**Exploring the linkages between indigenous knowledge and reduction of food vulnerability in district Charsadda KP, Pakistan**

**By**

**M. Ali and Dr. Abdurrazaq**

**Abstract**

This study investigates status of indigenous knowledge in disaster management to get a unified and dynamic picture of how local knowledge and flood vulnerability influence each other. The study area is rural. There are two spells of rainy season in a year in the study area. The winter rainfall occurs due to western disturbances shows a high record. The highest summer rainfall is in the month of August. The study area faces the problem of flash floods. Heavy rainfalls and tortuous course of the drain are the major natural causes of flood. Floods are the potential hazard of the area. They highly affect the agriculture sector and physical infrastructure in the area. People are having capability to predict and handle disaster with their indigenous knowledge. Flood hazard hinders the socio-economic development of the study area. The present study is carried out in the district Charsadda KPK, Pakistan. Two village councils are selected namely Sardaryab and Mirzagan and two villages from each village council for study due to rapid frequency of the flood in these area. A total number of 48 respondents were selected using multistage sampling plan technique. Both qualitative and quantitative data was collected for the study. Semi-Structured questionnaire was designed for quantitative data collection and focused group discussion also conducted for qualitative the data. A lot of human lives can save from disasters if the focus is on proactive strategies not reactive strategies, Government responds is very low and people have to respond themselves on the occurrence of disaster because their own knowledge is cost effective and easy to understand.

**Chapter 1**

**Introduction**

 **1.1 Background of the study**

The tropical typical weather and uneven landforms, including high population density, poverty, illiteracy and lack of satisfactory infrastructure, rates Islamic Republic of Pakistan as one of the foremost vulnerable developing countries to suffer fairly often from varied natural disasters , particularly drought, flood, cyclone, earthquake, landslide, eruption, etc. that strike inflicting a devastating impact on human life, economy and atmosphere. Recent estimates shows that regarding 29,210 thousand individuals are affected in Islamic Republic of Pakistan from 1991 to 2014 owing to natural disasters and 83,4000 have died throughout this era and damages in USA $ 3573.053 million (EM-DAT, 2014). In Islamic Republic of Pakistan 8,887 natural disasters reportable from 1980 to 2014 out of that 47 % are associated with floods and rains. The tolls are 3,541 persons each year by the disasters from the year 1990-2014. Islamic Republic of Pakistan is hierarchal tenth among high affected countries for deaths as a result of weather connected events like floods, rains, heat waves etc. (Disaster Mortality, 2015).

The province of Khyber Pakhtunkhwa (KPK) is smallest province in term of geographical region regarding 9.4% of the full space of Islamic Republic of Pakistan, placed on the bankside of watercourse Indus. There are two major watercourse systems existed in KP one is watercourse Indus and second watercourse that floats from Afghanistan. Throughout the monsoon downfall the riverine floods occur in these rivers and someday flash floods happens leading to severe losses of the population residing these areas. The reason behind these flash floods is targeted rainfalls within the watershed watercourse Indus swat and capital of Afghanistan. 3.8 million of the population are affected throughout the floods of 2010 and killed 1070 folks in recent history (GoKPK, 2012).

Floods have forever existed among the region. However, over the last few years their physical, social and economic impact has hyperbolic many folds. several studies ar taken to grasp flood vulnerability among the region. These studies ranged from studies of technical causes of physical vulnerability to those of relationship to sustenance, gender etc. Needleless to say, the agricultural communities among the region have a strong vernacular tradition as a results of that they have targeted an enormous wealth of endemic data and skills (Oludare hakeem Adedeji, 2012).

Indigenous knowledge is outlined as “It refers to the full system, as well as ideas, beliefs, and perception, and also the method whereby it's no inheritable, augmented, stored, and transmitted” (Riegl, B., 2003 p. 433-446). In ancient societies, folks learned from their atmosphere, from peers and communities wherever they were accustomed live and such data varies from space to space society-to-society, community to community and atmosphere to atmosphere. (Mwaura, 2008)

**1.2 Purpose of the study**

Flood has forever existed at intervals the region. However, over the previous couple of years their physical, social and economic impact has hyperbolic many folds. Several studies are taken to understand flood vulnerability inside the region. These studies ranged from studies of technical causes of physical vulnerability to those of relationship to sustenance, gender etc. Needleless to say, the agricultural communities among the region have a strong vernacular tradition as a results of that they have focused an enormous wealth of indigenous information and skills (Oludare doctor Adedeji, 2012).

Flood has been the cause of tremendous loss of life and property in each urban and rural areas. In developing countries, their impact is extremely severe on rural communities due to many social and economic factors that have contributed towards their physical vulnerability. The current study deals with the problem of vulnerability to disasters generally in that context, it'll just check up on flood as one variety of natural disasters and highlights its linkages with indigenous knowledge of local people in reducing their vulnerability

The aim of the study is to explore the linkages between endemic information and reduction of flood vulnerability on native level in district Charsadda of KPK. The study conjointly plans to uncover the local knowledge in handling and predicting the occurrences of flood in the study area.

**1.3 Scope of the study**

The study has been inductive and it's developed over time in terms of main focus and problems at hand. First start my study with associate aim of local information, which is embodied in designed heritage. Eventually discover that substantial information has already got lost. No matter exists is generally to be found in ancient buildings and townscape, native and traditional institutional frameworks and land relations. On intensive study of literature on disaster topics, work out that vulnerability and capability is that the two closely connected key words and local knowledge in truth falls inside the reach of capacities of the individuals to mitigate the impact of disasters prepare for them and additionally recover within the aftermath. This somehow enlarged the scope of local information.

**1.4 Limitations of the study**

Start my thesis with such a perspective, hoping to discover Local knowledge, terribly before long completed that such information is incredibly tough to re-discover, as a result of the subsequent reasons:

1. This information of building method is thus dynamic that it's hard to limit this information temporally, as joy to at least one amount in time.

2. The dynamical context is additionally one issue as a result of that one might notice it tough to justify one equitably information over another.

3. It is discover that almost all of the information has already disappeared, a minimum of from the people minds. Most of it's not living as clearly perceived skills for disaster mitigation.

**1.5 Objectives**

1. To explore the physical vulnerability of the people from flood in study area
2. To gather the indigenous knowledge for predicting of flood
3. To identify linkages between indigenous knowledge and reduction of flood vulnerability

**1.6 Layout of the thesis**

**Chapter 1** Deals with the introduction of the research topic

**Chapter 2**

 Deal with conceptual framework of the topic which describes the useful terms and their significance.

**Chapter 3**

 Deal with extensive literature on disaster management especially flood through indigenous knowledge.

**Chapter 4**

 Deal with methods use for data collection and brief overview of the study area.

**Chapter 5**

 Deal with result and discussions that were find in the study area during research process

**Chapter 6**

 Deal with conclusion of the thesis

**Chapter 2**

**Conceptual Framework**

This chapter deals with conceptualization of theoretical framework and highlights terms related to disaster management through indigenous knowledge. The purpose is to relate local knowledge in disaster management as an important factor, because rural communities mostly trust on their own wisdom experience that they learned through their past i.e. Local knowledge. This chapter gives conceptual clearance of Indigenous knowledge, disaster, disaster management, with theoretical discussion on vulnerability of the local communities.

**2.1 Defining indigenous knowledge**

Knowledge may be sub classified in to 2 major selections i.e. explicit knowledge and tacit Knowledge. Explicit knowledge is articulated data, expressed and recorded as words, numbers, codes, mathematical and scientific formulae, and musical notations. Explicit knowledge is simple to speak, store, and distribute and is that the data found in books, on the web, and different visual and oral suggests that. Whereas Tacit knowledge describing data is Unwritten, unspoken, and hidden huge depot of data command by much each traditional person, supported his or her emotions, experiences, insights, intuition, observations and internalized info (Fodor, 1981).

Indigenous knowledge is additionally called “traditional knowledge” and “Local knowledge.” native data may be a narrower term, for this, it's necessary for communities having all the innate members. Whereas these days, owing to modernization varied communities reformulated by new migrated members and onward, a few communities existed with innate members, so easy analysis the term “local knowledge” is victimization currently by varied researchers. The term indigenous knowledge includes those members conjointly World Health Organization be a part of recent communities when migration from alternative elements, tolerate them and adopt their cultural values. The term “traditional knowledge” typically used beside native knowledge in an exceedingly broader sense, well it may occupy a broader space than a “local knowledge” (Langill, 1999).

**2.2 Disaster Management**

The United Nations defines a disaster as a significant disruption of the functioning of a community or a society. Disasters involve widespread human, material, economic or environmental impacts, that exceed the power of the affected community or society to cope victimization its own resources (Therapy, 2014).

The NGO and Red Crescent societies outline disaster management because the organization and management of resources and responsibilities for coping with all humanitarian aspects of emergencies, above all readiness, response and recovery so as to minimize the impact of disasters (IBID).

There is no country that's immune from disaster, although vulnerability to disaster varies. There square measure four main styles of disaster. Natural disasters: together with floods, hurricanes, earthquakes and volcano eruptions that have immediate impacts on human health and secondary impacts inflicting any death and full of (for example) floods, landslides, fires, tsunamis (IBID).

Any disaster will interrupt essential services, like health care, electricity, water, sewage/garbage removal, transportation and communications. The interruption will seriously have an effect on the health, social and economic networks of native communities and countries. Disasters have a significant and durable impact on individuals long when the immediate result has been alleviated. Poorly planned relief activities will have a big negative impact not solely on the disaster victims however conjointly on donors and relief agencies. Therefore it's vital that physical therapists be a part of established programs instead of making attempt individual efforts.

**2.2.1 Disaster prevention**

These are activities designed to provide permanent protection from disasters. Not all disasters, significantly natural disasters will be prevented, However the chance of loss of life and injury will be mitigated with smart evacuation plans, environmental designing and style standards. In Jan 2005, 168 Governments adopted a 10-year world arrange for natural disaster risk reduction referred to as the Hyogo Framework. It offers guiding principles, priorities for action, and sensible suggests that for achieving disaster resilience for vulnerable communities. (IBID)

**2.2.2 Disaster preparedness**

These activities are designed to reduce loss of life and injury – for instance by removing folks and property from a vulnerable location and by facilitating timely and effective rescue, relief and rehabilitation. State is that the main manner of reducing the impact of disasters. Community-based state and management ought to be a high priority in physiotherapy applies management (IBID).

**2.2.3 Disaster Relief**

This is a coordinated multi-agency response to scale back the impact of a disaster and its long-run results. Relief activities embrace rescue, relocation, providing food and water, preventing sickness and incapacity, repairing important services like telecommunications and transport, providing temporary shelter and emergency health care (IBID).

**2.2.4 Disaster recovery**

Once emergency wants are met and therefore the initial crisis is over, the folks affected and therefore the communities that support them ar still vulnerable. Recovery activities embody reconstruction infrastructure, health care and rehabilitation. These ought to mix with development activities, like building human resources for health and developing policies and practices to avoid similar things in future (IBID).

**2.3 Relationship between indigenous knowledge and disaster management**

The relationship between indigenous knowledge and natural disasters has developed a lot of interest in recent years. The new discussions around indigenous knowledge highlight its potential to boost disaster risk reduction policies through integration into disaster education and early warning systems. Throughout disaster risk reduction literature, four primary arguments are created for the worth of indigenous knowledge (Noralene Uy, 2008).

First, varied specific native practices and methods embedded within the information that prove valuable against natural disasters, are often transferred and adapted to different communities in similar situations. Second, associate incorporation of indigenous information in existing practices and policies encourages the participation of the affected community and empowers its members to require the leading role altogether disaster risk reduction activities. Third, the information contained in indigenous knowledge will facilitate improve project implementation by providing valuable information concerning the native context. Finally, the non-formal suggests that by that autochthonous information is disseminated provides a fortunate model for different education on disaster risk reduction. Whereas this publication focuses on collection specific autochthonous ways and mechanisms which may be transferred and custom-made to different communities, the teachings learned emphasize all of those four areas (Noralene Uy, 2008).

There is associate plain gap between the progress of scientiﬁc knowledge and also the increasing frequency of disasters. This, however, doesn't mean that apply of disaster risk reduction (DRR) is failing there are various samples of endeavors that have junction rectifier to signiﬁcant enhancements within the ability of native communities to face natural and different hazards (Wisner et al. 2004). Collaboration between stakeholders is crucial for property DRR. Native communities, government authorities, non-government organizations (NGOs), scientists, college communities and religion teams all have a task to play. Communities (including citizen-based organizations, lecturers and pupils, and religion groups) ar a very important resource and represent the frontline of action since they're most severely laid low with, and also the ﬁrst to reply to disaster (Delica-Willison 2004).

Achieving such a mixing of data and action in DRR, however, proves difﬁcult. several scientists and government ofﬁcial typically underestimate the worth of native information and community activities (Mercer, 2010; Shaw, 2009). Similarly, native communities seldom have a close understanding of scientiﬁc information and organization staff typically claim that science is disconnected from reality. Such a spot between stakeholders, in terms of actions and information, is taken into account a significant obstacle for reducing the danger of disasters in a very property manner and on an outsized scale (Wisner 1995).

To bridge this gap, Mercer (2009) provides a helpful four-step method framework. First, it needs associate initial engagement with the community to create conﬁdence and trust, and to know people’s goals. Second, it involves associate assessment of the vulnerability of the community and its drivers, which can be internal or external. Third, the framework focuses on potential ways to cut back people’s vulnerability within the face of natural hazards. These ways could also be exogenous or endogenous, and suppose a mix of scientiﬁc and native information. Fourth and ﬁnally, it provides house for each discussion and integration of antecedently identiﬁed ways so as to integrate bottom-up and top-down actions for reducing the danger of disasters. Initial applications of this framework to marginalized communities in island New Guinea tried triple-crown (Mercer et al. 2009)

**2.4 Disaster management cycle**

Various organizations, researchers, and practitioners elaborate disaster management cycle in line with the requirements of their practicum or subjectiveness. However, the theme of the cycle is same altogether i.e. pre-disaster activities, during-disaster and after. Numerous stages of disaster management cycle elaborate here following various references over it (Commonwealth, 2010)

**2.4.1 Pre-disaster**

Pre-disaster activities discuss with activities that perform before the prevalence of disaster i.e. by anticipating natural hazards preventive measures should adopted. It includes 2 main sets of activities i.e. prevention and mitigation

i. Prevention: Prevention is to confirm that human activity or natural phenomena don't lead to disaster or emergency (Commonwealth, 2010).

ii. Mitigation: Mitigation means that to cut back the severity of the human and material injury caused by the disaster (IBID).

iii. Preparedness: Preparedness contains sets of activities that perform throughout the disaster. It consists of activities designed to reduce loss of life and injury, organize the suspension of individuals and property from vulnerable location (Kumar, 2008).

**2.4.2 Throughout Disaster**

Pre-disaster activities confer with activities that performed at the prevalence of disaster that embrace early response, rescue, and relief.

i. Response: This section includes actions ought to perform straightaway throughout disasters i.e. to avoid wasting lives, stop property injury and to preserve the atmosphere. The amount of those activities might depend upon the severity of the disaster; it's going to be for 6 months or for a year (Commonwealth, 2010).

ii. Rescue: The imperative support to disaster victims among 1st three days of disaster occurrence; it includes the availability of basic desires solely i.e. Food, water, sorted temporary shelter and saving lives.

iii. Relief: The short term support to disaster victims to come to normal life i.e. Building suspension bridges for broken bridges, providing individual temporary shelters, launching medical camps, provision of hygiene facilities, provision of advanced basic facilities.

**2.4.3 Post-Disaster**

It includes activities to confirm complete come back of traditional life with no sign of disaster prevalence (David, 2004). It provides semi-permanent recovery through 2 main steps i.e. Rehabilitation and Reconstruction (Kumar, 2008).

i. Rehabilitation: It includes operations and choices taken once a disaster with a read to restoring traditional life (IBID).

ii. Reconstruction: It includes actions to re-establish a community once an amount of rehabilitation. Actions would come with constructions of permanent homes to supply shelter, full permanent restoration of services, constructions of permanent roads and broken bridges, and complete commencement of pre-disaster state (IBID).

**2.5 Concept of Vulnerability:**

The IPCC Third Assessment Report (TAR) describes vulnerability as “The degree to that a system is prone to, or unable to address, adverse effects of global climate change, together with climate variability and extremes. Vulnerability could be operate of the character, magnitude, and rate of climate variation to that a system is exposed, its sensitivity, and its adaptive capability.” (IPCC, 2001, p. 995)

Set of prevailing conditions that adversely have an effect on the community’s ability to stop, mitigate, steel oneself against or reply to a hazard. Absence of cope ways is additionally a neighborhood of vulnerability and must be thought of in vulnerability assessment e.g. living in hazard prone locations like just about a ocean or watercourse, on top of the fault lines, at the bottom of a mountain etc. (Studies, 2010).

**2.5.1 Physical Vulnerability**

The physical vulnerability of a locality additionally depends on its geographic proximity to the supply and origin of the disasters e.g. if a locality lies close to the coast lines, fault lines, unstable hills etc. it makes the realm additional at risk of disasters as compared to a locality that's remote from the origin of the disaster. Physical vulnerability includes the issue in access to water resources, means that of communications, hospitals, police stations, hearth brigades, roads, bridges and exits of a building or/an space, just in case of disasters. Moreover, the shortage of correct designing and implementation in construction of residential and industrial buildings leads to buildings that are weaker and vulnerable in earthquakes, floods, landslides and different hazards (IBID).

**2.5.2 Economic Vulnerability**

Economic vulnerability of a community may be assessed by determinant however varied its sources of financial gain are, the benefit of access and management over suggests that of production (e.g. farmland, livestock, irrigation, capital etc.), adequacy of economic fall back mechanisms and also the handiness of natural resources within the space (IBID).

**2.5.3 Social Vulnerability**

A socially vulnerable community has weak family structures, lack of leadership for higher cognitive process and conflict resolution, unequal participation in higher cognitive process, weak or no community organizations, and also the one during which folks ar discriminated on racial, ethnic, linguistic or spiritual basis. Alternative social factors like culture, tradition, religion, local norms and values, economic normal, and political responsibility additionally play a significant role determinant the social vulnerability of a community

Social vulnerability to natural phenomena is greatest among the poorest folks in developing countries because of a scarcity of knowledge and resources with that to require the acceptable measures. Among this cluster, children, girls and also the older are thought of to be the foremost vulnerable. to cut back social vulnerability, all of the on top of factors should be addressed however this needs information and understanding of the native conditions, which might – in most cases – solely be provided by native actors (IBID).

**2.5.4 Attitudinal Vulnerability**

Community that has negative perspective towards modification and lacks initiative in life resultantly become additional and additional captivated with external support. They cannot act severally. Their sources of living don't have selection, lacks entrepreneurship and don't possess the construct of collectivism. This brings regarding disagreement and individualism within the society. Thus, they become victims of conflicts, despair and pessimism that reduces their capability of dealing with a disaster (IBID).

**Chapter 3**

**Literature Review**

This chapter deals with an extensive review of literature on disaster management and the relation of indigenous knowledge in managing practices. Secondly it deals with reviewing flood and their destruction on human social and economic endeavors.

**3.1 Disaster Management and indigenous Knowledge**

Vivian Camacho, Quechua from Bolivia, signposts that we have a tendency to as endemic peoples ought to continue caring for the natural seeds, seeds that guard life info therefore we will have sensible food, genetically changed organisms are poison to life, they poison plants, soil, water with harmful agro used for its cultivation. Rediscovering and applying our ancestral sorts of organic production harmonized with Mother Earth will once more regenerate the living tissue of the disabled soil. Additionally to respecting every cycle once more, hospitable the sun and therefore the seasons with songs, music and rituals, as we have invariably done, as a result of they hear North American nation, they additionally grieve, and rejoice once we convey them. Mother Earth is happy after we discuss with her through our sacred fires, our ancestors celebrate that life remains sacred to our folks, therefore it's necessary to strengthen this endogenous knowledge of each place, of each culture that is aware of life inside life, energy inside a bigger field of energy. for good terminate the employment of agro toxics as a result of they contaminate the plants, fruits and vegetables we have a tendency to eat, still on poison and kill as well as underground aquifers, and kill the small species that in balance act on the skin of soil to form the desired feeding electronic equipment between land and plants, still as pollution in human bodies (Julián Burgos, 2011).

Indigenous peoples, AN calculable 370 million gift in some ninety countries throughout the globe, face systematic discrimination and exclusion from political and economic power and still be over-represented among the poorest, illiterate. Indigenous peoples are usually homeless of their ancestral lands and bereft of their resources for survival, each physical and cultural, additional weakening their capability to agitate hazards, each natural and manmade (John C. Scott, 2013).

Due to illiteracy and stupidity, several rural folks of countries couldn't perceive the signal system. Poor access to info and services is reinforcing by social systems. Therefore a mixture of physical, economic and social factors lead to the foremost vulnerable individuals being the smallest amount forewarned and ready. Whereas documenting the older people’s disaster experiences, Action Aid in 2000, incontestible data of native warning indicators supported animal behavior or phenomenon. This knowledge not continuously passed on to the younger generations, and unnoticed as “unscientific.” The research worker suggests in his study that, there's a necessity to analysis, monitor native data to work out specifically which of them area unit reliable, and to what extent they will indicate the severity of an imminent disaster. Howell 2003 emphasize that an identification of indicators driving out from the natural behavior and mix with native data will validate and evidence warning signals (Howell, 2003).

An illustrious organization ICIMOD worked on local knowledge of the mountainous region of Himalaya underneath the project of disaster preparation. Under this project, the main target was solely on info gift relating to native data and knowledge. They solely gave summary of indigenous knowledge employed in all phases of disaster management from mitigation measures to rehabilitation. Project didn't directly involve the native folks and their knowledge and data in preparation, planning, policies, and implementation. Though ICIMOD study was sensitive towards use of native data of communities living within the space for disaster mitigation, however the study didn't cover properly the employment of native data in mitigation and preparation for disasters. observe that was inaugurated by Muslims and later adopted by numerous Hindus, particularly in Asian country, which involves the seclusion of ladies from public observation by suggests that of concealing covering (including the veil) and by the employment of high-walled enclosures, screens, and curtains inside the house (Kayani, 2009)

Therefore, it may be orientating that, local knowledge is helpful to empower distant communities towards disaster management. NCDM (National Center for Disaster Management) in conjunction with Oxfam-Nepal additionally highlighted and reviewed the entomb relationship between the employment of native information for estimating seemingly damages of future disasters, their focus was on victimization native knowledge in disaster cope methods at national level policies. Moreover, by involving such knowledge country get fast and immediate response as a result of these communities area unit 1st victim of any disaster (Dekens, 2007).

Australian researchers additionally acknowledge the importance of local information. Australian National University, ready a journal “Australian Journal of Emergency management” during which they highlighted the importance of native data for disaster management. They termed native data as “Traditional Ecological Knowledge” (TEK), this information developed by ecological experiences. The report counseled that native data can be effectively use to address a state of affairs that outsiders understand to be threatening, and customarily provides rather more detail of understanding of native environments. It are often valuable in predicting the threats display by hazards (Young, 1997).

In Africa, native communities had well-developed ancient indigenous data systems for environmental management and cope methods, creating them a lot of resilient to environmental amendment. This information had, and still has, a high degree of satisfactoriness amongst the bulk of populations during which it's been preserved. These communities will simply establish with this information and it facilitates their understanding of bound trendy scientific ideas for environmental management as well as disaster interference, preparation, response and mitigation. Indigenous data could be a precious national resource which will facilitate the method of disaster interference, preparation and response in cost-efficient, democratic and property ways that. Therefore a mix of approaches and ways from science and technology and from content opens avenues towards higher disaster interference, preparation, response and mitigation (Kamara, 2013).

**3.1.1 Use of indigenous knowledge in disaster management**

Indigenous peoples round the world have used their traditional knowledge to organize for, deal with and survive disasters. Their ways and practices have originated at intervals their communities and are maintained and passed down over generations (John C. Scott, 2013). Till recently, policy manufacturers have for the most part neglected this immense body of data, in favor of Western science and technology-based ways of disaster risk reduction and response. Today, however, several of those ancient practices square measure thought-about necessary and necessary contributions to the conservation of variety and environmental property. At constant time, this data is beneath constant threat of being scoured, lost or illegal, factors contributory to bigger community vulnerability as incontestable by the increasing levels of loss stemming from natural disasters in recent decades (John C. Scott, 2013)

Local capability, practice, information and tradition have helped communities that have developed a detailed relevancy their natural atmosphere deal with hazards and thrive for millennia in extremely at-risk areas. However, in several cases, these practices, otherwise extremely property, are lost as a result of social, political or economic modification, resulting in exaggerated vulnerability. Taking under consideration the benefits and challenges of this method, which can be mentioned later, there's a desire to adequately analysis and document ancient risk reduction and mitigation practices so as to grasp however they will be incorporated into thought local people and national designing. Through participative assessments (of each capacities and vulnerabilities) and political processes geared toward combining native data with scientific ways, communities should be sceptered to require advantage of their own content to develop integrated ways that square measure institutionalized and maybe even transferred to similar contexts elsewhere.(C. Scott, 2013).

Local communities had well-developed ancient autochthonic data systems for environmental management and cope ways, creating them additional resilient to environmental modification. This data had, and still has, a high degree of acceptableness amongst the bulk of populations within which it's been preserved. These communities will simply determine with this data and it facilitates their understanding of sure fashionable scientific ideas for environmental management together with disaster interference, readiness, response and mitigation (Kamara, 2013).

Indigenous information could be a precious national resource which will facilitate the method of disaster interference, readiness and response in cost-efficient, democratic and property ways in which. Therefore a mix of approaches and ways from science and technology and from content opens avenues towards higher disaster interference, readiness, response and mitigation globally. There's increasing acknowledgement of the connectedness of autochthonic data as a useful and underused data reservoir that presents developing countries, notably Africa, with a strong quality in environmental conservation and natural disaster management. Specifically, from past times, natural disaster management in Africa has been deeply nonmoving in native communities that apply and use autochthonic data to master and monitor climate and different natural systems and establish early warning indicators for his or her own benefit and future generations (Kamara, 2013).

**3.2 Indigenous knowledge and disaster management in Asia**

After the 2004 Indian Ocean tidal wave, two success stories emerged, conveyance new interest to the construct of indigenous knowledge. The Simeulueans living off the coast of island, country and therefore the Moken, living within the Surin Islands off the coast of Asian country and Asian country each used data passed on orally from their ancestors to survive the devastating tidal wave. Whereas these two cases scarf the limelight in recent years, there are several less conspicuous samples of communities United Nations agency have additionally used indigenous knowledge to survive fateful events and address tough environmental conditions. These communities’ use of indigenous data to cut back risk, cope and survive recent natural disasters provides several lessons for practitioners and policy manufacturers on the worth of native information for disaster risk reduction (Noralene Uy, 2008).

Indigenous data refers to the ways and practices developed by a bunch of individuals from a complicated understanding of the native surrounding, that has shaped over various generations of habitation contains many alternative necessary characteristics that distinguish it from alternative sorts of knowledge. These embody originating inside the community, maintaining a non-formal suggests that of dissemination, together owned, developed over many generations and subject to adaptation, and imbedded during a community’s approach of life as a way of survival (Noralene Uy, 2008)

**3.3 Flood management through indigenous knowledge in Pakistan**

The communities in Pakistan have conjointly developed many different adaptation methods so as to extend their resilience to flash floods. as an example, locals have learned to interpret early signs of probably damaging flash floods (Dekens, 2007) . Such signs also the color, smell and behavior of mountain streams also as meteorologic forecast skills. In 2005, 106 homes were destroyed in Brep village as a result of a Glacial Lake Outburst Flood (GLOF).

Knowledge concerning flood preparation is transmitted orally through learning by doing, daily observation of their native surroundings, story-telling, and therefore the learning of bound practices over generations. The dissemination of this information happens at two levels: among community members (i.e., early warning Circular mud repository ‘chakka’, with uncommon “pigeon hole” style to stay valuable belongings throughout floods possible to intervene in disasters influence however folks are getting to answer the interventions of these actors (Dekens, 2007). Technical adaptation methods to floods embrace measures associated with house construction and protection.

In several societies supported oral tradition, past events, together with flood crises, are embedded in memory through storytelling, songs, poems, proverbs, attend activities and ceremonies, rituals then forth. as an example, historically, songs and poems area unit a vital a part of the Nepali and Terai culture. One such example is that the proverb: “the snake and therefore the watercourse don’t run straight”.

The shape of the watercourse will be compared to the movement of a snake pertaining to the character of the rivers within the study sites: the water channels area unit terribly unstable, taking new directions and dynamic the landscape on an everyday basis. a number of the songs focus entirely on floods, whereas different mention floods among other necessary problems the villagers face. In some cases, songs and proverbs become the repository (as very much like the relay) of past floods event and might facilitate stimulate people’s learning, memory and creativity (Komino, 2008).

Songs and proverbs additionally contribute to the transmission of flood-coping methods, produce public knowledge, and share a typical understanding of amendment associated with frequent and occasional flood events. Songs and proverbs may facilitate to create a way of community and commonness at intervals the village and/or at intervals the various teams affected. native singers or composers area unit key data carriers and alter agents WHO play a significant role at intervals the community in terms of building awareness. Some worships, sacrifices, and ceremonies facilitate the community to know and keep in mind past floods and relieve the anxiety associated with the threat of future disaster risks (IBID).

**3.4 Flood within the world**

World statistics mirror a rise within the pattern of disasters, starting from natural events like earthquakes, floods and cyclones, to disasters caused by human factors (‘manmade’) like oil spills, transport accidents, infrastructure collapses and large-scale population displacement as a result of conflict The impact of such disasters on the populations and therefore the material losses isn't in any respect similar (Le Arthur, 2007). Over ninety fifth of all disaster connected deaths occur in developing countries. Losses as a result of natural disasters are twenty times larger within the developing world than those in industrialized countries. This differential impact depicts that disasters mustn't be thought of as isolated events at all: they're presumably connected to the physical, social, political and economic surroundings within which they occur specifically, the probabilities of a disaster happening and therefore the impact of a disaster rely upon exposure to hazards and vulnerability of populations (IFRC, 2001).

Floods are among the foremost powerful forces on earth. Human societies worldwide have lived and died with floods from the terribly starting, spawning a distinguished role for floods among legends, religions, and history, impressed by such accounts, geologists, hydrologists, and historians have studied the role of floods on humanity and its supporting ecosystems, leading to new appreciation for the many-faceted role of floods in shaping our world. However the popularity of the necessary role of flooding in shaping our cultural and physical landscape additionally owes to accrued understanding of the variability of mechanisms that cause floods and the way the categories and magnitudes of floods will vary with time and house. The USGS has contributed to the current understanding through over a century of numerous analysis activities on several aspects of floods, as well as their causes, effects, and hazards. This Circular summarizes a aspect of this analysis by describing the causes and magnitudes of the world’s largest floods, as well as those measured and represented by trendy ways in historic times, still as floods of prehistoric times, that the sole records are those left by the floods themselves (Costa, 2004).

Two complimentary varieties of info are employed in this outline of the world’s largest floods. The primary may be a compilation of the world's largest known Quaternary floods. A number of these floods ar known solely from geological proof and resulted from special circumstances throughout the course of Earth’s history. Nonetheless, the records of such floods shed light-weight on the good diversity and scales of flood-producing mechanisms and their specific settings on earth and over time. The second supply of knowledge is historical measurements of the most important meteorologic floods on the most important watercourse basins within the world. These floods, that are additional among the realm of every day human expertise, give a background for discussing the earth science, climatologic, and physiographic settings of enormous earth science floods on a worldwide basis (Costa, 2004).

Frequently, in terribly long-standing series cluster of maximum events becomes evident which ends in fluctuations of statistical characteristics. Trend analyses on flood harm are rare, as a result of the rarity of comprehensive knowledge bases. However, the ever present perception is that flood damages are growing quick or perhaps dramatically. Pielke and Downton (2000) study the US national flood harm record of the National Weather Service for the amount 1903–1997. the overall annual flood harm, adjusted for inflation, grew in this amount with a mean annual rate of two.92%. Barredo (2009) compiles a statistic of economic damages of major floods in thirty one European countries for the amount 1970–2006, supported the general public databases NATHAN of Munich Re and EM-DAT of street cred (Centre of analysis on medicine of Disasters).

Fifteen out of twenty seven events occurred within the half of the study amount, and therefore the information clearly shows increasing losses. in an exceedingly additional step, each studies normalize flood harm to account for time-varying socio-economic factors. forward that the annual US growth (1.26%) is representative for the growth in flood-prone areas, forty third of the rise high harm will be attributed to growth. If it's assumed that the wealth in flood-prone areas grows at constant rate of the nation’s wealth (3.13%), then all of the rise high harm will be explained by the economic process. Similarly, Barredo (2009) normalizes the raw harm knowledge by considering inflation and changes in population and wealth. Further, inter-country worth variations are removed by adjusting the losses for buying power parity. Once the economic losses are normalized, a major trend isn't found. each studies conclude that the ascertained increase within the raw flood loss knowledge is usually driven by social factors, though Pielke and Downton (2000) conjointly notice indications that accrued precipitation is related to raised flood damages. Analyses flash- floods in district and attribute the rise within the variety of extraordinary flash-floods inflicting harm to infrastructure on rivers to the expansion of urban development and, hence, to increasing exposure. Alternative studies, partly supported less reliable knowledge or on additional qualitative measures (Llasat et al. 2008)

**3.5 Floods in Asia**

In the last decade of the twentieth century, floods killed 100,000 persons and affected over 1.4billion individuals round the world (Jonkman 2005). it's calculable that the annual value to the globe economy thanks to flooding is regarding 50–60 billion U.S.A. greenbacks. in line with a study by the international organisation (UN), floods claimed an average of 22,800 lives annually and caused an calculable injury of US$ 136 billion to the Asian economy. The losses incurred by developing countries area unit 5 times higher per unit of gross domestic product than those of made countries (IBID).

South Asia covers regarding 3.2% of the globe area and 100 percent of Asia, with over a population of over 1.46 billion accounting for twenty fifth of the globe population (Singh, 2008). South Asia includes eight countries, viz. Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka and homes regarding four-hundredth of the world’s poor. the key rivers of South Asia area unit the Indus, Ganges, river and therefore the Meghna. The stream originates in Pakistan and flows through Afghanistan. It's one in all the key tributaries of the Indus. The Indus and its tributaries flow south and west to empty into the Arabian Sea. The Ganges and therefore the river and their tributaries flow south and east to enter the Bay of geographic area. These rivers offer sustenance to over five hundred million individuals of the region, activity water for drinking, irrigation, hydropower generation, fisheries, and interior navigation, furthermore as for the upkeep of wetlands and diversity. However these rivers also are the supply of various forms of floods that adversely have an effect on the socioeconomic development of the region (Singh, 2008).

The climate of South Asia is dominated by the South-West monsoon, with important abstraction and temporal variations in precipitation and temperature throughout the region. The heaviest average annual precipitation of eleven, 873 millimeter has been recorded at Mawsynram, a tiny low city close to Shillong, within the Meghalaya Hills in Asian country (Bandyopadhyay 2006). From the east to the west of the region, the precipitation decreases, with some areas having with but four hundred millimeter of precipitation annually. Given the varied topography, geographical location and environmental condition from North to South and East to West, floods of varied sorts occur together with flash floods, junk flow, landslides, and glacial lake outburst floods, etc. Most of the countries during this region have an oversized rural population passionate about agriculture and with high population density. Regarding twenty eighth of the full population is urban. The economic process is comparatively low compared to it of alternative regions of the globe. The per capita financial gain varies from a minimum of US$ 250 in Asian nation to US$ 2,390 within the Maldives. Compared to the event indicators of alternative regions, South Asia occupies a grim image. Besides the prevailing physical and environmental factors in South Asia, these poor social and economic conditions more increase the vulnerability to differing types of disasters like floods, landslides, earthquakes, and others. The key development indicators of South Asia that contribute to inflated vulnerability. Disaster information area unit important for distinctive trends within the impacts of disaster and trailing relationships between development and disaster risk (IFRCRCS 2005). For any flood event, loss of lives, total variety of individuals affected furthermore because the economic injury is thought-about as indicators for assessing flood impacts.

**3.5.1 Total range of Flood Disasters in Asia**

The reportable range of flood disasters has dramatically increased over the last three decades an identical increasing trend has conjointly been determined for Europe (Hoyois and Guha 2003) furthermore as globally (Jonkman 2005). To some extent, this increase flooding disasters may be attributed to improved data communication technology (ICT), resulting in increase in coverage activities; but, this in itself isn't the sole the cause. It may even be attributed to the increased socioeconomic vulnerability and development processes resulting in increased range of disasters.

The impacts of population and economic process, speedy urbanization, environmental degradation, and temperature change ar a number of the factors that contribute to the present increased trend, It should be recalled here that the United Nations World Conference on Disaster Risk Reduction was conjointly control in January 2005 in Kobe, Japan. It provided recommendations and therefore the Hyogo Framework for Action (HFA) to call manufacturers and risk managers for disaster risk reduction, together with flood disasters. The HFA has highlighted the necessity for improved compilation of knowledge on disaster risk and impact in the least scales for property development. The recent 2005 report entitled Case studies launched by United Nations agency claims 2005 to be a record year of natural disaster-related incidents, that killed quite ninety,000 individuals and affected quite one hundred fifty million lives worldwide(Singh, 2008).

**3.5.2 Total range of individuals Killed by Flood**

Throughout the last three decades a complete of 491,074 deaths has been reportable because of natural disasters in South Asia. Hydro meteorologic disasters resulted in 337,917 deaths (~70%), out of that floods account for 64,658 numbers of deaths (~20%). The loss of life because of the 2004 tidal wave has skew the proportion. Over the amount 1976–2005, on a mean two,154 individuals were killed annually because of floods in South Asia. tho' there's a variation within the range of individuals killed annually, normally there's associate degree increasing, the 5 flood events that killed the foremost range of individuals in South Asia over the thirty-year amount ar given in Table half-dozen.3. The floods in Northeast Republic of India in 1978 and therefore the floods in Bangla Desh in 1988 stand out conspicuously. Here it ought to be noted that a number of the flood reports within the EM-DAT are a mix of many individual events lumped into one record. this is often the case for the 1994 furthermore because the 1998 events reportable in Republic of India, which mixes the floods from completely different components of the country occurring within the same month below one record(Singh, 2008) .

**3.5.3 Economic Losses because of Floods**

The entire economic loss reportable for the 30-year amount from 1976 to 2005 is concerning thirty two billion greenbacks. reportable economic losses because of floods.in 1988, Bangla Desh knowledgeable one amongst the worst floods in living memory, that resulted during a total price of roughly North American country $2 billion to the economic system of roughly North American country $2 billion killing two440 around 2,400 people. In 2004, BanglaDesh is reportable to possess knowledgeable an enormous economic loss because of floods to the tune folks $7 billion. This large economic loss compared to previous years may be attributed to increased population density, higher per sq. metric linear unit GDP and infrastructural development in floodplains and concrete centers. This steep rise in economic loss for 2004-5 can also be attributed to the unity within the information recorded in previous years as compared to 2004.

World Disasters Report 2005, revealed by the International Federation of NGO and Red Crescent societies conjointly reports that information ar most incomplete for economic losses for natural disasters (IFRCRS 2005). It any states that because of lack of standardized methodology, loss estimates from Iran’s Bam earthquake in 2003 ranged from US$ thirty two.7 million to US$ one billion support losses, particularly within the informal sector, also are poorly understood and infrequently recorded. The reports accessible on the EMDAT info on economic losses because of floods in South Asia are restricted. A number of the countries haven't any reports on economic losses, for instance, Asian nation whereas those accessible seem to be incomplete, because of the unity within the recorded information furthermore as lack of standardized methodology, caution ought to be exercised in victimization the info for any reasonably interpretation.

**3.6 Floods in Pakistan**

By means that of proof from the 2010-11 ﬂoods in Islamic Republic of Pakistan, we tend to demonstrate that natural disasters will impact a spread of politically relevant variables higher than and on the far side citizens’ material well-being. The 2010 ﬂood aﬀected quite 20 million individuals, caused between 1,800 and 2,000 deaths, and broken or destroyed more or less 1.7 million homes, creating it the worst ﬂood in Pakistan’s trendy history (EM-DAT, 2010). The 2010 ﬂoods were driven by an uncommon monsoon storm that born traditionally new levels of wetness on the mountainous northwest regions of the country. in keeping with government accounts, Khyber Pakhtunkhwa (KPK) received twelve feet of rain from July twenty eight to August three, fourfold the province’s average annual total (Gronewold, 2010).

Those exceptionally high downfall rates in mountainous areas combined what was already a strangely fast snowmelt to trigger ﬂash ﬂoods that immensely exceeded something in historical memory because the water drained from KPK throughout the ﬁrst week of August, a a lot of typical monsoon storm inundated the Indus ﬂood plain, rendering it incapable of riveting the dramatic inﬂows from the mountainous regions and overwhelming several water-management structures. The subsequent year Pakistan got hit by a strangely sturdy monsoon storm, inflicting another spherical of devastating ﬂoods within the southern plains. The stormy waters hit some places quite others due partly to the random combination of act, previous diﬀerences in soil wetness, micro-topographic diﬀerences, and complicated ﬂuid dynamics.

Pakistanis living in ﬂood-aﬀected places clothed to vote at abundant higher rates, that those hit onerous by the ﬂoods have a lot of aggressive attitudes regarding hard government services, which they apprehend a lot of regarding politics (C. Christine truthful, 2013). The EM-DAT International Disaster info records more or less 20.4 million individual aﬀected and 1,985 killed from the 2010 ﬂoods. The ninety fifth conﬁdence interval on this eﬀect ranges from seven-membered to thirty first of the amendment. 3This is sort of 0.5 the 5.4 percentage point increase between the 2000 and 2004.

Overall, this major natural disaster that clearly created a transient economic shock, additionally light-emitting diode to major changes in citizens’ attitudes and civic engagement. These results decision into question the interpretation of a broad set of papers and tie into an upscale literature in government showing that disasters will have difficult political eﬀects that area unit typically quite unmarried from economic impacts (C. Christine truthful, 2013).

Artless localized assist eﬀorts that emerged throughout the initial section of the crisis and continued throughout. These enclosed victims and their kin’s own eﬀorts to avoid wasting their belongings however additionally enclosed survivor-led repair of native access roads and bridges when the ﬂoods receded. This was additionally to a massive civil society response that attended ad lib coalescing at terribly native levels (mohallas, union councils, villages, etc.). Such native teams collected and distributed truckloads of relief things. Countless native furthermore as national organizations created assortment sites for donations of products and money then undertook the distribution of an equivalent. Individual philanthropists, skilled bodies, and even chambers of commerce given cash and provides to the victims. students related to Pakistan’s property Development Policy Institute note the importance of those native types of help however contend that they're just about unknown (and therefore poorly documented) on the far side the native level (Shahbaz et al., 2012).

Such volunteerism wasn't distinctive to the 2010 ﬂood rather it's a standard feature in Pakistan’s domestic response to such calamities. Halvorson and Hamilton (2010), for instance, document very high levels of volunteerism following the 2005 geographic region earthquake. By the top of July 2010 the govt. had appealed to international donors for facilitate in responding to the disaster, when having deployed military troops altogether aﬀected areas beside twenty one helicopters and a hundred and fifty boats to help aﬀected individuals (Khan and Mughal, 2010).

Disaster management in Asian country primarily revolves around flooded areas with a primary target rescue and relief. When every disaster episode is over the govt. spends their resources at rescue, relief and rehabilitation (United Nation Pakistan, 2010). Disasters are viewed in isolation from the method since price effective strategies don't influence disaster management policy and responses. After1992 floods, a comprehensive flood statement and warning system were established underneath the auspices of the FFC and also the PMD. The Indus Flood statement System includes weather radars, an HF radio system for communication, gauges at intervals the watercourse system to observe water flow, development of coaching and user manuals, and preparation of simulation models. The PMD problems warnings to the PDMAs and district authorities frequently supported this method (Sayeeda Amber Sayed, 2014).

However, there's a requirement to distribute data mistreatment less technical hydrological data for an acceptable and ascendable response from district authorities. Moreover, flash floods are inherently troublesome to predict. Moreover, even with rive floods, the scope of the floods caused by breaches within the irrigation system could also be troublesome to predict, as was the case throughout the harmful 2010 floods (Sayeeda Amber Sayed, 2014). Thus, there's a requirement to boost the technical capacities of the system any and enhance its ability to produce easy data to district authorities, additionally, district authorities typically lack the resources to transmit the knowledge right down to communities. Thus, but 100% of the affected villages in 2010 floods had received advanced warning which too was sometimes from mass media sources or word of mouth. The flood warning system is that the most comprehensive one in Islamic Republic of Pakistan despite all its weaknesses. There area unit pilot action systems on the coast for tsunamis and cyclones. However, these systems don't seem to be absolutely purposeful.

Flood-Disaster Risk Reduction, bar and Mitigation though individual flood events can not be joined with certainty to global climate change, an increase in international floods area unit more and more seen as a partial issue to international climate changes. As such, a discount in their frequency would force international coordination by all countries (GNCSO, 2010). Given its high vulnerability to floods, Pakistan should play a vigorous and significant role in international global climate change negotiations and increase its contribution. the govt. of Asian country had created a global climate change Ministry in 2010 and also the NDMA has been incorporated into it recently (NDRMF, 2007). However, the ministry is just too new at the instant to possess taken any major steps to upset global climate change. The high degree of deforestation that has occurred throughout Asian country is additionally tributary to exaggerated prevalence of floods. in depth deforestation within the upland drainage basin for timber and fuel wood reduces the water-retention capability of the forest eco-systems, this could increase surface water runoff and wearing away, increasing the number, speed and sediment load of the root age getting into the watercourse system successively this causes recurrent landslides, damages riverine infrastructure and ends up in any siltation of the downstream water channels, whereas some small-scale renewal programs exist, major steps area unit required to reverse the deforestation (Sayeeda Amber Sayed, 2014) .

Another major issue undermining people’s strength is that the social organization in rural Asian country since resources area unit controlled by native elites, like landlords and social group leaders. Land possession is heavily targeted in Asian country and poor communities are typically pushed into cultivating marginal land that is a smaller amount productive and additionally situated in areas a lot of at risk of disasters (Sabates R, 2008). Throughout the 2010 floods, there have been varied complaints against landlords and administration conspiring to divert floods far from the lands of rural elites and towards their lands.

Flood mitigation activities do occur annually in Pakistan underneath the auspices of the FFC and also the provincial irrigation departments. These departments set up, design, construct, and maintain flood protection works through flow activity at specific sites on rivers, canals, and ‘nullah’ and construction, and maintenance of flood protection irrigation channels, little dams and protecting works (Michael J, 2010). However, there's no simply accessible program joined to a national hazard and vulnerability atlas that may highlight the most points of vulnerability throughout the country and facilitate in analyzing whether or not these departments area unit targeted on the foremost crucial points of vulnerability and the way effectively and with efficiency they're addressing them additionally, reduction of mitigation could be a serious issue in Asian country as a result of the development of large-scale development project while not adequate analysis of their impact on disaster risks (World Bank, 2006)

**3.7 Floods in KPK**

During monsoon period serious rainfall could be a routine event in Islamic Republic of Pakistan however within the last week of July 2010 the intensity of downfall inflated staggeringly within the mountainous spaces of the KPK and Azad Jammu and Kashmir that result flash flood in the upstream area. Owing to prolonged rains of monsoon, tremendous runoff was generated, inflicting harmful floods that unfold through-out the country. Flood are natural events that cause nice losses in terms of human life, properties and infrastructure (Montgomery, 2006).

The effects in term of losses to life and property are unprecedented. The infrastructure like, roads, bridges, houses, schools, water, gas and electricity activity lines and power homes are severely broken or destroyed, the land containing crops over several acre were utterly or part broken. a number of the adverse effects of the flood square measure as follows. Losses of human life and farm animal in keeping with the initial assessment by the Provincial Disaster Management Cell of KPK The devastating flood of 2010 forced to displaced nine,12,999 folks out of that quite seventy five the troubles (6,07,366 people) were from the greatly affected areas of Charsada, Nowshera, Swat and Dir higher (Muhammad, 2011) .

The number of oxen death is incredibly high i.e. 52,750 and crops over a region of 5,07,423 acres were utterly destroyed throughout the flood (Muhammad, 2011). the ability offer system was conjointly washed out at variety of places which has 605 transformers, 305 poles and five grid stations within the province. Damages to the villages and infrastructure The damages to the opposite infrastructure within the province highlights that over all 544 villages were accomplished wherever within the households were or so (PDMA, 2010).

Flood affected areas of Pakistan in monsoon flood of 2010 are 546,003. Total homes accomplished were 191215 and out of those paka developed homes were 82551 and kacha developed homes were 108664. In alternative infrastructure broken owing to flood square measure 283 roads, 278 bridges, twenty three culverts, 885 education facilities, and 178 Government buildings were conjointly destroyed. The aborning relief to the affected areas is greatly coupled with the supply of the transportation link. The standing link roads throughout the month of Sep 2010 show that only 50% might be partly opened for light-weight traffic solely (PDMA, 2010).

**Chapter 4**

**Research Methodology**

This chapter addresses the research methodology and procedure used in this study to investigate the research problems. The main purpose of this study is to find out the linkages between Indigenous knowledge and reduction of flood vulnerability.

**4.1 Study Universe**

The universe of the study is district Charsadda, 17 miles from Peshawar. Charsadda district is located in west of Khyber Pakhtunkhwa province, spread over an area of 996 sq km. It is bounded by Malakand district on its north, district Mardan on its east, and district Nowshera& Peshawar on its south and Mohmand Agency & other tribal regions on its west.

Three rivers pass through the district Jindi, Kabul and Swat. It is chiefly a fertile plain, mainly producing crops of tobacco, sugarcane, sugar beet, wheat and maize According to SMEDA in 2000, District Charsadda has a population of 1.7million. In the rural area, the number of persons per housing unit is about 10. Around 81.1% population lives in rural areas (Go KPK, 2012). Charsadda have the density 1081 persons per Sq.Km. Its Literacy rate is 43.09%. All major infrastructures are available for communication in which 352.Km as high type Road in district Charsadda. But the Railway facility are still awakened Water and Electricity facility are available. The main languages are Urdu and Pashto.

**4.2 Study Area**

Two village Councils namely Sardaryab and Mirzagan selected for conducting this study. The population of village council Mirzagan is almost 5000 with affected population of 3000 people and hundreds of damages. However, the population of village council Sardaryab is 2,997 with numerous damages.

**4.2.1 Sardaryab village council**

Sardaryab village council is located on the bankside of river Kabul, and hit every year with flood. This area is very fertile, people were used to work in their lands, some of them are related with fishing sector, and other has employments for their livelihood generation. House structures are mix of kacha, semi kacha and pakka with a lot of livestock in this area. There is a one BHU in the village council and have one primaryschool for boys and girls primary school. Secondary school also exists in the area. Number of private schools also provides their services in education sector.

**4.2.2Mirzagan village council**

Mirzagan village council is located on the bank side of River Jindi. This area is very close to urban area. Services availability is much better than the Sardaryab Village council. This area also hit with flood every year. House structures are concreted and have such houses which are made up of mud. The people are working in the fields and have involved in services sector for the livelihoods. Livestock in this area is comparatively less than Sardaryab village council. There are schools (1 primary boys school and a girls school) in this area both public and private.

The reason behind choosing this region is the location i.e. the bank side of the river and has been prone to several natural disasters especially floods almost every year flood hits this region. Vulnerability of the people in this region is high as compared to other area of the districts because of most affected households in this area.



**Map of District Charsadda**

Figure 1- Map of charsadda

**4.3 Sampling technique**

Multistage sampling plan will be used to select households as given in the table 1.1. The reason is this technique reduces the population by cutting in to smaller groups and it allows researcher to provide option for either using random sampling or cluster sampling. The multistage sampling will provide decision making process involved in choosing groups.

**4.4 Sample Size**

A sample size of 48 households is selected from the study area (25% respondents will be female headed houses). Two village councils have been selected for data collection, alongside two villages will be selected from each village council and finally from each village 10 households will be selected for conducting the study. Sampling plan is depicting in the table 4.1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| District  | Tehsil  | Villages Council |  Village/ village council  | Household/Village | Total  |
| Charsadda | Charsadda | Sardayryab | 2 villages | 12 | 40  |
| Mirzagan | 2 villages | 12 |

Table 4.1

**4.5 Data collection**

For current study, data obtained through primary as well as secondary sources.

Primary data collection well semi-structured questionnaire is designed contained open and closed ended questions for the households as well as focused group discussion conducted from the community for qualitative data and quantitative data. A pre-test was conducted to validate the questionnaire. The questionnaire will be based on following variables:

* Section 1: Demographic data such as age, education, family size, gender, occupation
* Section 2: Socio economic data such as living standards, livelihood, source of income, income distribution,
* Section 3: Flood destruction in past
* Section 4: Traditional ways for mitigation measures

For corroborating information collected through formal methods, qualitative tools such as the visit among the local villages and conducting focus group interviews with participatory members along with open-ended questions and answers through checklist also used. It mentions that formal methods supplemented through smart close-ended questionnaire that based on recording qualitative as well as quantitative information from the sample respondents.

Secondary data was obtained through literature, from published research articles related to the study and related Government offices.

**4.6 Data analysis**

The data treated and analyzed by using Excel, ANOVA and SPSS 21. The vulnerability assessment Matrix used in order to find the vulnerability of local people from flood. A practical and diagnostic tool in the form of a simple matrix which measures vulnerabilities and capacities in three broad and interrelated areas (i.e., physical/material, social/organizational, and motivational/attitudinal) Other factors are added to the matrix to reflect a complex reality such as disaggregation by gender or economic factors, changes over time, different scales etc. The benefits of the matrix are that it is practical and broad-based, linking the many different aspects of vulnerabilities and capacities

**Chapter 5**

**Results and Discussion**

This chapter contains results and findings of the research study, this chapter is divided in to four sections through which focusing upon Demography, Physical vulnerability, Prediction and handling of Flood and gathered indigenous knowledge regarding flood from study area

**5.1 Demographic trends of the study area**

Demographic trends are the characteristics of the population of the study area in terms of age, education, family size, gender, occupation and the income of household. Mean, Median and slandered deviation of the demographic traits of the study are shown in table 5.1

|  |
| --- |
| **Table 5.1** |
| Statistics  | Gender | age in years | respondent education | household size | occupation | monthly income by all |
|  | Valid | 48 | 48 | 48 | 48 | 48 | 48 |
| Missing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | 1.25 | 3.79 | 2.35 | 2.10 | 6.48 | 2.96 |
| Median | 1.00 | 4.00 | 2.00 | 2.00 | 7.00 | 3.00 |
| Std. Deviation | .438 | .944 | 1.158 | .751 | 2.492 | 1.304 |

**5.1.1 Age and Sex of respondent**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Men and women are important segments of any society. During flood management both these segments have defined roles and responsibilities in traditional societies. Above table 4.1 showing that 25 percent of the total respondents were female. Data was collected from different age groups of people to check the validity of indigenous knowledge in the study area. Above table shows gender-age distribution of respondents in the study area. Age limit starts from 16 years to 75 years. However, mostly respondents lie in the 46 to 60 years.

| **Gender and age in years Cross-tabulation** |
| --- |
| Table 5.2 |
| Gender | age in years | Total |
| 16-30 | 31-45 | 46-60 | 61-75 |
|  | Male | 5 | 8 | 16 | 7 | 36 |
| Female | 0 | 4 | 3 | 5 | 12 |
| Total | 5 | 12 | 19 | 12 | 48 |

Source: Study Survey, 2016**5.1.2 Family System and Size in the Study Area**A family may be defined as a group of persons related to a specific degree, through blood, adoption, or marriage. A household is defined in many surveys as a person or a group of persons that usually live and eat together. It is important to distinguish between a family, where members related either by blood or by marriage, and a household, which involves the sharing of a housing unit, facilities and food (World Bank, 2005). Household size refers to the number of persons per family and family structure refers to whether they are in joint family or nuclear family9 structure (Dekens, 2007). The graph in figure 2 shows the household size and structure in the study area. N=48Figure 2- Family structure and household sizeSource: Study Survey 2016According to the study, the household size of KPK is more than 8. The same results obtained by Household Integrated Economic Index 2013-2014, Study reveal that in the study area household size of about 78% of the population is more than eight. Moreover, most of the families live in joint family system in the area. The decrease of the family size could be endorse partly to economic difficulties, the high cost of living, cost of children’s education and keeping the batter standard of living, which is only possible within the more reasonable smaller size family. Consequently, both of these, household size and the joint family system, increase the vulnerability of these people against disasters (Howell, 2003).**5.1.3 Education and Schooling in the stud Area**For the development of any area, the first thing is the provision of excellent education that is seemed very low in the study area. Because the primary and middle education provided there is also of no quality. The observed schools were mostly just in one room or just in the open air with one blackboard. Only one or two teachers facilitated schools. Hence, such education is just equal to no education. In the study area, most of the people are illiterate. Modern techniques and and updated knowledge for them is a fantasy for managing floods.  N=48Figure 3- Village wise Education**Source: Study Survey, 2016****5.1.4 Monthly income By the Respondents**The provision of monthly family income depends on skills and opportunities in the area. Skill development depends on provision of education that has discussed earlier. The income opportunities are low in this area this raises unemployment there because of lack of skills. The results show very low levels of income even at extreme level i.e. Rs.10000-20000 PM .This is very less amount to become secure enough from annual disasters hence will increase their vulnerability as there is a direct relationship between income and vulnerability.  N=48Figure 4- Monthly incomeSource: Study Survey, 2016 **5.1.5 Occupations of the respondents**Occupation of the resident of these villages is mostly in services sector and agriculture sector. A larger pool is also engage in their own business for earning their income or livelihood. Literature shows that people in the study area relied on multiple source of income in the past depending on household resource ownership. Farming was the major component of their livelihood survival because of, each family had access to some land as owner or tenant.Livestock and woodcutting were an additional strategy to meet the day-to-day challenges. With the passage of time increase in salinity and decrease in availability of fresh water source of income gradually diminishing and household becoming dependent on other source of income N=48 |

Figure 5- Occupation of respondents

Source: Study Survey, 2016

**5.2 Physical Vulnerability**

Physical vulnerability refers to the properties of physical structures that determine their potential damage in case of disaster i.e. material type and construction quality (Ebert, 2008). Physical vulnerability represents the culmination of human vulnerability and structural vulnerability. In principle human are susceptible to actions that intimidate their physical body and near location.

**5.2.1 House situation**

Physically, in flooding zones, vulnerable or unsafe conditions of houses are commonly exposed through the height of the ground floor being lower than the average flood level and lack of upper or heighted floor to protect people and assets from flooding.

In the study area House structure of study area is composed of mud houses semi-mud houses and concreted houses. Most of the houses in the study area of Sardaryab are mud houses and are high vulnerable to floods while in Mirzagan Village council there is a mix structure of houses.

 N=48

Figure 6- condition of house

 **Source: Study Survey, 2016**

Above figure illustrates that both village councils almost half of the houses is made up of Mud/Katcha houses that leads to enhance their vulnerability from flood because mud houses are not enough to sustain or protective even in high rainfall areas. The mud bricks are very weak in cut, tension and compression. In case of floods, walls separate at the corners and the shear cracks develop across the wall, causing breakdown of the structure. Extensive destruction was detected during flood especially if it occurs after a rainfall. When flood hit the region the most collapse building are the mud houses that is a supreme reason of the injuries and deaths in humans and their livestock as well.

**5.2.2. Houses distance from River**

The distance from bank of the river is also a major source to minimize the effect of flood in the area. Larger the distance low will be the damages and vice-versa. In the study area 66% of the houses are located on the bankside of the river Jindi and river Kabul. People are residing near the edges of the river and during flood they affect. People attitude is quite important for reducing their vulnerabilities as government not allowed to make house on the bankside of the rivers. People violate the laws and make their house on the bankside of the river.

 N=48

Figure 7- House distance from river

**Source: Study survey, 2016**

**5.2.3 Height of the houses**

Height of the house from the ground surface is a common practice to lower the effect of the flood and to stop the flood water enters in to their houses. But in the case of study area 44% of the respondents houses are below than 1.5 feet height that is really a severe to increase their vulnerability from flood. 41% of the houses having a height range between 1.5-3 feet. The set standards or the code of the houses are the platform must be raised at least 1ft above to regular flood level with compacted earth and extend the edges minimum 3ft away from building footprint. The slope of platform may be maintained for sandy soil at 1V to 2H (For each vertical ft height, horizontal width of 2 feet) and for clayey soil, (1V:1.5H). The water must be drained away from the building. For control of erosion of platform, deep rooted edge plants, bushes or grass may be grown on edge. The depth of foundation may be taken as min 4 feet for soft soil and 2 feet for hard soil. The width of foundation may be taken as twice the width of wall for soft soil and 1.5 times the wall width for hard soil.

 N=48

****

Figure 8- Height of House

**Source: study survey, 2016**

**5.2.4 Distance from Main Market of Study Area**

Remoteness from the community centers contributes to uplifting vulnerable communities to become more vulnerable in a way the more remote area lower infrastructural development take place in the area. Access to basic facilities is very low in remote areas like health and education. Above figure describes in study area 42% of the respondents are having a view that time required to reach the main city is almost of 3-5 hours approximately, which increase their vulnerability because if the person hit by flood time span is much higher and the chance of the survival of the patient is very low due to maximum time required to reach the modern equipment that is only available in the hospital of the city area.

 N=48

Figure 9- Time required for reaching main market

Source: Study survey, 2016

**5.2.5 Crises management Cell**

In disaster prone areas or disastrous situation occur in any locality some of the segments of the health institution are very important to be existed in the area and provide very basic facilities to the flood victim i.e. emergency camp, relief camps and basic health units for the survival of the people. Above figure tells that there is a lack of all above mentioned necessary segments. In village council sardaryab the availability of the emergency camp, relief camp and the basic health units is very low as maximum respondents goes with ‘NO’ of the statement. Same is the case with village council Mirzagan. With these low quality facilities people of these village council are highly vulnerable to flood and that’s why the cause of damages is high in these area.

 N=48

Figure 10- crises management cell

Source: Study survey, 2016.

**5.2.6 Rehabilitation and Reconstruction after Destruction due to flood**

After immediate threat to the human lives, the next most vulnerable are the homes. The impact of earthquakes and floods on homes has been enormous and therefore the reconstruction of homes after these natural disasters is usually a tough task for the communities. Above figure show that 48% of the respondents stated that they rebuilt their houses with their own self help. 25% are having a view they can rebuilt their houses with the assistance of their communities. Role of NGO is 17% according to respondents for making houses for the flood affected communities. Governments are only able to provide assistance for 10% of the respondents of the study area.

 N=48

Figure 11- House Rehabilitation

**Source: Study survey, 2016.**

**5.2.7 Training for Rehabilitation**

Under extreme pressure, decisions are made in extraordinary circumstances. In flood affected areas the need of emergency responders is going high. In such situation a group of local people are the first who manage and have most responsibilities. They play an important role to rebuild their communities. Through training these respondents are quite able to respond in crises situation equitably because exercises make them skillful and develop techniques to tackle the situation. Above figure shows that highest proportion about 73% of the respondents from the study area are never go through from training process and they don’t have skilled techniques for countering the flood impacts.

 N=48

Figure 12- Training For Rehabilitation

Source: study survey, 2016

**5.3 Prediction of flood indigenously**

Figure shows that above 60% of the respondents is able to predict the flood without any external assistance provided to them. Lesser proportion of the respondents is not being able to predict flood without external. Respondents of the view that an announcements in the television, radio or newspaper enables him to predict floods in coming days. After their ability to predict the question arises how they predict flood there number of practices or knowledge available indigenously available in the study area. Majority of vote goes in the basket of rain patterns in a way, fluctuations in the rain during flood season warns them to be aware that flood is may arise the area. Other knowledge related to their predictions is surface of water is going to high, drainage problem started, edges of water changes, flow of river changes, change in the color of water etc.

 N=48

Figure 13- Prediction of flood without any assistance

Source: study survey, 2016

**5.3.1 Estimation of Local Knowledge in study Area**

As discussed earlier Local knowledge is a knowledge, which needs no schooling and certificates; it developed by long and revives experiences of communities living in a certain geological and meteorological surroundings. With the passage of time and modernization, many of such knowledge became extinct. Based on previous literature and ground realities here for conceptualizing local knowledge measured.

|  |
| --- |
| **age in years \* status of living Cross-tabulation** |
| Table 5.3 |
| Age in years | status of living | Total |
| full time |
|  | 16-30 | 5 | 5 |
| 31-45 | 12 | 12 |
| 46-60 | 19 | 19 |
| above 60 | 12 | 12 |
| Total | 48 | 48 |

Source: Study Survey, 2016.

Given table 5.3 shows that from total respondent all are living from very long time in the area and these respondents are well aware of the environment and surroundings of their own locality from anyone else. Moreover, due to very old relation with the environment of these people they can not only predict any future coming event very easily but also can manage and tackle it.

**5.3.2 Use of Local Knowledge in Forecasting Flood**

Local communities are living in the area from years and they are much more familiar than anyone else about their surroundings is and environmental change is. Local communities use their wisdom and indigenous knowledge in all stages of disaster management to prevent their selves from maximum destruction

Figure shows that most of the people prefer self-forecasting 52 percent of the total respondents from the study area rely on their own forecasting for flood by using their own knowledge about their surroundings. Second leading source for future events is community. Hence, most of the community depends on their own self-forecasting.

 N=48

Figure 14- use of local knowledge

Source: Study Survey, 2016.

**5.3.3** **Local Knowledge Methods for predicting of flood in Study Area**

Figure shows 27% of the respondents use weather patterns for predicting of flood in advance, because the areas are cloud very often and the intensity of being cloudy and depressed dark environment tells them about the intensity of the flood. 21% believe on the animal behaviors enables them to predict flood indigenously because information about animal behaviors mostly provided by the women and they still rely on them because they live within their homes and observe their cattle’s movement and behavior continuously

The existed classification of local knowledge prevailed in study area is:

As for as Weather Patterns are concerned they are Sky turns gloomy and Black rolls of cloud Weather unusually hot and humid/ hot spell after rain. For Wind Direction strong wind blows from the south, strong wind blow from north/, east wind blows at full moon, mud Smell in the wind. River patterns dark rolls of water, Noise in the river, river water becomes hot. Animals Behavior cattle become restless and stop grazing, Cattle wail continuously, Ants climb trees with eggs on their back, Bees move around in cluster, Birds fly without destination, Increased number of flies and mosquitoes, Insects attack cattle, Fish jump in the river and pounds, Crows fly at night Frogs call constantly. Moon Patterns are Red half-moon, full red moon, Red circle around moon, and dark shades on moon.

N=48

Figure 15-Local knowledge methods use by respondents

Source: Study Survey, 2016

**5.3.4 Time required predicting the flood**

Major portion of the respondents 70% having a view that they are able to predict flood in less than a day while there are respondents also exist who can be able to predict flood more than one day earlier. Early prediction helps in preparing themselves for countering the effects of flood. These predictions are also serving as an early warning indigenously, means that through self-prediction they have less need to provide early warning and they are able to take precautionary measures to save them from flood. These practices are helping them to reduce their vulnerability from flood. The use these historical knowledge and practices can save maximum lives, their livestock land and their productive assets.

 N=48

Figure 16- time required to predict

Source: Study survey, 2016

**5.3.5 Pattern followed by local people to prevent flood**

67% of the respondents are in the favor of traditional ways that they are using is good to mitigate the consequences of the flood. While 33% are in the favor of modern ways to mitigate the effects of flood. Two schools of thoughts are prevailing in the study area, as majority of the respondents in the favor of traditional ways to mitigate flood. Traditional school of thought are having view that know-how of circumstances and the geographical understanding is best known by the local elites and we best manage it and they are against the government respond because according to respondents government not respond on time. Second view they are having that we modern knowledge is not accessible to every individual of the area so they easily manage and help him by using their own knowledge at time of flood.

N=48

Figure 17-Pattern Followed to predict flood

Source Study Survey, 2016

Modernist are having view that that government respond in best possible way they have modern, scientific and updated knowledge in all aspects of disaster and they are better respond during and after the flood period. Science proven knowledge is best in regard of flood prevention during flood and post flood recovery period.

**Chapter 6**

**Conclusions and Recommendations**

**6.1 Conclusion**

The review of policies and approaches from a global perspective of disaster management concludes that the globe is giving special concern to save lots of the human from disasters destruction. Withal, their focus was and is on post disaster activities. These establishments and organizations are managing a pre disaster state of affairs as a core and central purpose. These organizations are implementing their ways on the vulnerable teams while not involving local individuals and their knowledge and don't seem to be focusing wants of those native communities. The situation isn't a lot of totally different in Pakistan’s strategy for disaster management. There's a requirement to focus these problems as a core issue.

Over time native folks usually have developed appreciable local information and practices on flood state that contribute to enhance survival and mitigate property losses. Social relationships, and particularly caste arrangements, are necessary parts that facilitate within the understanding of local knowledge.

Coping contains a cost-financial, social and chance. Monetary ability is that the key. Vulnerable charsadda people have very little or no surplus financial gain to take a position on the measures that may defend them from flood. As a result, people’s header is proscribed to touch upon immediate circumstances rather to undertake measures that are future in nature. Social capital e.g. reciprocal support among the neighbors, support from immediate relations, larger kinship internetwork are the very important safety net for the char individuals in addressing perennial flooding. However, individuals are more and more addicted to the formal establishments, notably within the context of fixing nature of flood. Philosophy formal institutional setting is nice for individuals to cope, as this will increase probability of obtaining access to data and services. Therefore, targeted governance wherever vulnerable people have access to should be promoted.

Indigenous information, provides necessary mechanisms to scale back disaster risk, and is particularly valuable for community level disaster management. Policy manufacturers ought to think about protective such effective, traditional cope mechanisms and improve on them to make sure that development doesn't increase vulnerability to natural hazards. Further, encouraging community involvement through the utilization of ancient practices provides a a lot of realistic and local-specific strategy since the community understands the case because of past disaster expertise.

Nature of floods as individuals is dynamical in terms of their frequency, intensity, time of prevalence (relation to cropping season) and certainty. This dynamical nature has an impression on people’s ability to cope. though the community has used its own science and humanities to predict floods, this ancient tool is changing into of very little facilitate owing to the dynamical nature of floods and departure the community with no selection however to believe no matter early warning system is in place.

The discussion of traditional knowledge that means, why and the way it ought to be protected, continues to have interaction traditional knowledge holders, governments, non-governmental organizations, academics, practitioners, and every one different conceivable stakeholders, and can most likely interact all involved for a really long term. Opinions dissent among and among communities and countries. This could not be seen as a rational motive however as a part of the method of and a chance for shaping agreement.

**6.2 Recommendations:**

1. Strategy for Flood management practices should be proactive rather than reactive.
2. Indigenous knowledge should incorporate in all the aspect of disaster management as well as in policy matters.
3. Further studies also conducted on indigenous knowledge so that disasters sepecifically flood will be managed properly and cost effectively.

# Bibliography

1. Bandyopadhyay J., (2006). A Framework for Research on Integrated Water Systems Management in South Asia, Centre for Development and Environment Policy, Indian Institute of Management, India

.

1. Barredo, J. I.: (2009) Normalised flood losses in Europe: 1970-2006, Nat. Hazards Earth Syst. Sci., 9, 97–104, <http://www.nat-hazards-earth-syst-sci.net/9/97/2009/>
2. C. Christine Fair, P. M. (2013, july 27). How Natural Disasters Aﬀect Political Attitudes and Behavior: Evidence from the 2010-11 Pakistani Floods. pp. 5-8.
3. Commonwealth. (2010). Introduction to Disaster Management. Vancouver, Canada: VUSSC-1055
4. Costa, J. E. (2004). The World's Largest Floods, Past and Present. *US Geological survey*, pp. 2-5.
5. David, R. G. (2004). Breaking The Disaster Cycle: Future Direction In Natural Hazard Mitigation. Chapel Hill. USA : University of North Carolina
6. Dekens, J. (2007). Local Knowledge for Disaster prepardness: A Literature Review. Kathmandu: International Center for Integrated Mountain Development (ICIMOD).
7. Delica-Willison Z (2004) Vulnerability reduction: a task for the vulnerable people themselves in Bankoff G, Frerks G and Hilhorst D eds Mapping vulnerability: disasters, development and people Earthscan, London 145–58
8. Dhar, O.N. and Nandargi, S.: (2003) Hydrometeorological Aspects of Floods in India, Natural Hazards 28, 1-33.
9. Dutta, D. and Heradth, S.: (2004). Trend of floods in Asia and Flood Risk management with integrated rivers basins approach, Proceedings of the 2nd International Conference of Asia-Pacific Hydrology and Water Resources Association, Singapore, Volume I, pp. 55-63.
10. EM-DAT: Emergency Events Database. (online database, accessed in August 2014).ESCAP Statistical Yearbook for Asia and the Pacific 2014
11. Fodor, J. (1981). The Appeal to Tacit Knowledge in Psychological Explanation. Bradford/MIT Press: Representations. Cambridge, MA.
12. Global Network of Civil Society Organizations for Disaster Reduction. Pakistan Floods: Preventing Future Catastrophic Flood Disasters; Marcus Oxley.2010. Available from http://www.preventionweb.net/files/15697\_01.10.101.pdf/
13. Gronewold, Nathanial. 2010. “What Caused the Massive Flooding in Pakistan
14. Guha Sapir, D., and Below, R.: 2002, The quality and accuracy of disaster data — a comparative analysis of three global data sets, The Pro Vention Consortium, The Disaster Management Facility, The World Bank.
15. Hoyois, P., and Guha Sapir, D.: 2003, Three decades of Floods in Europe: a preliminary analysis of EMDAT data, working draft prepared for Centre for Research on the Epidemiology of Disasters
16. Hoyos, C. D., and P. J. Webster (2007), The role of intra-seasonal variability in the nature of Asian monsoon precipitation, J. Clim., 20, p. 44, doi:10.1175/JCLI4252.
17. IFRC. (2001) World Disasters Report. Geneva: International Federation of Red Cross and Red Crescent Societies. Available from: [www.ifrc.org/publicat/wdr2001/](http://www.ifrc.org/publicat/wdr2001/)
18. IPCC (2001) Climate change 2001: Impacts, Adaptation and Vulnerability, Summary for Policymakers, WMO.
19. John C. Scott, D. C.-L. (2013). engaging indigenous people in disaster risk reduction. centre for publi service communications.
20. Jonkman, S.N.: 2005, Global Perspectives on Loss of Human Life caused by Floods, Natural Hazards 34, 151-175.
21. Julián Burgos, R. C. (2011, may 17). Harmonized Perspectives, pp. 7-9.
22. Kamara, J. (2013). poverty times. Retrieved may 20, 2016, from GRID ARENDAL: http://www.grida.no/publications/et/ep3/page/2608.aspx
23. Kayani, S. A. (2009). Islam: Past, Present and Future. (S. A. Kayani, Ed.) The Dialogue, 320-338
24. Komino, T. (2008). Indigenous Coping Mechanisms for disaster managment in pakistan. Good Practices and Lessons Learned from Experiences in the Asia-Pacific Region, pp. 40-48.
25. KPK, G. o. (2013). khyber pakhtunkha local government act, 2013. KPK, pakistan .
26. Kumar, A. (2008). Global Disaster Prepardness. Dehli, India: Sbs Publisher & Distributors India
27. Langill, S. (1999). Indigenous Knowledge: A Resource Kit for Sustainable Development Researchers in Dry land Africa. Ontario: People, Land and Water, Ottawa: p.37-49
28. Le Arthur Lam L. Assessing global exposure to natural hazards: Progress and future trends. Environmental Hazards: 2007; Volume 7: 10-19
29. Llasat, M. C., Lopez, L., Barnolas, M., and Llasat-Botija, (2008). Flash-floods in Catalonia: the social perception in a context of changing vulnerability, Adv. Geosci., 17, 63–70, <http://www.adv-geosci.net/17/63/2008/>.
30. Mercer J, Dominey-Howes D, Kelman I and Lloyd K 2007 The potential for combining indigenous and western knowledge in reducing vulnerability to environmental hazards in small island developing states Environmental Hazards 7 245–56
31. Mercer J, Kelman I, Suchet-Pearson S and Lloyd K 2009 Integrating indigenous and scientiﬁc knowledge bases for disaster risk reduction in Papua New Guinea GeograﬁskaAnnaler B 91 157–83
32. Michael J, Hicks and Mark L, Burton, Preliminary Damage Estimates for Pakistani Flood Events, 2010, Center for Business and Economic Research, Ball State University, August 2010. Available from: http://cber.iweb.bsu.edu/research/ PakistanFlood.pdf.
33. Montgomery, C.W. Environmental Geology, 8th edition, McGraw Hill International Edition, 2006
34. Muhammad, M. S. (2011). ENVIRONMENTAL EFFECTS OF HAZARDOUS FLOOD OF 2010 IN KPK. Science International, 147-152.
35. Mwaura, P. (2008). Indigenous knowledge in disaster management in Africa . Nairobi, Kenya: United Nations Environment Programme
36. National Disaster Risk Management Framework (NDRMF), 2007
37. Noralene Uy, R. S. (2008). Indigenous Knowledge fordisaster risk reduction. *UN/ISDR*.
38. Oludare Hakeem Adedeji, B. O. (2012). building capabilities for flood disaster and hazard preparedness and risk reduction in nigeria: need for spatial planning and land management. Journal of Sustainable Development in Africa , Volume 14, No.1
39. Pielke Jr., R. A. (2000). Flood impacts on society. Damaging floods as a framework for assessment, in: Floods, edited by: Parker, D. J., Routledge Hazards and Disasters Series, 133–155.
40. Pielke Jr., R. A. (1999): Nine Fallacies of floods, Climatic Change, 42, 413–438.
41. Provincial Disaster Management Cell. 2010. Floods Damages Data, on web site.
42. Riegl, B., 2003: Climate change and coral reefs: different effects in two high-latitude areas (Arabian Gulf, South Africa). Coral Reefs, 22, 433-446
43. Sabates R, Devereux S, Mitchell T, Tanner T, Davies M and Leavy J. Rural disaster risk - poverty interface. Brighton, England: University of Sussex, Institute of Development Studies. 2008.
44. Sayeeda Amber Sayed, P. A. (2014). Flood disaster profile of Pakistan: A review . *Science Journal of Public Health* , 144-149
45. Shahbaz, Babar, Qasim Ali Shah, Abid Q. Suleri, Steve Commins and Akbar Ali Malik. 2012. Livelihoods, basic services and social protection in north-western Pakistan. Report Overseas Development Institute and Sustainable Development Policy Institute. URL: <http://www.odi.org.uk/publications/6756-livelihoods-basic-services-social-protectionnorth-western-pakistan>
46. Singh, M. (2008). Impacts of flodds in south Asia. *Research Gate*, 86-91.
47. Studies, M &E. (2010). Types of Vulnerabilities in Disaster Management. Retrieved may 10, 2016, from M&E Studies: <http://www.mnestudies.com/disaster-management/vulnerability-types>
48. Therapy, W. C. (2014, june 18). world confederation of physical therapy. Retrieved may 3, 2016, from WCPT: http://www.wcpt.org/disaster-management/what-is-disaster-management
49. Tran P, Shaw R, Chantry G and Norton J 2009 GIS and local knowledge in disaster management: a case study of ﬂood risk mapping in Viet Nam Disasters 33 152–
50. United Nations, Pakistan: Floods Relief and Early Recovery Response Plan, United Nations, November 2010, http://pakresponse.info/LinkClick.aspx?fileticket=47teGm9 PeB8%3d&tabid=93&mid=676
51. Wisner B 1995 Bridging ‘expert’ and ‘local’ knowledge for counter-disaster planning in urban south Africa GeoJournal 37 335–48
52. Wisner B, Blaikie P, Cannon T and Davis I 2004 At risk: natural hazards, people’s vulnerability and disasters 2nd ednRoutledge, London.
53. World Bank. Natural disaster hotspot: case studies. Working paper series 5. Washington DC: World Bank Hazard Management Unit. 2006. Available from: www.proventionconsortium.org/?pageid=37&publicationid= 128#128
54. Young, E. (1997). Dealing with hazards and disasters: risk perceptions and community participation in management. *Australian Journal of Emergency Management*, 13-27
55. Zibulewsky, J. (2001). Defining disaster: the emergency department perspective. *Proc (Bayl Univ Med Cent)*, 144–149.