**Assessing the flood induced conflicts on the agricultural land resources: A case study of Balakot**

**By**

**M. Shoaib Raffique and Dr. Abda**

**ABSTRACT**

Floods can occur in almost any river valley at almost any time. They are unpredictable. Worldly, the average annual potential damage to property because of flood disaster is estimated at nearly a billion dollars. Even though floods are no worse or more frequent than formerly, they are more costly as the flood plains increase in population and economic development. The study is mainly emphasized on to explore the flood induced conflicts on the agricultural land resources in village Kashtara which is located on active flood plain of Balakot. A total of 40 respondents were selected for the interview. The results show that a high agricultural land resource of the study area was exposed to the floods which eventually hit their agricultural lands and ultimately conflicts arise on the boundary settings of the lands. More than 80% people found difficulties to cope with the floods and their consequences although maximum respondents in groups, practiced safety measures according to their economic power. The role of government line agencies was found very poor in minimizing the vulnerabilities of people, less training and education and not following the building codes reduce their adaptive capacity and make them susceptible. There is an essential need of government initiatives/projects and scientifically sound awareness programs that must highlight the importance of flood risk management in the study area.

**CHAPTER 1**

# INTRODUCTION

## Introduction

Flood is among the most common and frequent natural hazards, devastating to societies worldwide (Jongman, B. et al., 2015). Flood risk is referred to the combination of the likelihood of flooding and the consequences of the incident (UNSDR 2015, Glosin, E., 2014). The consequences are again determined by the exposure level of the hazard and vulnerability of people, belongings and infrastructure that are sensitive or unable to cope with the consequences (Maaskant, B, et al., 2009, Jongman, B. et al., 2012, Kron, W., 2005). Flood possibility is a common threat to many populated areas, both in the lowland river basin and coastal areas of the world (Maaskant, B, et al., 2009). Exposure depends on the severity of the hazard, population settlement patterns and size, networks and land use (Winsemius, HC, et al., 2013), while susceptibility of a particular community can be assessed by economic, socio-cultural and environmental areas (Krishnamourthy, P.K., at. al., 2011). Flooding is among the most expensive natural disasters in terms of human oppression and loss in economics. About 90 percent of destructions associated with natural disasters (except droughts) are due to flooding and related waste/debris flow. Floods have potential to damage and destroy accommodations, farms, crops, domestic animals and disrupt agricultural lands and businesses (Handmer Jand Dovers S, 2007).

## Flooding resulting from extreme hydro and meteorological events and taking place in unexpected magnitudes and frequencies can cause loss of lives, livelihoods and infrastructure. They can also damage the environment (Integrated flood management tools series flood forecasting and early warning, 2013). In general, it was analyzed that worldwide flood is the most destructive natural hazards causing extensive damage to the built and natural environment, and devastation to human settlements. Economic losses due to the effects of damaging floods have increased significantly around the world (Integrated Flood Risk Management in Asia, 2005).

## The frequency of natural disasters has been increasing over the years, resulting in loss of life, damage to property and destruction of the environment (Living with Risk, 2000). Flood losses reduce the assets of households, communities and societies through the destruction of standing crops, dwellings, infrastructure, machinery and buildings, apart from the tragic loss of life. In some cases, the effect of extreme flooding is dramatic, not only at the individual household level, but also in the country as a whole (Integrated Flood Management Concept Paper, 2009). The Fourth Assessment Report (2007) of the Intergovernmental Panel on Climate Change (IPCC) predicts “heavy precipitation events, which are very likely to increase in frequency, will augment flood risk”. These floods will affect life and livelihoods in human settlements in all areas, such as flood plains, coastal zones, river deltas and mountains.

Climatologists are now starting to identify and attribute changes in severe events to human pressure on the worldwide climate system (Zwiers and Zhang, 2003). For instance, the risk of a heat wave like to that experienced by Europe in 2003 would have doubled because of historical emission of greenhouse gas (Stott et al., 2004). Risk of further extremes such as severe rain (Groisman et al., 1999), disparaging cyclones (Emanuel, 2005) and floods (Milly et al., 2002) are also predictable to increase. It has been observed for the long term that the intensity and frequency of heavy rainfall has increased in many areas during the 20th century (Groisman et al., 1999), and the climate models of different regions indicate that intensity will continue to increase over the next decades (Ekstrom et, al., 2005).

The environmental impact creates great uncertainty, frustration, resource scarcity and weak law enforcement and order, which often suggests increasing the likelihood of conflict (Burke et al., 2009, Brancati, 2007, Homer Dixen, 1999, Nel and Righarts, 2008, Miguel Satyanath & Sergenti, 2004). While no one discussed about the serious consequences caused by the environmental shock suffering, there is no consent on how people should respond to this kind of challenges. Environmental factors of climate change can trigger the risk of conflict, and resource scarcity plays a major role. Most of the natural calamity occur quite suddenly (except drought), but the after effect may last long, causing supply shortages caused by reduced offerings, skew distribution or an increased demand, and suggested equally important future basis of conflict (Homer Doxon, 1999).

Quarantile and Dynes (1976) observed that the disputes associated to the resource allocation or distribution, rights tends to occur right after the hit of natural calamity. Resource rights refer to an inforcable authority to undertake particular action with regards to resources (Ostron Elinor, 1999). Goldstone (2001) advise that the political outcomes of natural calamity pivot on how they are tackled, poor management of disasters in developing countries are argued to raise the risk of political unrest and conflict, while proficient disaster management may in fact increase the government support. Conflict relations always include the starving for the control of scarce resources, or to influence the behaviors of others in a desired direction. This means that in a conflict relationship there is always an attempt to attain or use power, or the actual attainment of power (Sheppard, 1954).

Natural calamities disturb the economy and devastate infrastructure, interfere with livelihood, routine services and health services. Flooding can be predominantly disturbing, triggering to a major breakdown of infrastructure and are the leading reason of death from natural calamities in the world, with approximately 6.8 million deaths in twentieth century. Asia is the region which is most affected by flooding, accounting for almost 50% of deaths in the past 25 years. Flooding and its impact will most likely to increase in the future as a result of urbanization and changes in land use, high concentrations of poverty and marginalized populations, and lack of regulatory and emergency preparedness work (Jonkman SN, Kelman I, 2005).

The common impact of flooding incidents has been formerly described, but there is minute knowledge about the flooding impacts on the natural settings in the context of resource scarcity and conflicts on scarce resource. This study explores the management of land resource conflicts which are mainly caused because of floods. In addition how local community is involved in management if these conflicts and what are the coping strategies they have used.

## 1.2 Importance of the Study

Pakistan is subject to periodic flooding of rivers. Glacier melting, moon soon rains, deforestation in watershed, and salinitation are among the principal drivers of riverine floods. In the last few decades, climate change has emerged as an important driving force behind floods in Pakistan, primarily by affecting glacier melting, by interfering in summer moon soon patterns. Many factors including population growth, dense population living in hazard prone areas, global warming, environmental degradation, and unsustainable development patterns have contributed to this trend. This often leads to high level of susceptibility, as well as fast and spontaneous urbanization, among others. Worldwide, the risk reduction interventions are unsuccessful to keep pace with increase in contact to natural hazards or calamities and advanced level of susceptability. In Pakistan, like other developing countries, there is less focus on the issues which ultimately are responsible for the destruction and losses because of disasters; therefore, refocusing on human activities to minimize the risk of disaster and ultimately the conflicts and the natural resources needs careful consideration. Keeping in view the importance of the issue the present research study is designed which besides identifying reasons and understand the land conflicts which are mainly caused because of climate related disasters of the study area but also will analyze the extent of understanding and realization of the coping strategies of government line agencies and the local communities in the reduction and management of these conflicts. Furthermore, the present study will contribute and influence policies and practices for the planning and development department for future developmental projects.

## 1.3 Theoretical Framework

## A theoretical framework provides guidance to a research study i.e. it is concerned with the past researches that readily defines the core concepts and theory of a research study (Richard, 2013). The theory of Homer Dixen will be used as a theoretical framework for guiding this research. He argued that environmental factors of climate change can affect conflict risk, and the lack of important resources holds an important place. Acute deficiencies caused by reduction in supply, asymmetric distribution or increased demand are considered as an important current and future source of conflict (Homer Dixon, 1999). The majority of natural disasters occur relatively suddenly, but the aftermath can last for a long time, which leads to worsening deficiencies.

## Social vulnerable communities are more prone to be affected by the climate related bad events i.e. the extent to which a system is vulnerable to or unable to deal with the harmful effects of climatic extremes and variability. Susceptibility is nature’s function, frequency and size of climatic variations to which a system is exposed, its sensitivity and ability to adapt (adaptive capacity). Also referred to a set of specific circumstances that affect the community's ability to prevent, reduce, get ready or react to a threat (Lundy and Janes, 2009). The lack of management strategies is also an ingredient of social vulnerability and should be included in the vulnerability analysis, for example, people living in the foothills, fault lines, river banks or flood plains, etc.

## Social vulnerable communities have feeble family system, lack of leadership qualities in individuals for decision making and conflict management, lack of participation in collective matters, feeble or no local organization. Additional social or communal factors such as traditions, culture, religion, economics, norms and values, accountability and political stability also plays significant role to determine social vulnerability (Cardona & Hurtado, 2000) .

## Considering the mentioned analytical characteristics of social vulnerability concept, the study is planned to use this concept to understand the management of land resource conflicts which are mainly caused because of floods. In addition how local community is involved in management if these conflicts and what are the coping strategies they have used.

## 1.4 Problem Statement

There is a mounting consent that the population, infrastructure and environment are threatened by climate impact. Climatologists are now starting to identify and attribute changes in severe events to human pressure on the worldwide climate system (Zwiers and Zhang, 2003). Risk of further extremes such as severe rain (Groisman et al., 1999), disparaging cyclones (Emanuel, 2005) and floods (Milly et al., 2002) are also predictable to increase. Northern areas of Pakistan are prone to disasters and floods and at the top, and people of the area face varying type of vulnerabilities under the catastrophic situations. Moreover, regular and concentrated precipitation leads to riverine flooding and devastating the agricultural settings on the floodplains. The effects of climate change induced hazards and disasters are being observed in many sectors with and adverse impact on natural resources and the livelihood sources that they support. In Pakistan 40 percent (Human Development in South Asia, 2006) of the people are highly susceptible to natural disasters and frequently exposed to multiple catastrophes. This exposure to vulnerabilities also emerges risks of conflicts on the redistribution and management of natural resources, right after a hit of flood event. Therefore, the present study is designed to understand the management of land resource conflicts which are mainly caused because of floods. In addition how local community is involved in management if these conflicts and what are the coping strategies they have used.

## 1.5 Research Objectives

The major objective of this research study is to explore the flood induced conflicts on the agricultural land resources on the floodplain area.

The specific objectives of the study are given below;

## To explore how floods affect the land resources and increase social vulnerability of the target population.

## To analyze the communal conflicts on land resource management and the coping strategies of local community in reduction of these conflicts.

## 1.6 Thesis layout

## The first chapter addresses the background information related with the flood induced conflicts on the agricultural land resources. It provides the overview of this research study. Second chapter includes the literature review reflecting the contributions of different authors regarding the research study. Third chapter contains detailed research methodology which includes the information about targeted area, study sample size and technique, data collection techniques, study variables and the tools been used data analysis. Fourth chapter includes the data results obtained during this thorough research is discussed in this chapter, in the form of tables, graphs and discussions. The fifth chapter contains the conclusions of this dissertation.

**CHAPTER 2**

# LITERATURE REVIEW

* 1. **Understanding Floods**

Floods are the most costly and wide reaching of all natural hazards. They are responsible for up to 50,000 deaths and adversely affect some 75 million people on average worldwide every year (Mwape, 2009). According to Nott (2006), the causes of floods can be broadly divided into physical, such as climatological forces, and human influences such as deforestation and urban development. The most common causes of floods are climate related, most notably rainfall. Prolonged rainfall events are the most common cause of flooding worldwide. These events are usually associated with several days, weeks or months of continuous rainfall. Human impacts on river catchments influence flood behavior. Land use changes in particular have a direct impact on the magnitude and behavior of floods. Deforestation results in increased run-off and often a decrease in channel capacity due to increased sedimentation rates. Nott (2006) correctly points out that a flood event is not considered to be a natural hazard unless there is a threat to human life and/or property. The most vulnerable landscapes for floods are low-lying parts of flood plains, low-lying coasts and deltas, small basins subject to flash floods. Rivers offer human populations transport links, a water source, recreational amenities, fertile plains and are an attractive place for settlements. Floods then become a major natural hazard because of the high human population densities that inhabit these lands.

Nott (2006) further stated that physical damage to property is one of the major causes for tangible loss in floods. This includes the cost of damage to goods and possessions, loss of income or services in the floods aftermath and clean-up costs. Some impacts of floods are intangible and are hard to place a monetary figure on. Intangible losses also include increased levels of physical, emotional and psychological health problems suffered by flood-affected people. Ariyabandu and Wickramasinghe (2005) observed that some groups are more vulnerable to floods than others are. Vulnerability is not just poverty, but the poor tend to be the most vulnerable due to their lack of choices. The influences of both poverty and development process on people’s vulnerability to disaster are now well established. Class, ethnicity, gender, disability and age are some of the factors affecting people’s vulnerability.

They further noted that because vulnerability plays such an important part in why natural hazards become human disasters, it is worth spending time to examine the characteristics of vulnerability. Conditions of vulnerability are a combination of factors that include poor living conditions, lack of power, exposure to risk and the lack of capacity to cope with shocks and adverse situations.

Primarily losses can be high in rural areas where most of the damage is sustained by crops, livestock and the agriculture infrastructure, such as irrigation system, levees, walls and fences. In other words primary losses relate mainly to the disruption of economic and social activities, especially in urban areas, immediately after a flood (Pegram, 2003).

According to Lind, et al. (2008), the loss in case of flooding has many dimensions. In addition to economic loss and loss of life and injury, there may be irreversible loss of land, of historical for cultural valuables and loss of nature or ecological valuables

Economic development of flood prone areas is a factor that increases flood risk. Population pressure and shortages of land cause encroachment into flood plains. Mushrooming informal settlements often form enlargement zones around mega cities in developed countries (Kundzewicz, et al.2002).

According to Mustafa (2002), despite Pakistan’s massive investment in its water sector, it still remains vulnerable to the flood hazard. Pakistan suffered major floods in 1950, 1956, 1973, 1976, 1988 and 1992, each affecting more than 10 thousand lives. The 1992 floods cost the country more than 3 percent of its total GDP. According to the study undertaken in four villages in Central Pakistan, the people attributed their vulnerability to floods to poverty, God’s will, socio-economic powerlessness and Government (Mustafa 2002).

## 2.2 Floods and Vulnerability

The origin of the word vulnerability can be traced back to its Latin root vulnerary - which means "to hurt" or in a broader perspective to be subjected to any physical attack with inability to defend (Lundy and Janes-2009). More specifically, in reference to floods, vulnerability can only be defined as being prone to floods with inadequate coping skills to overcome its consequences. Initially vulnerability was defined as a threat or limiting factor for a society's ability to absorb and recover from a negative dangerous event (Gabor and Griffith 1980; Timmerman 1981; Kates 1985; Bogard 1989). Later it was approached in terms of the extent to which a society or its people are exposed to risk elements (Petak and Atkisson 1982). Some distinguished geographical vulnerability (physical conditions) on the one hand and social vulnerability (human relations) on the other (Liverman 1990).

Differences in theoretical approaches to disaster studies and development reflect on the need to review key concepts that situate floods within the vulnerability context. To assess the extent to which hazards affect people or society it is necessary to distinguish between, "risk" and "vulnerability" components of disaster analysis. Hazard in this case can be defined as an extreme geophysical event that poses a potential threat to cause a disaster (Alexander 2000). Risk, therefore, can be understood as the probability of loss as a result of interaction between a given level of risk and vulnerability (Stewart and Donovan 2008; Wisner, et al., 2004; Alexander 2000).

The vulnerability is a function of the nature, size and frequency of climate variation which a system is exposed, its sensitivity, and its adaptive capacity. Also defined as a set of specific circumstances which adversely affects the community's ability to prevent, mitigate, prepare for or respond to a threat (Lundy and James 2009). Absence of coping strategies is also part of the vulnerability and has to be considered in vulnerability analysis e.g. living in danger exposed places as close to a lake or river i.e. flood plain, the fault lines at the foot of a mountain etc.

Vulnerability of a region depends on its geographical proximity to the source and origin of disasters e.g. if an area located near the floodplains, unstable slopes etc. it makes the area more vulnerable to disasters in relation to an area that is far away from the origin of the disaster. Physical vulnerability also include difficulties with access to water resources, means of communication, hospitals, police stations, fire departments, roads, bridges and exits of a building or an area in case of disaster. Moreover, the lack of proper planning and implementation in the construction of residential and commercial buildings that is weaker and vulnerable in floods, landslides, earthquakes and other hazards. (Cardona and Hurtado, 2000a)

## 2.3 The Drivers of Vulnerability

To effectively manage risk, it is important to understand how vulnerability is generated, how it increases and how it builds up (Maskrey, 1989; Cardona, 1996a, 2004, Lavell, 1996, 1999a; O'Brien et al., 2004b). Vulnerability describes a set of conditions for people originating from the historical and prevailing cultural, social, environmental, political and economic contexts. In this sense, vulnerable groups are not only at risk because they are exposed to a risk, but as a result of marginality, everyday patterns of social interaction and organization, and access to resources (Watts and Bohle, 1993; Morrow, 1999; Bankoff 2004). Consequently, the effects of a flood at any particular household due to a complex set of drivers and cooperative relation. It is important to remember that people and society are not solely or mainly of the victims, but also active managers of vulnerability (Ribot, 1996; Pelling 1997, 2003). Therefore integrated and multidimensional approaches are very important to understand the causes of vulnerability.

Some global processes are key drivers of risk and are particularly related to the creation vulnerability. There is high confidence that these include population growth, rapid and inappropriate urban development, international financial pressures, increase in socioeconomic disparities, trends and failure of governance (e.g. corruption, mismanagement), and environmental degradation (Maskrey, 1993a, b, 1994, 1998; Mansilla, 1996; Cannon, 2006). Vulnerability profiles can be constructed that takes into account the sources of environmental, social and economic marginality (Wisner, 2003). This includes an assessment of the relationship between society and specific environmental services and vulnerability components of the ecosystem (Williams et al, 2008).

There are many examples of interaction between society and environment that makes people vulnerable to extreme events and highlight the vulnerability of ecosystem services (Metzgeret al., 2006). As an example, vulnerabilities due to flooding intervention and increased risk exposure is typical of the intricate and finely balanced relationships within human-environment systems(Kates, 1971) as we have been aware for several decade. Increasing human occupancy at floodplains increase exposure to flood risk. It could put not only the lives and property of human beings with risk, but can damage flood ecology and allied ecosystem services. Increased exposure of humans comes about even in the face of measures to reduce the risk. Structural response and relief measures (such as provision of fillings, channel modification, and other physical changes of floods Environment), designed ostensibly to reduce flood risk, may have reverse result. This is among other things known as Levee effect (Kates 1971), escalator effect (Parker, 1995), or the secure development paradox (Burby, 2006), where flooding intervention leads to increased flood risk and to end flooding. A misfit policy response to such exposure provides structural flood defenses, which encourages the belief that flood risk is removed. This in turn stimulates more flooding intervention and a repeat of cycle as flood protection (built to a lower design specification) is exceeded. This is typical of many maladaptive policy measures, as focus on the symptoms rather than the causes of bad environment management.

Within the environmental dimension, physical aspects refer to a site-specific context of human-environment interaction (Smithers and Smit, 1997) and to the material world (e.g. built structures).

The physical exposure of humans to hazards has been partially shaped by patterns of settlement risk vulnerable landscape for the equalization benefits they offer. Furthermore, in the context of climate change, physical exposure in many regions also increasing due to spatial extension of natural hazards such as flooding, areas affected by drought, or delta regions affected by salinization. This does not make the inhabitants of such places vulnerable because they may have the capacity to withstand the impact of extreme events; this is the basic difference between exposure and vulnerability. The physical dimension of vulnerability begins with the recognition of a link between an extreme physical or natural phenomenon and a vulnerable human group (Westgate and O'Keefe, 1976). Physical vulnerability includes aspects of geography, location and location (Wilbanks, 2003); settlement patterns; and physical structures (Shah, 1995), including infrastructure located in hazard-prone areas or with lacking in resistance or susceptibility to injury (Wilches-Chaux, 1989).

**2.4 Floods and Social Vulnerability**

Socially vulnerable communities have weak family structures, lack of leadership for decision making and conflict resolution, unequal participation in decision making, weak or no local organizations, and one in which people are discriminated against on ethnic, ethnic, linguistic or religious basis. Other social factors such as culture, tradition, religion, local norms and values, economic standard, and political accountability also play an important role to determine the social vulnerability of a community (Cardona and Hurtado, 2000a).

Social vulnerability to floods is greatest among the poorest in developing countries due to lack of information and resources to take the necessary measures. Within this group are children, women and older are considered to be the most vulnerable. To reduce social vulnerability, all the above factors to be addressed, but this requires knowledge and understanding of the local conditions, which can - in most cases - only be provided by local actors.

**2.5 Flood Induced Conflicts: Global Context**

The relationship between climate change and conflict has gained increasing attention from academics and policy makers alike in recent years (Barnett and Adger, 2007; United Nations, 2007; Burke et al., 2009; Hsiang et al., 2013), especially after the publication of the fourth assessment report of the Intergovernmental Panel on Climate Change (IPCC, 2007). French President Nicolas Sarkozy (2008) warned that “climate change is already having considerable impacts on security [...] and the Darfur crisis will be only one crisis among dozens.” President Obama in his Nobel Peace Prize acceptance speech warned that climate change “will fuel more conflict for decades” (White House, 2009). Similarly, the recently released Strategic Sustainability Performance Plan by the U.S. Department of Defense (DOD, 2014) predicts that, in addition to direct effects on military infrastructure, climate change will have indirect effects on regional stability, particularly on those areas of the world already prone to conflict.

Among its wide range of impacts, climate change is expected to increase the frequency and severity of natural hazards such as floods, droughts, heat waves, storms and tropical cyclones. These hazards can become natural disasters with profound environmental, political, and social consequences (Nel and Righarts, 2008). Floods are a potentially "dangerous" consequence of climate change. Having a rapid onset compared to changes in mean conditions (such as temperature, sea-level, or annual precipitation), they allow for less time to adapt (Falk, 1971, Barnett, 2003).

Floods are already the most frequent natural disaster, accounting for 40 percent of all natural disasters reported over the last 25 years (CRED/OFDA, 2011), and the reported frequency and damages of floods show a positive trend that is expected to continue (IPCC 2007, 2012). It is estimated that by 2020, climate change will have exposed 6 million more people living in coastal areas to flooding (39% more than would otherwise be the case) (Warren et al., 2006). Although moderate floods can be beneficial in the medium to long term (Fomby et al., 2011, Cunado and Ferreira, 2014), extreme weather events can be highly disruptive. In 2010, hydrological disasters caused about US$ 46.9 billion in economic damages worldwide (Guha-Sapir et al., 2011), were responsible for over 8,100 deaths, and displaced over 179 million people (CRED/OFDA, 2011).

Disasters are often described as a result of the combination of exposure to a hazard, preexisting conditions of vulnerability, and insufficient capacity to reduce or cope with the potential negative consequences. More generally, environmental change does not undermine human security in isolation from a broader range of social factors that include poverty, access to opportunities, social cohesion, and institutional effectiveness (Barnet and Adger, 2007). For example, countries with higher income and better institutions are less vulnerable to and better able to cope with natural hazards (Kahn, 2005; Ferreira and Ghimire, 2012; Ferreira et al., 2013). On the other hand, the incidence of natural disasters is increasing because of economic growth and growing exposure of population and infrastructures in disaster-prone areas, floodplains in particular (Raschky, 2008; IPCC, 2012).

**2.6 Floods and Security: Theoretical Connections**

According to the environmental security view of conflict, degradation in natural environments creates scarcity that when combined with population growth, skewed resource distribution, and weak institutions can lead to violent conflict. This conflict is more likely to occur at a subnational level rather than between states, to be persistent and diffuse, and to affect poor societies that are less able to buffer themselves from environmental degradation and the social crises they cause (Homer-Dixon, 1994, 1998; Homer-Dixon and Blitt, 1998)

The literature on environmental security suggests different, complementary mechanisms through which extreme flood events might lead to social unrest. First, flood events can result in anger and frustration among groups losing material benefits that they once enjoyed (Grofman and Muller, 1973; Miller et al., 1977). Relative deprivation theories stress rapid changes in people’s conditions such as those arising from rapid-onset floods. Floods can quickly destroy crops, cropland, forests, pastures, freshwater, and fish, leading to food shortages and spikes in market prices. Catastrophic flooding can knock down power lines, contaminate oil supplies, and destroy other infrastructure needed to deliver energy supplies resulting in energy scarcities. With rapid onset disasters, little time is available for adaptive changes, which increases the likelihood and intensity of violent conflict (Falk, 1971).

Because of immediate damage to capital and agriculture, extreme events can have large negative short-run macroeconomic impacts. For instance, the 2010 floods in Pakistan damaged 3.3 million Ha. of standing crops, more than 5,000 miles of primary and secondary roads, 400 bridges, 400 miles of railways, 11,000 schools, and 200 health facilities, and reduced Pakistan’s GDP growth in that year by 2 percentage points (UNITR, 2010; Looney, 2012). In Thailand, floods in 2011 resulted in US$ 45 billion damages (almost 14% of Thailand’s GDP) and lowered GDP growth by one percentage point (Xinhua, 2011). Displacement, loss of lives, and damages to infrastructure, agriculture and crops can hurt overall economic productivity and result in an economic slowdown (Hendrix and Salehyan, 2012). During an economic slowdown, the opportunity costs to engage in violence are lower, while the benefits from looting and engaging in violence may become attractive (DiPasquale and Glaeser, 1998). In addition, an economic slowdown may increase competition among ethnic groups to control local resources (Olzak, 1992; Brass, 2003). Following the 2010 floods in Pakistan, with the government troops concentrated in rescue and relief works in a few urban areas, Pakistani Taliban exploiting the ‘political space’ created by the floods, intensified their activities in several parts of the country (CBS News, 2010).

Within the current debate on how environmental factors may affect the risk of conflict, scarcity of important resources holds a prominent place. Acute scarcities, caused by reduced supply, increased demand or skewed distribution, are suggested as a significant current and future source of violent conflict (Homer-Dixon, 1999). The idea that climate change leads to violent conflict in general can be regarded as a continuation or revised version of the Malthusian concept of resource scarcity as a cause of environmental degradation, poverty, and an escalating struggle for resources (Homer-Dixon, 1994). Traditionally, the scarcity literature has primarily been concerned with 'overpopulation' and the associated 'overuse' of renewable natural resources (Homer-Dixon, 1999). With global warming and the subsequent climate security discourse, the putative impact of anthropogenic climate change on the security of societies and livelihoods has gained prominence.

## Most natural disasters occur relatively abruptly (the main exception is drought), but the after-effects may linger on for a long time, causing or exacerbating scarcities caused by reduced supply, increased demand or skewed distribution, are suggested as a significant current and future source of conflict (Homer-Dixon, 1999).

Quarantelli & Dynes (1976) find that conflicts related to the allocation of blame or the distribution of resources rights tends to arise right after the flood. Resource rights refer to an enforceable authority to undertake particular actions with regards to resources (Ostrom, Elinor, 1999). Goldstone (2001) suggests that the political outcomes of disasters hinge on how they are handled; poorly managed floods in developing countries are argued to increase the risk of political unrest and conflict, while competent disaster management may actually increase the support for the government.Conflict relations always include the striving for control of scarce resources, or to influence behaviors of others in a desired direction. This means that in a conflict relationship there is always an attempt to attain or use power, or the actual attainment or application of power (Sheppard, 1954).

## 2.7 Coping and Adaptive Capacities

Capacity is an important element in most conceptual framework of vulnerability and risk. It refers to the positive aspect of people's properties that can reduce the risk of a certain danger. Improving capacity is often identified as targets for policies and projects, based on the notion that a strengthening of the capacity will eventually lead to reduced risk. Capacity counts clearly also to reduce the impact of climate change (Sharma and Patwardhan, 2008).

Mastering is generally used to refer to ex post actions, whereas adaptation is normally associated with ex ante actions. This means that the coping capacity also refers to the ability to react to and reduce the negative effects of experienced hazards, while adaptive capacity refers to the ability to predict and transform the structure, function or organization to better survive hazards (Saldaña-Zorrilla, 2007). Presence of capacity indicates that the effects will be less extreme and / or recovery time is shorter, but high capacity to recover does not guarantee equal levels of ability to predict. In other words, the capacity to handle not imply capacity to adapt (Birkmann, 2011a), although coping capacity is often considered to be part of adaptability (Levina and Tirpak, 2006).

**2.8 Capacity to anticipate risk**

Capacity risk prevention and reduction can be understood as number of elements, measures and tools aimed at intervention in hazards and vulnerability in order to reduce existing or controlling future potential risks (Cardona et al., 2003a). This may vary from guarantees survival to the ability to secure future livelihoods (Batterbury 2001; Eriksen and Silva, 2009).

Development planning, including land use and urban planning, river basin and land management, hazard resistant building codes, and the landscape design are all activities that can reduce exposure and vulnerability to dangers and change (Cardona, 2010). The ability to carry out these effectively is a part of the capacity to reduce the risk. Other Activities include diversifying income sources; maintain social networks, and collective action to avoid a development that puts people at higher risk (Lavell, 2003).

### 2.9 Capacity to Recover and Change

Having the ability to change is a requirement for being able to adapt Climate change. Looks customization that requires transformation means that it cannot be understood as just a set of actions that physically protect people from floods (Pelling, 2010). In conjunction with natural calamities, the possibility of change often greatest during recovery phase, when the physical infrastructure has to be rebuilt, and may be improved and behavior patterns and habits could be (Comfort et al, 1999). This is an opportunity to rethink whether crops planted which is most suited to the climate and whether it is worth rebuilding hotels near the floodplains, taking into account what other types of environmental changes can occur in the region.

## 2.10 Vulnerabilities of the People of Balakot

Balakot was one of the worst quake-hit towns in the episode of 8 October 2005. Balakot town sits on an active fault line. The intensive geotechnical and seismic microzonation study of Balakot city and peripheral region was conducted by NESPAK and micro-seismic hazard map was prepared. The two fault systems merged here form a network of four major and twenty small fracture lines. These fractures net are very vulnerable to seismic. Therefore, the risk of earthquake in the area is very high. Based on various studies conducted in the area and looking at the future seismic activity and earthquake hazard vulnerability Balakot, the government declared Balakot site in the red zone and abandoned it for residential purposes.



**Figure 1:** Seismic Zones of Pakistan (Source: Chaudry, 2009)

The river Kunhar runs through the middle of Balakot. The geomorphic analysis of river Kunhar show that it has elongated oval shape with catchment area of 2706 Sq. Km. The valley is characterized by steep slopes with a maximum altitude of 5075 m and a minimum 632 m. The elongated oval shape of the catchment area and steep slope are the indicators of flooding. River Kunhar near Balakot has relatively more active flood plain area than elsewhere in the valley. This active flood plain area is at one meter distance and extensively used for agricultural purposes. This area is subjected to frequent flooding. The floods of 1992 and 1993 severely damaged agaricultural and residential area on both sides of the river.

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**Figure 2 :** River Kunhar, Balakot (View of Village Kashtara)

### Source: Study Survey 2016

Balakot lies on active fault and the surrounding region has complex geology. The eastern part especially along the fault line is highly vulnerable to landslide danger. In built up area is natural rocks or soil and drainage system less prone to landslide hazards. Steep slopes and vertical cutting of the river, streams and roads are major factors for landslide hazards in the area, while other factors such as fault surface fractures in the northeastern part, receptive soil of gable plains in the south and moisture availability along the river and streams are other factors.



**Figure 3:** Balakot digital (3d) surface model (gis-based terrain analysis of balakot region, mehran university research journal)

## 2.11 Flood Vulnerability Assessments

Vulnerability assessments carry tools and processes used to assess the extent to which a society and its natural resources to climate change that ultimately affect them. The approach recommended in much climate literature (Marshall et al. 2010) covers three main areas i.e. exposure, sensitivity and adaptability, as they collectively determine the level of sensitivity to climate change. The human dimension, which is the focus of this addendum, is collected to provide a better understanding of the social aspects of exposure, sensitivity and adaptability of the valuation community. In a social context, the following terms are defined as follows:

### 2.11.1 Exposure

The extent to which a society comes into contact with climatic events or specific climatic effects is called its exposure to that specific hazard. Specifically, this includes the areas of residence and resource use exposed to various climatic events and consequences. For example, the house near the shoreline has high exposure to rising sea levels. Settlement of people in the flood plain may have high exposure to flood damage.

### 2.11.2 Sensitivity

The extent to which a society is adversely affected by changes in climate is known as sensitivity. Sensitivity is largely determined by the relationship between individuals, households, or communities to the resources affected by climate events, and the degree of dependence on these resources. For example, if "exposed" agricultural products are the main source of food and income for a community, family or group of households, as they can have a high degree of sensitivity. If the exposed reefs are the most important area for fishing providing income and food for a community, that community very sensitive to mass coral bleaching that results from an increase in water temperature.

### 2.11.3 Adaptive Capacity

The potential or ability of a community to adapt to the consequences of climate change is its adaptive capability. Adaptability is complicated. It can be strongly influenced by a few key characteristics, or by a wide range of social features. For example, well-informed villages with a strong traditional leader who is able to develop good plans and make decisions that help and involve all members of society are likely to show high adaptive capacity. A household that has diversified revenue sources and supplemental livelihood options will likely have higher adaptability to the consequences of climate change than those who do not.

#

# CHAPTER 3

# RESEARCH METHODOLOGY

**3.1 Research Methods and Paradigms**

In this Chapter some of the key aspects of research execution will be explained in detail. These aspects or methods are not just limited to qualitative data collection and analysis, for example, participant observation and interviewing, but also include establishing research relationships with issues like selecting sites, participants, data collection and analysis. Decision about research methods depend upon specific context and issues being raised. One of the critical decision in shaping the study is designing of paradigm.

The word paradigm, according to Thomas Kuhn, refers to the assumptions that tend to be shared by researchers working in a specific field. Paradigms also include specific methodological strategies linked to these assumptions and methods. At the most abstract and general levels, examples of these paradigms are philosophical positions, such as positivism, constructivism, realism and pragmatism.

Each embodying very different ideas about reality (Patton, 2002) and providing the methods to gain knowledge from them. Specifically, paradigms relevant to the qualitative research include interpretivism, critical theory, feminism, postmodernism, and phenomenology. Established paradigm allows the study coherence and well developed approach. However it is possible to combine aspects of different paradigms based on the compatibility among them (Schram, 2003).

The study will use the interpretivist/constructivist paradigm. This approach to research has the intention of understanding "the world of human experience" (Cohen & Manion, 1994), suggesting that "reality is socially constructed" (Mertens, 2005). The interpretivist/constructivist researcher tends to rely upon the "participants' views of the situation being studied" (Creswell, 2003) and recognizes the impact on the research of their own background and experiences.

**3.2 Research Methodology**

Research methodology is a systematic way to solve a research problem (Industrial Research Institute, 2010). Research in common words refers to a search for knowledge to get specific information on a specific topic. In fact, research is an art of scientific investigation (Kothari 1990). Redman and Mory (1923) define research as a “systematized effort to gain new knowledge.” It is a way to systematically solve the research problem.

After reviewing the existing literature on vulnerabilities of people in the context of flood induced conflicts on agricultural lands on the flood plain. It has been clearly known that most of the researchers had used positivist approach to analyze the quantitative data. For data collection in this case of study, the constructivist approach will be used to analyze the interviews and personal observations. As it is necessary to observe the individual experiences and knowledge.

**3.3 Reliability and Validity of Research**

The principles of reliability and validity are important parts of the scientific method. When we talk about reliability we mean consistency or repeatability of results. Validity of a study means that the study is capable to measure for which it has been designed. According to Patton (2001), validity and reliability are two factors, which any qualitative researcher should be concerned about while designing a study, analyzing results and judging the quality of the study. However the credibility in quantitative research depends upon the instrument construction while in qualitative research the researcher is the instrument (Patton, 2001). Hence validity of the research is referring towards the researcher abilities in collecting and analyzing the data. The concept of a good quality research when reliability is a concept, evaluate quality in quantitative study with a “purpose of explaining” while quality concept in qualitative study has the purpose of “generating understanding” (Stenbacka, 2001).To ensure reliability in qualitative research, examination of trustworthiness is essential (Seale, 1999).

In the present study care has been taken to ensure reliability and validity by giving a detailed account of all the processes involved in the research. Constructivism paradigm values multiple realities that people have in their minds. Therefore, to acquire valid, reliable multiple and diverse realities, multiple methods of search or gathering data are in order. Engaging multiple methods, such as, personal observation, interviews and recordings will lead to more valid, reliable and diverse construction of realities. The study has construct the reality and by engaging all such methods in collecting and analyzing the data.

**3.4 How Biases were removed in the Study**

It is not possible to conduct a completely unbiased research but what one can do to ensure accuracy of a study is to clearly become aware of one’s own biases. In this study, the researcher took certain measures to deal with his own biases. For instance, the respondents who were not directly been affected by the floods were contacted just for taking preliminary interviews (for improving the interview guide) but their information was not included in the actual study. Similarly, simple and clear questions were asked from the respondents rather than making them complicated to understand. If the respondents were unable to understand the questions, they were made simpler at the moment. Moreover, the questions were kept neutral to reduce question bias and question order bias was also reduced. For instance, general questions were asked before specific questions.

**3.5 Ensure accuracy in research**

Two important threats to the validity of qualitative conclusions are the selection of data that is appropriate to the researcher’s existing theory or preconceptions and the selection of data that stand out the research. Such situation in the research refers towards the biasedness (Miles and Huberman, 1994). Qualitative research is concerned with the understanding of how particular researcher values and expectations influence on research conducted to eliminate biases.

Another problem in conducting the qualitative research is related with the influence or reactivity of the researcher on the setting during the data collection. Most importantly during interviews this thing is well understood in mind that not only minimize the reactivity but also to understand the situations accordingly.

**3.6 Study Area**

The study area is Balakot and is located about thirty-eight kilometers north-east of the city of Mansehra, in Khyber Pakhtunkhwa Province. It has an average elevation of 971 metres (3188 feet). It is a historical town, a famous tourist destination of the region and the gateway to Kaghan valley of the Khyber Pakhtunkhwa Province of Pakistan. The river Kunhar, originating from Lulusar lake, runs through the city and merges with Jhelum. It was one of the towns which was most damaged in the flash floods of 1992 and 1993 severely destroyed the area. Villages were badly affected and landslides cut off thousands of people from Balakot. People of Balakot are susceptible to seasonal floods, land sliding and earthquakes because Balakot is geographically situated on the fault line. The geomorphic analysis of river Kunhar show that it has elongated oval shape with catchment area of 2706 Sq. Km. The valley is characterized by steep slopes with a maximum altitude of 5075m and a minimum 632m. The elongated oval shape of the catchment area and steep slope are the indicators of flooding. River Kunhar near Balakot is relatively more active flood plain area than elsewhere in the valley. This active flood plain area is at one meter height and extensively used for agricultural purposes. This area is subjected to frequent flooding. According to Pakistan Floods/Rains report 2012 series 4, Northern areas of Pakistan faced floods and tormenting rains during the three consecutive monsoons from 2010 to 2012 and this problem is frequent and continuous.

The respondents have been taken from the area of Balakot, namely village Kashtara. The main reason for selecting these areas was due to its location on active flood plain. A location map of village Kashtara is as attached. In figure XX it can be clearly observed that the huge agricultural part of study area is located on the active flood plain. River kunhar affects the area from one side and Bagaa nala from the other.



**3.7 Sampling Technique and Sample Size**

Sampling may be defined as the selection of some part of an aggregate or totality on the basis of which a judgment or inference about the aggregate or totality is made (Kothari 1990). Sample should be truly representative of population characteristics without any bias so that it may result in valid and reliable conclusion (Kothari 1990). Stratified sampling technique was used in the present study. The strata were divided into four various groups depending upon their trade and living statuses. The rationale behind makeup of these strata lies in the fact that for effective assessment of social vulnerability and impacts of flood, we need to target various groups of people who are affiliated with agricultural land resources or who live near/on flood plain. Secondly, an inclusive approach is useful when we need to understand the phenomenon under study from different scenarios. Therefore, stratified sampling technique was used to build the strata. Respondents were selected and divided into four strata including equal proportion of landlords, tenants, sharecroppers and local men and women.

The sample size for the study was forty interviews were taken and divided into four strata (Figure XX) to get detailed interviews from the areas. These interviews were taken from each of area, including both males and females based on the availability during the time of interviews.

The total sample size for the study was 40 interviews, which was further divided into 4 equal strata i.e. 10 respondents per strata.

|  |  |
| --- | --- |
| **Respondents/Strata of the Study** | **Number of Respondents** |
| Landlords | 10 |
| Sharecroppers | 10 |
| Tenants | 10 |
| General Public – men and women | 10 |

**3.8 Unit of Analysis**

A researcher Jackson pointed out that if we consider households as complete units of analysis, then the internal workings of the households are generally ignored. Therefore, for the present study, the households are not used as complete unit of analysis, so individuals from different household are considered as unit of analysis.

**3.9 About Strata and Respondents of the Study**

The study has considered the landlords, tenants, sharecroppers and general public including both sexes as the unit of analysis. Because, the main focus of the study was to assess flood induced conflicts on the agricultural land resources.

**3.10 Research Instruments used in the Study**

In order to achieve the objective of the research, pragmatic research methodology has been used to analyze the data collected from both primary and secondary sources. The primary data has been collected from the respondents through personal observations and structured interviews, while, secondary data was collected through the published research reports and articles relevant to the study.

**3.11 Structured Interviews**

The study has used structured interview method to get information from individuals. Individuals were mostly related to the agriculture. The method of collecting information through personal interviews is usually carried out in a structured way. As such we call the interviews as *structured interviews.* Such type of interviews involves the use of a set of predetermined questions and of highly standardized techniques of recording (Kothari 1990).

## This method was used for several reasons. Firstly, to explore how floods affect the land resources and increase social vulnerability of the target population. Secondly, the objectives of the study were based upon analyzing the communal conflicts on land resource management and the coping strategies of local community in reduction of these conflicts and its continuous degradation.

**3.12 About the Interview Guide**

In order to get information about people and problem (2 Ps), structured interview guide was design. It was mostly containing open ended questions. The interview guide was designed in order to cover all the aspects of the study like, demography, sensitivity i.e. exposure to hazard, flood and their impact on social life, damages caused by floods, flood induced conflicts, flood control measures and adaptive capacity of the habitats of study area. However, it was finalized after taking few interviews from people who are not included in this case of study. The guide has been redesigned after pretesting it in taking five interviews. Some of the irrelevant and repeated questions were eliminated and most relevant questions were added. This exercise was done to minimize baseness and ensure validity of the study.

**3.13 Personal Observations**

Personal Observation becomes a scientific tool and the method of data collection for the researcher. When it serves as a formulated research purpose, it is systematically planned and recorded and is subjected to check and control the validity and reliability. Under the observation method, the information is sought by way of investigator’s own direct observation without asking from the respondent (Kothari 1990). Along with the interviews personal observations were also gathered through non-verbal expressions and attitudes of respondents.

**3.14 Secondary data**

Secondary data either is published data or unpublished data. Usually published data is available in various publications of the central, local governments, various publications of foreign governments , international bodies and their subsidiary organizations, technical and trade journals, books, magazines and newspapers, reports and publications of various associations on sociology, etc. in different fields and public records and statistics, historical documents, and other sources of published information. The sources of unpublished data are many; they may be found in diaries, letters, unpublished biographies and autobiographies and also may be available with scholars and research workers, and other public/ private individuals and organizations. The literature and secondary data linked with the present study has been collected through the reports and published articles from online websites like J-stor, Academia, etc.

**3.15 Quality of Data**

In order to ensure the quality of data the researcher has taken different measures during data collection. To build a rapport with the interviewee, the enumerator approached most of the interviewees with the help of reference persons, usually friends or relatives of the participants. This helped to build a relationship of trust with the interviewees. Secondly, the interview guide was designed in such a way that the opening questions were quite general, which also helped to build a good rapport between the researcher and the research participants. Enumerator initiated conversations with the respondents other than asking questions, to get them in confidence and to fill the gap. This exercise had worked in getting detailed information about the sensitivity of people in the context of flood induced conflicts and the role of local individuals and the representatives of government line agencies in this regard. Before taking the interviews the researcher had visited the study area just to observe the respondents behaviors and attitudes that helped a lot while conducting the research study.

**3.16 Respondents Behavior during Interview**

Many respondents were giving data in detail about the study and had sacrificed their time for the enumerator but some respondents were not taking it seriously and few were giving with over detailing. The unwanted data was not included in analysis of the data. Only the relevant data has been recorded based on personal observations about the respondent and the setting. Some of the respondents were hesitating and ignoring to provide any data about the conflicts. However, some respondents were much cooperative and candid in providing the data.

**3.17 Data Analysis**

A qualitative content analysis research technique was used to make replicable and valid inferences by interpreting and coding textual material. By systematically evaluating texts (e.g., documents, oral communication, and graphics), qualitative data can be converted into quantitative data.

The quantitative data was analyzed through MS Excel spreadsheets and Statistical Package for the Social Science (SPSS).The descriptive statistical tools such as means, standard deviations and percentages were used to condense and summarize data and to present it in the forms of tables and diagrams.

**3.18 Time Taken for Gathering Data**

The interview guide was prepared in the month of July, 2017 and the researcher started to gather research data from the start of August, and finally it got ended in the same month. Therefore, it took approximately 1 month in the whole data collection process.

**3.19 Limitations of the study**

The accessibility of data remains a serious concern, as people were generally reluctant to talk about the conflicts. Some of them were not ready to give that much time for detailed information. They got curious and did not reveal sensitive information about the role of police and land revenue department in the resolution and control of conflicts on land resources. But indirectly questions helped the enumerator to get real information. The exercise took much time in gathering data and only six to seven interviews were taken a day.

#

# CHAPTER 4

# RESULTS AND DISCUSSIONS

In this chapter, the empirical findings from the fieldwork have been gathered and presented underneath distinct themes exhibiting the results and discussion. The data has been reviewed and confirmed through existing literature available on the study and it has also been cross checked through personal observation by the researcher, himself. Basically this chapter is divided into six sections, focusing on demography, vulnerability, exposure, sensitivity, conflict and adaptive capability of the people of the study area.

# SECTION - I: DEMOGAPHY

## 4.1 Average and standard deviation of demographic traits of the respondents (Table 1)

Respondents were having enough information about the natural calamities of their area so the age limit (class) of the respondents of the study area ranged from 25 to 66 with the Mean ± Standard deviation of 45.3 ± 10.3. The schooling years of the respondents ranged from 0 to 16 with the Mean ± Standard Deviation of 7 ± 6.4 while, the average household size ranged from 3 to 20 with the Mean ± Standard Deviation of 8.4 ± 4.5.

The elevation was measured by using GPS device to get appropriate idea about the steep slopes of the study area which make it more susceptible to frequent flooding. Elevation of Kashtara ranged from 824 to 901 meters with the Mean ± Standard Deviation of 850.6 ± 28.

**Table 1:** Average and Standard Deviation of Demographic Traits of the Respondents

|  |  |  |
| --- | --- | --- |
| **Demographic Traits** | **Range** | **Mean ± Standard Deviation** |
| **Age** | 25 – 66 | 45.3 ± 10.3 |
| **Years of Education** | 0 - 16 | 7 ± 6.4 |
| **No. of household members** | 3 - 20 | 8.4 ± 4.5 |
| **Elevation (meters)** | 824 - 901 | 850.6 ± 28 |

## 4.2 Demographic Profile of the Communities

Statistics of target population in terms of number of respondents, age and education is depicted in table 2. The youngest respondent was 25 years old and the oldest was 66 years. Majority of the respondents fall under 36 to 45 years of age cadre. To get better idea about the problem prevalence, interviews were been conducted from both sexes, 67 percent male respondents were interviewed and 33 percent female respondents were interviewed.

Education is considered as an important factor as an awareness and adaptation because educated people can better understand and implement the mitigation practices regarding hazards or disasters. Majority of the respondents were having 5 years of education i.e. till primary level. It was observed that the study area was backward and people had less job opportunities in the area. Most of the respondents interviewed were affiliated with agriculture.

**Table 2:** Demographic Profile of the Communities

|  |  |
| --- | --- |
| **Classes** | **Kashtara** |
| **Age** | **Frequency** | **Percentage** |
| 25 – 3536 – 4546 – 5556 – 6566 – 75 **Total** | 520771**40** | 12.55017.517.52.5**100%** |
| **Education** | **Frequency** | **Percentage** |
| 0 – 506 – 1011 – 16**Total** | 1816 6 **40** | 454015**100%** |

# SECTION II– VULNERABILITY

The vulnerability is a function of the nature, size and frequency of climate variation which a system is exposed, its sensitivity, and its adaptive capacity. Also defined as a set of specific circumstances which adversely affects the community's ability to prevent, mitigate, prepare for or respond to a threat (Lundy and James 2009). More specifically, in reference to floods, vulnerability can only be defined as being prone to floods with inadequate coping skills to overcome its consequences. Initially vulnerability was defined as a threat or limiting factor for a society's ability to absorb and recover from a negative dangerous event (Gabor and Griffith 1980; Timmerman 1981; Kates 1985; Bogard 1989). Later it was approached in terms of the extent to which a society or its people are exposed to risk elements (Petak and Atkisson 1982).

# Definition of Vulnerability According to the Respondents

The respondents were asked about their perception about the concept of vulnerability, (Fig XX ) 67.5 % respondents said that according to our understanding, vulnerability is moon soon rain which eventually causes floods. It was observed that most of the people were so helpless in the context of flood and it’s after effects. The remaining respondents said that floods and earthquakes is vulnerability and we find so much difficulty to cope up with them and their after affects. It was observed that this perception of respondents was directly linked to their physical vulnerability as on average 38% people of the study area were having average of 20 kanals agricultural land and property on the active flood plain area which in fact made them more vulnerable to flood induced destructions and eventually the conflicts.

## 4.3 Extent of Damage Due to Floods and other Calamities

Balakot lies on active fault line and the surrounding region has complex geology. The eastern part especially along the fault line is highly vulnerable to landslide danger. In built up area is natural rocks or soil and drainage system less prone to landslide hazards. Steep slopes and vertical cutting of the river, streams and roads are major factors for landslide hazards in the area, while other factors such as fault surface fractures in the northeastern part, receptive soil of gable plains in the south and moisture availability along the river and streams are other factors.

The river Kunhar runs through the middle of Balakot. The geomorphic analysis of river Kunhar show that it has elongated oval shape with catchment area of 2706 Sq. Km. The valley is characterized by steep slopes with a maximum altitude of 5075 m and a minimum 632 m. The elongated oval shape of the catchment area and steep slope are the indicators of flooding. River Kunhar near Balakot has relatively more active flood plain area than elsewhere in the valley. This active flood plain area is at one meter distance and extensively used for agricultural purposes. This area is subjected to frequent flooding. The floods of 1992 and 1993 severely damaged agaricultural and residential area on both sides of the river.

The region is vulnerable for many types of natural disasters. In spite of being susceptible to earthquake and landslide, the community of study area was also vulnerable to seasonal and flashfloods. Many examples of flooding in the area are still there.

A 65 years old respondent who was also a member of jirga told us that on October 8, 2005 the earthquake that hit Northern Pakistan caused widespread destructions and killing people. That devastating disaster severely injuring many more, leaving millions without shelter. The affected areas of Northern Pakistan suffered extensive structural and economic damage, with vulnerable groups in this mountainous region bearing the brunt of the disaster. The devastation was spread over thousands of square kilometers to treacherous Himalayan terrain. Hundreds of post-quake tremors and constant landslides multiplied the shock and trauma, while the onset of winter threatened the lives of the survivors. This was without question the worst natural calamity in Pakistan history; recovering from it is going to cost billions of dollars, but different communities who were badly affected did not lose hope and fought against all odds over a period of almost 10 years managed to come back to normal life.

### 4.3.1 Damage

The monetary value of fully or partially destroyed assets, equities and real estate is considered as damage. It is basically assumed that the assets will be repaired or replaced to the same state - in quantity and quality - before the disaster, i.e. valued at agreed replacement (as opposed to reconstruction) costs. The assessment should consider the degree of damage, i.e. whether an asset can be rehabilitated or repaired, or has been completely destroyed (R. Jovel, 2007).

#### 4.3.1.1 Damages Caused to Humans

Damages caused to human life at households level due to floods was 27.5 percent. Many of the households from target village were displaced from their actual location that had number of injured people with them.

#### 4.3.1.2 Damages Caused to Residents

The basic reasons for humongous magnitude of destruction in the study area were;

1. Poverty
2. Lack of proper building codes
3. Illiteracy/Lack of awareness
4. Absence of regulatory authorities regarding planning and development

The people of the study area were having less knowledge regarding the proper building codes. Figure 7 shows that they had mix of kachha, iron roof and cemented houses but mostly were having iron roof houses. Damage caused to houses is dependent on the way it is constructed, and this factor can increase or decrease the vulnerability to human loss. A school teacher told us that in our area most of the people do not have any knowledge about the building codes or prevention technique. Because of poverty and lack of education people built their accommodations according to their economic power, moreover, no one plans for the future and sustainability.

**Figure 6:** Types of House of Respondents

#### 4.3.1.4 Damages Caused to Assets

Most of the respondents were of the view that no one was safe from the damages of floods as the whole community lives on active flood plain. The Graph (Figure 9) illustrates the extent of damages to assets due to floods. In the study area significant damages to assets were reported. It was observed that Agricultural lands, houses and home appliances of respondents were affected severely by the floods. Business, livestock and automobile/motorbike got minor damages.

**Figure 9:** Damages Caused to Assets (Percentage of Respondents)

## 4.4 Respondents who were Forced to Leave Their Houses Due to Floods

In the disaster prone areas, disasters sometimes force the habitats of area to leave their houses which ultimately increases their susceptibility to many other kind of risks. The study shows that 80% respondents left their houses in disastrous situations to save their lives from the negative impacts of floods. These floods affected their assets badly.

# SECTION III – EXPOSURE

The extent to which a society comes into contact with climatic events or specific climatic effects is called its exposure to that specific hazard. Specifically, this includes the areas of residence and resource use exposed to various climatic events and consequences. For example, the house near the shoreline has high exposure to rising sea levels. Settlement of people in the flood plain may have high exposure to flood damage.

## 4.5 Exposure to Hazards

Hazard in this case can be defined as an extreme geophysical event that poses a potential threat to cause a disaster (Alexander 2000). The severity of the impacts of extreme and non-extreme weather and climate events depends strongly on the level of vulnerability and exposure to these events. Trends in vulnerability and exposure are major drivers of changes in disaster risk and of impacts when risk is realized. Understanding the multi-faceted nature of vulnerability and exposure is a prerequisite for determining how weather and climate events contribute to the occurrence of disasters, and for designing and implementing effective adaptation and disaster risk management strategies.

It was observed that 100% respondents were exposed to hazards like earthquakes because Balakot is located on fault line and is considered as a red zone area. The elongated oval shape of the catchment area and steep slope are the indicators of flooding so 97.5% respondents were exposed to the seasonal and flash floods and 62.5% respondents were eventually exposed to flood induced conflicts on agricultural lands. Percentage of respondents exposed to climate related land or mud slide was 57.5%. It was found that mostly people were exposed to different types of hazards and dangers. It was observed that people of the study area were highly exposed to floods, earthquakes and land/mud slides and were also having significant exposure to flood induced conflicts on agricultural lands.

**Figure 12:** Percentage of Respondents Who Were Having Exposure to Hazards

**Hazards Experience of Households for the Past 30 Years**

## Nel and Righarts, (2008) observed that climate change is expected to increase the frequency and severity of natural hazards such as floods, droughts, heat waves, storms and tropical cyclones. These hazards can become natural disasters with profound environmental, political, and social consequences.

The graph (Figure 12) delineates the percentage of respondents who had experienced above discussed hazards at their household level for the past 30 years. It was found that 100% respondents experienced the floods and earthquakes weather they were seasonal or flash floods and right after a hit of flood 52.5% respondents experienced flood induced conflicts on agricultural lands. 35% respondents also experienced Land/Mud slide.

**Figure 12:** **Hazards Experience of Households for the Past 30 Years (Percentage)**

### 4.5.1 Extent of Exposure to Hazards

# SECTION IV – SENSITIVITY

The extent to which a society is adversely affected by changes in climate is known as sensitivity. Sensitivity is largely determined by the relationship between individuals, households, or communities to the resources affected by climate events, and the degree of dependence on these resources. For example, if "exposed" agricultural products are the main source of food and income for a community, family or group of households, as they can have a high degree of sensitivity. If the exposed reefs are the most important area for fishing providing income and food for a community, that community very sensitive to mass coral bleaching that results from an increase in water temperature.

## 4.6 Extent of Vulnerability to Natural Disasters

The graph (Figure 13) represents the extent of vulnerability of the people of study area towards natural disasters and bad events. The questions were mainly focused on the frequency of natural hazards, their severity, difficulty to cope, and their negative impact of that disaster on their households. The respondents were given a scale of 1 - 12 to rate the frequency of natural hazards, their severity, difficulty to cope, and their negative impact of that disaster on their households. It was found that the people of village Kashtara rated the scale for earthquake and flood as 12 each respectively and they ranked the scale for flood induced conflicts on the agricultural lands and properties as 11. Issues relating land or mud sliding were found less severe. It was observed that mostly people find difficulties in coping the natural disaster or bad events and they also put negative impact on the habitats of the study area.

**Figure 13:** Extent of Vulnerability to Natural Disasters

**Note: Respondents were asked to Rank Between 1 to 12 the Frequency, Severity, Negative Impact of Disasters on their Households and Difficulty in Coping with Disasters.**

All interviews were audio taped and transcribed. Transcriptions of the interviews were analysed using the constant comparative method (Glaser, 1976, 1993; Glaser and Strauss, 1967)

Respondents were asked a few questions regarding their sensitivity to the floods focusing the questions regarding frequency of flood and its effect on agricultural land resource and the interventions of Government Line Agencies regarding the solution of this issue.

Most of the respondents were of the view that in almost every moon soon season, the flood emerges from river Kunhar from one side and Bagaa nala from the other side, which destroys our agricultural land and also sometimes our residential area. River Kunhar comes from the north of Balakot our corps are affected badly even in low scale floods. It was found that most of the habitats living in the area were having property on the flood plain and were so susceptible to the seasonal and flash floods. In this regard Government line agency installed only one retaining wall and some spurs to prevent the properties of people but according to the respondents only one retaining wall was insufficient to cover the area. One 55 years old respondent said that the area which is susceptible to seasonal floods is almost four kilometers long and one retaining wall cannot stop the huge amount of destructive water. So the interventions of Government Line Agencies in this context were found unsatisfactory.

## 4.7 Community’s Dependence on Resources

The table 5, [delineate](https://www.google.com.pk/search?biw=1280&bih=877&q=define+delineate&sa=X&sqi=2&ved=0ahUKEwiByvWazsPMAhWEPo4KHYCVD_oQ_SoIHzAA)s the percentage of community’s dependence on the resources and the percentage of it as household use and for income generation purpose. Study shows that in village Kashtara, 50% people use agriculture as house hold use and among them 20% also use it as income generation purposes. Livestock for house hold and income generation was used as 27% and 20% respectively.

It was observed that most of the people were dependent on forest wood for cooking and heating purposes while others were using Liquid Petroleum Gas(LPG) gas for the same purpose because there is an extreme weather condition in winters in the study area. This was also a big reason for deforestation in the area which eventually triggers weather extremes

**Table 5:** Percentage of Community’s Dependence on Resources

|  |
| --- |
|  |
| **Resource Name** | Household Usef (%) | Income Generationf (%) |
| Agriculture | 20 (50) | 8 (20) |
| Livestock | 11 (27) | 8 (20) |
| Farming | 6 (15) | 6 (15) |

## 4.8 Agriculture

The agriculture sector continues to be an essential component of Pakistan’s economy. It currently contributes 21 percent to GDP. Agriculture generates productive employment opportunities for 45 percent of the country’s labor force and 60 percent of the rural population depends upon this sector for its livelihood. It has a vital role in ensuring food security, generating overall economic growth, reducing poverty and the transforming towards industrialization. The present government is determined to improve the quality of life of the people and to banish hunger and malnutrition from the country by making agriculture an efficient, productive and profitable sector of the economy.

Agriculture was considered as an important factor as a food security in the study area, as illustrated in table 6, Almost 50 percent of population was producing wheat and maize as a major crops mostly for house hold use. A very few people also sale their crops to get cash income.

**Table 6 :** Percentage of Respondents Who Cultivate Crops

|  |  |  |
| --- | --- | --- |
| **Crop Name** | **Frequency (f)** | **Percentage** |
| Wheat | 20 | 50% |
| Maize | 20 | 50% |

## SECTION –V FLOOD INDUCED CONFLICT ON AGRICULTURAL LAND RESOURCE

Within the current debate on how environmental factors may affect the risk of conflict, scarcity of important resources holds a prominent place. Acute scarcities, caused by reduced supply, increased demand or skewed distribution, are suggested as a significant current and future source of violent conflict (Homer-Dixon, 1999). The idea that climate change leads to violent conflict in general can be regarded as a continuation or revised version of the Malthusian concept of resource scarcity as a cause of environmental degradation, poverty, and an escalating struggle for resources (Homer-Dixon, 1994). Traditionally, the scarcity literature has primarily been concerned with 'overpopulation' and the associated 'overuse' of renewable natural resources (Homer-Dixon, 1999). With global warming and the subsequent climate security discourse, the putative impact of anthropogenic climate change on the security of societies and livelihoods has gained prominence. (Homer-Dixon, Thomas (1994) Environmental scarcities and violent conflict: Evidence from cases. International Security 19(1): 5-40.)

## Most natural disasters occur relatively abruptly (the main exception is drought), but the after-effects may linger on for a long time, causing or exacerbating scarcities caused by reduced supply, increased demand or skewed distribution, are suggested as a significant current and future source of conflict (Homer-Dixon, 1999).

## Quarantelli & Dynes (1976) find that conflicts related to the allocation of blame or the distribution of resources rights tends to arise right after the flood. Resource rights refer to an enforceable authority to undertake particular actions with regards to resources (Ostrom, Elinor, 1999).

## Study shows that 65% respondents experienced flooding on their agricultural lands or properties which eventually caused loss in the shape of crops destruction or land runoff.

## Respondents were asked a few questions regarding the types of conflicts which generally arose on agricultural lands after floods and how they resolve them because it’s a continuous process and also the role of land revenue department in this context.

## It was noted that right after the flood the conflicts in area were generally emerged on the agricultural lands. According to the respondents the flood enters the agricultural lands and disturbs its boundary settings and this triggers emergence of conflicts among the land owners and also among the tenants or sharecroppers. The poor land owners are the most vulnerable in these conflicts. It’s the prime responsibility of land revenue department to take action in this context and work actively but due to their negligence, community manage the disputes on agriculture lands by the help of their local jigra members and the community elders by mutual consensus. They also help out people in the redistribution of Agricultural- land whose bounders are disturbed by the flood. Some people also had coordination with the police and land revenue department but because of the delays and lengthy processes people prefer to address their problem by themselves but if some big issue comes across, people contact them and get their services. The graph (figure XX) shows that approximately 42.5% people were having coordination with the Police and land revenue department in the context of flood induced conflicts on agricultural land resources. Some elderly people suggested that land revenue department should pay attention on these kinds of conflicts which are basically due to floods.

# SECTION – VI ADAPTIVE CAPACITY

Respondents were asked about their interventions for minimizing the impact of frequent flooding in the area, and also about the hindrances in their way. Most of the people were of the view that they were unable to minimize the impact of flooding on them and others because of ignorance, illiteracy and lack of appropriate resources but some said that they planted trees on the flood plain but the problem they faced again and again was that in every moon soon season flood took the plants away. Some people also said that they used sand bags to prevent their lands and property from flooding. A 50 years old respondent who was a teacher by profession said that he wrote many applications to the political representatives in order to get somekind of help from them regarding flooding matters but no one responded positively. It was observed that most of the people also were not having necessary information and training to minimize the effects of flooding incidents on themselves and other in the community. People demanded training sessions and workshops on the flood coping mechanisms and also provision of more spurs and retaining walls for the area. Some people suggested that mass media and TV should be used for alarming people for the expected flooding in the area.

**Ability of Community to Reorganize**

The graph (Figure 23) depicts the adaptive capacities of respondents with respect to their capabilities and capacities of community. Study shows that, mostly people agreed on the ability of community’s participation to work with each other and their ability to coordinate activities and having skilled people to respond quickly to the impacts of natural events and the institutions or communities that support them when they need to reorganize to cope with new situations or problems. Study found that most of people disagreed on the availability of reorganize to respond to a new situation and having any plans in place to deal with climate related hazards or events.

**Figure XX :** Ability of community to reorganize

## 4.13 Leadership Capabilities in Reducing Community Vulnerability

Leadership in an area really affects the habitats of that area and has vital role in increasing and decreasing the adoptive capability of respective community. The following graph (Figure XX) represents the leadership status of the study area. It was observed that, respondents were having neutral perception on the importance of the voice of individuals in the community planning for climate change adaptation because climate change is the factor which ultimately results in the cause of disasters. Mostly respondents disagreed on the leadership that led them through climate hazards in the past and were of the view that their community leaders and officials didn’t informed them about the national and regional climate policies or initiatives and also didn’t informed us where we can get climate related information. The results shown that mostly respondents were not having any trust on their community leaders those can lead their community through climate change adaptation.

Generally speaking, the leadership in the study area was not found satisfactory and the people were of the view that the leaders only visit their area in elections, after their nomination they do not even bother to listen our voices.

**FigureXX**: Leadership Capability (Response Average Using Likert Scale (1 - 5)

## 4.15 Role of Nongovernmental Organizations

Although NGOs have recently emerged into the development limelight but they are not a recent phenomenon. They were the earliest form of human organizations. Long before the governments, people organized themselves into group for mutual protection and self help.

NGOs play a critical role in all areas of development. People and policy makers are agree on one thing that NGOs play a vital role in development. Role of NGOs vary over the years as the policy of government changes. NGOs are almost dependent on policies of government. Socio economic development is a shared responsibility of both i.e. government and nongovernmental organizations. Role of NGOs are complementary but vary according to policies of government. If we closely pursue the voluminous literature on NGOs many roles can be found according to the expectations of people.

Previously many Government Line Agencies and Non-governmental organizations worked in response and rehabilitation works right after the disasters like earthquake 2005, landslides, flood 1990 etc in the study area. United Nations, Sungi, Sarhad Rural Support Program (SRSP), RDP and Army are amongst the top of list and these organizations facilitated most of the people. But currently the scenario is very different. The Government Line Agencies and the NGOs are not working efficiently. People are facing many financial issues regarding eradication of unsafe conditions especially in flood context.

# CHAPTER 5

# CONCLUSION

The results of study and common observations give certain noticeable conclusions as under:

The study shows that although maximum respondents practice safety measures according to their own understanding but poor coordination between government line agencies, less training and education and not following the building codes reduce their adaptive capacity and make them susceptible to floods. A proper awareness raising and capacity building sessions would help in raising people awareness to adopt mitigation techniques in case of natural disaster. The disaster management authorities should plan a proper system to cope with the seasonal floods and flash floods. Mitigation infrastructure be planned and constructed to avoid huge loss and land sliding from flash floods.

The study revealed that there is no scientifically sound awareness program to highlight the importance of emergency response management and risks for the site of Balakot. There is an essential need of scientifically sound awareness programs that must highlight the importance of emergency response management and risks of the site of Balakot. The awareness activities should be followed by emergency response management. The community preparedness activities like plan preparation, training and drills will increase their capacities for disasters. It will also make them aware that they are living in hazardous site. Avoidance to participate in resettlement also shows a lack of confidence among various sections of affected communities. Local leadership and the government line agencies should work efficiently so the communities could get benefits.

It was observed that the residential and built up system was entirely disappeared along the river banks and the low elevation while the land cover was also vanished due to the human induced activities by deforestation in the area, also a large amount of people were unaware about the coping strategies and were of the view that disasters are natural and they cannot do anything to better cope them. There is a dire need of retaining walls and spurs in the area. Because of unawareness and poverty people were not having enough information about the mitigation practices and their point of view was that it needs a lot of economic resources. Affordable financial schemes by local institutes and governments will encourage people for resettlement. Some banks can be pursued by the governments to step forward and play a role in the scheme.

People of village Kashtara were found most vulnerable to flood as they were settled on the flood plain. There was no preplanned system or plan to cope with flash floods. It is recommended to plant more trees i.e. Aforestation and reforestation to decrease soil erosion. This will is the most suitable mitigation method to avoid frequent floods. Capacity building of the community by using different techniques like skill development training, awareness raising trainings should be the first priority of the administration to make people aware of self-preparedness.

A wide gap was observed between communities and government line departments i.e. Police, Land revenue department. This also resulted in trust deficit among population towards government departments. Channel to improve coordination between communities and the local administration should be established so the people can get proper facilitation.

Capacity of communities to response immediately towards natural disasters was very low. Confidence building measures need to be taken to ensure maximum participation in resettlement from all sections of the affected communities. These measures will be based on changes in the present approaches. All stakeholders need proper attention particularly the elite class which has strong influence on the whole community perception and attitude.

NGOs and INGOs played an important role in assisting the local administration and state in relief efforts. A well planned and sound linkage between the communities and government line agencies and organizations should be established, so the gap between them can be bridged. A sound and well-coordinated mechanism should exist at federal and provincial government’s level to involve NGOs and INGOs in natural disaster management immediately.

Study revealed that the conflicts and disputes on land resources right after a hit of flood, were mostly resolved by the people themselves. There was a system of jirga which was responsible for the conflict resolution. Police and Land revenue department should work efficiently in the area to minimize the incidents of conflicts on land resources.

# CHAPTER 6

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**ANNEXURE**

**COMSATS Institute of Information Technology**

**Department Of Development Studies**

**Interview Questionnaire Guide for Research study**

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| **Information for the respondent:** We are conducting a research study on **assessing the flood induced conflicts on the agricultural land resources. A case study of Balakot.** We would like to ask you some questions regarding the objectives of this study.The survey usually takes 20 to 30 minutes to complete. Any information that you provide will be kept strictly confidential and will be used for research purpose only. This is voluntary and you can choose not to answer any or all of the questions if you want. However, we hope that you will participate since we value your views. Do you have any questions? May we begin now? |
| **a-**Date (day/month) │\_\_\_\_││\_\_\_\_│/ │\_\_\_\_││\_\_\_\_│ / │\_\_\_\_││\_\_\_\_││\_\_\_\_││\_\_\_\_│ **b**-Setting \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**c-** Setting\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**d-**Union Council\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **e-** City/village name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **f-**Enumerator names : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ **g**- Respondent name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **h** -Gender of respondent: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**i** =Cell phone: │\_│\_│\_│\_│\_│\_│\_│\_│\_│\_│\_│**j-** Relation of the respondent to the head of household? (chose one option from below) │\_\_\_\_│1= head of household; 2 = spouse, 3=parents or parents-in-law, 4= brother / sister or in-law, 5 = daughter / son,6=others, specify:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature enumerator: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature Supervisor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Section I – HOUSEHOLD COMPOSITION**  |
| **1** | What is the gender of the head of household? *(Choose one option)* | **1**= Male , **2** = Female |  |
| **2** | Do you have your own house? (**1** = Yes, **0** = No) |  |
| **3** | What is the type of your house? (**1** = kachha, **2** = iron roof, **3** = cemented) |  |
| **4** | What is the number of actual HH members? *(write number) (married children excluded)* |  |

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| **SENSITIVITY** |

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| **EXPOSURE TO HAZARD** |
|  | **Hazard** | **Exposure****(0** = No **, 1**= Yes**)** | **Extent of Exposure** |
| **5** | Earthquake |  |  |
| **6** | Flood |  |  |
| **7** | Conflict |  |  |
| **8** | Climate related land or mud slide |  |  |
| **9** | Other\_\_\_\_\_\_\_\_\_\_ |  |  |

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|  **HAZARDS AND THEIR IMPACTS** |

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|  | **Hazards** | **Which of the following climate events or other bad events has your household experienced in the past 30 years? (Check all that apply)** | **A: How would you rate the frequency   of this occurrence? 3= high,****2 = medium, 1= low** | **B: How would you rate the severity of this hazard? 3= high,** **2 = medium,** **1= low** | **C: How would you rate the degree of negative impact on your household   by this hazard?** **3 = high,****2 = medium****1 = low** | **D: How would you rate the difficulty of coping with   this hazard, for your household?   3 = high,****2 = medium,****1 = low** | **Total vulnerability rating   (sum of columns A through D)** |
| **10** | Earthquake |  |  |  |  |  |  |
| **11** | Flood |  |  |  |  |  |  |
| **12** | Conflict |  |  |  |  |  |  |
| **13** | Climate related land or mud slide |  |  |  |  |  |  |
| **14** | Other\_\_\_\_\_\_\_\_\_\_\_ |  |  |  |  |  |  |

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| **Percentage of community’s dependence on resources (Total % of household use & % sale (income generation) should be equal to 100%)** |
|  | **Resource Name** | % household use | % sale (income generation) |
| **15** | Agriculture |  |  |
| **16** | Livestock/Poultry  |  |  |
| **17** | Farming (Orchards) |  |  |
| **18** | Other\_\_\_\_\_\_\_\_\_\_\_ |  |  |

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| **FLOODS AND THEIR IMPACTS ON SOCIAL LIFE** |

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| **19** | Do you feel the pattern of weather is generally changing? |  |
| **20** | Have your family faced human losses because of floods?  |  |
| **21** | If yes, then how many people died in your household? (because of floods) |  |
| **22** | Have you been forced to leave your home due to flood? |  |
| **23** | What is your understanding about the word ‘vulnerability’? |  |
| **24** | How Flood Effect the land Resource in your area? |  |
| **25** | On average how far is your land from the catchment area? |  |
| **26** | What is the frequency of flooding in your area? |  |
| **27** | What are the visible destructions of flooding? (e.g. spurs, stones) |  |
| **28** | What is the percentage of people in your community who have land on the catchment/flooding area? |  |
| **29** | On average how much land people have? |  |

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| **DAMAGES TO ASSETS DUE TO FLOODS** |
|  | **Assets** | **Extent of Damage** |
| **30** | Home |  |
| **31** | Automobile/ Motorbike |  |
| **32** | Business |  |
| **33** | Land/Agriculture |  |
| **34** | Farm machinery (tractor, peter engine, thresher machine) |  |
| **35** | Livestock |  |
| **36** | Home appliances (TV, refrigerator etc.) |  |
| **37** | Others\_\_\_\_\_\_\_ |  |

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| **FLOOD CONTROL MEASURES** |

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| **FLOODS**  |
|  | **Variables** | **Practiced****(0** = No **, 1**= Yes**)** | **Effectiveness** |
| **38** | Sand Bags |  |  |
| **39** | Afforestation or Reforestation |  |  |
| **40** | Retaining Wall |  |  |
| **41** | Awareness/ Training and education |  |  |
| **42** | Spurs |  |  |
| **43** | flood protection irrigation channels |  |  |
| **44** | Coordination between Federal and Provincial Agencies and NGOs |  |  |
| **45** | Other\_\_\_\_\_\_\_\_\_\_ |  |  |

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| **SECTION V - ADAPTATIVE CAPACITY**  |

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| **46** | Has your property/Land ever been flooded? |  |
| **47** | What has been the cause of flooding to your property/Land? |  |
| **48** | What action, if any, have you taken, to be ready to minimize the impact of flooding incidents, on you and others within your community? |  |
| **49** | Is there anything preventing you from taking action to minimize the impact of flooding incidents on you and others within your community? |  |
| **50** | What action, if any, has your community taken, as a group, to be ready to minimize the impact of flooding incidents on you and others within your community? |  |
| **51** | Do you think your community has the necessary information and/or resources to be ready for flooding? |  |
| **52** | If not, what additional information and/or resources do you feel your community needs? |  |
| **53** | What methods of warning your community, of the risk of a flood, would you suggest be appropriate and/or effective? |  |
| **54** | What more do you think your community, as a group of individuals, could do, to minimize the impact of flooding incidents on you and others within your community? |  |
| **55** | Are there any other comments you would like to make in relation to flooding matters? |  |

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| **FLOOD INDUCED CONFLICTS** |
| **56** | What types of conflicts generally arise after floods? |  |
| **57** | Who is responsible for the land resource management? |  |
| **58** | Who is most affected in the conflicts? |  |
| **59** | What is the role of land revenue department in settlement of conflicts? (Patwar khana) |  |
| **60** | How people redistribute their lands after the removal of land boundaries by floods? |  |
| **61** | What kind of conflicts usually emerge right after a hit of flood, in your community? |  |
| **61** | Who are involved in conflicts? |  |
| **62** | Have you heard about any armed combat mainly because of the land resource? |  |
| **63** | Who is most susceptible for loss after floods? |  |
| **64** | Who is responsible to resolve the conflicts? |  |
| **65** | What are the precautionary limits people follow to stop the continuous degradation of land resources? |  |
| **66** | Are there any other comments you would like to make in relation to flooding matters? |  |
| **67** | What are the coping strategies to reduce the conflicts? |  |
| **68** | Is there any village organization which actively resolves the frequent conflicts?What is the mechanism of members or Jirga to cope up with conflict? |  |
| **69** | Do people have coordination with the Police department? |  |
| **70** | Do people have coordination with the Land revenue department in order to reduce the risk of conflict? |  |

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| **ABILITY OF COMMUNITY TO REORGANIZE** |
| **71** | **Perception/Idea** |  |
| **72** | Do your community has plans in place to deal with climate related events/hazards? |  |
| **73** | Is your community able to coordinate activities and has skilled people to respond quickly to the impacts of a natural event/hazard? |  |
| **74** | Is your community able to reorganize to respond to a new situation? |  |
| **75** | Do your community members work well with each other (community participation)? |  |
| **76** | Is your community able to access outside support when needed? |  |

**Enumerator’s observations;**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**