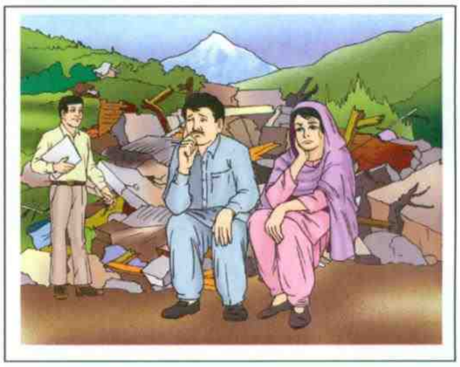
9 چھت

- ایسی ہلکی چھت کا انتخاب کریں جس میں لکڑی کی قینچی والی چھت کا استعمال ہو اور یہ نالی دار جستی چادر سے ڈھانپی گئی ہو۔ ڈھلوانی چھت کو بانسبت تکونی چھت کے زیادہ ترجیح دینی چاہیے۔
- لکڑی کی قینچی والی چھتوں کو ترچھے شہتیروں سے اوپر اور نیچے سے اچھی طرح سے باندھنا چاہیے۔
- زیادہ سے زیادہ مضبوطی کی یقین دہانی کے لئے چھت کے اوپری حصے کا اسکی چوٹی کے ساتھ مضبوط جوڑ ہونا چاہیے۔
- بارش کے پانی سے بچاؤ کے لئے چھت کو کم از کم 1.5 سے 2 فٹ تک دیواروں سے باہر کو بڑھائیں۔
- چھت کی ڈھلوان 20 سے 35 درجے رکھیں اور یہ ڈھلوان برفانی علاقوں میں مزید زیادہ کر دیں۔

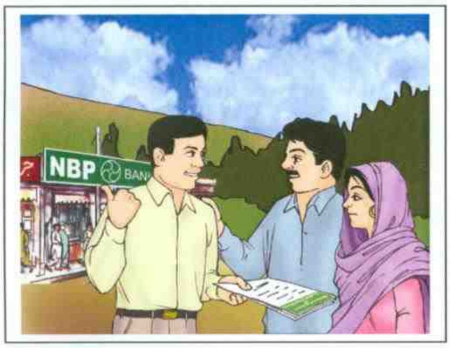
10 غسل خانہ اور کھانا پکانے کی جگہ

- نمی اور آگ کے خطرات کو کم کرنے کے غرض سے غسل خانہ اور کھانا پکانے کی جگہ کو گھر کی اصل عمارت سے الگ بنایا جائے۔
- غسل خانہ، کھانا پکانے کی جگہ اور آتش دان کو نمی اور آگ کے اثرات سے بچانے کے لئے عمارتی ڈھانچے پر دھاتی جالی لگا کر سیمنٹ اور ریت کے مسالے کا پلستر کر دینا چاہیے۔
- آگ سے بچاؤ کے لئے کیمیکل کا استعمال بھی کیا جاسکتا ہے۔ بشرطیکہ خرچ زیادہ نہ ہو۔

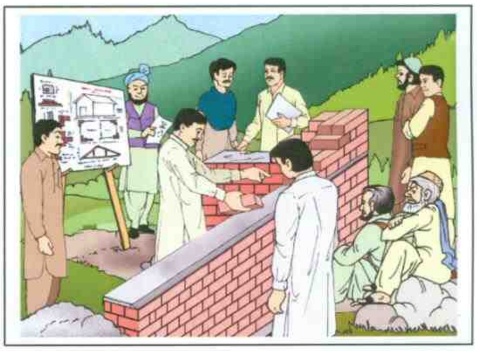
Annex-10: Landless Policy poster.



Surveyor: "I am the ERRA surveyor for earthquake affected houses. I can see that your house is destroyed."

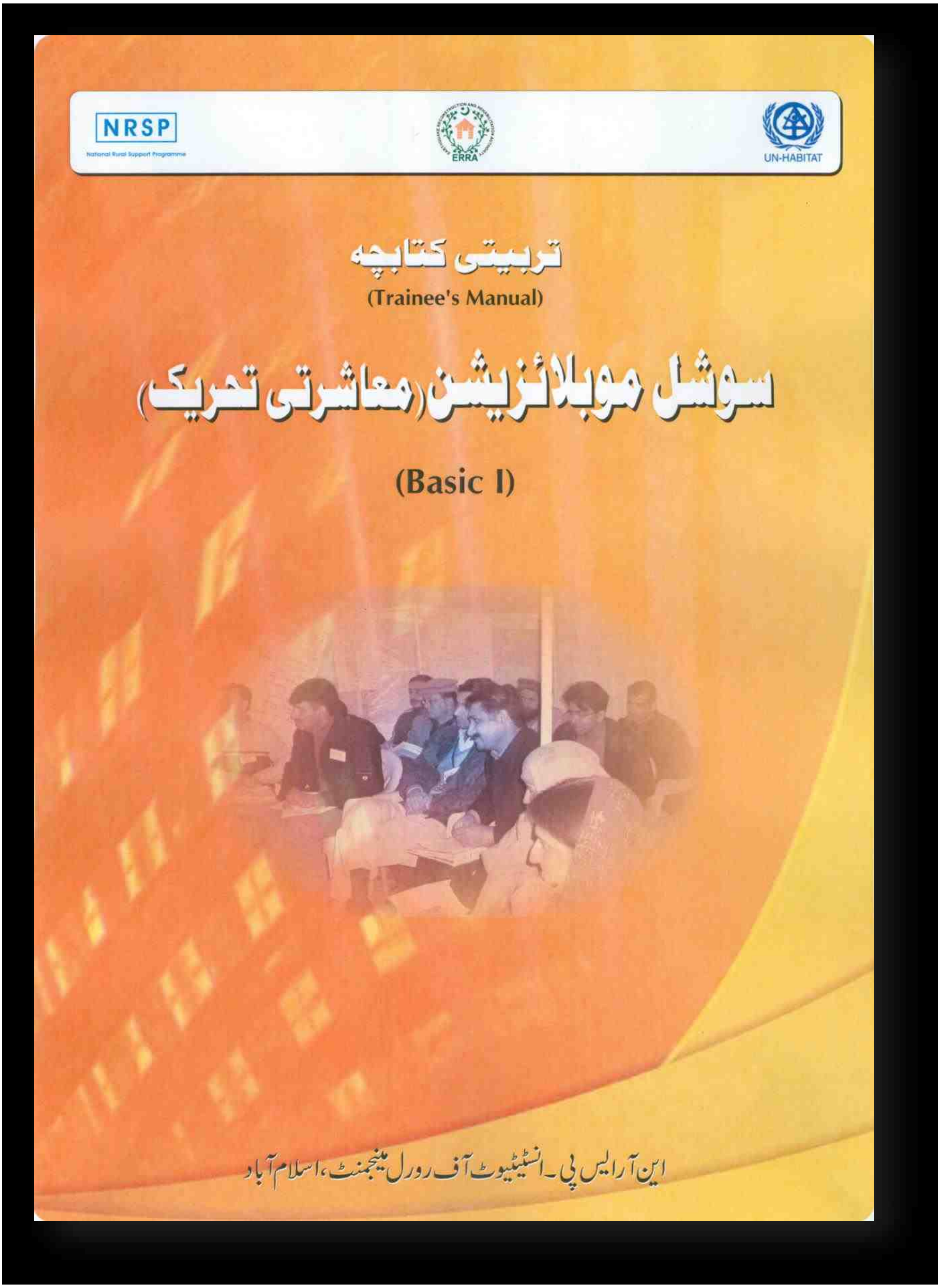


"Don't worry! Here's an MOU approving your house for reconstruction. Open a bank account so you can receive your installment of Rs. 75,000 that you are eligible for."



The next step is to attend the ERRA workshops so you can build Earthquake resistant houses. You will learn Earthquake resistant techniques from experts at these workshops.

Annex-11: Social mobilization pamphlet.



Annex-12: Memorandum of Understanding (MoU).

733506

ERRA

مفاہمت کی یادداشت

[illegible] (ERRA) [illegible] 61101-9190711-1 [illegible]

1۔ [illegible] 2005 [illegible] 75,000/- [illegible]

2۔ [illegible] (ERRA) [illegible]

3۔ [illegible]

4۔ [illegible]

5۔ [illegible] (25000 [illegible])

6۔ [illegible]

7۔ [illegible]

8۔ [illegible]

9۔ [illegible] (NOC) [illegible] MOU [illegible]

فریق ثانی کی جانب سے [illegible]

فریق اول کی جانب سے

[illegible]

Annex-13: Survey questionnaire form.

Pakistan Earthquake-2005: Private Housing Reconstruction in Azad Jammu & Kashmir, Pakistan - A Study of "Owner-driven reconstruction"

PLEASE READ THIS CAREFULLY

*The person to be interviewed is preferably the HEAD OF THE HOUSEHOLD. If he/she is not available, choose a **'principal respondent'** to answer the questions in place of the HOUSEHOLD HEAD. The person selected must be above 18 years age and a member of the household who is able to give information on the other household members.*

Household code (below)

Circle the code of the household you are interviewing here then transfer the code to the Questionnaire code above (follow the arrows).

MU: Muzaffarabad Urban

MR: Muzaffarabad Rural

BU: Bagh Urban

Household Code	
Name of person interviewed	
Address	
Relation to household head	
Interview date	
Interviewer:	
Do you agree for semi-structured interview in future?	**Yes / No**
Phone No:	

MU-001	MU-026	MR-01	MR-026	BU-01	BU-26	BR-01	BR-26
MU-002	MU-027	MR-02	MR-027	BU-02	BU-27	BR-02	BR-27
MU-003	MU-028	MR-03	MR-028	BU-03	BU-28	BR-03	BR-28
MU-004	MU-029	MR-04	MR-029	BU-04	BU-29	BR-04	BR-29
MU-005	MU-030	MR-05	MR-030	BU-05	BU-30	BR-05	BR-30
MU-006	MU-031	MR-06	MR-031	BU-06	BU-31	BR-06	BR-31
MU-007	MU-032	MR-07	MR-032	BU-07	BU-32	BR-07	BR-32
MU-008	MU-033	MR-08	MR-033	BU-08	BU-33	BR-08	BR-33
MU-009	MU-034	MR-09	MR-034	BU-09	BU-34	BR-09	BR-34
MU-010	MU-035	MR-10	MR-035	BU-10	BU-35	BR-10	BR-35
MU-011	MU-036	MR-11	MR-036	BU-11	BU-36	BR-11	BR-36
MU-012	MU-037	MR-12	MR-037	BU-12	BU-37	BR-12	BR-37
MU-013	MU-038	MR-13	MR-038	BU-13	BU-38	BR-13	BR-38

RELATIONSHIP TO HOUSEHOLD HEAD

Head...1
Wife/husband...................................2
Daughter/Son....................................3
Son/daughter-in-law.........................4
Grandchild...5
Father or mother...............................6
Sister or brother................................7
Grandfather/grandmother...............8
Niece/nephew...................................9
Other relative...................................10
Adopted/step child..........................11

WHO IS THE HEAD OF THE HOUSEHOLD?

The head of the household is the person who received the Housing Cash Grant from the government and signed the MoU with the AI Team.

MU-014	MU-039	MR-14	MR-039	BU-14	BU-39	BR-14	BR-39
MU-015	MU-040	MR-15	MR-040	BU-15	BU-40	BR-15	BR-40
MU-016	MU-041	MR-16	MR-041	BU-16	BU-41	BR-16	BR-41
MU-017	MU-042	MR-17	MR-042	BU-17	BU-42	BR-17	BR-42
MU-018	MU-043	MR-18	MR-043	BU-18	BU-43	BR-18	BR-43
MU-019	MU-044	MR-19	MR-044	BU-19	BU-44	BR-19	BR-44
MU-020	MU-045	MR-20	MR-045	BU-20	BU-45	BR-20	BR-45
MU-021	MU-046	MR-21	MR-046	BU-21	BU-46	BR-21	BR-46
MU-022	MU-047	MR-22	MR-047	BU-22	BU-47	BR-22	BR-47
MU-023	MU-048	MR-23	MR-048	BU-23	BU-48	BR-23	BR-48
MU-024	MU-049	MR-24	MR-049	BU-24	BU-49	BR-24	BR-49
MU-025	MU-050	MR-25	MR-050	BU-25	BU-50	BR-25	BR-50

SECTION 1: STATUS OF THE HOUSEHOLD BEFORE 2005 EARTHQUAKE (Note: Please clearly explain the stage)

1.1	Who was the head of the household before the earthquake? (Please write number)		
1.2	Age of the head at the time of earthquake.		
1.3	Was the land owned by the household?	**Yes**	**No**
1.4	If yes who owned the land? (Please write number)		
1.5	What was the size of the house?	Rooms: Kitchen: Toilet/Bath:	
1.6	Did the household live as a joint family before the earthquake?	**Yes / No**	
1.7	If Yes, how many families lived in the household?		
1.8	How many people lived in the house?		

Head. 1
Wife. 2
Husband. 3
Father. 4
Mother. 5
Grandfather. . . .6
Grandmother. . .7

1.9	What type of construction the house was?	**Kacha:** with mud roof	with CGI roof.	
		Pukka (stone): with RCC roof	with CGI roof.	
		Pukka (block): with RCC roof	with CGI roof.	
		Pukka (brick): with RCC roof	with CGI roof.	
		Dhajji. **Other.**		

CGI: Corrugated Iron Sheet
RCC: Re-enforced Concrete Cement.

1.20	What facilities did the household have before the earthquake?	Electricity	Yes / No
		Toilet	Yes / No
		PWS	Yes / No
		Phone	Yes / No
		RWH	Yes / No

PWS: Piped Water Supply
RWH: Rain Water Harvesting.

1.21	What were the livelihood sources of the household before 2005 earthquake. *(Please mention in order of volume)*	1	2	
		3	4	
1.22	What was the financial condition of the household before the 2005 earthquake? *(Please mark the relevant)*	1. Very poor	2. Poor	3. Moderate but unstable
		4. Moderate and stable	5. Strong	6. Well off
1.23	Was the household ever damaged by any disaster before the 2005 earthquake?	Yes / No		

1.24	If Yes, when and how?	
1.25	Was any kind of government assistance provided for the reconstruction of the damaged house?	Yes / No
1.26	If yes, what kind of assistance was provided?	
(a)	Financial (Please write amount in Rupees)	
(b)	Technical, e.g. building design, inspection team (Please briefly describe)	
(c)	Social Protection, e.g. rights of the women, elderly, orphans, minorities, poor etc. (Please briefly describe)	

SECTION 1 (Contd): STATUS OF THE HOUSEHOLD BEFORE 2005 EARTHQUAKE

(d)	Training (Please briefly describe)	
(e)	Community involvement, e.g. Village Reconstruction Committees (Please briefly describe)	
1.27	Did any kind of government committee visit the household to assess the damage?	Yes / No
1.28	Did you have any idea that the area was in the earthquake zone?	Yes / No

1.29	Does the household know anything about any major earthquake in area in the past?		Yes / No
1.30	If yes which was it?		
1.31	Did you have any knowledge of earthquake resistant building techniques before 2005?		Yes / No
1.32	Were any earthquake resistant techniques used in the construction of the damaged house?		Yes / No
1.33	If yes, please specify.		
1.34	What factors in your opinion were responsible for damage to the household? *(Please specify in order of merit)*	1	2
		3	4
		5	6
Section 2: Earthquake 2005 **(Please clearly explain that this is a new section and deals with the earthquake)**			
2.0	Was there any warning of the earthquake?		Yes / No
2.1	Did anybody die in your household due to the earthquake? If yes how many?		
2.2	How many people were injured in your household due to the earthquake?		

2.3	How quickly were services restored? (In number of days)					
	(a) Electricity	1. in the community:			2. in the household:	
	(b) Water Supply	1. in the community:			2. in the household:	
	(c) Road	1. in the community:			2. in the household:	
	(d) Phone	1. in the community:			2. in the household:	
	(e) Education	1. in the community:			2. in the household:	
2.4	Where did the household live immediately after the earthquake?					
	(a) Government camp (Please specify name)					
	(b) Friends or relatives (Please specify place)					
	(c) Rented accommodation (Please specify place)					
	(d) In the same house (Please specify the arrangement e.g. tent, shelter etc)					
2.5	For how many days did they stay in the new place?					
2.6	If the household shifted to other place, how many members stayed back in the damaged house?					
2.7	How soon did the patwari visit the household after the earthquake?					
2.8	How many days after the earthquake the damage survey was done?					
2.9	What help was provided to the household by anyone after the earthquake?	Food Items	Blankets	Warm Clothes	Household items	Medicines
2.10	When did the household receive the Rs. 25,000 grant?					

2.11	Did the household receive compensation for the dead and injured?				Yes / No
2.12	Did you have a bank account before the earthquake?				Yes / No
2.13	How much are you satisfied with the relief work?	Not satisfied	Less satisfied	Fairly satisfied	Highly satisfied
2.14	Did the household receive any shelter material?	Yes / No			
2.15	If yes, what material was received?	Tents / Shelter	CGI Sheets	Other material (Please specify)	
2.16	Which organisation provided the material?	Government	International NGO	National NGO	Private Individual
		Other (Please Specify):			
2.17	What were the main worries/Challenges of the household after the earthquake?	1		2	
		3		4	
2.18	Did the household spent any money form the housing subsidy on renting a house? If yes, how much?				

Section 3: After the Earthquake 2005 **(Please explain that this sections is about after the earthquake)**

3.0	Did the government survey team visit the household to assess the damage to house?	Yes	No		
3.1	What was the nature of damage?	Completely Damaged		Partially Damaged	Minor Damage

3.2	How much compensation was given by the government?	Rs.				
3.3	Are you satisfied with your damage category?	Yes	No			
3.4	When did you start the construction work?					
3.5	Did the government survey team visit the household to at every stage of construction?	Yes	No			
3.6	Did the household find these visits helpful?	Yes	No			
3.7	Please explain reason.					
3.8	What type of construction is the new house after reconstruction?	Pukka (stone) with RCC roof	Pukka (block) with CGI Sheet roof	Dhajji		
		Pukka (brick) with RCC roof	Pukka (brick) with CGI Sheet roof			
3.8	What is the size of the house?	Rooms	Kitchen	Toilet/Bath		
3.9	What facilities the new house has?	Electricity	Road	Toilet	Piped Water Supply	Rain Water Harvesting
3.10	How long did it take to complete the construction?					
3.11	Was the government compensation enough for construction? If not how much money did the household add?					
3.12	How much of this is the foreign remittance?					

3.13	How does the household feel about the new house?	Very Unhappy	Unhappy	Satisfied	Very satisfied	Happy	Very happy
3.14	Who is the head of the household after the construction of new house? (Please refer to Page 2 for reference)					Age:	
3.15	Who owns the land after the earthquake? (Please refer to Page 2 for reference)					Age:	
3.15	Explain reasons.						
3.16	How much safe you feel the house is in case of any future earthquake?	Not Safe	Safe	Very Safe	Not Sure		
3.17	Explain reasons.						
3.18	What is economic condition of the household now after the earthquake?	Very Poor	Poor	Moderate but unstable	Moderate but stable		
		Strong	Well Off				

Section 3 (Contd): After the Earthquake 2005

3.18	What are your main worries for future? *(Please specify in*	1	2

	order of priority)	3			4			
3.19	From where the household expects to get help in case of future disaster situation? (Please mark the relevant, may mark more than one)	Government		NGOs	UN		Relatives	
		Private Individuals		Army	Self-help		Not Sure	
3.20	Did the household experience any other disaster situation after the 8th October 2005 earthquake?						Yes	No
3.21	If yes, how? What kind of help did the household get and from which agency?							
3.22	How much the household was satisfied with this help?	Worse than 2005 earthquake.			Equal to 2005 earthquake.			
		Better than 2005 earthquake.			Not Sure.			
3.23	Did the household use the Complaint Redressal System?	Yes	No					
3.24	If yes, how do you rate your experience?	Worst	Bad	Satisfactory	Good	Very Good	Not Sure	
3.25	Do you have any experience of complaint redressal mechanism in the past?	Yes	No					
3.26	If yes, how do you rate 2005 experience with your past experience?	Worse than 2005 earthquake.			Equal to 2005 earthquake.			
		Better than 2005 earthquake.			Not Sure.			

3.27	Do you recommend the housing reconstruction approach of 2005 housing approach in case of a future disaster?		Yes	No
3.28	How do you feel the status of your household 8 years after the earthquake?	Worse than before 2005 earthquake.	Equal to 2005 earthquake.	
		Better than before 2005 earthquake.	Not Sure.	
Section 4: Enumerator's Notes				
4.0	How far is the household from the road?		Interview started at:	
			Interview ended at:	
4.1	Briefly describe the surroundings of the area.			
4.2	Briefly describe the household and its assets.			
4.3	Give your observations about the interview (e.g. how many people were present, how many talked, their behaviour, did the women also participate, what were their feelings while talking about the earthquake and afterwards etc.).			